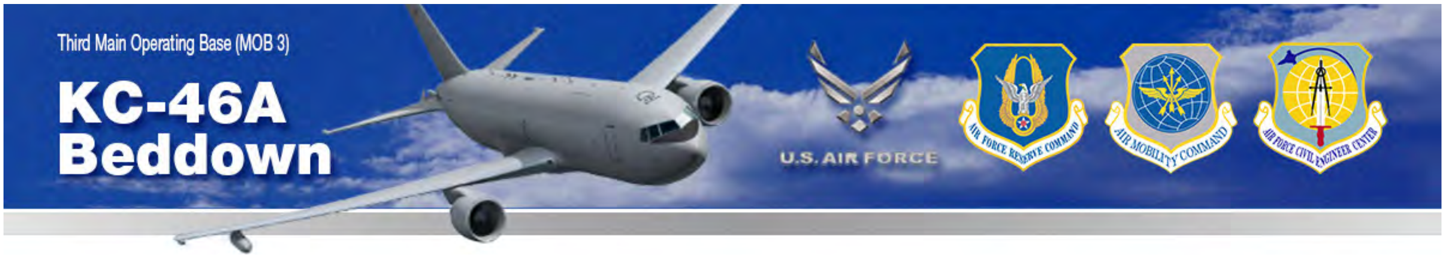

FINAL

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Prepared for:
Air Force Reserve Command
Air Force Civil Engineer Center
Air Mobility Command
United States Air Force

VOLUME I

April 2017

RECORD OF DECISION FOR THE KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN

Introduction

The United States Air Force (USAF) is issuing this Record of Decision (ROD) for the KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS) [*Federal Register* (FR), Vol. 82, No. 71, EIS No. 20170053, Page 17991, April 14, 2017]. In making this decision, the information, analysis, and public comments contained in the KC-46A MOB 3 Beddown Final EIS (FEIS), along with other relevant matters, were considered.

This ROD is prepared in accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) at Title 40 *Code of Federal Regulations* (CFR) §1505.2, (*Record of decision in cases requiring environmental impact statements*) and 32 CFR §989, Environmental Impact Analysis Process (EIAP). The USAF is the Lead Agency and there are no cooperating agencies.

Specifically, this ROD:

- States the USAF's decision (**Page 1 and 6**);
- Identifies alternatives considered by the USAF in reaching the decision (**Page 2**) and specifies the alternative considered to be environmentally preferable (**Page 2**);
- States whether all practicable means to avoid, minimize or mitigate environmental harm from the selected alternative have been adopted, and if not, why they were not adopted, and summarizes the applicable management actions (**Pages 3 through 5**).
- Identifies and discusses relevant factors that were considered in making the decision among the alternatives, and states how those factors entered into the decision (**Page 3**)

Decision

The USAF will, by this decision, beddown up to twelve (12) KC-46A Primary Aerospace Vehicles Authorized (PAA) in one squadron at Seymour Johnson AFB, where Air Force Reserve Command (AFRC) leads the Mobility Air Force mission.

Background

For more than 50 years, the KC-135 Stratotanker has served as the aerial refueling backbone to project U.S. global reach and combat power. The U.S. Congress authorized and appropriated funds supporting the USAF's selection of the KC-46A as the newest aerial refueling aircraft to replace a portion of the aging tanker fleet. Congress funded a total aircraft inventory of up to 179 KC-46A aircraft by 2028 to correct deficiencies, update the fleet, enhance operations, and increase mission effectiveness. The new KC-46A Pegasus will provide updated technology designed to enhance operations and increase mission effectiveness to support USAF, Navy, Marine Corps, and allies who rely on tanker range and flexibility to strengthen the coalition mission.

This basing action is only part of the USAF's program to replace the older KC-135 aircraft. This ROD focuses on the location for the USAF's KC-46A MOB 3 mission. Air Mobility Command (AMC) is preparing a separate EIS that will support an independent decision to beddown 48 KC-46A Pegasus aircraft at two active duty installations within the CONUS for the MOB 4 mission. Following these initial beddown actions, the USAF will plan additional beddown actions in the future for the remaining KC-46A aircraft.

RECORD OF DECISION FOR THE KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN

Alternative Identification

As more fully described in the FEIS (**Volume I, Pages 2-1 through 2-3, §2.2**), AMC presented the Lead Command Intent for the KC-46A to the Secretary of the Air Force (SecAF) in September 2011. This Lead Command Intent included planning conventions that described the proposed basing action tenets, force structure mix, and basing timelines. These planning conventions included the critical information that would be used to shape and inform decisions made throughout the KC-46A Strategic Basing Process.

In 2012, AMC presented objective screening criteria to the SecAF. The approved screening criteria were used to screen the enterprise of 18 bases to identify those bases' capacity to successfully support the MOB 3 mission. The objective criteria included mission, capacity, environmental considerations, and cost.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission.

The No Action Alternative was evaluated at each of the alternative basing locations and constitutes the baseline conditions at each alternative location (**FEIS, Volume I, Page 2-36, §2.6**).

Environmentally Preferred Alternative

The environmentally preferred alternative is considered to be the No Action Alternative. The No Action Alternative constitutes the baseline conditions at each alternative location and would not substantially change existing environmental conditions.

Basis of Decision

Seymour Johnson AFB was selected for the MOB 3 mission based on operational analysis, results of site surveys, environmental, economic and technical factors discussed in this ROD; environmental impacts as analyzed in the Final EIS; input from the public and government agencies and military judgment factors. The primary drivers for selecting Seymour Johnson AFB were its lower costs and its highly successful existing active-duty association, which will lead to the lowest active-duty manpower required to stand up the KC-46A unit.

Public Involvement

Public involvement was integral to the USAF's development of this EIS. Public and agency comments were received and considered, including those received during scoping, at public hearings, and during the public comment period on the Draft EIS.

Information reflecting public involvement can be found in the FEIS (**FEIS, Volume I, Pages 1-5 to 1-8 and 6-1 to 6-3, §1.5, §1.6 and Chapter 6**). Furthermore, FEIS Volume II, Appendix A, provides public involvement documentation as well as copies of comments received during the Draft EIS public comment period. Public notices and meetings included:

- Notice of Intent: Published March 23, 2016, in the FR, Vol. 81, Number 56, page 15510.
- Scoping Period: March 23, 2016 through April 25, 2016.
    - Scoping meetings:
        - April 12, 2016, Castle of Knights, Chicopee, Massachusetts;
        - April 14, 2016, Herman Park Center, Goldsboro, North Carolina;
        - April 19, 2016, Milestone Center, Peru, Indiana;
        - April 21, 2016, Reed Conference Center, Oklahoma City, Oklahoma.

- Draft EIS Notice of Availability (NOA): Published November 18, 2016, in the FR, Volume 81, Number 223, EIS No. 20160269, page 81765;
- Public Comment and Review Period: A 45-day comment period was initiated with the NOA publication in the FR on November 18, 2016 and ended on January 2, 2017;
    - Public Hearings:
        - December 6, 2016, Reed Conference Center, Oklahoma City, Oklahoma.
        - December 8, 2016, Milestone Center, Peru, Indiana;
        - December 13, 2016, Westover Airport, Chicopee, Massachusetts;
        - December 15, 2016, Herman Park Center, Goldsboro, North Carolina.
- FEIS NOA: Published in the FR on April 14, 2017, Vol. 82, No. 71, EIS No. 20170053, Page 17991, April 14, 2017. This initiated the mandatory 30-day waiting period prior to ROD signature.

Government to Government Consultation

The USAF conducted Government to Government Consultation with 19 different Federally Recognized Tribes (Tribes). Each tribe was contacted early in the environmental planning process and received USAF notification of the project in March 2016. Although the USAF consulted with the tribes on all of the alternatives in the EIS, the descriptions below describe only the consultations associated with the preferred alternative, Seymour Johnson AFB for MOB 3 mission.

Agency Coordination and Consultation

As described more completely in the FEIS (Volume II, Appendix A), the USAF coordinated and consulted with Federal and state agencies. The Federal and state agencies responsible for biological and cultural resources were contacted early in the environmental planning process and received USAF notification of the project in March 2016. The USAF consulted on all of the alternatives in the EIS. However, the descriptions which follow below describe only the consultations associated with the preferred alternative, Seymour Johnson AFB for MOB 3 mission.

Endangered Species Act Consultation with the U.S. Fish and Wildlife Service

The USAF completed informal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act. The USAF determined, through informal consultation with the USFWS, that there are no Federal or state threatened or endangered species in the region of influence at Seymour Johnson AFB. Therefore, no further Section 7 consultation was required.

National Historic Preservation Act Section 106 Consultation

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), the USAF initiated Section 106 consultation with the State Historic Preservation Office (SHPO) in North Carolina. On June 14, 2016, the North Carolina SHPO concurred with the USAF determination that none of the buildings affected by this undertaking are eligible for the National Register of Historic Places (NRHP). Section 106 consultation was concluded on February 21, 2017 when the North Carolina SHPO concurred that no historic properties would be affected by implementation of the MOB 3 mission at Seymour Johnson AFB **(FEIS Volume II Appendix A, Page A.5-8).**

National Historic Preservation Act Section 106 Government to Government Consultation

The USAF completed government-to-government consultation with potentially affected Tribes. No adverse Section 106 impacts to tribal resources are anticipated to result from implementation of the MOB 3 mission at Seymour Johnson AFB. There are no tribal resources located at Seymour Johnson AFB or in Wayne County. Seymour Johnson AFB has previously initiated consultation with the Eastern Band of the

Cherokee Nation. The tribe has indicated that they have no interests in projects in Wayne County (**see email dated 14 April 2014 in Volume II, Appendix A, Page A.3-10, § A.3.1.2**). Section 106 consultation for the KC-46A MOB 3 mission at Seymour Johnson AFB is complete.

Coastal Zone Management Act Consultation

On May 4, 2016, the North Carolina Division of Coastal Management agreed with the USAF determination that a Federal Consistency Determination would not be necessary for implementation of the KC-46A MOB 3 mission at Seymour Johnson AFB (**see letter dated May 4, 2016 in Volume II, Appendix A, Page A.2-21, § A.2.4**).

No agency coordination or consultation was required for air quality. Seymour Johnson AFB is located in an attainment area; therefore, a general conformity determination was not required for implementation of the MOB 3 mission at Seymour Johnson AFB.

Management Actions

The USAF considered and adopted all practicable means to avoid or minimize environmental harm at Seymour Johnson AFB. For the purposes of this ROD and future planning, management actions are defined as those actions that are built or designed into the proposed action and alternatives and either prevent or minimize impacts.

Specific management actions (i.e., those required by regulation, or USAF guidance or instructions) to facilitate the implementation of the decision were identified in the FEIS and will be carried forward and implemented (**FEIS, Volume I, Pages 2-49 and 2-50, §2.9**). Management actions are summarized below by their applicable environmental resource areas. Compliance laws and regulations administered by the US EPA and other regulatory and/or state environmental quality agencies are mandated, and although the laws and regulations have mitigating effects, they are not considered discretionary with respect to Air Force decision making.

To accommodate this continuous cycle and to track management actions, within 90 days of the signature of this ROD, AFRC will develop a management plan that identifies principal and subordinate organizations having responsibility for oversight and execution of specific management actions. In no case will an impact-inducing action be taken or implemented, prior to the applicable management action (defined below) being put in place.

The management action plan will include, but not be limited to, the following:

- Identification of the specific actions;
- Identification of the responsible organization for each action;
- Timing for execution of the actions, and;
- Definition of the adaptive management approach to be used.

Within certain parameters, the USAF may develop an adaptive management program as part of its overarching monitoring program. In doing so, the USAF would follow the President's Council on Environmental Quality mitigation and monitoring guidance[1] and other legal and generally accepted practices.

[1] "Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact," January 14, 2011

Furthermore, the USAF intent is to provide flexibility in its adaptive management approach in order to comply with regulatory requirements and allow for considered adaptations. Where the proposed use of adaptations are considered, the USAF will, before adapting, fully consider whether or not the adaptation triggers the need for more full analysis under NEPA and the USAF's EIAP (e.g., supplementation, tiering, etc.).

As described in the FEIS (**Volume I, Pages 4-23 to 4-43, §4.2**), management actions for the MOB 3 mission are listed below by each of the FEIS resource areas.

Noise

The USAF has required the KC-46 to meet FAA Part 36, Stage 4 noise levels (the most restrictive commercial aircraft noise level standard) and International Congress of Aeronautical Organizations, Committee of Environmental Protection (CAEP)/6 air contaminant emission limits (**FEIS Volume I, Page 1-4, §1.4.2**).

KC-46A operations will mirror existing tanker operations making use of existing ground tracks and altitude profiles currently flown by KC-135 aircrews at Seymour Johnson AFB (**FEIS, Volume I, Page 4-24, §4.2.1**). KC-46A aircrews based at Seymour Johnson AFB would fly five percent of total operations during acoustic night (10:00 P.M. to 7:00 A.M.), a decrease from the 13 percent of KC-135 operations currently flown during acoustic night (**FEIS, Volume I, Page 4-24, §4.2.1**).

The KC-46A will be operated at the same auxiliary airfield (Kinston Regional Jetport, Kinston, North Carolina) currently used by Seymour Johnson AFB based KC-135 aircrews and at about the same frequency. The KC-46A aircrews will use the same flight routes to access the auxiliary airfield and will operate on the same flight tracks that are used by the KC-135 aircrews. Use of the Kinston Regional Jetport, between 10:00 PM and 7:00 AM, as an auxiliary airfield, will be rare (**FEIS, Volume I, Page 4-24, §4.2.1**).

Air Quality

Employ fugitive dust control and soil retention practices (**FEIS, Volume I, Page 4-28, §4.2.2**) including:

- Water trucks to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area;
- Minimize the amount of disturbed ground area at a given time;
- Suspension of all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site.
- Designating personnel to monitor the dust control program and to order increased watering, as necessary, to minimize the generation of dust.

Safety

- Existing KC-135 emergency fuel jettison locations and procedures will be used for all KC-46A missions, if necessary (**FEIS, Volume I, Page 2-8, §2.3.1.4, Page 3-31, §3.2.3.1 and Volume II, Pages B-16 and B-17, §B.3.3.1**).
- Emergency and mishap response plans will be updated to address the needed procedures and response actions specific to the KC-46A airframe.

Soils and Water

The Storm Water Plan (SWP) will be revised to include an evaluation of deicing procedures and ways to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems. The revised SWP will include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff. The SWP will also be updated as required by state and federal Clean Water Act requirements (**FEIS, Volume I, Page 2-49, §2.10 and Page 4-34, §4.2.4.2**);

- Silt fence, interceptor trenches, hay bales, or other suitable erosion and sediment control measures will be used during construction. At the completion of construction, re-vegetation of disturbed areas will occur as soon as practical (**FEIS, Volume I, Pages 4-37, §4.2.8.3**);
- Post construction, all disturbed areas will be re-graded to pre-construction contours (**FEIS, Volume I, Page 2-49 §2.10**), and;
- Continue best management practices to reduce stormwater runoff containing deicing fluid. The revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff (**FEIS, Volume I, Page 4-34, §4.2.4.2**).

Biological Resources

- Continue adherence to Bird/Wildlife Aircraft Strike Hazard (BASH) program (**FEIS, Volume I, Page 4-35 §4.2.5.2**).

Cultural Resources

- In the case of unanticipated or inadvertent cultural resources discoveries, the USAF would comply with Section 106 of the NHPA and follow the standard operating procedures outlined in the Integrated Cultural Resource Management Plan (ICRMP) (**FEIS, Volume I, Page 4-35 §4.2.6**).

Land Use

- Once the full complement of KC-46A aircraft are operating at Seymour Johnson AFB, the USAF will prepare an update to the current Air Installation Compatible Use Zone Study (AICUZ) to validate operational data and identify projected noise levels based on the most recent noise data.

Infrastructure

- Incorporate Leadership in Energy and Environmental Design (LEED) and sustainable development concepts into construction projects to achieve optimum resource efficiency, sustainability, and energy conservation, except to the extent limited or prohibited by law (**FEIS, Volume I, Pages 2-4 and 4-28, §2.3 and §4.2.2**).
- Continue and enhance recycling and reuse programs to accommodate waste generated by the KC-46A beddown (**FEIS, Volume I, Page 4-38, §4.2.8.6**).

Hazardous Materials and Waste

- Update the Hazardous Waste-Management Plan to account for any new and/or changed waste streams or new procedures, if any, for managing. hazardous materials and wastes associated with KC-46A aircraft (**FEIS, Volume 1, Page 2-50, Table 2-21**);

- Review construction plans to identify any monitoring wells that would need to be removed and/or replaced **(FEIS, Volume I, Page 2-50, §2.3)**;
- Review construction plans to identify any buildings containing toxic substances such as lead based paint (LBP) and asbestos.

Although the USAF considered and adopted all practicable means to avoid or minimize environmental harm at Seymour Johnson AFB, potential impacts that could occur and cannot be mitigated include (but may not be limited to) the following **(FEIS Volume I, Page 2-67, §2.10, et seq.)**.

- The proposed MOB 3 mission would result in an increase of 1,746 annual airfield operations, or a three percent increase in overall annual airfield operations at Seymour Johnson AFB exposing one additional off-base acre of land and one estimated off-base resident to 65 dB L_{Adn} or greater noise levels;
- The existing capacity of regional landfills would be reduced due to the solid waste generated;
- Hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with the new aircraft;
- Stormwater runoff and associated erosion may increase due to construction, and;
- There is potential for an increase in the number of bird/wildlife-aircraft strikes and aircraft mishaps resulting from the increased number of annual operations.

The FEIS identifies all practicable measures to minimize harm to the existing environment.

Decision

The USAF will, by this decision, beddown up to twelve KC-46A PAA in one squadron at Seymour Johnson AFB, where the AFRC leads the Mobility Air Force mission.

Jennifer L Miller
JENNIFER L. MILLER
Deputy Assistant Secretary of the Air Force
Installations

8 Sept 2017
(Date)

Privacy Advisory

Any personal information provided throughout this process has been used only to identify individuals' desire to make a statement during the public comment period or to fulfill requests for copies of the Final EIS or associated documents. Private addresses were compiled to develop a mailing list for those requesting copies of the Final EIS.

COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE
KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN

a. **Responsible Agency:** United States Air Force (USAF)

b. **Report Designation:** Final Environmental Impact Statement (EIS)

c. **Inquiries:** For further information on this Final EIS, contact Mr. Hamid Kamalpour, AFCEC/CZN, Bldg 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853.

d. **Proposed Action:** Establish the KC-46A Third Main Operating Base (MOB 3). The MOB 3 mission includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The purpose of the MOB 3 mission is to provide a fully capable, combat operational KC-46A aerial refueling squadron to accomplish aerial refueling and related missions.

e. **Alternatives**: The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission.

f. **Abstract:** This Final EIS was prepared by the USAF in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 *United States Code [USC]* 4321 et seq.), as implemented by the Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations [CFR]* 1500–1508), and Air Force Instruction (AFI) 32-7061, “The Environmental Impact Analysis Process” (EIAP) (as promulgated in 32 *CFR* 989). The USAF has prepared this Final EIS to assess the potential environmental consequences associated with the implementation of the KC-46A MOB 3 mission. The USAF identified MOB 3 alternatives using operational analysis, the results of site surveys, and military judgment factors. Resources addressed in the Final EIS include noise, air quality, safety, soils and water, biological resources, cultural resources, land use, infrastructure, hazardous materials and waste, socioeconomics, and environmental justice and the protection of children.

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VOLUME II – APPENDICES

BACK COVER

*CD-ROM Appendix A and Appendix D are included on CD-ROM on the back cover of this document.

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ACRONYMS AND ABBREVIATIONS

ºC	degrees Celsius
ºF	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
ABW	Air Base Wing
ACM	asbestos-containing material
ACS	American Community Survey
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFE	Aircrew Flight Equipment
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFRC	Air Force Reserve Command
AFSC	Air Force Sustainment Center
AGE	aerospace ground equipment
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
ALC	Air Logistics Complex
AMC	Air Mobility Command
AMDS	Aerospace Medicine Squadron
AME	Alternate Mission Equipment
AMSL	above mean sea level
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
APE	area of potential effect
APZ	accident potential zone
AQD	Air Quality Division
AR	air refueling
ARB	Air Reserve Base
ARW	Air Refueling Wing
AST	aboveground storage tank
ATC	Air Traffic Control
AW	Airlift Wing
AWACS	Airborne Warning and Control System
B-767	Boeing-767
BA	Biological Assessment
BASH	Bird/Wildlife-Aircraft Strike Hazard
bgs	below ground surface
BE	Biological Evaluation
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BOD	biological oxygen demand
BOS	Base Operating Support
BOT	Boom Operator Trainer
C&D	construction and demolition

ACRONYMS AND ABBREVIATIONS (Continued)

C2	Command and Control
CAA	Clean Air Act
CAEP	Committee on Aviation Environmental Protection
$CBOD_5$	carbonaceous biochemical oxygen demand
CDC	child development center
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	cubic feet
CFR	*Code of Federal Regulations*
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	community of comparison
COD	chemical oxygen demand
CONUS	continental United States
CSAF	Chief of Staff of the Air Force
CWA	Clean Water Act
CWPCA	Chicopee Water Pollution Control Authority
CWPP	Comprehensive Watershed Protection Plan
CZ	clear zone
DAQ	Division of Air Quality
dB	decibel(s)
DEQ	Department of Environmental Quality
DFAC	dining facility
DISA	Defense Information Security Agency
DLA	Defense Logistics Agency
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
DVQ	distinguished visiting quarter
DWR	Division of Water Resources
E-coli	Escherichia coli
ECOS	Environmental Conservation Online System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EMS	emergency medical services
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
EPF	Environmental Planning Function
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency

ACRONYMS AND ABBREVIATIONS (Continued)

FFA	Federal Facilities Agreement
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONPA	Finding of No Practicable Alternative
FRP	Facility Response Plan
FTC	Flight Training Center
FTE	full-time equivalent
FTU	Formal Training Unit
FuT	Fuselage Trainer
FW	Fighter Wing
GHG	greenhouse gas
GIS	geographic information system
GMU	groundwater management unit
GMV	government motor vehicle
GPD	gallons per day
GPM	gallons per minute
GWP	global warming potential
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	hazardous air pollutant
HAZMART	Hazardous Materials Pharmacy
HMMP	Hazardous Materials Management Plan
HQ	Headquarters
HQW	High Quality Waters
HUD	U.S. Department of Housing and Urban Development
HWMP	Hazardous Waste Management Plan
I-	Interstate
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IDP	Installation Development Plan
IEMP	Installation Emergency Management Plan
ILS	Instrument Landing System
IMPLAN	Impact Analysis for Planning
IMR	Individual Medical Readiness
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IRP	Installation Restoration Program
JLUS	Joint Land Use Study
K-12	kindergarten through twelve
kV	kilovolt(s)
kVA	kilovolt-ampere
L_{Adn}	A-weighted day-night average sound level
L_{Amax}	A-weighted maximum noise level
LBP	lead-based paint

ACRONYMS AND ABBREVIATIONS (Continued)

LEED	Leadership in Energy and Environmental Design
L_{eq24}	24-hour exposure level
LID	Low Impact Design
LQG	large-quantity generator
LSZ	lower saturated zone
MAJCOM	Major Command
Mass DEP	Massachusetts Department of Environmental Protection
MBTA	Migratory Bird Treaty Act
MCEDA	Miami County Economic Development Authority
Mcf	thousand cubic feet
MDFW	Massachusetts Division of Fisheries and Wildlife
MG	million gallons
mg/L	milligrams per liter
MGD	million gallons per day
MGM	Metro Goldwyn-Mayer
MHC	Massachusetts Historical Commission
MILCON	military construction
MMcf	million cubic feet
MOB 1	First Main Operating Base
MOB 2	Second Main Operating Base
MOB 3	Third Main Operating Base
mph	miles per hour
MSGP	Multi-Sector General Permit
MSW	municipal solid waste
mVA	megavolts-ampere
MW	megawatt
MWh	megawatt hour
MWR	Morale, Welfare, and Recreation
MWS	Major Weapon System
NAAQS	National Ambient Air Quality Standards
NAVAIDS	Airfield Navigational Aid System
NC DEQ	North Carolina Department of Environmental Quality
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NEXRAD	Next Generation Radar
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIPSCO	Northern Indiana Public Service Company
NIPTS	noise-induced permanent threshold shift
NO_2	nitrogen dioxide
NOI	notice of intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSW	Nutrient Sensitive Waters
NVG	night vision goggles

ACRONYMS AND ABBREVIATIONS (Continued)

NVIS	Night Vision Imaging System
O&M	operations and maintenance
O_3	ozone
OAC	Oklahoma Administrative Code
OAQ	Office of Air Quality
OAS	Oklahoma Archeological Survey
OC-ALC	Oklahoma City Air Logistics Complex
ODEQ	Oklahoma Department of Environmental Quality
ODS	ozone depleting substance
OG&E	Oklahoma Gas and Electric
OHNI	Oklahoma Natural Heritage Inventory
OKESFO	Oklahoma Ecological Services Field Office
OPDES	Oklahoma Pollutant Discharge Elimination System
ORW	Outstanding Resource Waters
OSHA	Occupational Safety and Health Administration
OWQS	Oklahoma Water Quality Standards
OWS	oil-water separator
P2	Pollution Prevention
PAA	Primary Aerospace Vehicles Authorized
PCB	polychlorinated biphenyl
PCS	permanent change of station
PHA	Personal Health Assessment
PM_{10}	particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers in diameter
POC	point-of-contact
POV	privately owned vehicle
ppm	parts per million
P-PTT	Pilot Part Task Trainer
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
PZ	producing zone
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
REMC	Rural Electric Membership Cooperative
RISO	Regional Isochronal
ROD	Record of Decision
ROI	region of influence
SAC	Strategic Air Command
SecAF	Secretary of the Air Force
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOI	Secretary of Interior
SO_x	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasures

ACRONYMS AND ABBREVIATIONS (Continued)

SWP	Stormwater Plan
SWPPP	Storm Water Pollution Prevention Plan
TACAN	Tactical Air Navigation
TCE	trichloroethane
TFI	Total Force Integration
TKN	total Kjeldahl nitrogen
TLF	temporary lodging facility
TMDL	Toxic Maximum Daily Load
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UFC	Unified Facilities Criteria
UMD	Unit Manning Document
U.S. 31	U.S. Highway 31
U.S. 70	U.S. Highway 70
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	*United States Code*
USDA	U.S. Department of Agriculture
USEIA	U.S. Energy Information Administration
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
USZ	upper saturated zone
UTA	Unit Training Assembly
VOC	volatile organic compound
VQ	visiting quarter
WARP	Wing Air Refueling Pod
WCPS	Wayne County Public School
WST	Weapon System Trainer
WWTP	Wastewater Treatment Plant

CHAPTER 1

PURPOSE AND NEED FOR KC-46A THIRD MAIN OPERATING BASE BEDDOWN

1.0 PURPOSE AND NEED FOR KC-46A THIRD MAIN OPERATING BASE BEDDOWN

The U.S. Congress authorized and appropriated funds supporting the U.S. Air Force's (USAF's) selection of the KC-46A as the newest aerial refueling aircraft to replace a portion of the aging tanker fleet (H.R. 933, the Consolidated and Further Continuing Appropriations Act, 2013, H.R. 3304 - National Defense Authorization Act for Fiscal Year 2014, H.R. 4435 - Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, H.R. 1735 National Defense Authorization Act For Fiscal Year 2016). Beginning in 2010, the deployment of new USAF aircraft and missions must follow Air Force Instruction (AFI) 10-503, "Strategic Basing." Per AFI 10-503, the USAF must perform an enterprise-wide evaluation of Air Force Bases (AFBs) that could be considered as basing locations for the KC-46A. An initial beddown of a Formal Training Unit (FTU) and the First Main Operating Base (MOB 1) occurred at Altus AFB, Oklahoma, and McConnell AFB, Kansas, respectively. The units are led by active duty personnel. Additionally a Second Main Operating Base (MOB 2) beddown, led by the Air National Guard (ANG), occurred at Pease Air National Guard Station, New Hampshire.

This Final Environmental Impact Statement (EIS) has been prepared to provide the decision maker and the public the information required to understand the future potential impacts of the decisions that may be made regarding beddown of the KC-46A for the Third Main Operating Base (MOB 3) mission.

This Final EIS analyzes the USAF proposal to beddown the KC-46A MOB 3 mission at USAF installations in the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The MOB 3 mission would include the basing of 12 Primary Aerospace Vehicles Authorized (PAA), facilities and infrastructure, and manpower. The first KC-46A aircraft is estimated to arrive at the MOB 3 in 2019 with the transition to be completed by the end of 2020.

The KC-46A will provide decades of aerial refueling support from the Third Main Operating Base (MOB 3).

The USAF used the Strategic Basing Process outlined in AFI 10-503 to identify the preferred and reasonable alternatives for the KC-46A MOB 3 mission, as listed in alphabetical order below:

- Grissom Air Reserve Base (ARB), Indiana
- Seymour Johnson AFB, North Carolina
- Tinker AFB, Oklahoma
- Westover ARB, Massachusetts

Basing actions for the KC-46A mission would follow the 2008 Secretary of Defense Total Force Integration (TFI) policy concept. This policy was enacted into law through the passage of the 2008 National Defense Authorization Act. TFI associations pair two USAF component units (host and associate) together to operate as one. The host unit is assigned responsibility of the physical resources for accomplishing a mission (aircraft, equipment, facilities), and the associate unit shares those resources. Currently, there are three types of TFI associations: classic, active, and Air Reserve Component. The KC-46A MOB 3 mission will utilize an Active Association. Per AFI 90-1001, "Responsibilities for Total Force Integration," an Active Association is when an Air Reserve Component (AFRC or ANG) has principle responsibility for a weapon system it shares with one or more regular units. Reserve and regular units retain separate organizational structure and chains of command.

The new KC-46A will provide updated technology designed to enhance operations and increase mission effectiveness to support USAF, Navy, Marine Corps, and allies who rely on tanker range and flexibility to strengthen the coalition mission.

Headquarters (HQ) AFRC is the Proponent and lead Major Command (MAJCOM) responsible for the MOB 3 beddown. HQ AFRC will operate the MOB 3 mission with fully trained combat aircrews providing aerial refueling and mission support for regional conflicts, conventional global strike, and nuclear deterrence operations.

1.1 PURPOSE OF THE THIRD MAIN OPERATING BASE BEDDOWN

The purpose of the MOB 3 beddown is to provide a fully capable, combat operational AFRC and Air Mobility Command (AMC) KC-46A air refueling squadron to accomplish aerial refueling and related missions.

The mission-ready KC-46A squadrons will allow immediate and effective employment in exercises, peace-keeping operations, contingencies, and combat. Basing and operating the KC-46A will allow the USAF to maintain combat capability and mission readiness as U.S. military resources become increasingly committed to missions throughout the world.

1.2 NEED FOR THE THIRD MAIN OPERATING BASE BEDDOWN

The KC-46A MOB 3 beddown is needed to support the recapitalization of the USAF's aging refueling aircraft fleet. The USAF needs bases to accomplish the required training and to field a fully operational force. A USAF base for the MOB 3 mission is needed to achieve a high state of operational mission readiness.

1.3 BACKGROUND FOR MEETING THE PURPOSE AND NEED

In April 2006, the USAF completed an Analysis of Alternatives to determine the most appropriate strategy to recapitalize the existing KC-135 aircraft fleet. Based on this analysis, the USAF concluded that a commercial derivative replacement tanker would result in the best value. Although Section 1.4.2 details the technological improvements of the KC-46A, the following points are examples of capabilities that are currently lacking or are very limited with the existing tanker fleet.

- **Receiver Capable.** The ability to receive fuel from other tanker aircraft while in-flight is considered a force multiplier. Currently, this capability is only available on the KC-10 and a small number of KC-135 aircraft. This lack of capability limits persistence over the battlefield and results in inefficient use of aerial refueling assets.
- **Night Vision Imaging System (NVIS).** The fleet lacks a standard NVIS for tanker cockpits and inflight refueling stations. External aircraft lighting is currently not NVIS-compatible. The lack of this capability degrades effectiveness for special operations support and limits the use of these aircraft for covert operations.
- **Multi-point Refueling.** Only a small number of KC-135 aircraft are equipped for simultaneous multi-point refueling. The lack of this capability severely limits the aircraft's functionality to support multiple simultaneous refueling operations, as well as boom and drogue refueling on the same mission.

- **Command and Control (C2) Network.** The KC-135 lacks connectivity to C2 assets, and aircraft have no secure tactical datalink and limited connectivity to other combat support and mobility aircraft.
- **Defensive Protection.** KC-135 aircraft are not normally equipped with aircraft defensive systems, which limit aircrafts from operating in anything but a low-threat environment.

Congressional authority approved funding for a total aircraft inventory of up to 179 KC-46A aircraft by 2028. The KC-46A will modernize the tanker fleet by correcting known current deficiencies, enhancing operations, and increasing mission effectiveness. Most of the total aircraft inventory will be assigned to combat units and would be operated by units assigned to AMC, U.S. Air Force in Europe, Pacific Air Forces, AFRC, and ANG.

1.4 AIRCRAFT CHARACTERISTICS

This section compares the aircraft characteristics of the KC-46A and the existing KC-135. Some key specifications of the KC-135 and the KC-46A are compared in Table 1-1.

Table 1-1. Aircraft Comparison

Specification	KC-135	KC-46A
Length	136 feet, 3 inches	165 feet, 6 inches
Height	41 feet, 8 inches	52 feet, 10 inches
Wingspan	130 feet, 10 inches	156 feet, 1 inch
Power Plant	4 F108-CF-100	2 Pratt & Whitney 4062
Takeoff Thrust	21,634 pounds per engine	62,000 pounds per engine
Speed	530 miles per hour (mph) at 30,000 feet	530 mph at 30,000 feet
Ceiling	50,000 feet	40,100 feet
Maximum Takeoff Weight	322,500 pounds	415,000 pounds
Maximum Fuel Capacity	200,000 pounds	212,000 pounds
Pallets/Palletized Cargo Weight Capacity	6/36,000 pounds	18/65,000 pounds
Crew	3 crewmembers	3 crewmembers
Receiver Fuel Transfer	Very limited	Yes
Fuel Jettison	Yes	Yes
NVIS	No	Yes
Multi-point Refueling	Very limited	Yes
C2 Network	No	Yes
Defensive Protection	Very limited	Yes
Aeromedical Evacuation	Limited	Yes

1.4.1 Aircraft Characteristics of the KC-135

The KC-135 Stratotanker was developed in 1954 as the USAF's first jet-powered refueling tanker to replace the KC-97 Stratotanker and is derived from a Boeing 367-80 commercial passenger plane. Between 1956 and 1966, 820 KC-135 and KC-135 variant aircraft were built. Over the last 50 years, the KC-135 fleet has undergone substantial modifications to add capability. The KC-135 was originally developed to refuel strategic bombers. It was used in the Vietnam War and in all conflicts up to and including Operation Enduring Freedom in Afghanistan. For this Final EIS, all KC-135 models, including the current R model, are referred to as KC-135. Originally, all KC-135s were equipped with four Pratt & Whitney J-57-P-59W turbojet engines capable of producing approximately 13,000 pounds of thrust each. The current R models were upgraded to use the CFM56-2B1 (Military designation F108-CF-100) turbofan engines, which are capable of generating approximately 21,634 pounds of thrust per engine. The KC-135 has a maximum takeoff weight of more than 322,500 pounds and the ability to off-load in excess of 150,000 pounds of fuel. In addition, the KC-135 is capable of transporting up to 36,000 pounds of palletized cargo and/or ambulatory patients during aeromedical evacuations. A cargo deck above the refueling system can hold a mixed load of passengers and cargo depending on the fuel storage configuration. The KC-135 pumps fuel through the air refueling boom, but some aircraft have been specially fitted with wing pods to allow a multi-point aerial refueling drogue system. As noted previously, the aircraft is limited by not possessing the capability for receiver fuel transfer, NVIS, defensive protection, or C2 capabilities.

1.4.2 Aircraft Characteristics of the KC-46A

KC-135

The KC-46A is derived from a commercial Boeing 767-200ER series aircraft and is powered by two Pratt & Whitney 4062 engines (thrust reversers removed). Each engine has the capability to provide approximately 62,000 pounds of thrust. The aircraft will be Federal Aviation Administration (FAA)-certified for worldwide operations. The KC-46A configuration adds the military equipment (e.g., aerial refueling, defensive systems, and situational awareness) and will receive an FAA Supplemental Type Certificate as well as a USAF Military Type Certificate. It is required to meet the FAA Part 36 Stage 4 (most restrictive commercial aircraft noise level standard) and the International Civil Aviation Organization, Committee on Aviation Environmental Protection (CAEP)/6 air contaminant emission limits. Three crewmembers (Pilot, Copilot, and Inflight Refueling Operator) will operate the aircraft with permanent seating for an additional 12 crew members. With new technology and a maximum fuel capacity expected to be 212,000 pounds, the KC-46A is capable of accomplishing all current aerial refueling missions.

KC-46A

The KC-46A will be able to refuel any certified fixed-wing receiver-capable aircraft on any mission both day and night. The aircraft will be equipped with a modernized KC-10 refueling boom integrated with proven fly-by-wire control system and will have the ability to deliver fuel through a centerline hose and drogue system, which adds additional mission capability independent of the boom system.

This aircraft will be capable of accomplishing multi-role missions. By trading fuel for cargo, it will be able to carry up to 18 standard cargo pallets with a total palletized cargo payload of up to 65,000 pounds. With a far greater cargo area contour than the KC-135, KC-46A centerline pallet positions 1 through 8 can be built to carry full height (96-inch-high) cargo without the need for contouring. This is an improvement compared to KC-135 pallets, which are typically restricted to 65-inch-high cargo and must be contoured on the right-hand side starting at 50 inches off the top pallet surface. In normal operations, the KC-46A can be configured to carry 58 passengers and will be capable of providing urgent Aeromedical Evacuation, transporting up to 50 medical patients (24 litters/26 ambulatory).

Additional features include a flush-mounted air refueling receptacle, Wing Air Refueling Pods (WARPs) capability, boom air refueling camera and computer control systems, defensive and communication systems, NVIS/covert lighting, and military radio/navigation receivers. The Inflight Refueling Operator will control the refueling systems from the crew compartment via the Air Refueling Operating Station. A series of cameras mounted on the tanker's fuselage provide a

185-degree field-of-view under day and night lighting conditions. Imaging may be captured in three-dimensional or two-dimensional high-definition video. Fuel is automatically transferred within the aircraft to maintain center of gravity in all axes. The flow of fuel in, out, and within the aircraft can be manually or automatically controlled by the aircraft and can be manually controlled by the aircrew via control display units at the appropriate duty station.

In addition to fuel and cargo transport, each KC-46A aircraft will possess a secure airborne communications capability, which will provide beyond-the-line-of-sight messaging and line-of-sight tactical datalink multi-modal communications via secure networks. Hosting a suite of network-centric communications equipment, the KC-46A will function with most current C2 systems. The KC-46A will also support the C2 core function as a communications “gateway” when equipped with a roll-on gateway system to provide connectivity between tactical network partners in theater.

This aircraft will have self-defense and protection (both active and passive) capabilities and the necessary operational environment awareness to mitigate threats, but will not be operated in areas of high threats without requesting suppression of enemy air defenses and air support.

This aircraft is capable of ferrying fuel into semi-austere airfields. By following Forward Area Refueling Point procedures, the aircraft can off-load fuel into fuel pits, bladders, trucks, or other aircraft, with or without the engines running, without the need for special equipment. The aircraft will be able to operate at certain Night Vision Goggle (NVG) and/or defensive system-required airfields with a minimum of 7,000 feet of paved runway available for takeoff/landing.

The aircraft will be capable of operating in day-night and adverse weather conditions over vast distances to enable deployment, employment, sustainment, and redeployment of U.S., Joint, Allied, and Coalition Forces.

1.5 PUBLIC AND AGENCY INVOLVEMENT

The primary purpose of the Final EIS is to describe the actions being proposed by the USAF, along with the potential consequences associated with implementation of those actions. The USAF has evaluated all reasonable alternatives to ensure that informed decisions are made after review and consideration of the potential environmental consequences. The Environmental Impact Analysis Process (EIAP) (32 *Code of Federal Regulations [CFR]* 989) is the process by which the USAF implements the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) NEPA implementing regulations. This Final EIS documents the detailed study of these potential environmental consequences. Compliance with the NEPA process involves several steps to ensure public and agency involvement.

1.5.1 Scoping Process

The public scoping period for the KC-46A MOB 3 EIS began on 23 March 2016 with publication of the Notice of Intent (NOI) in the *Federal Register*. During the following weeks, notification letters were mailed to Federal, state, and local agencies; elected officials; federally recognized tribes (tribes)[1]; nongovernmental organizations; and interested individuals as a part of an interagency/intergovernmental coordination process. Through this process, concerned Federal,

[1] Per Department of Defense Instruction (DoDI) 4710.02, *DoD Interactions with Federally-Recognized Tribes*, “tribe” refers to a federally recognized Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges (DoDI 4710.02, Section 3.5). Although not included as federally recognized tribes in the list, we similarly must consult with Native Hawaiian organizations in accordance with DoDI 4710.03.

state, and local agencies are notified and allowed sufficient time to evaluate potential environmental impacts of a proposed action.

Appendix A provides sample notification letters, the notification mailing lists, and the agency comments and concerns received by the USAF during the public scoping period. Newspaper advertisements announcing the intent to prepare an EIS and hold public scoping meetings were published in six different local daily and weekly newspapers. These advertisements were published in the weeks preceding each of the scheduled public scoping meetings.

Four public scoping meetings were held between 12 and 21 April 2016 in communities near the four alternative bases (see Table 1-2). The meetings were held in an open house format where attendees could sign in, if desired, review display boards about the proposed KC-46A MOB 3 mission and provide written comments on the project. During these meetings, USAF personnel presented information on the project through the use of display boards and fact sheets. Comment sheets were available for attendees to provide written comments.

Table 1-2. Scoping Meeting Dates and Locations

Installation	Date	Location	Meeting Time
Westover ARB	12 April 2016	Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020	5:00 – 8:00 P.M.
Seymour Johnson AFB	14 April 2016	Herman Park Center, 901 East Ash St., Goldsboro, NC 27530	5:00 – 8:00 P.M.
Grissom ARB	19 April 2016	Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970	5:00 – 8:00 P.M.
Tinker AFB	21 April 2016	Sheraton Midwest City Hotel and Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, OK 73110	5:00 – 8:00 P.M.

The scoping meetings were attended by 142 people, which included residents, elected officials, local business leaders, military affairs committee members, congressional staffers, base employees, and others. The scoping period closed on 25 April 2016, and approximately 50 comments were received. The majority of the comments were supportive of the proposed KC-46A MOB 3 mission, with some commenters expressing concern over noise and others requesting that certain resource area information be presented in the Draft EIS.

Other than the expressions of support, the key issues identified during scoping are summarized in Table 1-3.

Table 1-3. Public and Agency Scoping – Summary of Key Issues for Proposed KC-46A MOB 3 Mission

Issue/Concern/Comment	Base	Concern Expressed by		
		Agency	Public	Tribe
Transportation Resources	Grissom ARB	X		
Requests for additional information	Grissom ARB			X
Biological resources	Grissom ARB, Tinker AFB	X		
Recommendations for compliance with state and Federal regulations	All bases	X		
Manpower	Seymour Johnson AFB		X	
Socioeconomics	Seymour Johnson AFB		X	
Aircraft Noise and Operations	Seymour Johnson AFB, Westover ARB		X	
Request for cultural resource information	Seymour Johnson AFB, Tinker AFB, Westover ARB	X		
Floodplains	All bases	X		
Coast zone consistency	Seymour Johnson AFB	X		

1.5.2 Draft EIS Public and Agency Review

The public review and comment period for the Draft EIS started on 18 November 2016 and ended on 3 January 2017. Notification of availability of the Draft EIS was made through the *Federal Register*, newspaper display advertisements, press releases, public service announcements, flyers, and letters accompanying the direct mailing of the Draft EIS document. The Draft EIS document was posted on a publicly available website at https://www.KC-46A-beddown.com. Copies of the Draft EIS document and postcards advertising the availability of the Draft EIS were sent to Federal, state, and local agencies, tribes, and special interest groups. The Draft EIS was also sent to citizens or entities that requested a copy and was made available at libraries throughout the region of influence (ROI).

Four public hearings were held between 6 and 15 December 2016 in communities near the four alternative bases (Table 1-4). Comments were received through the mail and the website, and were submitted in writing or presented verbally at the public hearings. All of the comments are contained in Volume II, Appendix A, Section A.7.2.

Table 1-4. Public Hearing Dates and Locations

Date	Applicable Air Force Base	Public Hearing Location
6 December 2016	Tinker AFB	Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, OK 73110
8 December 2016	Grissom Air Reserve Base (ARB)	Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
13 December 2016	Westover ARB	Westover Airport Departure Lounge, 255 Padgette Street, Chicopee, MA 01020
15 December 2016	Seymour Johnson AFB	Herman Park Center, 901 East Ash St., Goldsboro, NC 27530

The USAF appreciates submission of all comments. The fact that a change in the proposed actions or the EIS analysis did not occur as a result of a comment does not reduce the value of the comment or an individual's participation in the Environmental Impact Analysis Process (EIAP). Public and agency involvement is an important part of the NEPA process, and all comments were considered by the USAF during its decision-making process. Consistent with 40 *CFR* §1503.4, the USAF responds to substantive comments on a Draft EIS in the Final EIS. Substantive comments are regarded as those comments that challenge the analysis, methodologies, or information in the Draft EIS as being factually inaccurate or analytically inadequate; that identify impacts not analyzed or develop and evaluate reasonable alternatives or feasible mitigations not considered by the agency; or that offer specific information that may have a bearing on the decision, such as differences in interpretations of significance or scientific or technical conclusions. Non-substantive comments, which do not require a USAF response, are generally considered those comments that express a conclusion, an opinion, or a vote for or against the proposal itself, or some aspect of it; that state a position for or against a particular alternative; or that otherwise state a personal preference or opinion.

Many comment authors expressed personal opinions, histories, or experiences which are not appropriately addressed as part of the NEPA process. Such comments do not require a specific USAF response, but are included as part of the public input. In accordance with 40 *CFR* 1503.4, the USAF carefully considered all of the comments received during the Draft EIS public review period. The USAF determined none of the comments to be substantive; therefore, no specific USAF responses were developed and no changes to the Draft EIS were necessary.

1.6 TRIBAL CONSULTATION

In an ongoing effort to identify cultural resources or other issues of interest to tribes and as part of the NEPA scoping process, combined notification and Section 106 consultation letters were submitted to tribes (see Volume II, Appendix A, Section A.3). Response summaries are reflected in Table 1-3 (see Volume II, Appendix A, Section A.3, for complete responses). Refer to Table A-1 in Volume II, Appendix A, Section A.3, for a list of the tribes consulted. Following standard USAF practice for formal government-to-government correspondence, consultation was initiated by base Commanders who represent key leadership points of contact. Additional direct communication efforts (phone calls and emails) occurred for tribes that did not respond to USAF mailings. All communications with tribes were completed in accordance with the National Historic Preservation Act (NHPA) Executive Order (EO) 13175 "Consultation and Coordination with Indian Tribal Governments", Department of Defense Instruction (DoDI) 4710.02, and 36 *CFR* 800, "Protection of Historic Properties".

To support this EIS through the life of the project, the USAF consulted on a government-to-government basis with the respective tribes attaching historical, cultural, and/or religious significance to lands or sites in the project areas.

1.7 ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This Final EIS is designed to analyze the potential environmental impacts associated with the MOB 3 basing of KC-46A aircraft. The beddown will include facilities, personnel, and flight operations analysis at selected bases, but implementation of these actions would occur only at the selected location. The preferred and reasonable alternatives are described in Chapter 2.

Chapter 1 provides information on the purpose and need for the proposed KC-46A MOB 3 beddown. This section includes an overview of the KC-46A capabilities and explains that the bases identified as preferred and reasonable alternatives for the MOB 3 mission would need to provide facilities, infrastructure, and personnel to assist with KC-46A operations and training. In addition, Chapter 1 addresses public and agency involvement and tribal consultation.

Chapter 2 describes the process for identifying the range of alternatives and explains the USAF proposed action, the preferred alternative for the MOB 3 mission, the reasonable alternatives, and the No Action Alternative. This chapter includes a more detailed explanation of requirements for the MOB 3 beddown in terms of base-specific personnel, facility, and operational elements, and lastly describes the project requirements for each base alternative. This chapter also includes a comparison of the potential environmental consequences across the alternatives, a discussion on mitigation measures, and a discussion on unavoidable impacts.

Chapter 3 is organized by each of the four bases and presents the affected environment at each base selected as an alternative for the proposed MOB 3 mission.

Chapter 4, also organized by base, presents the analysis of potential environmental impacts associated with implementation of the proposed MOB 3 mission. The analysis in this chapter results from overlaying the mission-specific requirements from Chapter 2 upon the affected environment from Chapter 3 to present consideration of the context and intensity to identify the significance of the impacts by resource area.

Chapter 5 identifies past, present, and reasonably foreseeable future projects and describes potential cumulative effects of the proposed beddown in combination with other actions in each region. Chapter 5 also identifies irreversible or irretrievable commitments of resources.

References, contacts made during the EIS development, and a list of the preparers of this EIS are included following Chapter 5.

Volume II contains Appendices A through E, each of which provide supplementary information briefly described below.

Appendix A provides sample notification letters, the notification mailing lists, and the agency comments and concerns received by the USAF during the public scoping period. Newspaper advertisements announcing the intent to prepare an EIS and hold public scoping meetings were published in six different local daily and weekly newspapers. These advertisements were published in the weeks preceding each of the scheduled public scoping meetings. Appendix A includes letters of consultation with agencies and government officials, and public comments received during the Draft EIS public comment period.

Appendix B describes the methodology used to evaluate each environmental resource area relative to the environmental consequences of basing KC-46A aircraft for the MOB 3 mission. This appendix also includes the applicable regulations, permits, and appropriate agencies involved in the determination of environmental consequences. The methodology for impact analysis for each resource area, as described in Appendix B, is consistent for each resource area at each of the four bases.

Appendix C includes background information supporting the noise analysis.

Appendix D includes air quality background information for each of the four bases under consideration for the proposed KC-46A MOB 3 beddown. This background information includes regional climate information, along with the spreadsheets used to complete the air quality analysis contained in Chapter 4.

Appendix E contains partial lists of common flora and fauna known to occur at each alternative base.

Appendix F summarizes the buildings that would be affected by the proposed KC-46A MOB 3 beddown-related demolition, renovation, or alteration; their years of construction; and their potential to contain toxic substances (asbestos-containing material [ACM], lead-based paint [LBP], and polychlorinated biphenyls [PCBs]).

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CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW

This section presents a description of the activities and implementing actions associated with the KC-46A Third Main Operating Base (MOB 3) mission. The MOB 3 mission involves the basing of 12 KC-46A aircraft in one squadron at a U.S. Air Force (USAF) installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The squadron of KC-46A aircraft will require infrastructure, facilities, airfield operations, training activities, personnel, and airspace to support missions. This section identifies the operational requirements that would be involved at any of the alternative bases.

Table 2-1 provides an overview of key elements associated with the KC-46A MOB 3 beddown that have the potential to affect environmental resources at the base or under the regional training airspace.

Table 2-1. Overview of the KC-46A MOB 3 Beddown

The proposed MOB 3 beddown involves implementing several related elements at a selected base.

Elements Affecting the Base

- ✓ The beddown of 12 KC-46A aircraft in one squadron in accordance with the aircraft delivery schedule
- ✓ Depending on mission profiles, conduct sorties at each base for pilot, copilot, and inflight refueling operator training/certification, aerial refueling operations, and global reach missions
- ✓ Renovate, construct, and manage facilities and infrastructure necessary to support the mission
- ✓ Implement personnel changes (increases or decreases) at the base to conform to mission requirements

Depending on the base, the proposed action would either add to current missions or replace the existing KC-135 mission. Implementation of the proposed action would occur in two stages: a beddown stage and an operational stage. The beddown stage involves construction/retrofit of required facilities, infrastructure, and prepared surfaces, which includes renovation, alteration, new construction, and demolition. The beddown stage also includes preparing support facilities for new personnel to support the mission. The operational stage involves conducting the day-to-day activities (operational missions, maintenance, etc.) of the squadron at the base, including base flight operations, and training in the regional airspace.

Section 2.5 provides a detailed description of each of the alternative bases under consideration. The description of each alternative carried forward as a reasonable alternative contains specifics about how the beddown and mission would be implemented at each base and within the regional airspace. In accordance with the Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations [CFR]* 1502.14[d]), Section 2.6 describes a No Action Alternative, which consists of not bedding down a KC-46A MOB 3 mission.

2.2 NARROWING PROCESS FOR ALTERNATIVE BASES

The narrowing process used to identify alternatives for the KC-46A MOB 3 basing location is described below. The process applied operational and other selection criteria to identify reasonable alternatives for the beddown of the KC-46A MOB 3 mission.

2.2.1 Alternative Identification Process Methodology

This section describes the USAF Strategic Basing Process, and then describes how the Strategic Basing Process is applied to identify the KC-46A MOB 3 basing locations included in this Final Environmental Impact Statement (EIS).

In general, the USAF uses the Strategic Basing Process outlined in Air Force Instruction (AFI) 10-503 to select locations to beddown USAF missions. The process begins by identifying all the USAF installations that could reasonably support a given mission based on a few broad requirements. This enterprise of bases is then evaluated using Secretary of the Air Force (SecAF)-approved objective criteria to screen for a list of top candidate bases. Major Command (MAJCOM)-led site surveys are then conducted at each of the top candidate bases to determine if the base could reasonably support the mission in question. The Strategic Basing Executive Steering Group oversees the process and reports findings directly to the SecAF and Chief of Staff of the Air Force (CSAF). This process was mandated by the SecAF to ensure basing decisions were made using a deliberate, repeatable, and standardized process.

In September 2011, Air Mobility Command (AMC) presented the Lead Command Intent for the KC-46A to the SecAF. This Lead Command Intent described the proposed basing action tenets, force structure mix (Active Duty, Reserve, and Air National Guard [ANG] personnel), basing timelines, and the critical information that would be used to shape and inform decisions made throughout the USAF Strategic Basing Process. The following planning conventions were derived from the Lead Command Intent:

1. Identify the number of KC-46A aircraft scheduled to be delivered by 2019. This time period corresponded to the U.S. Department of Defense (DoD) Future Years Defense Program, which is the program and financial plan approved by the Secretary of Defense, and provides a basis for USAF planning. Planning beyond this time period is speculative due to the indeterminacy of resource availability.
2. Identify the number of KC-46A aircraft to be allocated to training and to operations based on then-current national strategic considerations.
3. Determine the number of bases minimally needed to support receipt of these aircraft for training and operations by dividing the amount allocated to training and to operations by the number of squadrons based on one squadron configuration of 12 Primary Aerospace Vehicles Authorized (PAA). PAA are those aircraft assigned to meet the primary aircraft authorization and reflect the number of aircraft flown by a unit in performance of its mission.
4. Recognize additional factors of Plans and Guidance and Global Positioning, which include strategic considerations but do not provide meaningful distinction among bases for USAF training within the United States and its territories. An additional Logistics Supportability factor equates to Boeing's support capacity set forth in its contract with the USAF. This factor does not distinguish among bases and is not included in the identification of reasonable MOB 3 beddown alternatives.

Consideration of the aforementioned planning conventions led to an initial screening of all USAF installations against the following standards for the MOB 3 mission: (1) a runway of at least 7,000 feet in length; (2) the presence of an AFRC wing that led a Global Mobility mission and owned the aircraft; and (3) a CONUS location. The initial screening yielded a defined enterprise of 18 bases to be evaluated for the MOB 3 beddown.

In 2012, AMC presented objective screening criteria to the SecAF for approval. The 2012 approved screening criteria were the same criteria used to score the MOB 3 enterprise list of 18 bases to identify those bases that could best support the KC-46A MOB 3 mission. The scoring criteria were divided into four major categories: Mission, Capacity, Environmental, and Cost. These categories and their sub-categories are described in further detail as follows:

- Mission criteria: Proximity to refueling demand; airfield and airspace availability; fuels dispensing capability; fuels storage; fuels receipt; and the potential to establish an association (Active Association)
- Capacity criteria: Hangar capacity; runway (length and bearing capacity); ramp space; Base Operating Support (BOS) capacity; Squadron Operations and Aircraft Maintenance Units (AMUs); Flight Training Center (simulators); Fuselage Trainer (FuT); and communications infrastructure
- Environmental criteria: Air quality (meet Clean Air Act [CAA] attainment status); environment impact (known environmental issues, such as wetlands, endangered species, etc.); noise (compatibility); encroachment (clear zone [CZ] and accident potential zone [APZ] considerations); and land use (local community's adoption of zoning or other land use controls to reduce encroachment and preserve the base's flying operations)
- Cost criteria: Favorable area construction factor based on the DoD Facilities Pricing Guide, dated June 2007 (DoD 2007), as updated by the June 2009 draft Office of the Secretary of Defense Pricing Guide (DoD 2009); and favorable area locality cost factors

The SecAF considered the objective screening results, as well as subjective operational factors, in determining the candidate bases for the KC-46A MOB 3 mission. The subjective operational factors, also known as military judgment factors, included the following:

- Plans and Guidance
- Global and Regional Coverage
- Combatant Commander Support
- Total Force
- Beddown Timing
- Force Structure
- Training Requirements and Efficiencies
- Logistic Supportability
- Resources/Budgeting

The Strategic Basing Process described above resulted in the identification of four alternative bases for the MOB 3 mission (see Figure 2-1).

- Grissom Air Reserve Base (ARB), Indiana
- Seymour Johnson Air Force Base (AFB), North Carolina
- Tinker AFB, Oklahoma
- Westover ARB, Massachusetts

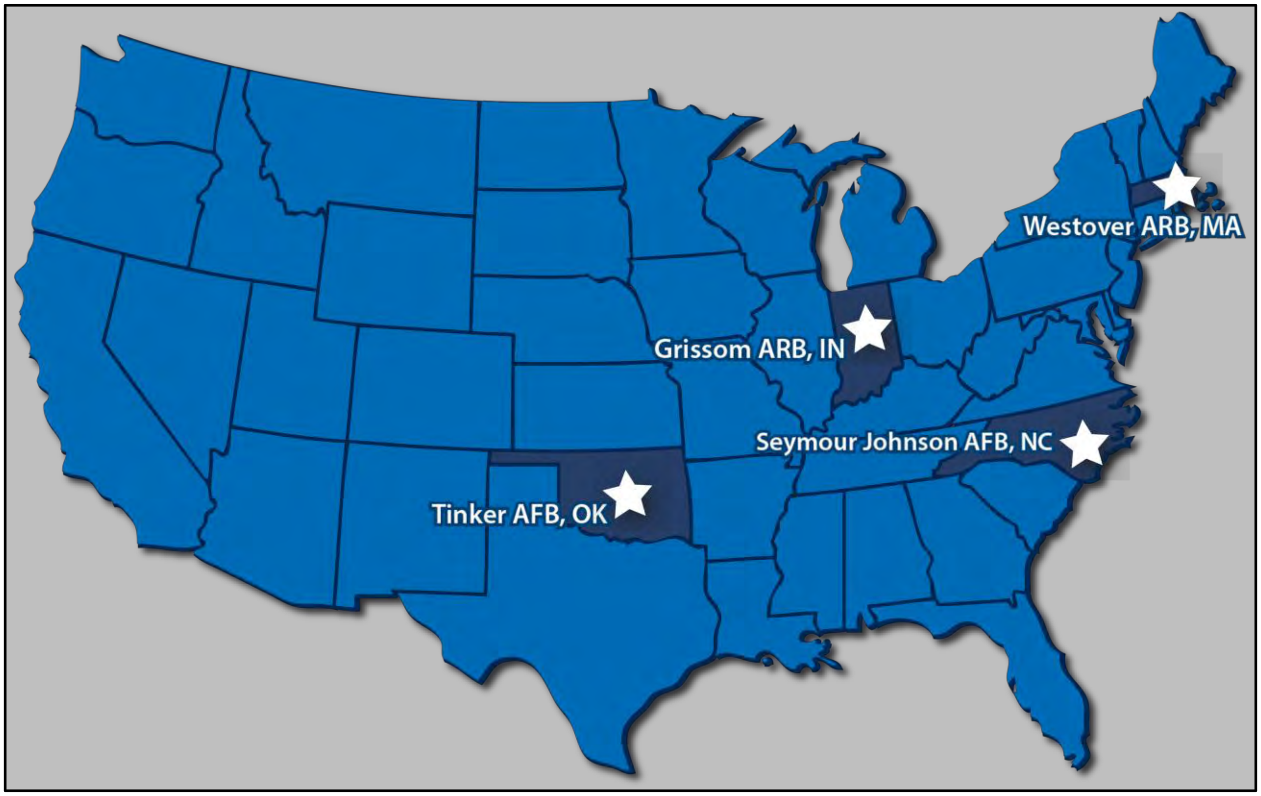

Figure 2-1. MOB 3 Alternative Basing Locations

2.3 KC-46A MISSION-SPECIFIC REQUIREMENTS

The objective criteria described above specify the general requirements for the MOB 3 mission. This section describes the specific details and requirements of the mission. Various factors influence the siting of facilities within a developed cantonment area. These factors involve operational functionality, safety, and compliance with regulations and policies (Federal, state, or local). The process of planning the beddown for a new aircraft and mission considers facility requirements that can be partially or wholly fulfilled by existing facilities on the base. The siting process for new construction is iterative, applying factors described below to identify suitable sites relative to existing space and facilities that provide a reasonable operational efficiency/cost-benefit value. All construction contracts would require the use of Unified Facilities Criteria (UFC) 3-101-01-*Architecture* and attainment of a Leadership in Energy and Environmental Design (LEED) certificate level of silver. Construction and renovation projects within the 65 decibel (dB) noise contour would include acoustical design considerations for façade elements and interior design requirements per UFC 3-101-01. Land use should comply with AFI 32-7063, “AICUZ Program” (December 2015).

As part of the process described above, bases were evaluated based on their ability to: (1) provide basic infrastructure and (2) meet the physical mission requirements with existing infrastructure and facilities (with minor renovation or additions and alterations). For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required.

In addition to the infrastructure requirements, the manpower requirements for each base are different due to the process in which manpower is determined for each unique Major Weapon System (MWS) and its associated mission. In addition, the current mission and organization at each base are factors in determining the magnitude of manpower changes. These considerations include whether or not there is an Active Association already supporting the current mission, and whether the KC-46A mission would be added to the existing installation missions or replace an existing tanker mission.

2.3.1 KC-46A MOB 3 Mission-Specific Requirements

The basic requirements for the KC-46A MOB 3 beddown include the physical infrastructure, land, airspace, personnel, and water and energy assets needed to support the MOB 3 mission. This section presents the criteria that apply to the MOB 3 siting, facilities for mission and mission support functions, and personnel authorized to execute work related to the mission and flying operations required as part of the MOB 3 mission.

2.3.1.1 MOB 3 Facility and Infrastructure Requirements

The basic allocation and physical requirements necessary to support one squadron of 12 KC-46A aircraft are listed below.

- General Maintenance Hangar
- Fuel Cell Hangar
- Corrosion Control/Wash Rack Hangar
- Squadron Operation Facilities
- Aircraft Maintenance Unit (AMU) Facility
- Flight Training Center (FTC) consisting of:
  - Weapon System Trainer (WST)
  - Boom Operator Trainer (BOT)
  - Pilot Part Task Trainer (P-PTT)
- Fuselage Trainer (FuT)
- Supply Warehousing, Flightline Support Facility and Aircraft Parts Storage
- Aerospace Ground Equipment (AGE) storage and parking
- Cargo Deployment Function, Passenger Deployment Function, and Small Terminal Ops Function for a unit organic deployment capability
- Crash Recovery Shop with adequate vehicle parking
- Alternate Mission Equipment (AME) Storage and Maintenance Facility (pallets, etc.)
- Parking ramp with eight AMC generic aircraft sized parking spots equipped with Fuel Pits and a Type III Fuel Hydrant System
- Appropriate fuel supply, storage, and distribution systems to support 12 PAA
- Radar Approach Control (RAPCON), Instrument Landing System (ILS), Tactical Air Navigation (TACAN), and Airfield Navigational Aid System (NAVAIDS) that can support the KC-46A
- Vehicle Operation Administration and Maintenance Shop
- Aircrew Flight Equipment (AFE) Facility
- A variety of shop areas (welding, hydraulics, composite repair, sheet metal, etc.)

Depending on the location, a variety of other service-type facilities and infrastructure could be required to support the MOB 3 mission. These could include a child development center (CDC), utilities, roads, taxiways, overruns, dining facilities, a fitness center, visiting quarters, and dormitories.

Hangars, Aircraft Maintenance Units (AMUs), Squadron Operations. Two dedicated full-in maintenance hangars are required in accordance with SecAF/CSAF-approved Strategic Basing Criteria and Air Force Manual (AFMAN) 32-1084, “Facility Requirements,” para 3.1.2 and Table 3.1; using the KC-135 planning factor of 0.15. The two hangars must be capable of supporting all maintenance activities, including general and fuel cell maintenance, along with corrosion control/wash rack capabilities.

The MOB 3 mission will also require a Squadron Operations facility and an AMU. The AMU space serves as a home base for technicians working on the flightline and also houses the administrative functions for the flightline. All facilities would be designed based on the Total Force Integration (TFI) concept.

Flightline Development. To support the MOB 3 mission, a 7,000-foot-long, 147-foot-wide runway (minimum) capable of handling aircraft with a takeoff weight of 415,000 pounds is needed. The 12 PAA would require eight parking spots capable of supporting the KC-46A plus additional space for taxiways; all new construction required will be sized to accommodate AMC generic aircraft requirements, plus additional space for taxiways. In addition, the MOB 3 mission would require an available and functioning RAPCON, ILS, TACAN, and NAVAIDS capable of supporting day and night landings. The flightline would also require an Intrusion Detection and Surveillance System capable of supporting the additional aircraft.

Fuels Infrastructure. To support the MOB 3 mission, the base must be able to receive at least 120,000 gallons of jet fuel per day from commercial sources to maintain adequate supply. Fuel storage at the selected base would include storage facilities with more than 600,000 gallons of capacity and would be able to dispense at least 120,000 gallons of fuel per day through a Type III hydrant system.

Flight Training Center (FTC) and Fuselage Trainer (FuT). New aircraft like the KC-46A require a flight training center with a combination of full system trainers, part task trainers, simulators, classroom space, instructor accommodations/staff, and administrative space/staff to receive and train aircrews. Formal training involves classroom work; computer-based training; part task trainer sessions; WST and BOT training sessions; and FuT training sessions. All cargo operations training would be performed in the FuT or in a parked aircraft.

The FTC requires bays for the WST, BOT, one P-PTT, an adjoined or adjacent classroom, and office space. The FuT requires administrative and academic space, one open bay, and one cargo yard adjacent to the flightline.

Housing and Support Facilities. Housing for eligible permanent-party military personnel associated with the MOB 3 mission would include privatized base housing or housing available in the local market off base. For the MOB 3 mission, where possible, dormitories would be used for all unaccompanied enlisted Airmen and for permanently assigned, unmarried first-term Airmen. Because AFRC bases do not have dormitories, community housing would also be evaluated. Adequate child care, medical facilities, a fitness center, and other BOS/force support must also be available.

2.3.1.2 MOB 3 Personnel Requirements

Basing of the KC-46A MOB 3 mission would require sufficient personnel to operate and maintain the aircraft and to provide necessary support services. Depending on the location and the current mission, the anticipated increase in full time personnel would range from 53 to 411. This would include active-duty and AFRC officer, enlisted, DoD civilian, contractor support personnel, and BOS personnel. In addition to the personnel required to support the mission, the dependents or family members of non-contractor, full-time personnel are also included in the analysis. Family members and dependents were estimated at 2.5 times 65 percent of the full-time personnel, excluding contractors. School-age dependents of full-time personnel were estimated at 1.5 times 65 percent of full-time personnel, excluding contractors.

2.3.1.3 MOB 3 Flight Operations

KC-46A aircrews associated with the MOB 3 mission would complete mission sorties in support of real-world objectives and training sorties to maintain proficiency in the aircraft. The majority of training would occur in flight simulators. For those tasks that require in-flight training, a typical training sortie is described below.

A ***sortie*** *consists of a single military aircraft flight from the initial takeoff through the final landing and includes all activities that occur during that flight. An* ***operation*** *is an event, such as a landing or takeoff that occurs during the flight. A single sortie includes at least two operations – an initial takeoff and final landing – and may include additional operations conducted as part of additional practice approaches. Aircraft performing additional practice approaches conduct one operation during the landing portion and another operation as they depart the airfield to line up for the next approach.*

A typical KC-46A training sortie would be similar to a KC-135 training sortie and would include a takeoff from the home base; climb to altitude for training on a designated Aerial Refueling (AR) route; practice approaches at either the home base or another suitable location chosen by the aircrew; and then accomplish a final landing at the home base. Training sorties typically depart from and return to the home base on the same day.

Mission sorties occur during any hour of any day as needed to meet the requirements of the missions they support. In the airfield environment, these sorties follow the same procedures followed during a training mission, but returning flights conduct additional practice approaches much less frequently than returning training sorties. Mission sorties include but are not limited to transits to and from deployments.

KC-46A operations would, for the most part, follow the same flight procedures currently used by AFRC aircraft while operating near each alternative location. The capabilities of KC-46A aircraft would result in certain existing procedures being accomplished differently. For example, aircraft climb-out can be accomplished more quickly in a KC-46A than in a KC-135 because the ratio of thrust to aircraft weight is higher in a KC-46A.

Tactical flight procedures, which are only rarely conducted by KC-135 aircraft, would comprise 3 percent of total KC-46A flying operations. Tactical approaches and departures are designed to minimize aircraft exposure to ground-based threats. These procedures could involve approaching the airfield from randomly-selected directions at low altitudes or climbing away from an airfield following a tight spiral pattern that remains over the installation. KC-46A aircrews would practice tactical procedures primarily in flight simulators, minimizing the number of actual tactical flying operations.

Any operations that occur between the hours of 10:00 P.M. and 7:00 A.M. local time are classified as occurring in acoustic night. Operations during this late-night time period are sometimes necessary to accomplish real-world missions and to meet night operation training requirements. Operations during acoustic night would comprise no more than 11 percent of total operations.

The days of the week on which KC-46A operations would occur would follow patterns set by ongoing AFRC unit operations. Training sorties would be conducted during weekdays and on

Reserve duty weekends. Mission sorties are scheduled based on real-world events and would be conducted on any day of the year.

2.3.1.4 MOB 3 Airspace Use

The KC-46A would be operated in existing airspace, and the types of flight operations would mirror existing KC-135 operations, when applicable. KC-46A aircrews would use existing AR routes and fuel jettison areas, when applicable. AR routes are classified by the Federal Aviation Administration (FAA) as Special Activity Airspace. Like the KC-135, the KC-46A would not require designated military airspace other than existing AR routes.

2.4 PREFERRED AND REASONABLE ALTERNATIVES

In early 2015, AFRC and AMC conducted detailed, on-the-ground site surveys at each of the four alternative bases, with each base evaluated against operational requirements, potential impacts to existing missions, housing, infrastructure, and manpower. Additionally, cost estimates to bed down the KC-46A at each of the candidate bases were developed.

As part of the Strategic Basing Process, all of this information was evaluated and presented to the SecAF and the CSAF. Based on operational analysis, results of the site surveys and military judgment factors, the USAF identified Seymour Johnson AFB as the preferred alternative with Grissom ARB, Tinker AFB and Westover ARB as reasonable alternatives. Along with the No Action Alternative, all four bases are evaluated as alternatives in this EIS.

2.5 DESCRIPTION OF ALTERNATIVE BASING LOCATIONS

Depending on infrastructure, facilities, and, to some degree, personnel, available for the KC-46A MOB 3 mission, proposed construction, demolition, renovations, and incoming personnel numbers vary between alternatives. The facility siting analysis for each base considered the functional mission requirements and compared them with the existing infrastructure and environmental constraints at each base. The following subsections provide specifics about the beddown and operations at each of the four bases in alphabetical order. Table 2-2 provides a summary comparison of the alternatives, along with the No Action Alternative.

Table 2-2. Summary of Alternatives

Alternative Components	Grissom ARB[a]	Seymour Johnson AFB[a]	Tinker AFB[a]	Westover ARB	No Action Alternative
Current KC-135 PAA	16	16	8	0	Varies by location
Proposed KC-46A PAA	+12	+12	+12	+12	0
Facilities and Infrastructure	See Section 2.3.1				None
Full-Time Personnel Change	+217	+53	+308	+411	0
Aircraft Operations Change	-1,490	+1,746	+4,041	+7,032	0

[a] Denotes KC-135 replacement mission.
Note: "+" indicates an increase and "-" indicates a decrease.

2.5.1 Grissom Air Reserve Base, Indiana

The USAF is considering Grissom ARB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations that would occur with implementation of the MOB 3 mission.

2.5.1.1 Grissom ARB Overview

Grissom ARB is located in north-central Indiana, approximately 70 miles north of Indianapolis (see Figure 2-2). The base covers an area of approximately 1,312 acres. A single, 12,500-foot-by-200-foot, joint use runway (Runway 05/23) is located at the base. The joint use nature of the runway allows it to be used by both civilian-owned and military aircraft. The overall layout of existing facilities and infrastructure at Grissom ARB is shown on Figure 2-3.

Originally named Bunker Hill Naval Air Station, the base was opened in 1942 as a training base for Navy, Marine, and Coast Guard pilots. In 1942 the base encompassed 2,722 acres. The base closed after World War II. In 1954, the base was reopened as Bunker Hill AFB and assigned to the Tactical Air Command. In 1968, the base name was changed to Grissom AFB. As a result of the Defense Base Closure and Realignment Act of 1990, Grissom AFB was realigned in 1994; AFRC retained 1,312 acres as a cantonment area, designated as Grissom ARB. Today the base is home to 434th Air Refueling Wing (ARW) as the host unit. The 434 ARW is one of the largest KC-135 missions in the AFRC, with a mission to develop and maintain the operational capability of its units and train reservists for worldwide duty. In addition to the large USAF presence, Grissom ARB is also home to units from the U.S. Army Reserve and U.S. Marine Corp Reserve.

2.5.1.2 MOB 3 Beddown Specifics

The USAF determined that Grissom ARB's infrastructure and base resources could accommodate the basic requirements of the KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2. This section details the actions that would occur at Grissom ARB if the base were selected for the KC-46A MOB 3 mission. The MOB 3 mission would be a replacement mission for the existing KC-135 mission at Grissom ARB. The first replacement aircraft is estimated to arrive in 2019. The current aircraft inventory at Grissom ARB includes 16 KC-135 aircraft.

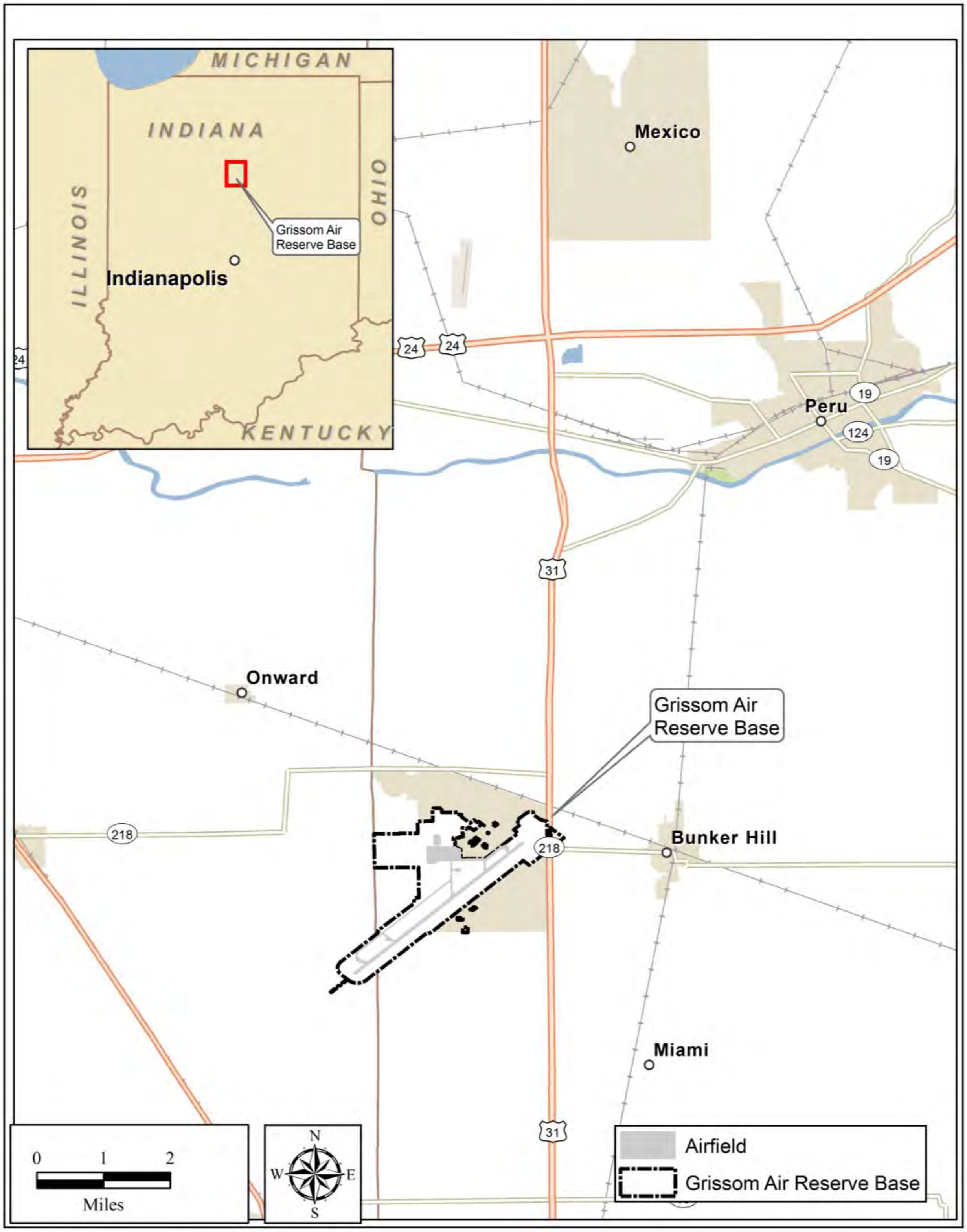

Figure 2-2. Regional Location of Grissom ARB

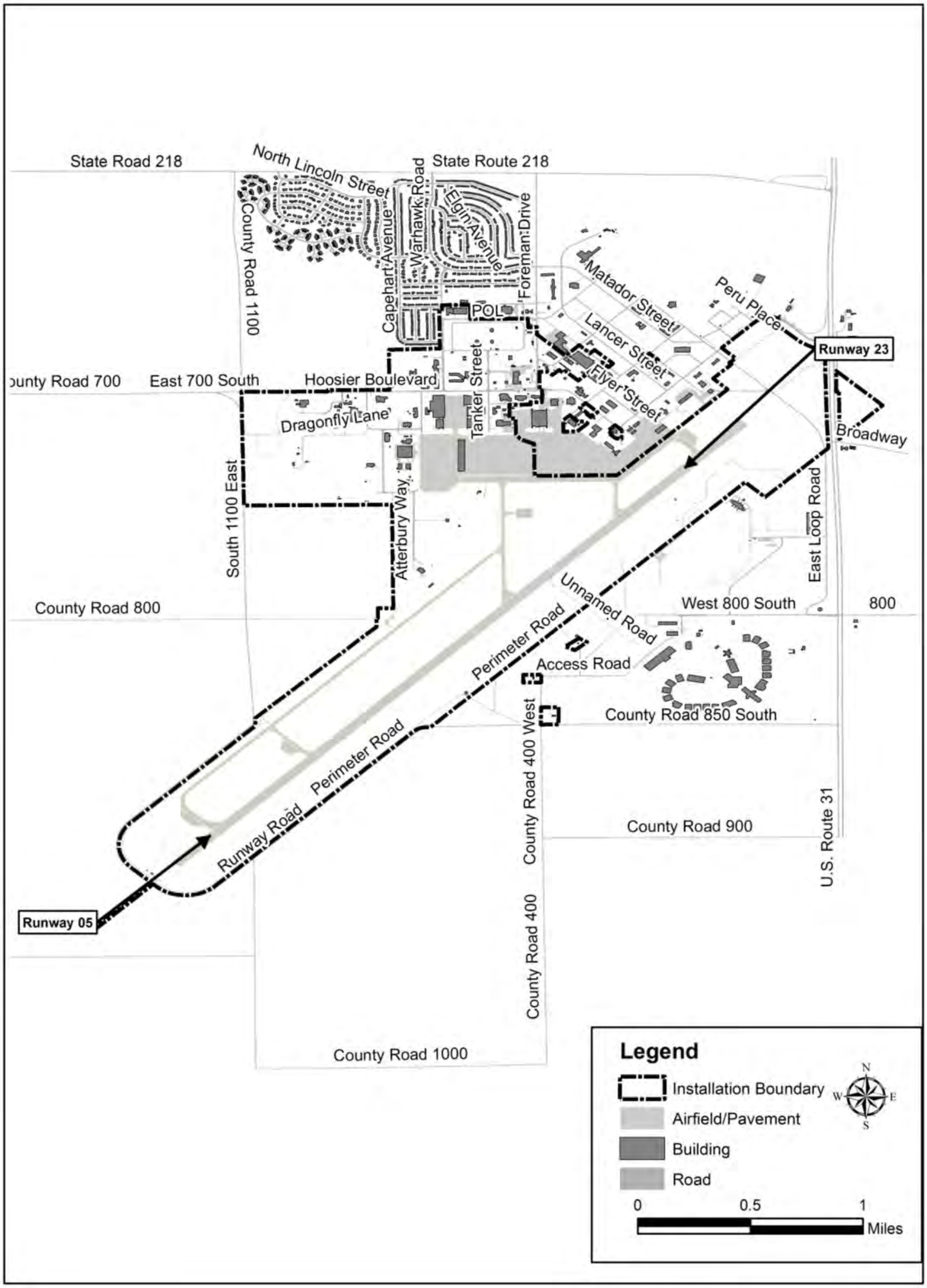

Figure 2-3. Base Overview of Grissom ARB

2.5.1.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Most of these requirements are met through existing infrastructure. However, the proposed MOB 3 beddown at Grissom ARB would require new construction and demolition (C&D) of facilities, as well as modifications to some existing facilities. The projects that would be necessary to support the KC-46A MOB 3 mission at Grissom ARB are listed in Table 2-3.

Table 2-3. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB

Project	Facility Size (square feet)
Demolition	
Building 437 (Hangar 5)	31,142
Building 438 (Hangar 3)	29,471
Total Square Feet	**60,613**
Renovation	
Building 209, Logistics Readiness Squadron (Internal fencing and vault)	7,244
Building 426, Wing Air Refueling Pod (WARP) storage and maintenance	2,423
Building 434, (Hangar 6) FuT	36,285
Building 436, (Hangar 2) AME	28,686
Building 439, (Hangar 1) Maintenance/Various Shops	12,971
Building 453, Composite Maintenance Shop	9,731
Building 473, Renovate Lodging (convert rooms into first-term Airmen/Single Airman Quarters)	28,579
Building 663, Squadron Operations	25,973
Building 668, Flight Simulators (WST/BOT)	13,154
Relocation of two portable sheds (PB-56 and unnamed)	100
New pavement parking ramp	15,000
Total Square Feet	**180,146**
New Construction	
2-Bay Hangar (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	157,358
Building 563, Fitness Center	26,242
Total Square Feet	**183,600**

One new two-bay hangar would be constructed along the existing flightline to support the KC-46A MOB 3 mission at Grissom ARB. Construction of this facility would require the demolition of Buildings 437 and 438. New construction would also be required for an expansion to the fitness center. Renovations would be required in nine buildings (209, 426, 434, 436, 439, 453, 473, 663, and 668). Two small, portable sheds would be relocated, and an area of pavement within the aircraft parking ramp would be upgraded (Figure 2-4). Building 670 is currently funded for renovations which would occur with or without the KC-46A MOB 3 beddown. Should the MOB 3 beddown occur, the building would be used for maintenance supply. Three additional buildings would be used by the KC-46A MOB 3 mission, but no changes to those buildings would occur. Building 7075 would be used for Aerial Port Squadron, Airlift Control Element, AME, and potable water truck parking. Buildings 1610 and 7087 would be used by KC-46A personnel and as additional storage space.

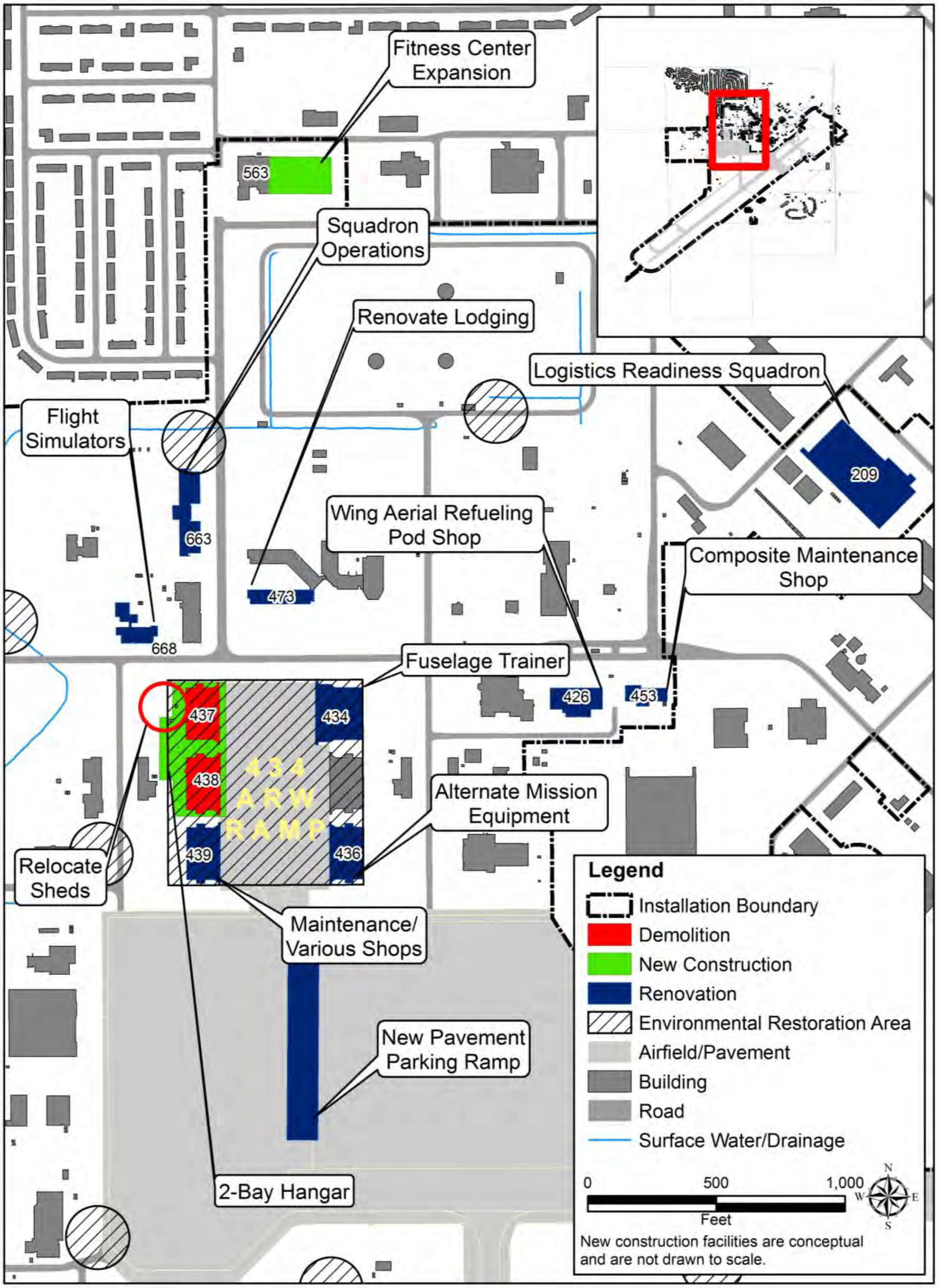

Figure 2-4. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB

Although a military dining facility is located on Grissom ARB, it is only operational during Unit Training Assembly (UTA) weekends due to Traditional Reservists only operating this facility during drill weekends. Therefore, personnel associated with the proposed KC-46A MOB 3 mission would utilize commercial dining facilities outside of Grissom ARB. Also, childcare is not available on Grissom ARB. The EIS assumes that childcare will not be available on the installation.

2.5.1.2.2 Personnel

The 434 ARW at Grissom ARB is authorized 1,605 personnel: 47 military, 246 DoD Civilians and 1,312 part-time Reservists (Table 2-4). Currently, the base has approximately 1,715 personnel, which includes 110 contractors in addition to the 1,605 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-4. Personnel Changes for the KC-46A MOB 3 Mission at Grissom ARB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	47	0	47
Dual Status Technician (Reserve, civilians, Federal)	305	+45	350
Non-Dual Status (DoD civilians)	246	-2	244
Contractors[a]	110	+15	125
Subtotal	**708**	**+217**	**925**
Part Time			
Drill Status Reservists	1,312	-117	1,195
Total Personnel Authorizations[b]	2,020	+100	2,120
Total Personnel on Base[c]	**1,715**	**+55**	**1,770**

[a] Contractors are not authorized on the Unit Manning Document (UMD). They are categorized as "other base personnel."
[b] Some personnel work off-site but are assigned to the unit.
[c] Total personnel supporting the 434 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Grissom ARB would result in a net increase of 55 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 972 dependents currently associated with the non-contractor, full-time personnel at Grissom ARB live in communities surrounding the installation. Approximately 328 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.1.2.3 Aircraft Operations

The 434 ARW currently flies 1,100 sorties per year (Table 2-5) and an average of three additional practice approaches per sortie, for a total of 8,800 annual airfield operations. Approximately 19 percent of total operations are currently flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). A variety of different military transient aircraft (including A-10, C-130, C-17, C-5, F-18, CH-46 and UH-60 aircraft) conduct operations at Grissom ARB. Of the 2,450 transient aircraft operations per year, 11 percent are conducted during acoustic night. The majority of the annual 4,618 civilian aircraft operations are conducted by general aviation aircraft, and only 2 percent of these operations are conducted during acoustic night.

Table 2-5. Baseline Airfield Operations at Grissom ARB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-135	1,100	0	858	242	5,148	1,452	7,106	1,694	8,800
Transient	879	132	879	132	428	0	2,186	264	2,450
Civilian	2,263	46	2,263	46	0	0	4,526	92	4,618
Total	**4,242**	**178**	**4,000**	**420**	**5,576**	**1,452**	**13,818**	**2,050**	**15,868**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern. Data are based on information provided by the 434 ARW.
[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

After the aircraft beddown, KC-46A aircrews associated with the MOB 3 mission would fly approximately 1,219 annual sorties and an average of four additional practice approaches per sortie, for a total of 7,310 airfield operations per year (Table 2-6). The 17 percent net decrease in tanker operations does not directly correspond to the 25 percent decrease in PAA (from 16 KC-135 aircraft to 12 KC-46A aircraft), because each KC-46A aircraft would be flown more frequently than the KC-135 aircraft are currently being flown. Approximately 5 percent of KC-46A operations would occur during acoustic night. Grissom ARB-based KC-46A aircrews would occasionally conduct practice approaches at other airfields according to aircrew preference and training requirements. No single airfield other than Grissom ARB would be used by the KC-46A on more than an occasional basis.

Table 2-6. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Grissom ARB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	1,219	0	1,097	122	4,628	244	6,944	366	7,310[c]
Transient	879	132	879	132	428	0	2,186	264	2,450
Civilian	2,263	46	2,263	46	0	0	4,526	92	4,618
Total	**4,361**	**178**	**4,239**	**300**	**5,056**	**244**	**13,656**	**722**	**14,378**

[a] An operation is the accomplishment of a single maneuver such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.
[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.
[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.5.2 Seymour Johnson Air Force Base, North Carolina

The USAF has identified Seymour Johnson AFB as the preferred alternative for the MOB 3 mission of 12 KC-46A aircraft. The 12 KC-46A aircraft would replace the 16 KC-135 aircraft currently located at Seymour Johnson AFB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations that would occur with implementation of the MOB 3 mission.

2.5.2.1 Seymour Johnson AFB Overview

Seymour Johnson AFB is located in Wayne County, North Carolina, within the city limits of Goldsboro (see Figure 2-5). The 3,233-acre installation hosts one east-to-west runway (Runway 08/26) that is 11,758 feet long by 300 feet wide. The overall layout of existing facilities and infrastructure at Seymour Johnson AFB is shown on Figure 2-6. The host unit at Seymour Johnson AFB is the 4th Fighter Wing (FW) which flies the F-15E fighter. A second flying wing (916 ARW) under the command of AFRC is stationed at Seymour Johnson AFB. The 916 ARW flies the KC-135.

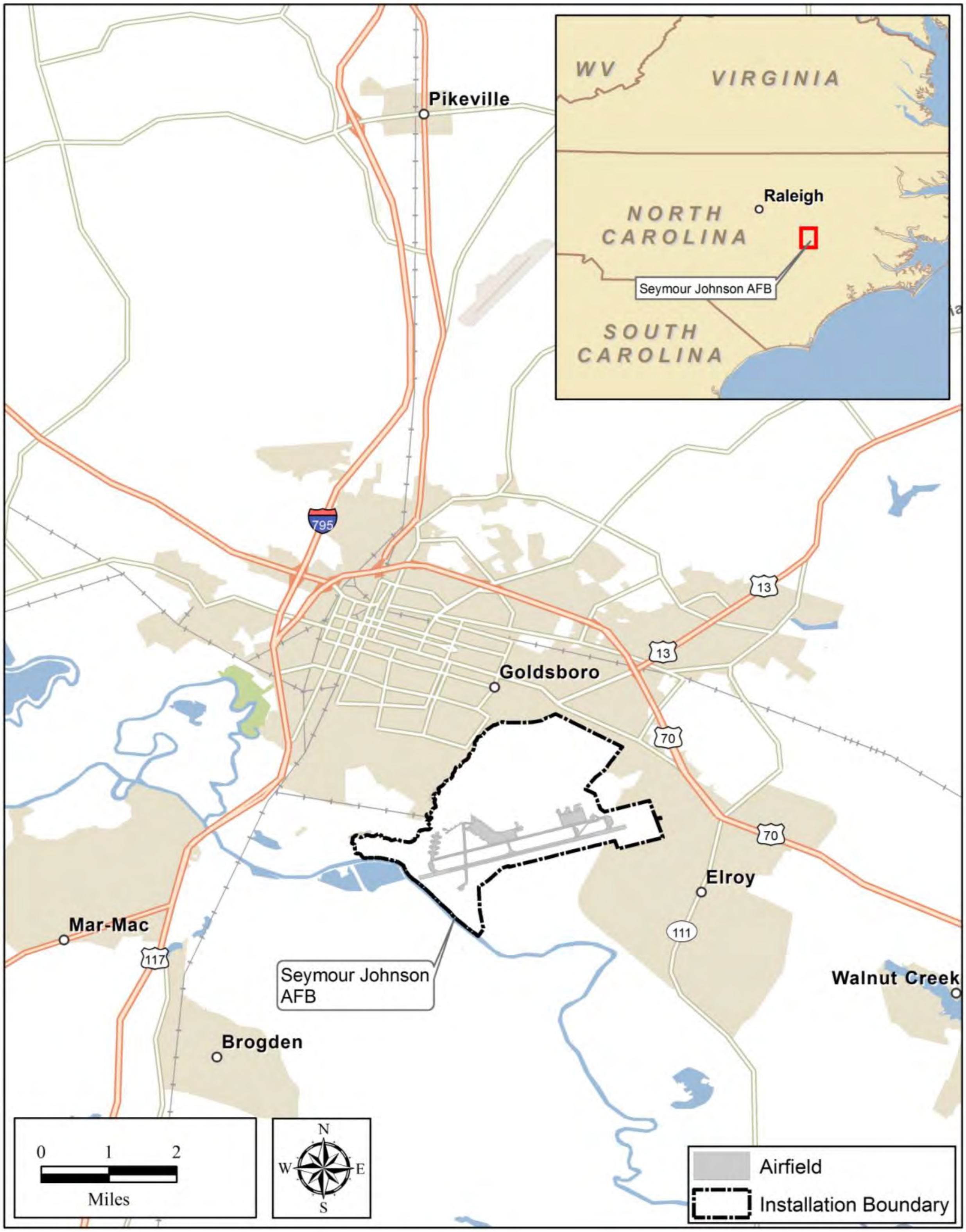

Figure 2-5. Regional Location of Seymour Johnson AFB

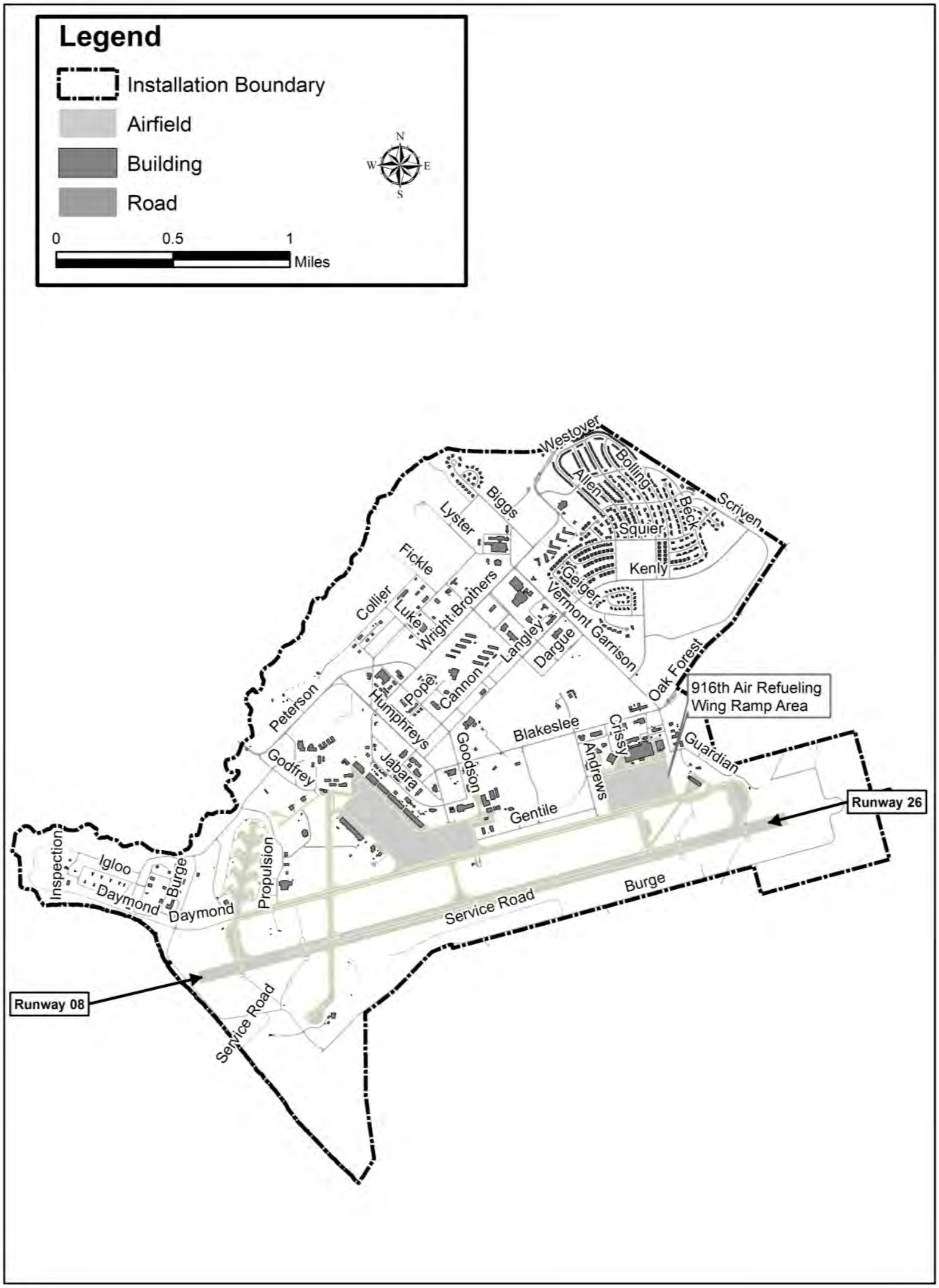

Figure 2-6. Base Overview of Seymour Johnson AFB

Seymour Johnson Field was activated in June 1942 as Headquarters (HQ), Technical School, Army Air Forces Technical Training Command. Shortly after the conclusion of World War II, the field was deactivated. In 1956 the installation was reactivated as a Tactical Air Command Base and the 83rd Fighter-Day Wing was assigned to the base. The 4 FW replaced the 83rd in December, 1957. Through the years the base has housed B-52 bombers, KC-10 and KC-135 tankers, and F-4, F-15E, and F-16 fighters.

2.5.2.2 MOB 3 Beddown Specifics

This section details the actions that would occur at Seymour Johnson AFB if selected to base 12 KC-46A aircraft for the MOB 3 mission. The MOB 3 mission would replace the existing KC-135 aerial refueling mission at Seymour Johnson AFB and result in a net decrease of four PAA. The 4 FW operations at Seymour Johnson would continue unchanged.

The USAF determined that Seymour Johnson AFB's infrastructure and base resources could accommodate the basic requirements for a KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

2.5.2.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Most of these requirements are met through existing infrastructure. However, the proposed MOB 3 beddown at Seymour Johnson AFB would require some new construction, demolition of existing facilities, and renovations to some existing facilities. The projects anticipated to be required to support the KC-46A MOB 3 mission at Seymour Johnson AFB are listed in Table 2-7. The proposed redevelopment would take place near the 916 ARW parking ramp within the previously disturbed cantonment area of Seymour Johnson AFB (see Figure 2-7).

Table 2-7. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB

Project	Facility Size (square feet)
Demolition	
Hangar 4909	76,270
Building 4911	1,436
Total Square Feet	**77,706**
Renovation	
Building 4810, Logistics Readiness Squadron/Supply	3,983
Building 4822, FuT	41,635
Building 4828, KC-46A Various Shops	24,004
Building 4908, Maintenance	32,421
Building 4916, Flight Simulators (WST/BOT), Squadron Operations	40,009
Total Square Feet	**142,052**
New Construction	
2-Bay Hangar (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)[a]	180,095
Building 4906, AFE addition	2,551
Total Square Feet	**182,646**

[a] This project includes a new apron access from the new two-bay hangar to the parking ramp.

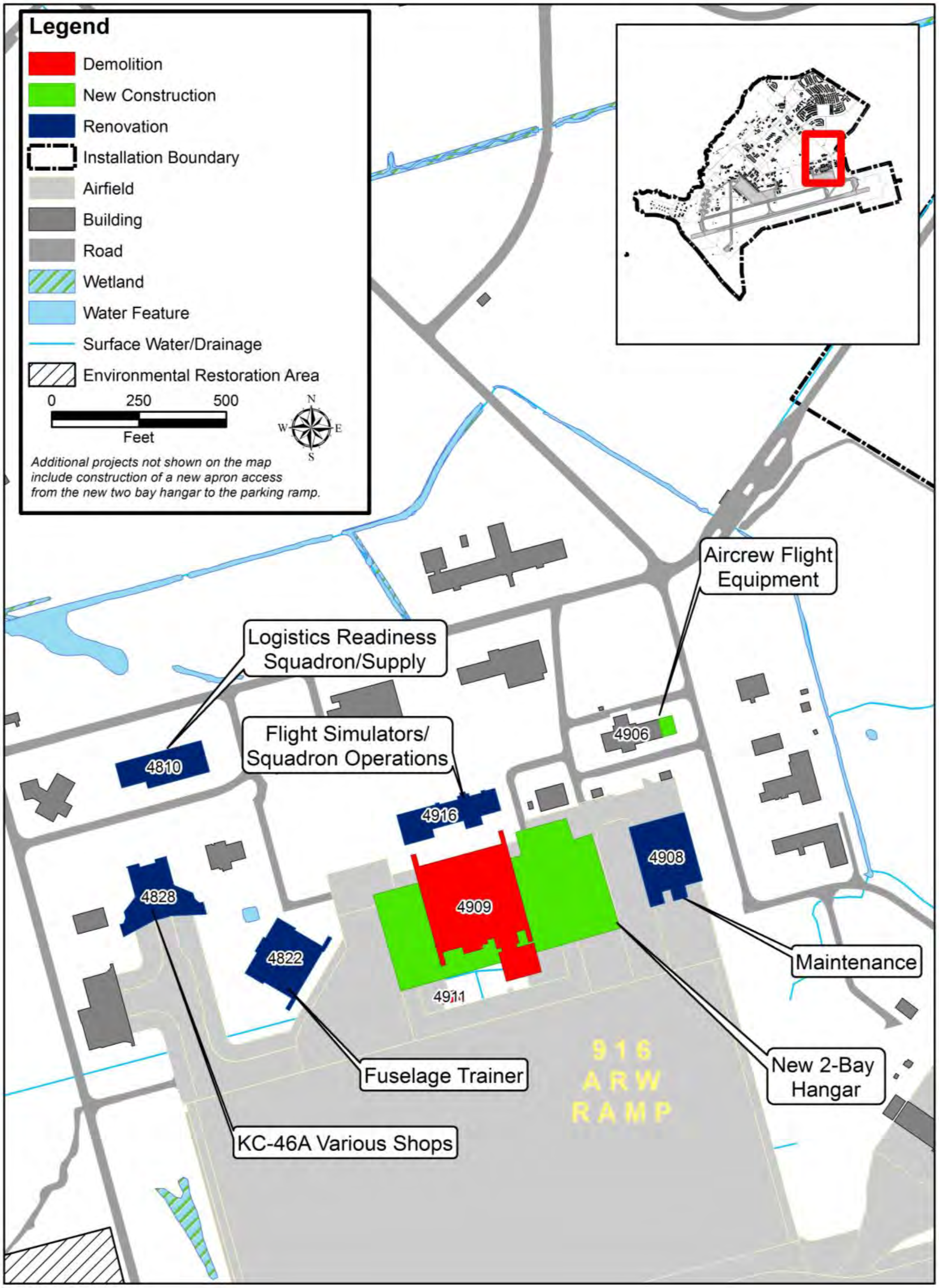

Figure 2-7. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB

One new two-bay hangar would be constructed along the existing 916 ARW flightline area to support the replacement mission at Seymour Johnson AFB. Construction of this facility would require the demolition of Building 4911 and Hangar 4909. New construction would also be required for an expansion to Building 4906 to house the AFE function. Renovations would be required in five buildings (4810, 4822, 4828, 4908, and 4916) to accommodate mission personnel and equipment storage. Building 4901 would be used to house the Combat Crew Communication, but no renovations would be required.

2.5.2.2.2 Personnel

The 916 ARW at Seymour Johnson AFB is authorized 1,315 personnel: 192 military, 28 DoD Civilians, and 1,095 part-time Reservists (Table 2-8). Currently, the 916 ARW has approximately 1,329 personnel, which includes 14 contractors in addition to the 1,315 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-8. Personnel Changes for the KC-46A MOB 3 Mission at Seymour Johnson AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	188	-29	159
Active Reserve	4	0	4
Dual Status Technician (Reserve, civilians, Federal)	268	+67	335
Non-Dual Status (DoD civilians)	28	0	28
Contractors[a]	14	+15	29
Subtotal	**502**	**+53**	**555**
Part Time			
Drill Status Reservists	1,095	-101	994
Total Personnel Authorizations[b]	1,597	-48	1,549
Total Personnel on Base[c]	**1,329**	**-115**	**1,214**

[a] Contractors are not authorized on the UMD. They are categorized as "other base personnel."
[b] Some personnel work off-site but are assigned to the unit.
[c] Total personnel supporting the 916 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Seymour Johnson AFB would result in a net decrease of 115 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 488 dependents currently associated with the non-contractor, full-time personnel in the 916 ARW at Seymour Johnson AFB live in communities surrounding the installation. Approximately 62 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.2.2.3 Aircraft Operations

The 916 ARW currently flies 756 sorties per year (Table 2-9), with each sortie conducting approximately 1 additional practice approach per sortie on average. Of the 2,568 total annual airfield operations flown by the 916 ARW, approximately 13 percent are flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). The four stationed F-15E fighter squadrons comprise the majority of aircraft operations at Seymour Johnson AFB, flying 55,800 operations annually. A variety of military transient aircraft conduct operations at Seymour Johnson AFB, including C-130, C-17, and others. F-15E and transient aircraft both conduct only 2 percent of total airfield operations during acoustic night.

Table 2-9. Baseline Airfield Operations at Seymour Johnson AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-135	748	8	567	189	914	142	2,229	339	2,568
F-15E	18,000	0	16,919	1,081	19,575	225	54,494	1,306	55,800
Transient	459	12	467	4	0	0	926	16	942
Total	**19,207**	**20**	**17,953**	**1,274**	**20,489**	**367**	**57,649**	**1,661**	**59,310**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern. Data are based on information provided by the 916 ARW.

[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct a higher number of arrivals and patterns without a corresponding number of night departures. The same applies for F-15E.

After the aircraft beddown, KC-46A aircrews associated with the proposed MOB 3 mission would fly approximately 1,270 annual sorties and an average of 1.4 additional practice approaches per sortie, for a total of 4,314 operations per year (Table 2-10). As is the case with current KC-135 operations, KC-46A aircrews would conduct many of their practice airfield approaches at other airfields to de-conflict with the F-15E mission at Seymour Johnson AFB. However, per sortie on average, KC-46A aircrews would conduct a larger number of additional practice approaches at home base than KC-135 aircrews. The increased number of home base practice approaches per sortie and the increased frequency of usage of each KC-46A aircraft would result in the total number of annual tanker airfield operations increasing by 68 percent following beddown of the KC-46A. This increase would occur despite the 25 percent reduction in number of tanker aircraft assigned to the base. KC-46A aircrews would conduct 5 percent of total operations during acoustic night. Seymour Johnson AFB-based KC-46A aircrews would primarily use the Kinston Regional Jetport for off-station practice approaches, conducting up to 1,623 airfield operations at that location (Figure 2-8). Other airfields would be used on an occasional basis.

Table 2-10. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Seymour Johnson AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	1,270	0	1,143	127	1,685	89	4,098	216	4,314[c]
F-15E	18,000	0	16,919	1,081	19,575	225	54,494	1,306	55,800
Transient	459	12	467	4	0	0	926	16	942
Total	**19,729**	**12**	**18,529**	**1,212**	**21,260**	**314**	**59,518**	**1,538**	**61,056**

[a] An operation is the accomplishment of a single maneuver such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.

[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures. The same applies for F-15E.

[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

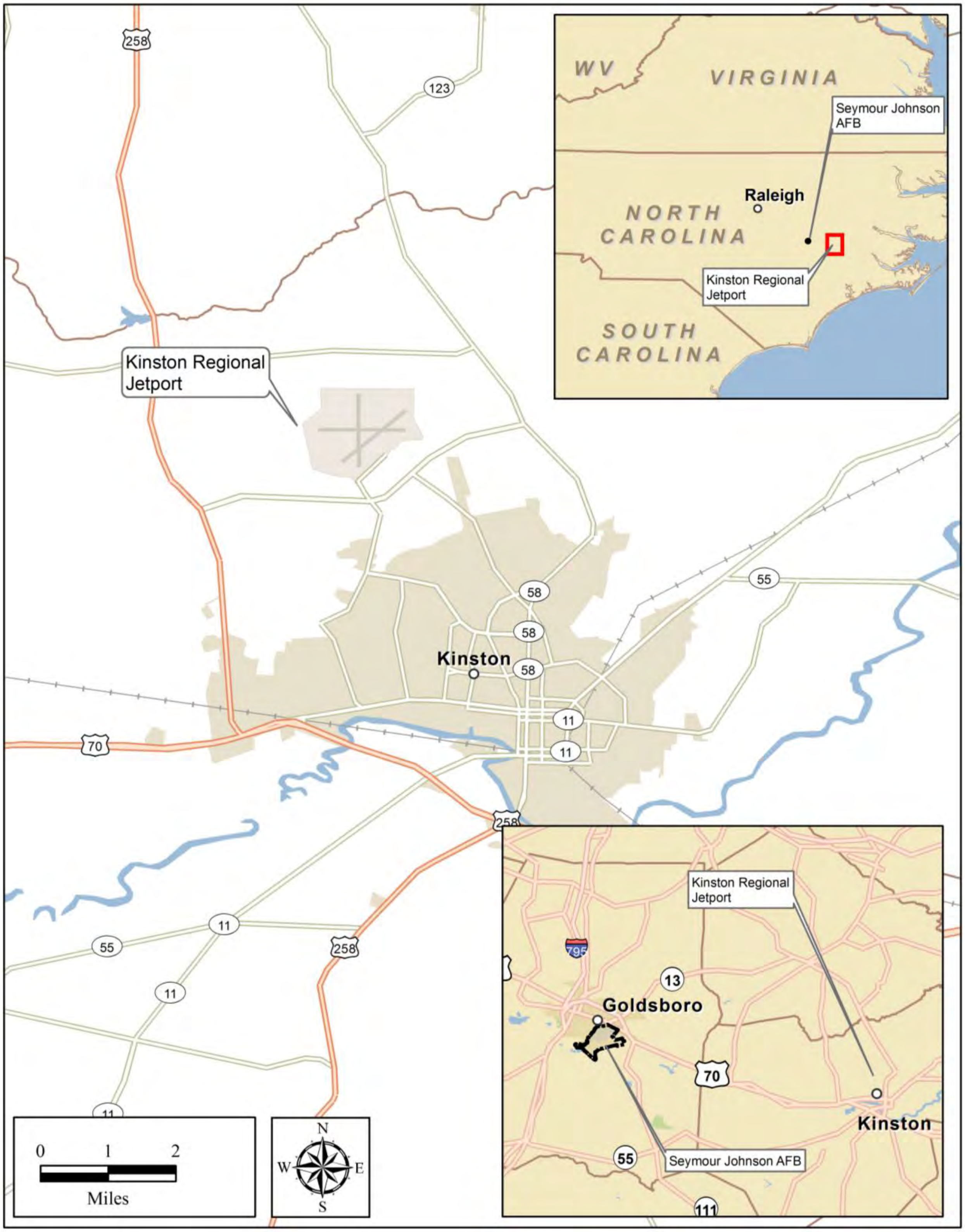

Figure 2-8. Auxiliary Airfield for Seymour Johnson AFB

2.5.3 Tinker Air Force Base, Oklahoma

The USAF is considering Tinker AFB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. The 12 KC-46A aircraft would replace the 8 KC-135 aircraft currently stationed at Tinker AFB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations associated with implementation of the MOB 3 mission.

2.5.3.1 Tinker AFB Overview

Tinker AFB is located in Oklahoma County, Oklahoma, within Oklahoma City limits (see Figure 2-9). The installation is located 10 miles southeast of downtown. Nearby towns include Midwest City to the north and Del City to the northwest.

The installation encompasses approximately 5,588 acres of land and hosts two runways. Runway 18/36 is a north-south runway that is 11,100 feet long and 200 feet wide. Runway 13/31 is a crosswind runway that is 10,000 feet long and 200 feet wide. Figure 2-10 shows an overhead view of the base.

The host unit at Tinker AFB is the 72nd Air Base Wing (ABW). The 72 ABW provides base installation and support services for the Oklahoma City Air Logistics Complex (OC-ALC), the Air Force Sustainment Center (AFSC), and more than 45 associate units assigned to six MAJCOMs. The OC-ALC performs depot maintenance on KC-135, B-1B, B-52, F-35, and E-3 aircraft and will provide depot maintenance on the KC-46A. The OC-ALC also performs maintenance for the Navy E-6 and for select aircraft engines within the USAF, ANG, Navy, and foreign military inventories.

The AFSC HQ, located at Tinker AFB, provides expeditionary capabilities to the warfighter through depot maintenance, supply chain management, and installation support. The AFSC consolidates oversight of the maintenance missions performed at OC-ALC, Warner Robins Air Logistics Complex (ALC), and Ogden ALC. The AFSC also has responsibility for supply chain management at Tinker and Scott AFBs.

Tinker AFB is home to six other major DoD, USAF, and Navy activities, including the 552nd Air Control Wing, the Navy's Strategic Communications Wing 1, the 38th Cyberspace Engineering Installation Group, Defense Logistics Agency (DLA) Distribution, the Defense Information Security Agency (DISA) Defense Enterprise Computing Center, and the 507th ARW.

The 507 ARW is the largest AFRC flying unit in the State of Oklahoma. The Wing operates and maintains 8 KC-135. The 507 ARW reports to the 4th Air Force and performs daily missions in support of AMC and the U.S. Strategic Command.

Tinker AFB's history began with an order in April 1941 establishing the installation as a maintenance and supply depot. During World War II, the installation's industrial facilities repaired B-24 and B-17 bombers and fitted B-29s for combat. The installation has continued to operate through the Korean Conflict, the Vietnam War, and Operations Desert Shield and Desert Storm.

2.5.3.2 MOB 3 Beddown Specifics

This section details the actions necessary at Tinker AFB if selected for the basing of the KC-46A MOB 3 mission. The MOB 3 mission would replace the existing KC-135 mission at Tinker AFB. The USAF determined that Tinker AFB's infrastructure and base resources could accommodate the basic requirements for a KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

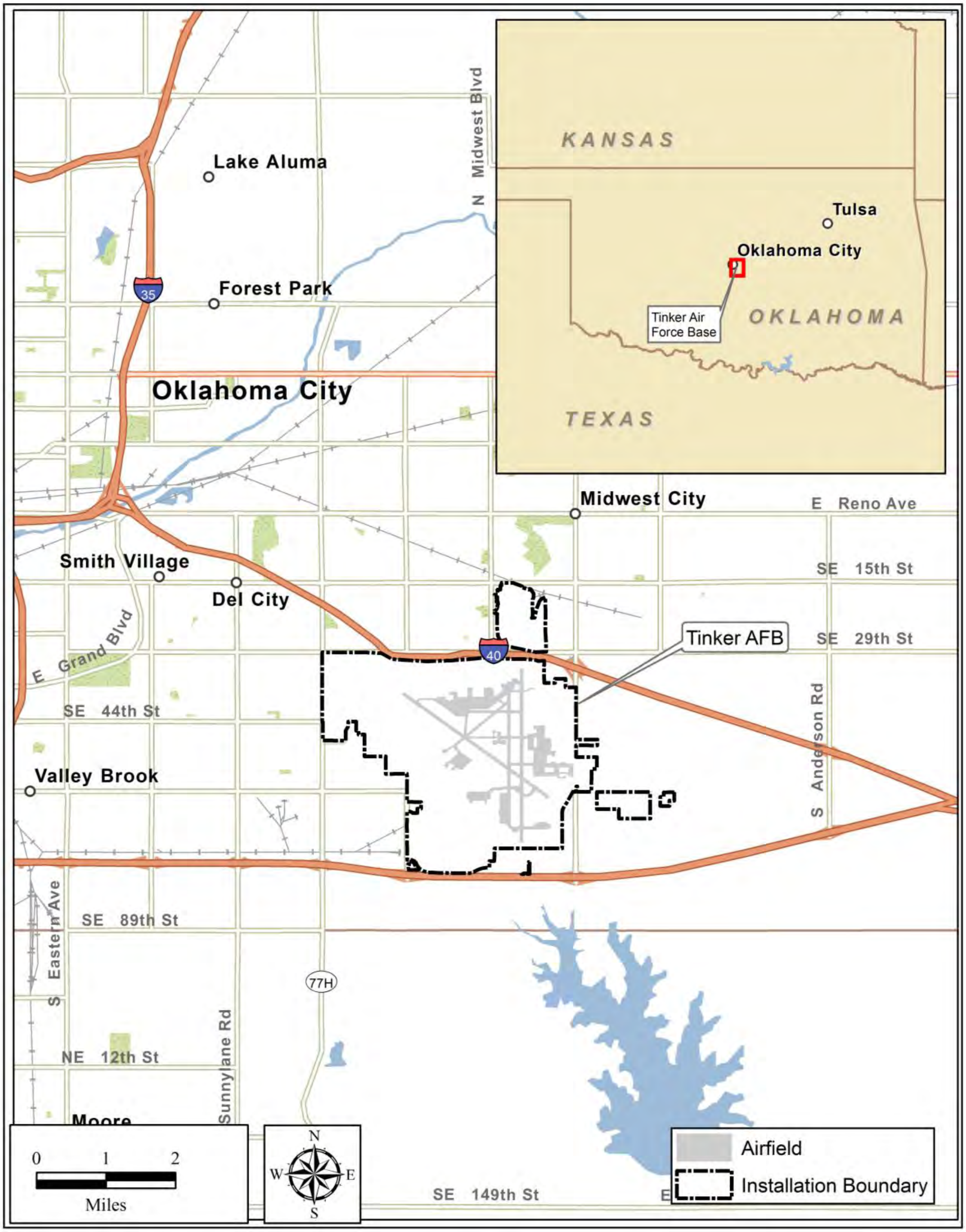

Figure 2-9. Regional Location of Tinker AFB

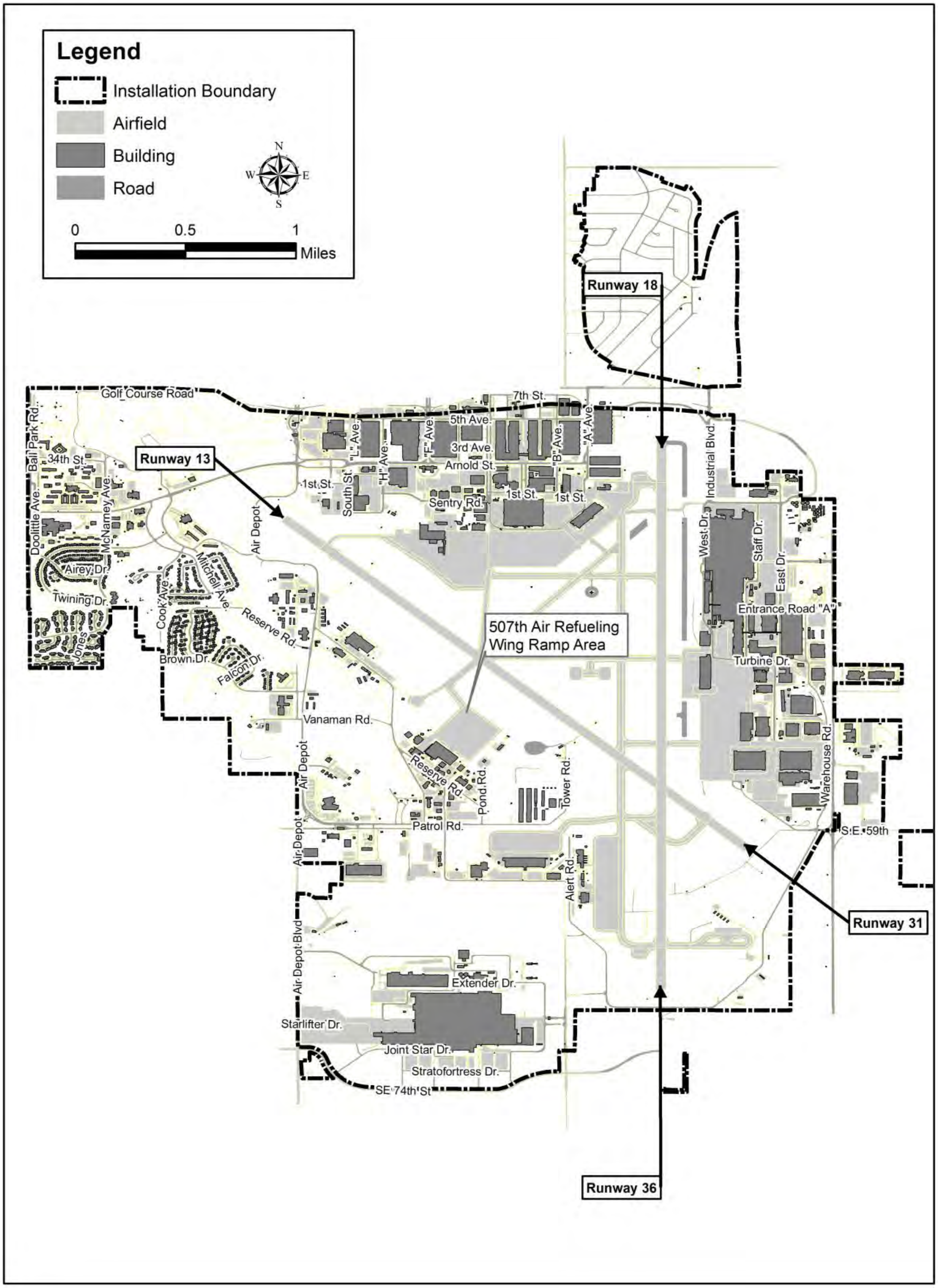

Figure 2-10. Base Overview of Tinker AFB

2.5.3.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Tinker AFB has the basic physical real estate and infrastructure to beddown the KC-46A MOB 3 mission; however, certain projects are required to support the KC-46A MOB 3 beddown at Tinker AFB (Table 2-11). Some of the existing facilities, airfield ramp space, and hangars are currently utilized for the day-to-day KC-135 missions. Due to ongoing base operations and the KC-46A aircraft mission requirements, new construction, demolitions, and renovations would be required for the KC-46A MOB 3 mission (see Figure 2-11).

Table 2-11. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

Project	Facility Size (square feet)
Demolition	
Building 1030 [a] (to make room for new 2-Bay Hanger with Apron Access)	99,184
Building 1067 (to make room for new 2-Bay Hanger with Apron Access)	11,460
Building 1068 [a] (to make room for new 2-Bay Hanger with Apron Access)	19,775
Building 1069 (to make room for new 2-Bay Hanger with Apron Access)	250
Deicing Detention Basin	7,330
Total Square Feet	**137,999**
Renovation	
Hangar 1053, Various KC-46A Shops and Storage	10,000
Building 1056, Maintenance Leadership Facility	10,000
Building 1082, FuT	15,000
Hydrant Pit repositioning	Not Applicable
Total Square Feet	**35,000**
New Construction	
2-Bay Hanger with Apron Access (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	200,000
Flight Simulators (WST, BOT)	10,500
Ramp and Shoulder expansion	114,000
Total Square Feet	**324,500**

[a] Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

Two new facilities and additional ramp space would be constructed to support the new mission at Tinker AFB. The largest new construction would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and would also require the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities and within the current hydrant fueling system on the current KC-135 ramp.

Interior renovations would occur in Hangar 1053 and Buildings 1056 and 1082 to accommodate mission personnel and equipment storage. Although Buildings 11, 260, 469, 1048, 1059, 1071, and 1112 would be used to house various KC-46A functions, including logistics warehousing, engine storage, maintenance, squadron operations, and airfield equipment, no renovations would be required for the use of these buildings. The aircraft requirements used to determine ramp parking would require a reconfiguration of parking spaces on the current KC-135 ramp. This relocation of parking spaces would require the existing hydrant pits associated with each KC-135 aircraft to be relocated to the proposed KC-46A parking locations.

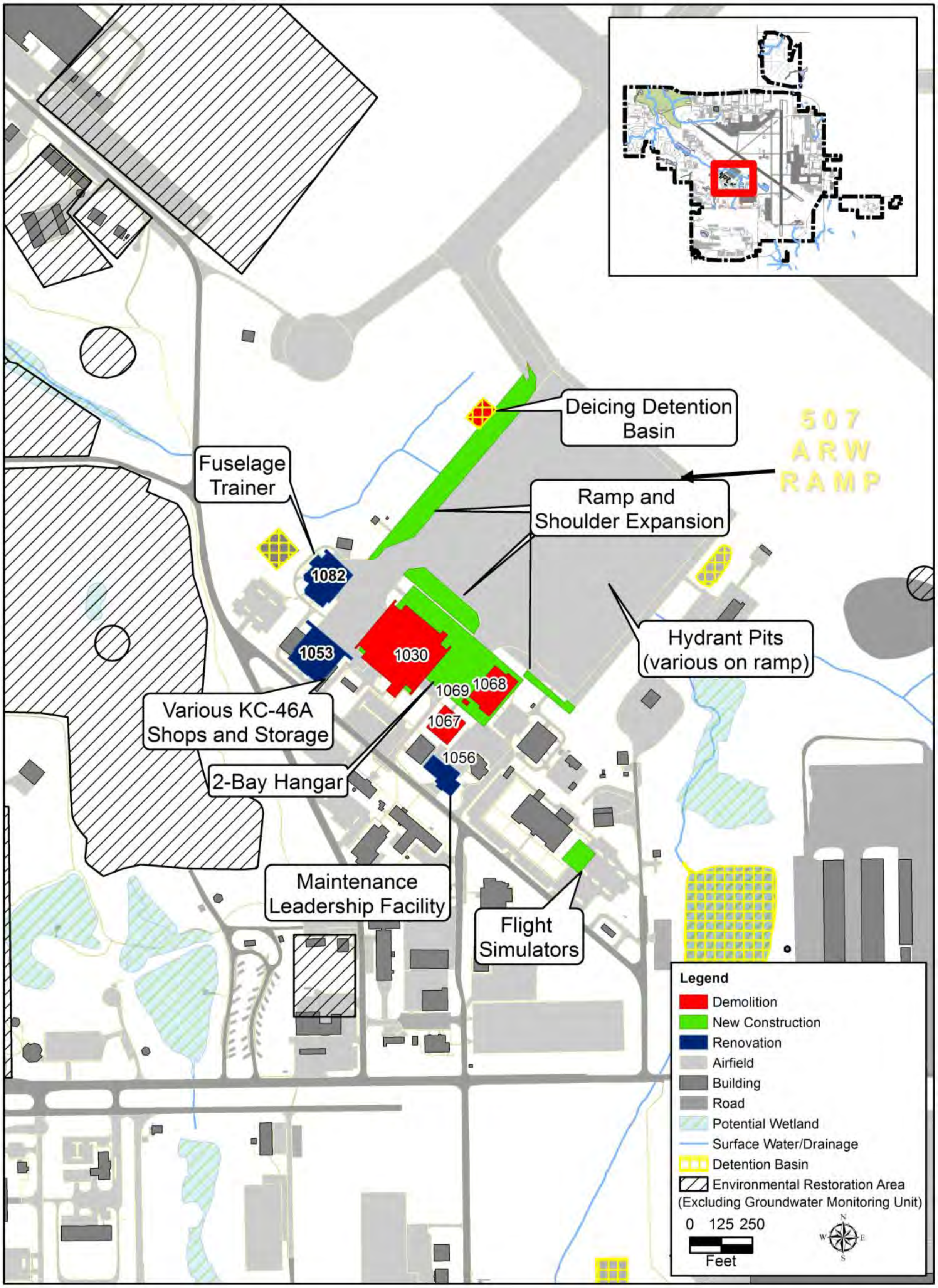

Figure 2-11. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

2.5.3.2.2 Personnel

The 507 ARW at Tinker AFB is authorized 1,032 personnel: 3 military, 27 DoD Civilians, and 1,002 part-time Reservists (Table 2-12). AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-12. Personnel Changes for the KC-46A MOB 3 Mission at Tinker AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	3	0	3
Dual Status Technician (Reserve, civilians, Federal)	214	+129	343
Non-Dual Status (DoD civilians)	27	+5	32
Contractors[a]	0	+15	15
Subtotal	**244**	**+308**	**552**
Part Time			
Drill Status Reservists	1,002	+232	1,234
Total Personnel Authorizations[b]	1,246	+540	1,786
Total Personnel on Base[c]	**1,032**	**+411**	**1,443**

[a] Contractors are not authorized on the UMD. They are categorized as "other base personnel."
[b] Some personnel work off-site but are assigned to the unit.
[c] Total personnel supporting the 507 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Tinker AFB would result in a net increase of 411 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 397 dependents currently associated with the non-contractor, full-time personnel in the 507 ARW at Tinker AFB live in communities surrounding the installation. Approximately 476 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.3.2.3 Aircraft Operations

The 507 ARW currently flies 400 sorties per year and an average of 2 additional practice approaches per sortie, for a total of 2,399 total annual airfield operations (Table 2-13). Of the total annual operations flown by the 507 ARW, approximately 11 percent are flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). Other based aircraft (i.e., E-3, B-737, and E-6) conduct a combined total of 18,708 operations per year, with 10 percent of their total operations occurring during acoustic night. An additional 4,468 operations are conducted annually at Tinker AFB by KC-135, E-3, B-52, and B-1 aircraft as part of the depot maintenance mission. A wide variety of transient aircraft visit the base, conducting a total of 4,988 operations annually. Depot and transient aircraft infrequently conduct flying operations during acoustic night.

Table 2-13. Baseline Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-135	400	0	360	40	1,371	228	2,131	268	2,399
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	**4,065**	**84**	**3,877**	**272**	**22,042**	**1,859**	**29,984**	**2,215**	**32,199**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 507 ARW.
[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

After the aircraft beddown, KC-46A aircrews associated with the proposed MOB 3 mission would fly approximately 1,150 annual sorties and an average of 3.5 additional practice approaches per sortie, for a total of 6,440 operations per year (Table 2-14). The 168 percent increase in annual tanker operations would result from an increase in the number of assigned tanker aircraft (from 8 KC-135 to 12 KC-46A), an increase in the frequency at which each aircraft is flown, and an increase in the number of practice approaches per sortie. KC-46A aircrews would conduct approximately 11 percent of total operations during acoustic night. KC-46A aircraft would begin to be processed through depot maintenance, increasing total depot airfield operations from 4,468 to 6,104 per year. Practice approaches would be conducted at airfields other than Tinker AFB on an occasional basis.

Table 2-14. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	1,150	0	1,034	116	3,547	593	5,731	709	6,440[c]
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	**4,815**	**84**	**4,551**	**348**	**24,218**	**2,224**	**33,584**	**2,656**	**36,240**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.
[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.
[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.5.4 Westover Air Reserve Base, Massachusetts

The USAF is considering Westover ARB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. The proposed KC-46A MOB 3 mission would add to the existing missions at Westover ARB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations associated with implementation of the MOB 3 mission.

2.5.4.1 Westover ARB Overview

Westover ARB is located in Hampden County, Massachusetts, within the city limits of Chicopee and Ludlow (see Figure 2-12). The installation is located six miles northeast of downtown Springfield, Massachusetts. Other nearby towns include Holyoke and West Springfield.

Figure 2-12. Regional Location of Westover ARB

The installation encompasses approximately 2,390 acres of land and hosts two runways. Runway 05/23 is a north-south runway that is 11,598 feet long and 300 feet wide. Runway 15/33 is a crosswind runway that is 7,082 feet long and 150 feet wide. Figure 2-13 shows an overhead view of the base.

The 439th Airlift Wing (AW), a unit of AFRC, is assigned to Westover ARB and operates 14 C-5B airlifters. The 439 AW reports to the 4th Air Force. The 337th Airlift Squadron is the Wing's flying unit.

Westover AFB opened in April 1940 as part of a war-readiness appropriation signed by President Franklin D. Roosevelt. The base served as a bomber training base and as a station for anti-submarine operations. After World War II, the base took on a role supporting the Berlin Airlift. Westover AFB remained active during the Cold War as a Military Air Transport Service Base. In 1955, the 4050 ARW, flying the KC-97 tanker, was assigned as the host unit responsible for base operations. The first KC-135 Stratotankers arrived at the base in August 1957. From 1955 to 1970, the 8th Air Force was headquartered at Westover AFB. The base was turned over to AFRC in 1974.

Since 1974, Westover ARB has been an AFRC base. The base operated C-130 Hercules and C-123 Provider aircraft until 1987, when the C-5 became the primary aircraft operating from the base. Since 1987, C-5 aircraft have operated at Westover ARB. The C-5 aircraft at Westover ARB have been used to fly missions in support of United Nations Peacekeeping, Desert Shield, Desert Storm, Kosovo, the Global War on Terror, and other missions across the globe. C-5 aircraft from Westover ARB were also used in support of firefighting activities during the 1988 Yellowstone National Park fires. In addition to AFRC units, the base is also home to an Army Reserve Training Battalion and a unit of Navy Seabees.

2.5.4.2 MOB 3 Beddown Specifics

This section details the actions necessary at Westover ARB if selected for the basing of the KC-46A MOB 3 mission. Implementation of the MOB 3 mission would beddown 12 PAA KC-46A aircraft, facilities and infrastructure, and manpower. The USAF determined that infrastructure and base resources at Westover ARB could accommodate the basic requirements for the KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

2.5.4.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. The projects anticipated to be required to support the KC-46A MOB 3 mission at Westover ARB are listed in Table 2-15 and illustrated on Figure 2-14. Although some of these requirements are met through existing infrastructure and facilities on Westover ARB, new construction, renovation, and demolition would be required.

There is no military dining facility located on Westover ARB. Therefore, personnel associated with the proposed KC-46A MOB 3 mission would utilize off base commercial dining facilities. Also, childcare is not available on Westover ARB. The EIS assumes that childcare will not be available on the installation.

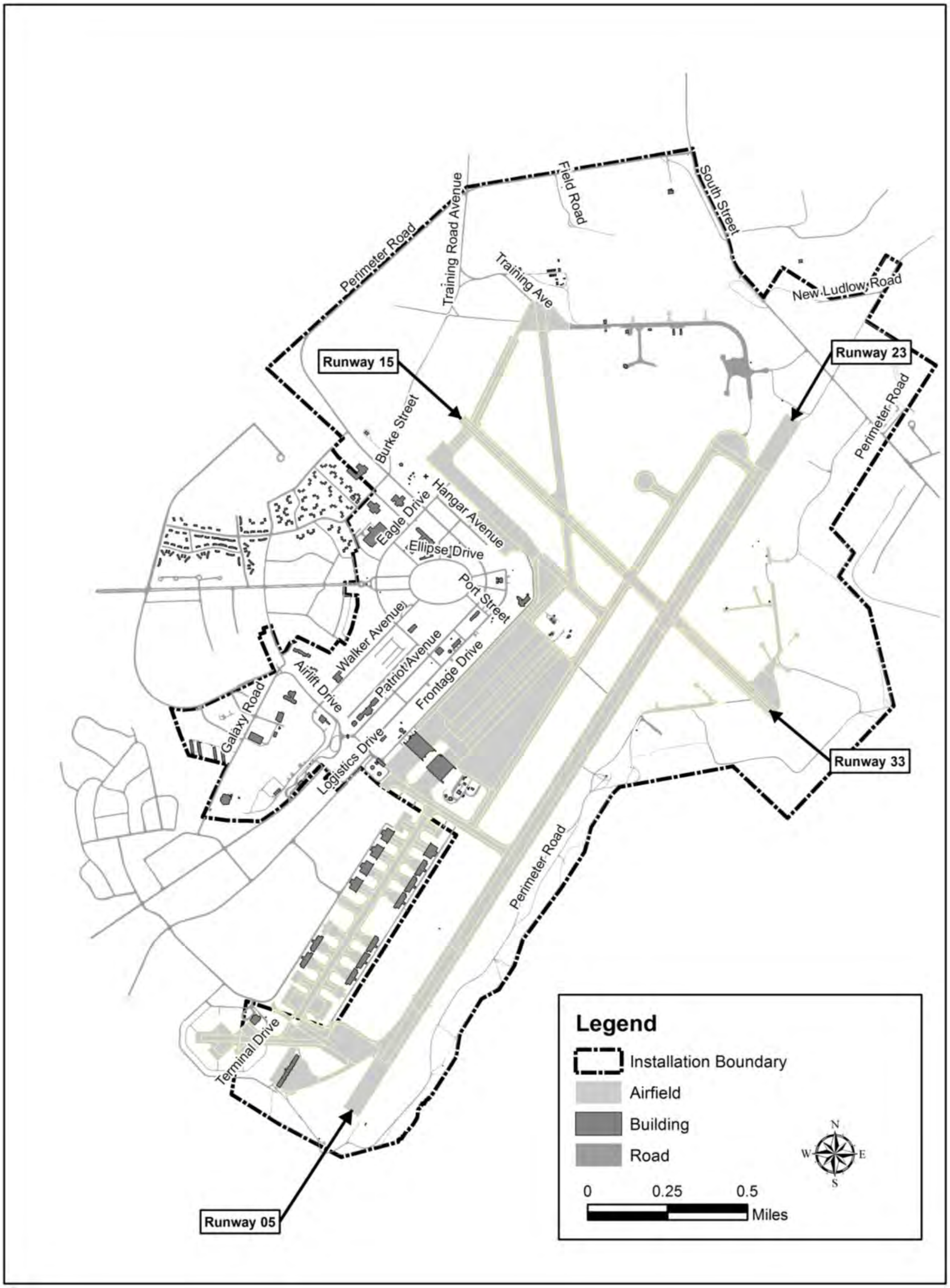

Figure 2-13. Base Overview of Westover ARB

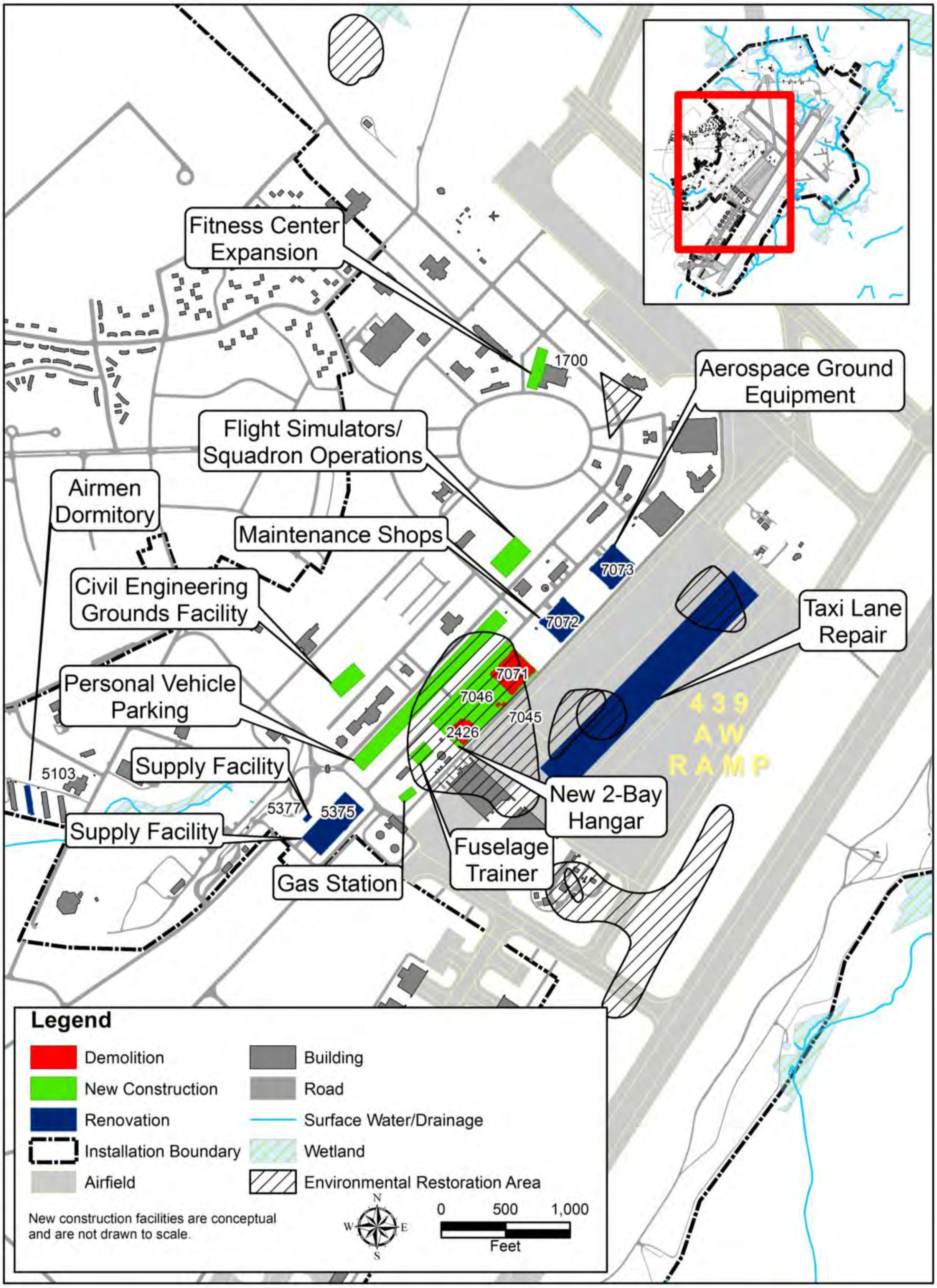

Figure 2-14. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB

Table 2-15. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB

Project	Facility Size (square feet)
Demolition	
Building 2426[a]	24,588
Building 7071[a]	74,313
Building 7045, Gas station relocation	720
Building 7046, Gas station relocation	720
Total Square Feet	**100,341**
Renovation	
Parking Ramp Taxi Lane Repair	941,585
Building 7072, Maintenance Shops	1,000
Building 7073 (Hangar 5), AGE	15,000
Building 5103, Airmen Dormitory	28,579
Building 5375 and 5377, Supply Facilities (secure storage vault and fencing)	Not applicable
Total Square Feet	**986,164**
New Construction	
2-Bay Hanger (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops, and Personal Vehicle Parking)	217,772 (Parking is additional 164,858)
Flight Simulators/Squadron Operations	65,626
Fuselage Trainer	13,018
Civil Engineering Grounds Facility	7,503
Gas Station (Relocate)	1,440
Fitness Center Expansion	26,242
Total Square Feet	**496,459**

[a] Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

Six new facilities would be constructed to support the new mission at Westover ARB. The largest new construction would be a 2-bay hangar built along the existing flightline. Construction of this facility would require the demolition of Buildings 2426 and 7071, and the relocation of a government vehicle gas station (Buildings 7045 and 7046). Other new construction includes two new training facilities (flight simulators/squadron operations and FuT); a new facility for Civil Engineering Grounds; and a new addition would be constructed to the fitness center to accommodate the needs of the new Airmen associated with the KC-46A MOB 3 mission. The largest renovation project would be the repair of the taxi lane located in the center of the existing aircraft parking ramp. This renovation project would bring the airfield pavements in compliance with the requirements for the KC-46A aircraft. Minor interior renovations are proposed for Buildings 7072, 7073, 5375, and 5377. Building 5103 would be renovated to meet the housing requirements for young Airmen. Although three additional buildings would be used to support the KC-46A MOB 3 mission, no renovations or other work would be required. Building 7075, the existing AFRC aerial port and Airlift Control Element, would also house KC-46A AME and potable water truck parking. Buildings 1610 and 7087 (Hangar 1) would be used by KC-46A personnel and as additional storage space.

2.5.4.2.2 Personnel

The 439 AW at Westover ARB is authorized 2,423 personnel: 66 military, 333 DoD Civilians, and 2,024 part-time Reservists (Table 2-16). Currently, the 439 AW has approximately 2,654 personnel, which includes 231 contractors in addition to the 2,423 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-16. Personnel Changes for the KC-46A MOB 3 Mission at Westover ARB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	66	0	66
Dual Status Technician (Reserve, civilians, Federal)	416	+237	653
Non-Dual Status (DoD civilians)	333	0	333
Contractors[a]	231	+15	246
Subtotal	**1,046**	**+411**	**1,457**
Part Time			
Drill Status Reservists	2,024	+453	2,477
Total Personnel Authorizations[b]	3,070	+864	3,934
Total Personnel on Base[c]	**2,654**	**+627**	**3,281**

[a] Contractors are not authorized on the UMD. They are categorized as "other base personnel."
[b] Some personnel work off-site but are assigned to the unit.
[c] Total personnel supporting the 439 AW is the sum of all categories minus the number of people with dual status.

Because the KC-46A MOB 3 mission would be a new mission at Westover ARB, the beddown would result in a net increase of 627 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 1,324 dependents associated with the non-contractor, full-time personnel at Westover ARB live in communities surrounding the installation. Approximately 644 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.4.2.3 Aircraft Operations

The 439 AW operates the C-5 aircraft, flying approximately 121 sorties per year and an average of six additional practice approaches per sortie, for a total 1,724 total operations annually (Table 2-17). Westover ARB does not have an existing refueling mission. The majority of aircraft operations at Westover ARB are conducted by transient military and civilian aircraft. The majority of transient military operations are conducted by C-130 Hercules and UH-60 Blackhawk helicopters. Operations by all aircraft types during acoustic night are infrequent.

Table 2-17. Baseline Airfield Operations at Westover ARB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
C-5	121	0	121	0	1,482	0	1,724	0	1,724
Transient	1,645	16	1,645	16	4,921	0	8,211	32	8,243
Civilian	2,920	0	2,920	0	1,204	0	7,044	0	7,044
Total	**4,686**	**16**	**4,686**	**16**	**7,607**	**0**	**16,979**	**32**	**17,011**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 439 AW.
[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

KC-46A aircrews associated with the MOB 3 mission would fly approximately 647 annual sorties and 4.4 additional practice approaches per sortie, for a total of 7,032 total airfield operations. These operations would add to existing operations, which would remain unchanged after the beddown. The addition of KC-46A operations would increase the total number of operations conducted at Westover ARB by 41 percent, from 17,011 to 24,043 (Table 2-18). Approximately 5 percent of the total annual KC-46A sorties would be flown during acoustic night. Practice approaches would be conducted by KC-46A aircrews at airfields other than Westover ARB on an occasional basis.

Table 2-18. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Westover ARB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	647	0	582	65	5,451	287	6,680	352	7,032[c]
C-5	121	0	121	0	1,482	0	1,724	0	1,724
Transient	1,645	16	1,645	16	4,921	0	8,211	32	8,243
Civilian	2,920	0	2,920	0	1,204	0	7,044	0	7,044
Total	**5,333**	**16**	**5,268**	**81**	**13,058**	**287**	**23,659**	**384**	**24,043**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern.

[b] Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.6 NO ACTION ALTERNATIVE

Section 1502.14(d) of the National Environmental Policy Act (NEPA) requires the analysis of a No Action Alternative. Analysis of a No Action Alternative provides a benchmark, enabling decision makers to compare the magnitude of the environmental effects to the proposed action or alternatives. No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward.

At Grissom ARB, Seymour Johnson AFB, and Tinker AFB, the No Action Alternative for this Final EIS reflects the *status quo* (i.e., the KC-46A MOB 3 beddown would not occur). No KC-46A aircraft would arrive, and all existing aircraft would remain in place. No construction, renovation, or demolition of any structure or other infrastructure would occur. No KC-46A personnel changes would occur and existing flight operations would remain unchanged.

At Westover ARB, the No Action Alternative considers the complete conversion of the C-5B fleet to the C-5M aircraft. No KC-46A aircraft would arrive and no construction, renovation, or demolition of any structure or other infrastructure would occur. No KC-46A personnel changes would occur and existing flight operations would remain unchanged.

The No Action Alternative has been carried forward in the EIS per CEQ regulations. The No Action Alternative serves as a reference for existing impacts that can be continued into the future and used to compare impacts of the action alternatives.

Evaluation of the No Action Alternative compares the effects of implementing the KC-46A MOB 3 beddown with the effects of the No Action Alternative at each base and for each resource area.

At each base, ongoing and currently planned activities, missions, and programs would continue, whether or not the basing of the KC-46A MOB 3 mission would be implemented. These activities have been approved by the USAF and supported by existing NEPA documentation. The No Action Alternative is described for each resource area in Section 4.5.

2.7 COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-19 summarizes the potential environmental consequences from Chapter 4 where the MOB 3 mission requirements from Chapter 2 are overlaid on the baseline conditions from Chapter 3. The consequences are presented for each environmental resource area and are described for each Final EIS alternative.

This summary comparison of environmental consequences provides an overview of the consequences associated with implementation of the MOB 3 mission at each base. The following NEPA activities have been completed to ensure that decision makers have a comprehensive understanding of the potential environmental consequences of their decision.

- Documentation of existing environmental conditions for each alternative base. The existing conditions for these resources relied heavily on recent environmental materials and Federal and state databases prepared at and near each base.
- Base-specific assessments of environmental consequences of the beddown of the KC-46A MOB 3 mission. Each assessment overlaid the project details upon the existing conditions to estimate potential base-specific environmental consequences.

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Table 2-19. Comparative Summary of Environmental Consequences

<table>
<tr><th>Resource Area</th><th>Grissom ARB</th><th>Seymour Johnson AFB</th><th>Tinker AFB</th><th>Westover ARB</th><th>No Action</th></tr>
<tr><td>Acoustic Environment</td>
<td>The proposed KC-46A MOB 3 mission would replace 16 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in a decrease of 1,490 annual airfield operations, or a 9 percent decrease in overall annual airfield operations at Grissom ARB.
Affected by 65 dB L_{Adn} or greater:
Off-base Acres: -21
Estimated off-base residents: 0</td>
<td>The proposed KC-46A MOB 3 mission would replace 16 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 1,746 annual airfield operations, or a 3 percent increase in overall annual airfield operations at Seymour Johnson AFB.
Affected by 65 dB L_{Adn} or greater:
Off-base Acres: +1
Estimated off-base residents: +1</td>
<td>The proposed KC-46A MOB 3 mission would replace 8 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 4,041 annual airfield operations, or a 13 percent increase in overall annual airfield operations at Tinker AFB.
Affected by 65 dB L_{Adn} or greater:
Off-base Acres: +7
Estimated off-base residents: +6</td>
<td>The proposed KC-46A MOB 3 mission would add 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 7,032 annual airfield operations, or a 41 percent increase in overall annual airfield operations at Westover ARB.
Affected by 65 dB L_{Adn} or greater:
Off-base Acres: -396
Estimated off-base residents: -38
C-5 aircraft operations are the largest driver of noise at Westover ARB. The planned replacement of C-5B models with the quieter C-5M model has the largest influence on noise at Westover ARB. It is anticipated that replacement of the C-5B with the C-5M would result in an overall decrease in noise at Westover ARB, even with the addition of the 12 KC-46A aircraft as part of the proposed MOB 3 mission.</td>
<td>Under the No Action Alternative at Grissom ARB, Seymour Johnson AFB, and Tinker AFB, existing flying operations would continue unchanged and construction associated with the proposed KC-46A MOB 3 mission would not occur. Noise levels would remain as they are under existing conditions, and there would be no new noise impacts.
Under the No Action Alternative at Westover ARB, implementation of the proposed KC-46A MOB 3 mission would not occur, but conversion of the 439 AW fleet from C-5B to C-5M aircraft would be completed. The off-base area and people affected by noise levels greater than 65 dB L_{Adn} would decrease by 398 acres and 38 people, respectively.</td></tr>
<tr><td rowspan="2">Air Quality</td>
<td>Emissions from the proposed KC-46A MOB 3 operations would not exceed Prevention of Significant Deterioration (PSD) thresholds for any of the National Ambient Air Quality Standards (NAAQS) pollutants. No significant impacts to air quality are anticipated.</td>
<td>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for any of the NAAQS pollutants. No significant impacts to air quality are anticipated.</td>
<td>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for VOCs, carbon monoxide (CO), sulfur oxides (SO_x), particulate matter less than or equal to 10 micrometers in diameter (PM_{10}), or particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$).
Nitrogen oxides (NO_x) emissions from the proposed KC-46A MOB 3 operations would exceed the 250-tons-per-year PSD threshold. These NO_x emission increases would amount to 1 percent of the total NO_x emissions generated by Oklahoma County in 2011. Given that the county attains all of the NAAQS, these NO_x emission increases would not be substantial enough to contribute to an exceedance of any NAAQS (such as the ozone and NO_2 standards). Therefore, the proposed MOB 3 mission at Tinker AFB would not result in significant air quality impacts.</td>
<td>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for VOCs, CO, SO_x, PM_{10}, or $PM_{2.5}$.
NO_x emissions from the proposed KC-46A MOB 3 operations would exceed the 250-tons-per-year PSD threshold. These NO_x emission increases would amount to 1 percent of the total NO_x emissions generated by Hampden County in 2011. Given that the county attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to an exceedance of an NAAQS. Therefore, the proposed MOB 3 mission at Westover ARB would not produce significant air quality impacts.</td>
<td rowspan="2">Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.2, 3.2.2, and 3.3.2. No changes would occur. No construction emissions would occur, and operational emissions would be identical to the current baseline conditions. Impacts under the No Action Alternative would be minor.
At Westover ARB, the No Action Alternative would cause minor changes in air quality emissions. Impacts under the No Action Alternative would be minor.</td></tr>
<tr><td colspan="4">Emissions from construction activities would be below any PSD pollutant threshold of 250 tons per year.</td></tr>
<tr><td>Safety</td>
<td colspan="4">Implementation of the proposed KC-46A MOB 3 mission is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or any increase in the risks of occurrence of those mishaps. No significant impact would occur related to bird/wildlife-aircraft strike hazard (BASH) issues. The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) and Occupational Safety and Health Administration (OSHA) requirements are implemented.</td>
<td>Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain unchanged.
At Westover ARB, the No Action Alternative is not anticipated to significantly change safety, as the number and types of operations would remain the same as those described under baseline conditions.</td></tr>
</table>

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

<table>
<tr><th>Resource Area</th><th>Grissom ARB</th><th>Seymour Johnson AFB</th><th>Tinker AFB</th><th>Westover ARB</th><th>No Action</th></tr>
<tr><td rowspan="2">Soil and Water Resources</td><td>The total disturbed area would be less than 5 acres for new construction.</td><td>The total disturbed area would be less than 5 acres for new construction. No changes to current deicing operations would be required. Upon implementation of the proposed MOB 3 mission, the Stormwater Plan (SWP) would be revised to include an evaluation of deicing procedures and ways to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.</td><td>The total disturbed area would be less than 8 acres for new construction. Expansion of the 507 ARW parking ramp would impact approximately 3.5 acres of floodplain and approximately 45 linear feet of East Crutcho Creek. East Crutcho Creek is a jurisdictional water of the United States, and according to the Tulsa District of the U.S. Army Corps of Engineers (USACE), this work would be permitted using Nationwide Permit 39. Because impacts to East Crutcho Creek would be less than 300 linear feet, no mitigation would be required To avoid altering the elevation, function, and capacity of the floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion. A Finding of No Practicable Alternative (FONPA) would be prepared should Tinker AFB be selected for the proposed MOB 3 mission.</td><td>The total disturbed area would be less than 12 acres. If the proposed MOB 3 mission would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, additional water quality monitoring would be required. If the sample results exceed the benchmark levels, additional controls would require evaluation and possible implementation. Because the nature of the activity (aircraft deicing) is not changing, a change to the permit would not be required. Although increases in aircraft operations could increase the amount of deicing fluid utilized, long-term, significant, adverse impacts to water quality are not anticipated to result from deicing operations associated with the proposed KC-46A MOB 3 mission at Westover ARB.</td><td rowspan="2">Under the No Action Alternative, conditions at each base would remain unchanged. None of the construction associated with the proposed KC-46A MOB 3 mission would occur and there would be no additional impacts to soil and water resources.</td></tr>
<tr><td colspan="4">Relevant stormwater and land disturbance permits would be required and stormwater plans would be updated. During the design phase, a variety of stormwater controls would be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. No significant impacts to soil and water resources are anticipated.</td></tr>
<tr><td>Biological Resources</td><td colspan="2">No significant impacts to biological resources or wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission.</td><td>Expansion of the 507 ARW parking ramp would impact approximately 1 acre of forested floodplain habitat. This area is described in the Integrated Natural Resource Management Plan (INRMP) as habitat for migratory bird species at risk.

The USAF prepared a Biological Evaluation (BE) for the least tern, the piping plover, the whooping crane, and the red knot. The BE was submitted to the U.S. Fish and Wildlife Service (USFWS) on 19 September 2016. Based on the information contained in the BE, the USAF has determined that should Tinker AFB be selected for the proposed KC-46A MOB 3 mission, implementation of the mission may affect, but is not likely to adversely affect any of these species.</td><td>No significant impacts to biological resources or wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission. The USFWS concurred with the USAF determination that no threatened or endangered species would be affected by implementation of the proposed MOB 3 mission (See letter dated 30 June 2016, Volume II, Appendix A, Section A.6.4.2).</td><td>Under the No Action Alternative, baseline conditions at each base would remain unchanged. No vegetation or wildlife habitat would be disturbed. No additional impacts to biological resources would be anticipated.</td></tr>
</table>

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Cultural Resources	No adverse Section 106 impacts to cultural or tribal resources are anticipated. The Indiana State Historic Preservation Office (SHPO) has concurred that no cultural resources occur at Grissom ARB. Therefore, the proposed MOB 3 mission would not have an adverse impact on cultural resources. The USAF completed consultation with tribes potentially affiliated with the base. No comments or concerns were raised regarding tribal resources and consultation is now complete.	Seymour Johnson AFB has determined that no facilities are National Register of Historic Places (NRHP)-eligible, and the SHPO has concurred with this finding (see letters dated 14 June 2016 and 21 February 2017, Volume II, Appendix A, Section A.5.2). Seymour Johnson AFB has conducted consultation with the Eastern Band of the Cherokee Nation. The tribe has indicated that they do not have any cultural or tribal resources at Seymour Johnson AFB and no interest in Wayne County. Consultation is now complete.	Tinker AFB has determined that no historic properties would be affected. The SHPO has concurred with this finding and requested additional concurrence on archaeological resources from the Oklahoma Archeological Survey (OAS). The OAS concluded that prior to any construction, an archaeological field inspection would be required (see letter dated 19 May 2016, Volume II, Appendix A, Section A.5.3). Should Tinker AFB be selected for the proposed MOB 3 mission, an archaeological field inspection of the construction area would be completed. Col Stephanie Wilson of Tinker AFB met with Chief Harjo of the Seminole Nation of Oklahoma on 5 August 2016. Although Chief Harjo was interested in small business opportunities for the Seminole Nation of Oklahoma, he had no comments or concerns specific to the proposed KC-46A MOB 3 mission. None of the other tribes commented or raised concerns regarding tribal resources; therefore, consultation is now complete.	On 4 August 2016, Westover ARB submitted a letter to the Massachusetts Historical Commission (MHC) identifying the area of potential effect (APE), which includes the Historic District. This letter stated that the proposed undertaking includes the demolition of Hangar 7071 and Building 2426, contributing resources to the Historic District, and would therefore result in an adverse effect on the historic property. Pursuant to 36 CFR § 800.6(c), the letter also stated that USAF was seeking concurrence from the MHC on the adverse effect determination and would continue to consult with the MHC in order to avoid, minimize, or mitigate the potential adverse effects of the undertaking. In a response dated 26 August 2016, the MHC concurred with the USAF letter (see Volume II, Appendix A, Section A.5.4.1). Should the proposed MOB 3 mission be located at Westover ARB, the USAF would prepare Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) recordation of Hangar 7071 and Building 2426 and develop a map that identifies the boundaries of the Westover ARB Historic District. In addition, the MHC has agreed to participate in the design review process for new construction. Consultation with tribes potentially affiliated with the base has been completed. No issues or concerns were raised regarding tribal resources.	Under the No Action Alternative, baseline conditions at each base would remain unchanged. No additional impacts to historical buildings or other cultural resources would occur.
	Inadvertent discovery of archaeological resources is considered unlikely. An inadvertent discovery of previously unrecorded cultural resources would be managed in compliance with Federal and state laws and USAF regulations.				
Land Use	Implementation of the proposed MOB 3 mission would decrease the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 21 acres. No significant impacts to land use resources would result from the proposed MOB 3 mission.	Implementation of the proposed MOB 3 mission would increase the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 1 acre. The 1 acre of additional land affected by noise is not located near sensitive receptors. The anticipated noise increase to this 1-acre area would not cause unsafe conditions and would not change or conflict with any current or planned land uses in this area. No significant impacts to land use resources would result from the proposed MOB 3 mission.	Implementation of the proposed MOB 3 mission would increase the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 7 acres. These 7 acres are not located near sensitive receptors. The anticipated noise increase to these off-base areas would not cause unsafe conditions and would not change or conflict with any existing or planned land uses in this area. No significant impacts to land use resources would result from the proposed MOB 3 mission.	Implementation of the proposed MOB 3 mission in conjunction with C-5B to C-5M conversion would result in a net decrease in acres (-396 acres) and estimated residents (-38) exposed to noise levels of 65 dB L_{Adn} or greater. No significant impacts to land use resources would result from the proposed MOB 3 mission.	Under the No Action Alternative, conditions at each base would remain unchanged. No changes would occur to planning noise contours surrounding the bases and no land use changes would occur within the base boundaries.
Infrastructure	Implementation of the proposed MOB 3 mission is not anticipated to result in significant impacts to infrastructure systems (e.g., potable water, wastewater, stormwater, electrical, natural gas, solid waste management, and transportation).				Under the No Action Alternative, baseline conditions at each base would remain unchanged. No new construction would occur and no new personnel would arrive or decrease at any of the bases. No additional impacts to the infrastructure system at any of the bases would occur.

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

<table>
<tr><th>Resource Area</th><th>Grissom ARB</th><th>Seymour Johnson AFB</th><th>Tinker AFB</th><th>Westover ARB</th><th>No Action</th></tr>
<tr><td rowspan="2">Hazardous Materials and Waste</td><td colspan="3">The types of hazardous materials and wastes that would be used and generated by the proposed MOB 3 mission are consistent with those currently utilized and generated by the KC-135 mission and other missions at each base; however, the quantities of hazardous materials used and wastes generated would increase with implementation of the proposed MOB 3 mission.</td><td>Although the types of hazardous materials used and wastes generated by the proposed MOB 3 mission would increase relative to the current C-5 mission, the types of materials would be similar and hazardous wastes generated would be similar to those currently generated at Westover ARB.</td><td rowspan="2">Under the No Action Alternative, conditions at each base would remain unchanged. Each base would continue to use hazardous materials and dispose of hazardous waste as described for each base's baseline conditions.</td></tr>
<tr><td colspan="4">The systems engineering process has eliminated halon and minimized the use of the hazardous materials hexavalent chromium and cadmium. Other hazardous materials (e.g., trichloroethane) have available alternates and would not be required for the KC-46A. The preference would be to use the least hazardous material when alternatives are available. Any structures proposed for upgrade or retrofit would be inspected for asbestos-containing materials (ACM) and lead-based paint (LBP) according to established procedures. Modifications and/or additions to existing buildings would occur in proximity to existing Environmental Restoration Program (ERP) sites. The USAF would coordinate with regulatory agencies for any impacts to monitoring wells and any excavation on or near active ERP sites. Formal construction waivers would not be required, but the USAF would require the review of excavation and/or construction siting and compatibility with environmental cleanup sites to be conducted and documented in accordance with current environmental impact analysis processes. During the design phase for each development project, proximity to the various types of ERP sites would be evaluated to determine if additional costs would need to be included in project estimates to maintain the proper land use controls and the groundwater monitoring well networks, and to incorporate proper health and safety precautions into construction plans.</td></tr>
<tr><td>Socioeconomics (all numbers are approximated)</td><td>Population
Overall population increase of 530 full-time mission personnel (not including contractors) and military and DoD civilian dependents (0.7 percent increase in the ROI).
Economic Activity
Total increase on-base full-time military personnel, DoD civilians, and contractors: 217 (estimated 29 jobs). Total construction costs of $117.8 million could generate 1,197 jobs and $11.4 million in indirect and induced income for the duration of the construction activity.
Housing
The housing market in the ROI and surrounding communities within adjacent counties would be anticipated to support the incoming personnel.
Education
An estimated 197 military dependents of school-age would enter the school districts in surrounding communities. Based on the number of school corporations and schools in the ROI, as well as class size for the state, the schools in the county would be anticipated to have the capacity to support the incoming population.</td><td>Population
Overall population increase of 100 full-time mission personnel (not including contractors) and military and DoD civilian dependents to Wayne County (0.08 percent increase in the ROI).
Economic Activity
Total increase on-base full-time military personnel, DoD civilians, and contractors: 53 (estimated 22 jobs). Total construction costs of $103.4 million could generate 1,144 jobs and $13.7 million in indirect and induced income for the duration of the construction activity.
Housing
Under the assumption that all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 38 off-base housing units.
Education
An estimated 37 military dependents of school age would be anticipated to enter the Wayne County Public School District.</td><td>Population
Overall population increase of 769 full-time mission personnel (not including contractors) and military and DoD civilian dependents to Oklahoma County (0.1 percent increase in the ROI).
Economic Activity
Total increase on-base full-time military personnel, DoD civilians, and contractors: 308 (94 estimated jobs). Total construction costs of $101 million could generate 968 jobs and $31.2 million in indirect and induced income for the duration of the construction activity.
Housing
Assuming all 293 incoming full-time mission personnel would require off-base housing, the housing market in the ROI would be anticipated to support the incoming personnel.
Education
Approximately 286 military and non-military dependents of school age would enter public school districts in Oklahoma County.</td><td>Population
Overall population increase of 1,040 full-time mission personnel (not including contractors) and military and DoD civilian dependents to the ROI (0.17 percent increase in the ROI).
Economic Activity
Total increase on-base full-time military personnel, DoD civilians, and contractors: 411 (estimated 100 jobs). Total construction costs of $196.9 million could generate 2,137 jobs and $41.5 million in indirect and induced income for the duration of the construction activity.
Housing
Assuming all 396 incoming full-time military personnel associated with the MOB 3 mission would require off-base housing, the housing market in the ROI would be anticipated to support the change in personnel.
Education
Approximately 386 military and non-military dependents of school age would enter public school districts in the ROI.</td><td>Under the No Action Alternative, conditions would remain as described in Chapter 3. No new personnel increases or decreases would occur at any of the bases, and none of the bases would receive the benefits of a population increase. No construction would occur, thus no construction-related beneficial expenditures would occur.</td></tr>
</table>

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Socioeconomics (Continued) (all numbers are approximated)	***Public Services*** Demand for public services in the ROI would increase with the projected change in the population; however, it would not be anticipated to result in a significant change due to the small increase in population partially offset with the recent annual decline in population in the ROI. ***Base Services*** Several base services would require additional manpower and facilities to accommodate the incoming personnel.	***Public Services*** Public services would be anticipated to support the incoming population. ***Base Services*** Base services have adequate capacity in the CDC, housing, fitness, and dining facilities under the existing infrastructure to support replacement of the KC-135 mission with the proposed MOB 3 mission.	***Public Services*** Public services would be anticipated to support the incoming population. ***Base Services*** There is adequate infrastructure and capacity to support incoming military populations.	***Public Services*** Public services would be anticipated to support the incoming population. ***Base Services*** Several base services would require additional manpower and facilities to accommodate the incoming personnel. No childcare or military dining facilities are available on Westover ARB.	
Environmental Justice and Other Sensitive Receptors	Implementation of the proposed MOB 3 mission is not anticipated to disproportionately impact any off-base minority, low-income, youth, or elderly populations.				Under the No Action Alternative, baseline conditions at each base would remain unchanged. There would be no environmental justice impacts or impacts to youth or elderly populations at any of the bases.

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2.8 MITIGATION

Mitigation measures avoid, minimize, remediate, or compensate for environmental impact. CEQ regulations (40 *CFR* 1508.20) define mitigation to include the following:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action, and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

Avoiding, minimizing, or reducing potential impacts has been a priority guiding the development of the proposed KC-46A MOB 3 mission and aircraft operations. Mitigation measures are either built or designed into the proposed action and alternatives; applied to construction, operation, or maintenance involved in the action; or implemented as compensatory measures. Following the EIS Record of Decision (ROD), a Mitigation Plan will be prepared in accordance with 32 *CFR* 989.22(d). The Mitigation Plan will address specific mitigations identified and agreed to during the Environmental Impact Analysis Process (EIAP).

Given the relative immaturity of the KC-46A program, identification of new data and information relative to the aircraft could arise and it is possible that the impacts identified in the Final EIS may be different from those expected. An understanding of various aspects that are part of a complex interrelated KC-46A operational environment may not be achieved without a more long-term process built around a continuous cycle of evaluation, learning, and improvement over time.

To accommodate this, the Mitigation Plan will identify principal and subordinate organizations having responsibility for oversight and execution of specific mitigation and management actions. The plan will be prepared in accordance with the CEQ mitigation and monitoring guidance.

2.8.1 Measures Proposed to Reduce Potential for Environmental Impacts

Specific mitigation measures are presented in Table 2-20. The table identifies proposed mitigation measures to reduce the potential for environmental impacts. The table presents the mitigation measures by resource area and base.

Table 2-20. Mitigation Measures to Reduce the Potential for Environmental Impacts

Resource Area/Alternative	Mitigations Measures to Reduce the Potential for Environmental Impacts
Acoustic Environment	
All Bases	No base-specific mitigation identified.
Air Quality	
All Bases	No base-specific mitigation identified.
Safety	
All Bases	No base-specific mitigation identified.
Soils and Water	
Grissom ARB	No base-specific mitigation identified.
Seymour Johnson AFB	No base-specific mitigation identified.
Tinker AFB	The proposed 507 ARW ramp expansion would occur within the 500-year floodplain of East Crutcho Creek. In order to avoid altering the elevation, function, and capacity of the 500-year floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion.
Westover ARB	No base-specific mitigation identified.
Biological Resources	
Grissom ARB	No base-specific mitigation identified.
Seymour Johnson AFB	No base-specific mitigation identified.
Tinker AFB	No base-specific mitigation identified.
Westover ARB	No base-specific mitigation identified.
Cultural Resources	
Grissom ARB	Consultation with the SHPO is complete. No base-specific mitigation identified.
Seymour Johnson AFB	Consultation with the SHPO is complete. No base-specific mitigation identified.
Tinker AFB	Consultation with the SHPO is complete. Should Tinker AFB be selected to host the MOB 3 mission, an archaeological field inspection of the construction area would be completed prior to construction.
Westover ARB	Consultation with the SHPO is complete. Should Westover ARB be selected to host the MOB 3 mission, the USAF would prepare HABS/HAER recordation of Hangar 7071 and Building 2426 and develop a map that identifies the boundaries of the Westover ARB Historic District. The USAF would invite the MHC to participate in the design review process for the new construction.

Table 2-20. Mitigation Measures to Reduce the Potential for Environmental Impacts (Continued)

Resource Area/Alternative	Mitigations Measures to Reduce the Potential for Environmental Impacts
Land Use	
All Bases	No base-specific mitigation identified.
Infrastructure	
All Bases	No base-specific mitigation identified.
Hazardous Materials and Waste	
All Bases	No base-specific mitigation identified.
Socioeconomics	
All Bases	No base-specific mitigation identified.
Environmental Justice and Protection of Children	
All Bases	No base-specific mitigation identified.

2.9 MANAGEMENT ACTIONS

In addition to mitigation measures, the EIS has identified a series of management actions. These management actions will be implemented in accordance with applicable regulations or USAF guidance. Specific management actions identified in the Final EIS are presented in Table 2-21. The table presents the management actions by resource area and base.

2.10 UNAVOIDABLE IMPACTS

Potential impacts that could occur and cannot be mitigated include the following:

- The existing capacity of regional landfills would be reduced due to the solid waste generated.
- Although anticipated to be similar in type to what is currently generated or what was recently generated at all four bases, hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with the new aircraft.
- Individual species would be affected by land disturbance and air operations.
- Stormwater runoff and associated erosion would increase due to construction.
- There is potential for an increase in the number of bird/wildlife-aircraft strikes and aircraft mishaps resulting from the increased number of annual operations.

Table 2–21. Management Actions to Reduce the Potential for Environmental Impacts

Resource Area/Alternative	Management Actions to Reduce the Potential for Environmental Impacts
Acoustic Environment	
All Bases	• KC-46A MOB 3 aircrews would conduct no more than 11 percent of total airfield operations between 10:00 P.M. and 7:00 A.M.
Air Quality	
All Bases	Employ fugitive dust control and soil retention practices including: • Water trucks to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area. • Suspension of all soil disturbance activities when visible dust plumes emanate from the site. • Designating personnel to monitor the dust control program and to order increased watering, as necessary, to prevent the transport of dust off-site.
Safety	
All Bases	• Emergency and mishap response plans would be updated to address the needed procedures and response actions specific to the KC-46A airframe.
Soils and Water	
All Bases	• Update installation Storm Water Pollution Prevention Plans (SWPPPs), as required by state and federal CWA requirements, to include the new KC-46A building construction. • Post construction, all disturbed areas would be re-graded to pre-construction contours. • Silt fence, interceptor trenches, hay bales, or other suitable erosion and sediment control measures would be used during construction, and revegetation of disturbed areas will occur as soon as practical.
Grissom ARB	• No base-specific management actions identified.
Seymour Johnson AFB	• Upon implementation of the proposed MOB 3 mission, the SWP would be revised to include an evaluation of deicing procedures and ways to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.
Tinker AFB	• No base-specific management actions identified.
Westover ARB	• If implementation of the proposed MOB 3 mission at Westover ARB would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, quarterly benchmark water quality monitoring at Outfall 1 would be required to validate compliance with the benchmark monitoring concentrations contained in the base's permit. The quarterly results would be reported to the USEPA. If the sample results exceed the benchmark levels for Biological Oxygen Demand (BOD) [30 milligrams per liter (mg/L)], Chemical Oxygen Demand (COD) (120 mg/L), Ammonia (2.14 mg/L) or pH (6-9), additional controls would require evaluation and possible implementation.

Table 2–21. Management Actions to Reduce the Potential for Environmental Impacts (Continued)

Resource Area/Alternative	Management Actions to Reduce the Potential for Environmental Impacts
Biological Resources	
All Bases	• Continue adherence to BASH program.
Cultural Resources	
All Bases	• Track results of government-to-government consultation with tribes. • In the case of unanticipated or inadvertent cultural resource discoveries, the USAF would comply with Section 106 of the NHPA and follow the standard operating procedures outlined in the Integrated Cultural Resource Management Plan (ICRMP).
Land Use	
All Bases	• Once the full complement of KC-46A aircraft are operating at the MOB 3 base, prepare an update to the current Air Installation Compatible Use Zone Study (AICUZ) to validate operational data and identify projected noise levels based on the most recent noise data.
Infrastructure	
All Bases	• Incorporate LEED and sustainable development concepts into construction projects to achieve optimum resource efficiency, sustainability, and energy conservation, except to the extent limited or prohibited by law. • Continue and enhance recycling and reuse programs to accommodate waste generated by the KC-46A beddown.
Hazardous Materials and Waste	
All Bases	• Update Hazardous Waste Management Plans to account for any new and/or changed waste streams or new procedures, if any, for managing hazardous materials and wastes associated with KC-46A aircraft. • Review construction plans to identify any monitoring wells that would need to be removed and/or replaced. • Review construction plans to identify any buildings containing toxic substances such as LBP and asbestos.
Socioeconomics	
All Bases	• No base-specific management actions identified.
Environmental Justice and Protection of Children	
All Bases	• No base-specific management actions identified.

CHAPTER 3

BASE-AFFECTED ENVIRONMENT

3.0 BASE-AFFECTED ENVIRONMENT

This chapter is alphabetically organized by each of the four U.S. Air Force (USAF) installations under consideration for the proposed KC-46A Third Main Operating Base (MOB 3) mission. The baseline or existing condition information, organized by resource area in each of the four base sections, forms the basis for the comparative analysis presented in the summary table at the end of Chapter 2 (Table 2-19). The USAF evaluates and compares operational and economic factors and environmental resources to determine whether to make a beddown decision at this time and, if such a decision is made, where the proposed KC-46A MOB 3 mission would be located. With the exception of Westover Air Reserve Base (ARB), the baseline conditions described in this chapter constitute conditions under the No Action Alternative. The No Action Alternative for Westover ARB includes conversion of the C-5B fleet to the quieter C-5M aircraft (as described in Section 4.5).

The geographic scope of potential consequences, known as a region of influence (ROI), is described for each resource area. For most of the resource areas, the ROI is defined as areas of the base affected by aircraft operations and infrastructure upgrades. For some resources (e.g., acoustic environment, air quality, and socioeconomics), the ROI extends into surrounding communities unique to that specific resource area. See Volume II, Appendix B, for a description of the ROI for each resource area.

The goal in producing this Final Environmental Impact Statement (EIS) has been to prepare a concise document that addresses the base-specific concerns of individuals, agencies, and others while meeting the comparative needs of the USAF decision makers. Public, agency, and other comments received during scoping were used to focus the analysis on those environmental resources of interest to scoping participants. Certain environmental resources were not carried forward for separate evaluation in this Final EIS because it was determined that implementation of the proposed KC-46A MOB 3 mission at any of the alternative bases would be unlikely to affect those resources. Airspace management was not evaluated, because no new airspace would be proposed and no changes to the manner in which the existing airspace is used would occur. Visual resources were also not evaluated because implementation of the proposed MOB 3 mission would not affect landscapes and landforms or other features that attribute to landscape-level visually aesthetic qualities. Resource definitions, as well as the regulatory setting and methodology of the analysis, are contained in Volume II, Appendix B.

3.1 GRISSOM AIR RESERVE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Grissom ARB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed MOB 3 mission at Grissom ARB.

3.1.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Information on baseline aircraft operations was provided by USAF installation points-of-contact (POCs) in December 2015. After being processed for input to the computer noise model, the information was re-confirmed and validated by the same USAF personnel in March 2016.

Under baseline conditions, KC-135 aircraft based at Grissom ARB conduct 8,800 airfield operations per year, and military transient aircraft conduct 2,450 airfield operations per year. Civilian aircraft operating at the co-located Grissom Aeroplex conduct 4,618 airfield operations per year. An airfield operation is counted each time an aircraft departs from the runway and each time an aircraft approaches the runway. The A-weighted maximum noise levels (L_{Amax}) in decibels (dB) (see Volume II, Appendix B for description of noise metrics) generated by individual overflights of KC-135 aircraft as well as the most common types of military transient and civilian aircraft users of the Grissom ARB runways are shown in Table 3-1.

Table 3-1. Aircraft Maximum Noise Levels at Grissom ARB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
C-5B	85% NF	104	94	78	65
C-17	1.08 EPR	85	76	64	55
Business jet (Cessna 500)	305 LBS	64	56	46	37
Dual propeller (Cessna 441)	30% RPM	70	62	52	44
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29
Takeoff					
KC-135	90% NF	87	80	69	59
C-5B	4.68 EPR	104	94	79	68
C-17	1.35 EPR	91	83	72	64
Business jet (Cessna 500)	1,554 LBS	76	69	58	49
Dual propeller (Cessna 441)	100% RPM	73	67	58	51
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 434 Air Refueling Wing (ARW) KC-135 aircraft are R models, which are substantially quieter than earlier models.
Key: Power Units: NF = fan speed; EPR = engine pressure ratio; RPM = revolutions per minute; LBS = pounds of thrust.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (ºF) and 70 percent relative humidity.

Approximately 19 percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). Approximately 11 percent of military transient aircraft operations and 2 percent of total civilian aircraft operations occur during this time period.

In accordance with current USAF and U.S. Department of Defense (DoD) policies, baseline noise levels reflecting all ongoing aircraft operations were created using NOISEMAP (Version 7.2). NOISEMAP accounts for the effects of topography on noise, and are calculated for an average annual day (i.e., a day with 1/365th of annual operations). Figure 3-1 shows baseline day-night average sound level (L_{Adn}) and also includes the 65 dB L_{Adn} noise contours published in the 2014 Air Installations Compatible Use Zones (AICUZ) report as a point of reference (USAF 2014b). The relatively minor differences between the AICUZ noise contours and the updated baseline noise levels reflects a decreased percent of KC-135 operations flown during acoustic night and an increased number of KC-135 practice approaches per sortie. The effects of these two minor adjustments approximately cancel each other, resulting in minimal net change in L_{Adn}.

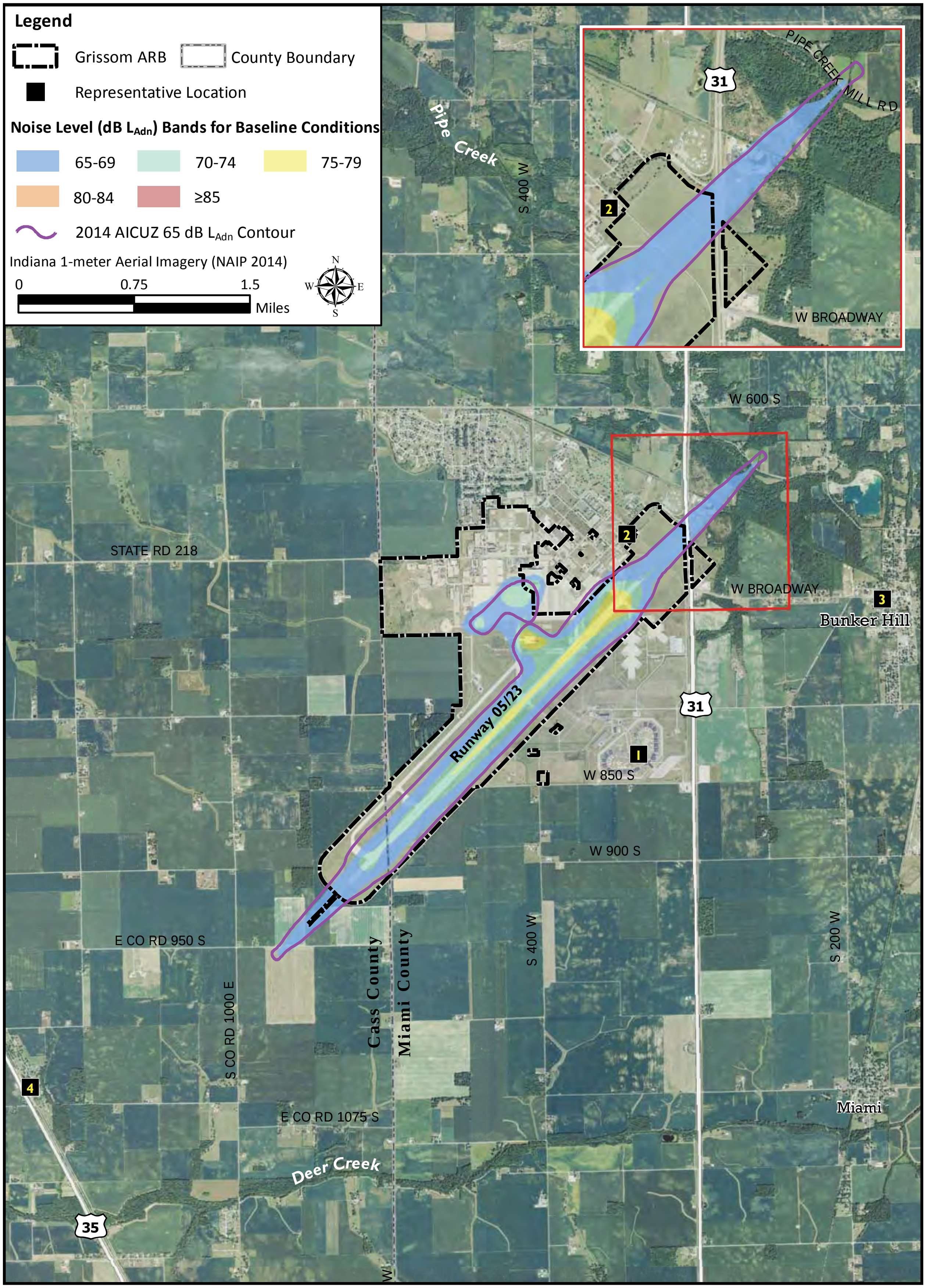

Figure 3-1. Baseline Noise Contours (dB L_{Adn}) at Grissom ARB

Table 3-2 shows the number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn}. It is widely accepted that 65 dB L_{Adn} is the noise level at which a substantial percentage of the population can be expected to be annoyed, and this has been accepted by the USAF and several other Federal agencies as the level above which not all noise-sensitive land uses are considered compatible (see Volume II, Appendix B).

Table 3-2. Acres Exposed to Noise Resulting from Baseline Conditions at Grissom ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	**Off-Base**	**Total**
65 - 69	320	86	406
70 - 74	204	4	208
75 - 79	67	0	67
80 - 84	0	0	0
≥ 85	0	0	0
Total	**591**	**90**	**681**

Although 90 acres of off-base land are affected by noise levels exceeding 65 dB L_{Adn}, the affected parcels of land are either vacant, owned by government agencies other than the DoD, or being used for non-residential purposes. Based on best-available data, it is estimated that zero off-base residents are currently affected by noise levels greater than or equal to 65 dB L_{Adn}.

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base land at Grissom ARB, and no buildings on Grissom ARB are exposed to noise levels greater than 80 dB L_{Adn}. The risk of hearing loss among workers at Grissom ARB is managed according to DoD regulations for occupational noise exposure. Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) occupational noise exposure regulations are enforced to protect employees of Grissom ARB.

Table 3-3 presents aircraft noise levels at several representative locations surrounding Grissom ARB. The representative locations, which are shown on Figure 3-1, were selected from among many locations that could be considered noise sensitive. All of the locations studied experience baseline noise levels less than 65 dB L_{Adn}, and the land uses at these locations are considered compatible with existing noise levels per recommendations contained in Air Force Instruction (AFI) 32-7063, *AICUZ Program*.

Table 3-3. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Grissom ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Private Dental Office	Less than 45[a]
2	Church in Town of Bunker Hill	57
3	Miami Correctional Facility	Less than 45
4	Town of Lincoln	61

[a] In quiet, small town areas, ambient noise level without aircraft noise is often approximately 45 dB L_{Adn} (USEPA 1974).
Note: Noise levels that are below ambient noise levels are listed as "less than 45."

Grissom ARB Public Affairs received 12 noise complaints from 2012 to 2015. Of the complaints received, 4 were related to aircraft that were either positively identified as KC-135 aircraft or that could have been KC-135 aircraft (Hays 2015). The remaining complaints were related to other aircraft not stationed at Grissom ARB. No noise abatement restrictions exist on flying at Grissom ARB.

3.1.2 Air Quality

Air quality in a given location is defined by the size and topography of the air basin, the local and regional meteorological influences, and the types and concentrations of pollutants in the atmosphere, which are generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare, and include a reasonable margin of safety to protect the more sensitive individuals in the population.

The Clean Air Act (CAA) (42 *United States Code [USC]* 7401–7671[q], as amended) provided the authority for the U.S. Environmental Protection Agency (USEPA) to establish ambient air quality standards to protect public health and welfare nationwide. National Ambient Air Quality Standards (NAAQS) exist for the following criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (less than or equal to 10 micrometers in diameter (PM_{10}) and less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$), and lead. The NAAQS are listed in Volume II, Appendix B, Section B.2.1.

The CAA establishes air quality regulations and the NAAQS, and delegates the enforcement of these standards to the states. The CAA requires areas in nonattainment of an NAAQS to develop a State Implementation Plan (SIP) that details how the state will attain the standard within mandated timeframes. The requirements and compliance dates for attainment are based on the nonattainment classification of the area.

CAA Section 176(c) and USEPA's General Conformity Rule generally prohibit Federal agencies from engaging in, supporting, permitting, or approving any activity that does not conform to the most recent USEPA-approved SIP in nonattainment or maintenance areas. This means that Federal projects in such areas or other activities using Federal funds or requiring Federal approval (1) will not cause or contribute to any new violation of an NAAQS; (2) will not increase the frequency or severity of any existing violation; or (3) will not delay the timely attainment of any standard, interim emission reduction, or other milestone. The General Conformity Rule applies to Federal actions affecting areas that are in nonattainment of a NAAQS or are designated maintenance areas (former nonattainment areas that have attained the NAAQS). Conformity requirements only apply to nonattainment and maintenance pollutants and their precursor emissions. Conformity determinations are required when the annual direct and indirect emissions from a proposed Federal action equal or exceed an applicable de minimis threshold. These thresholds are lower for more severe nonattainment conditions. Because Miami and Cass Counties currently attain all of the NAAQS, the General Conformity Rule would not apply to the proposed KC-46A MOB 3 mission at Grissom ARB.

Hazardous air pollutants (HAPs) are air pollutants known or suspected to cause serious health effects (e.g., birth defects or cancer) or adverse environmental effects. HAPs are compounds that generally have no established ambient standards. The CAA amendments identify 187 substances as HAPs (e.g., benzene, formaldehyde, mercury, and toluene). HAPs are emitted from a range of industrial facilities and vehicles, such as aircraft. The USEPA sets Federal regulations to reduce HAP emissions from stationary sources. A "major" source of HAPs under the Federal Title V Operating Program is defined as any stationary facility or source that directly emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of combined HAPs.

In Indiana, the Indiana Department of Environmental Management (IDEM) Office of Air Quality (OAQ) is responsible for enforcing air pollution regulations. The OAQ enforces the NAAQS by monitoring state-wide air quality and developing rules to regulate air emissions and permit stationary emission sources. The Indiana Air Pollution Control Rules are contained in the *Indiana Administrative Code* Title 326 (Air Pollution Control Division) (IDEM 2016).

Greenhouse gases (GHGs) trap heat in the atmosphere. Both natural processes and human activities generate these emissions. The accumulation of GHGs in the atmosphere effects regulation of the earth's temperature. Volume II, Appendix B, Section B.2.1.1, describes recent conditions regarding climate change and impacts on the United States, as described in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014).

GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its lifetime and ability to trap heat in the atmosphere. The GWP rating system is standardized to carbon dioxide, which has a value of one. For example, methane has a GWP of 28, which means that it has a global warming effect 28 times greater than carbon dioxide on an equal-mass basis (IPCC 2013). To simplify GHG analyses, total GHG emissions from a source are often expressed as a carbon dioxide equivalent (CO_2e). The CO_2e is calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While methane and nitrous oxide have much higher GWPs than carbon dioxide, carbon dioxide is emitted in such great quantities that it is the overwhelming contributor to global CO_2e emissions from both natural processes and human activities.

Given the global nature of climate change and the current state of the science, it is not useful at this time to attempt to link the emissions resulting from local actions to any specific climatological change or resulting environmental impact. Nonetheless, GHG emissions resulting from implementation of the proposed KC-46A MOB 3 mission have been quantified to the extent feasible in this Final EIS for information and comparison purposes.

3.1.2.1 Region of Influence and Existing Air Quality

Air emissions produced from construction and operation of the proposed KC-46A MOB 3 mission at Grissom ARB would mainly affect air quality within Miami County and, to a lesser extent, Cass County, as the end of Runway 05 at Grissom ARB extends into the eastern portion of Cass County. Identifying the ROI for air quality requires knowledge of the pollutant type, source emission rates, the proximity of project emission sources to other emission sources, and local and regional meteorology. For inert pollutants (e.g., CO and particulates in the form of dust), the focus of the analysis or the ROI is generally limited to a few miles downwind from a source. The ROI for reactive pollutants such as O_3 may extend much farther downwind than for inert pollutants. Ozone is formed in the atmosphere by photochemical reactions of previously emitted pollutants called precursors. Ozone precursors are mainly oxides of nitrogen (NO_x) and photochemically reactive volatile organic compounds (VOCs). In the presence of solar radiation, the maximum effect of precursor emissions on O_3 levels usually occurs several hours after they are emitted and many miles from their source. Currently, Miami and Cass Counties attain all of the NAAQS (USEPA 2016a).

3.1.2.1.1 Regional Air Emissions

Emissions for Miami County are used to describe the air emissions within the project region, as all administrative and source activities at Grissom ARB originate within this county. Table 3-4 summarizes annual emissions data developed for Miami County in 2011 as part of the National Emissions Inventory (NEI) process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages (VOCs), and (3) fugitive dust (PM_{10}/$PM_{2.5}$).

Table 3-4. Annual Emissions for Miami County, Indiana, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Stationary Sources	1,169	1,174	158	45	5,510	1,020	NA
Mobile Sources	729	6,746	1,542	7	91	63	303,044
Total	**1,898**	**7,920**	**1,700**	**52**	**5,601**	**1,083**	**303,044**[a]

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Miami County are incomplete.
Key: SO_x – sulfur oxides; CO_2e (mt) – carbon dioxide equivalent in metric tons; NA – not available.
Source: USEPA 2016b

3.1.2.1.2 Grissom ARB Emissions

Operational emissions due to existing operations at Grissom ARB occur from (1) aircraft operations and engine maintenance/testing, (2) aerospace ground equipment (AGE), (3) onsite government motor vehicles (GMVs) and privately owned vehicles (POVs), (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-5 summarizes estimates of the most recent (2015) annual operational emissions generated by the KC-135 434th Air Refueling Wing (ARW) at Grissom ARB. These data were developed in part from mobile source activity data and stationary source emissions found in the *2002 Air Emissions Inventory (Stationary and Mobile Sources) – Grissom Air Reserve Base* (Grissom ARB 2003) and from activity data collected for 2015 operations.

Table 3-5. Annual Emissions from Existing Operations of the 434 ARW at Grissom ARB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC-135 Aircraft Operations	4.71	80.30	186.86	16.57	0.90	0.90	46,163
On-Wing Aircraft Engine Testing – KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,200
AGE	0.07	0.39	0.42	0.00	0.06	0.06	65
GMVs	0.06	1.20	0.25	0.00	0.02	0.01	108
POVs – On Base	0.04	1.06	0.16	0.00	0.02	0.00	90
POVs – Off Base	0.31	11.42	1.95	0.02	0.11	0.04	942
Point and Area Sources	0.35	0.14	0.43	0.02	0.04	0.03	NA
Total Emissions[a]	**6.60**	**109.90**	**196.02**	**17.40**	**1.19**	**1.08**	**49,567**

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Miami County are incomplete.
Key: SO_x – sulfur oxides; CO_2e (mt) – carbon dioxide equivalent in metric tons

Because KC-135 on-wing testing emission data were not available for Grissom ARB, emission data from KC-135 maintenance activities at Fairchild Air Force Base (AFB) were used on a per-aircraft basis for activities at Grissom ARB (AFCEC 2014a). Emission data from the usage of AGE by the 434 ARW were also not available and are thus based on a per-aircraft usage of AGE by KC-135 aircraft at Seymour Johnson AFB (Zapata Inc. and URS Group, Inc. 2015). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.1.1, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from existing sources at Grissom ARB.

3.1.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with operations and maintenance (O&M) activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.1.3.1 Flight Safety

Aircraft flight operations at Grissom ARB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. In the past 10 years (2004–2014), there was only one Class A mishap at Grissom ARB. That mishap did not involve an aircraft crash or result in the loss of an aircraft. There have been five reported Class B mishaps during the past 10 years. Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between $500,000 and up to $2 million.

The KC-135 and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is Air Force Reserve Command (AFRC) policy to follow AFIs that have been established to avoid fuel jettison, unless safety of flight dictates immediate jettison. Air Mobility Command (AMC) policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet above ground level (AGL) (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events

(Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.1.3.1.1 Wildlife Strike Hazard at Grissom ARB and Vicinity

A bird/wildlife-aircraft strike hazard exists at and in the vicinity of Grissom ARB due to resident and migratory bird species. Grissom ARB is located in close proximity to several major duck and goose migration corridors (Grissom ARB 2011). The duck corridors, located south of the base, experience populations of between 50,000 and 750,000 ducks per year flying through the area. The goose corridors, located east and west of the base, experience populations of 5,000 to 300,000 geese per year flying through the area. Daily and seasonal bird movements create various hazardous conditions. Measures can be taken that reduce the potential for and the number of potentially hazardous bird strikes by aircraft at or near Grissom ARB. Such actions prevent damage to aircraft and preserve lives and valuable resources. In addition to the bird species, mammals (e.g., rabbits, hares, and occasionally coyotes) wander onto the airfield and become strike hazards.

The Grissom ARB Bird-Aircraft Strike Hazard (BASH) Plan establishes procedures to minimize this hazard, including the removal or control of bird attractants, as well as depredation methods such as bird hunts (Grissom ARB 2010a). The adopted BASH Plan establishes implementation procedures and actions that can be taken to minimize the potential of bird-aircraft strikes. Such measures include eliminating broad-leaf weeds, maintaining grass heights between 7 and 14 inches, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding (insects are a major food source for birds during much of the year). BASH reduction techniques currently employed by the base include abating nuisance avian species by using pyrotechnics, and depredation when necessary. Grissom ARB has been granted a U.S. Fish and Wildlife Service (USFWS) Depredation Permit to lessen the danger of bird strikes. The depredation permit is managed by the safety office at Grissom ARB.

The 434 ARW has the responsibility to implement the approved BASH Plan. The BASH Plan also establishes the Bird Hazard Working Group, composed of representatives of Flight Safety, Civil Engineering, Airfield Management/Base Operations, Air Traffic Control (ATC), Operations, and other concerned organizations. Between 2010 and 2014, Grissom ARB personnel recorded 176 bird strikes in the airfield and airspace.

3.1.3.2 Ground Safety

Grissom ARB, the Cities of Peru and Kokomo, the Town of Bunker Hill, and Miami and Cass Counties work collaboratively to protect the health and welfare of people living and working in this area while also protecting the military mission at Grissom ARB. Clear Zones (CZs) and Accident Potential Zones (APZs) have been established at military airfields to delineate recommended surrounding land uses for the protection of people and property on the ground. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2014 AICUZ Study (USAF 2014b). All of the CZs for Runway 05/23 at Grissom ARB overlie government property or open/agricultural/low-density/transportation properties.

Montgomery Aviation and Miami County have waivered facilities inside the CZ of Runway 23. U.S. Highway 31 (U.S. 31) (permissible deviation) also passes through the CZ of Runway 23. A county road (permissible deviation) penetrates the CZ of Runway 05. APZs I and II extend off base to the northeast and southwest of Runway 05/23 and include a few low-density residential structures scattered on agricultural property.

Capability for fire response is located on base and in the local communities. The base fire department is party to mutual-aid support agreements with three municipal fire departments (Peru, Kokomo, and Logansport) and six volunteer fire departments (Amboy, Denver, Galveston, New Harmony, Pipe Creek, and Walton).

3.1.4 Soils and Water

3.1.4.1 Soil Resources

Grissom ARB is located on the northern edge of the Tipton Till Plain Section. The area surrounding the base is relatively flat and gently rolling, with elevations ranging from about 780 feet above mean sea level (AMSL) near the north end of the base to about 810 feet AMSL near the south end of the base (Grissom ARB 2011). Soil underlying the base is primarily of the Fincastle-Brookston-Miamian association (IndianaMap 2016). The Fincastle-Brookston-Miamian soils are derived from glacial till and some wind-blown loess that was deposited 12,000 years ago. This area is dissected by stream channels that separate individual flat upland areas (Whitaker and Amlaner 2012).

Primary soil series within the Fincastle-Brookston-Miamian association are the Fincastle silt loam and the Treaty silt loam. These soil types consist of deep, nearly level, poorly drained, medium-textured soils. The Fincastle soils, located on the higher grounds of the base, have a high water capacity, moderately slow permeability, slow surface runoff, and a water table at 1 to 3 feet in winter and spring. Slopes range from 0 to 2 percent. Treaty silt loam soils are located in small, shallow depressions and narrow drainages. These soils have a high water capacity, moderate permeability, very slow surface runoff, and a water table between the surface and a depth of one foot throughout most of the year. Frost heaving, a high water table, and moderate permeability restrict downward movement of roots and water within the Treaty soils. Both of these soils have a slight erosion potential (Grissom ARB 2011).

3.1.4.2 Water Resources

3.1.4.2.1 Surface Water

Grissom ARB is located within the Upper Wabash Watershed, which represents the headwaters of the Wabash River. The Wabash River is located approximately 6 miles north of the base (NRCS 2007). Surface water features in the vicinity of the base include McDowell Ditch, Government Ditch, Cline Ditch, Bennett-Campbell Ditch, Pipe Creek, Little Deer Creek, a lime settling pond located northeast of the cantonment zone, a stormwater retention pond located near the Marine Building/Washrack Complex, and a storm water retention pond located near the base Civil Engineer Complex (Grissom ARB 2014c). There are no naturally-occurring water bodies at the base. Surface drainage from the base flows in a northern and western direction into Pipe Creek, which is a tributary of the Wabash River (Grissom ARB 2011).

A system of storm sewers and ditches collect stormwater at Grissom ARB. Stormwater is discharged off the installation through six outfalls. The western portion of the cantonment area, except for the southwestern portion of the runway, discharges to McDowell Ditch, which flows into Pipe Creek and ultimately into the Wabash River. Stormwater is collected through the other five outfalls from various areas on base, all of which also flow into Pipe Creek. The outfalls are visually inspected on a quarterly basis.

In 2004, the base conducted a stormwater capacity analysis to determine the capacity of the stormwater system at Grissom ARB. The results were summarized by drainage area. For the McDowell Ditch drainage area, the study concluded that the existing structures are able to convey the peak flows from the 10-year/24-hour storm event, but not from the 100-year storm event; minor flooding would result. The study also concluded that Outfall 001 is restricting flow, creating backwater that overflows into the housing area north of the base. The stormwater capacity analysis showed that 36.5 percent of the pipes on base were inadequate for the 10-year storm event. The report further concluded that the pipe system near the southwest end of the runway is not draining as originally designed (USAF 2004).

The IDEM issued a general National Pollution Discharge Elimination System (NPDES) Permit for stormwater discharges associated with industrial activity on 22 June 2014, which expires on 22 June 2019 (Permit Number INRM00746). The General Permit requires an annual report and sampling at four outfalls. Analytical results from current grab samples and a comparison of these sample results to the other results from within the permit years are included in each report. The grab samples are collected from Outfalls 001, 002, 003, and 005. They are sampled for: oil & grease, carbonaceous biochemical oxygen demand ($CBOD_5$), chemical oxygen demand (COD), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), total phosphorus, pH, nitrate plus nitrite nitrogen, propylene glycol, and potassium. Rule 6 requires that “any pollutant that has the potential to be present in the storm water discharge” also be sampled. Potassium acetate and propylene glycol have been identified as potential pollutants and added to the list (Grissom ARB 2014c).

Several pollutants could be present in the stormwater at the base and potentially enter waters of the state. These pollutants are detergents/soaps, glycols, oil and grease, miscellaneous solvents, and various hazardous constituents of fuels used at the base (i.e., benzene, toluene, xylene, cyclohexane, ethylbenzene, and naphthalene). The application of deicing fluids to aircraft during conditions of snow and freezing rain generates runoff laden with deicing fluids. The deicing fluid used at the base is propylene glycol, which is applied in a diluted form, generally 50/50 percent with water. The deicing runoff is further diluted due to the mixing with precipitation and snow melt runoff. At Grissom ARB, deicing is accomplished at two primary locations on the Southwest portion of the ramp. Spent deicing fluid is collected into a designated collection system. The collection system pumps the spent deicing fluid into designated tanks. When the tanks are full, the fluid is recycled or properly disposed of. The quantity of propylene glycol used at the base is approximately 13,000 gallons annually.

The primary environmental concern regarding aircraft deicing is the effect that spent deicing runoff has on surface water quality. Deicing compounds, because of their organic nature, exert a high biological oxygen demand (BOD) on receiving streams, which depletes oxygen levels necessary to sustain aquatic life. In addition, the aprons, taxiways, and runways at the base are deiced/anti-iced with potassium acetate throughout the winter.

3.1.4.2.2 Groundwater

The principle aquifer underlying Grissom ARB is in the Liston Creek Limestone formation, which is part of the Silurian and Devonian Carbonates Aquifer System (Unterreiner 2007). Wells penetrating the Silurian and Devonian Carbonates Aquifer System in Miami County range from 35 to 500 feet deep, but are commonly 80 to 170 feet deep. Wells completed in the Silurian and Devonian Carbonates Aquifer System are capable of meeting the needs of domestic and some high-capacity users in Miami County. Static water levels typically range from 15 to 60 feet below ground surface (bgs), with a few reports of flowing wells in the county. There are nine registered large ground-water withdrawal facilities (25 wells) using the Silurian and Devonian

Carbonates Aquifer System in Miami County, with reported high-capacity well yields ranging from 76 to 950 gallons per minute (GPM) (Unterreiner 2007). The dominant use for these facilities is public water supply. This aquifer system is generally not very susceptible to surface contamination due to thick clay deposits over most of the county. However, areas where overlying clays are thin or absent are at moderate to high risk for contamination.

Institutional controls associated with Environmental Restoration Program (ERP) sites at Grissom ARB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.1.4.2.3 Floodplains

Although the 2004 stormwater capacity analysis documented that flooding could occur at various areas on Grissom ARB, no Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) have been prepared for the base. Although the FIRM for areas north of the base and outside of the installation boundary indicates floodplains associated with Pipe Creek, no other floodplains are identified near the base (See Figure 3-2).

A geographic information system (GIS) analysis was performed using the FEMA FIRM 100-year base floodplain elevations for Pipe Creek. In compliance with Executive Order (EO) 13690, an additional three feet was added to those elevations to identify the locations of areas that have an elevation of three feet above the 100-year floodplain. These locations were then plotted using a digital elevation model to identify areas near the existing 100-year floodplain that were greater than the 100-year floodplain base elevations and less than or equal to the 100-year plus 3 feet elevation. The results are shown on Figure 3-2.

3.1.5 Biological Resources

3.1.5.1 Vegetation

Grissom ARB lies within the Central Till Plain Natural Region and the Beech-Maple Forest Section of the Eastern Deciduous Forest Province. Vegetation associated with this ecoregion is characterized by temperate deciduous forests dominated by tall, broadleaf trees. The area that is now Grissom ARB was originally a mixed hardwood forest that was logged and cleared for agricultural uses (e.g., row crops, small grains, forage grasses, and pasture) during the 1800s. Historical farming and urban development have resulted in limited remaining forests in the vicinity of the base (Grissom ARB 2011).

Most of Grissom ARB is now urbanized, and the original vegetation has been removed or extensively altered by development, construction, landscaping, and other disturbances. Turf grasses and various broad-leaf weeds comprise the predominate vegetation types within improved and semi-improved areas on the base (Volume II, Appendix E). Vegetation management at Grissom ARB is guided by the Integrated Natural Resource Management Plan (INRMP), the Land Use Management Plan, and the BASH Plan (Grissom ARB 2008, 2010a, 2011).

3.1.5.2 Wildlife

Information on wildlife occurring on Grissom ARB is provided in the INRMP (Grissom ARB 2011). Common wildlife documented on the base includes a wide variety of mammals, birds, amphibians, and reptiles. Very few fish species are present within the base’s drainage ways and consist mainly of several minnow species. See Appendix E for a partial list of common species that occur at Grissom ARB.

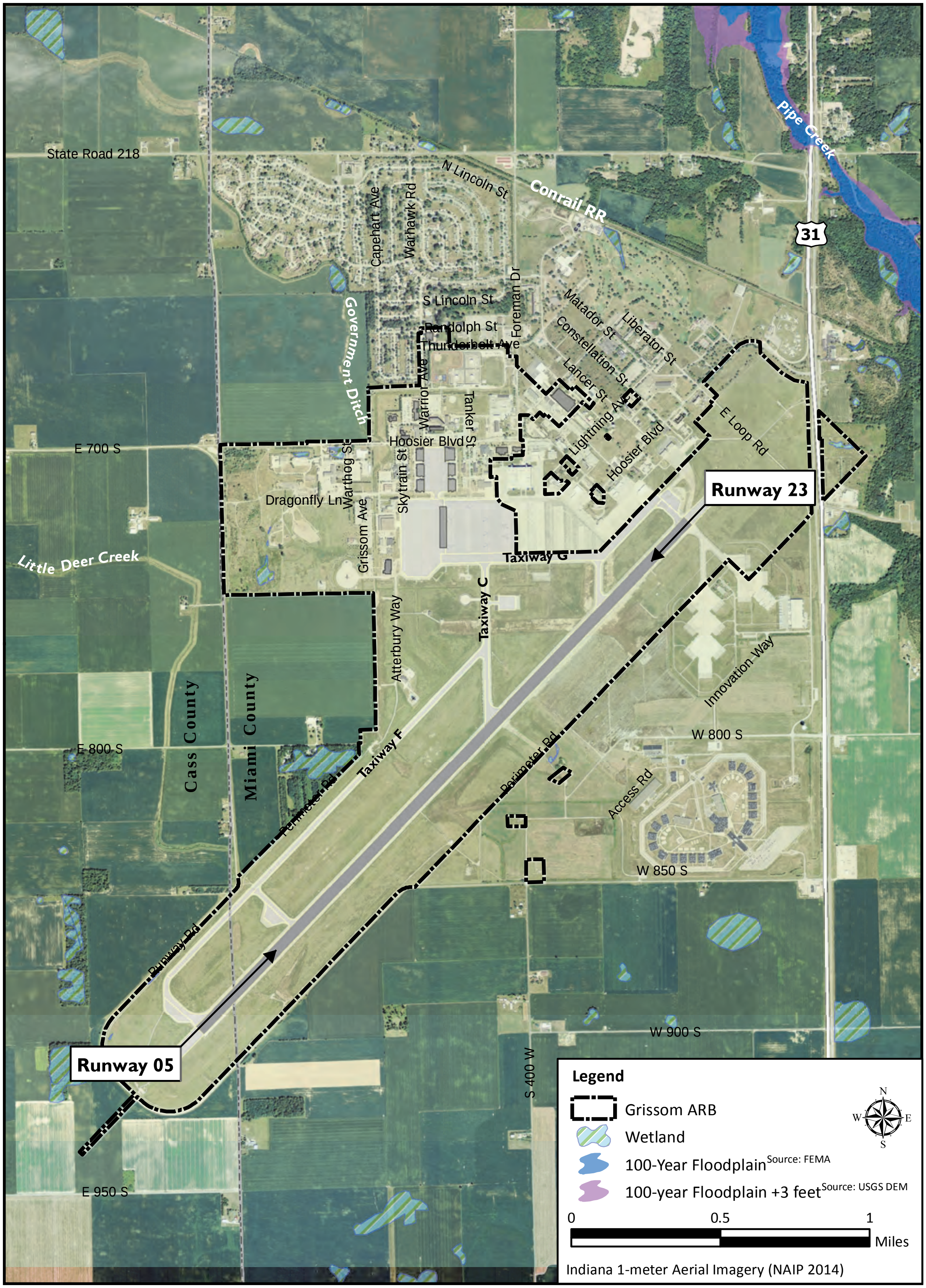

Figure 3-2. Grissom ARB Water Resources

3.1.5.3 Special-Status Species

Two USFWS online review sources (the Information for Planning and Conservation [IPaC] and Environmental Conservation Online System [ECOS]) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Grissom ARB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the Endangered Species Act [ESA], inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Grissom ARB. Separate submissions were completed for Cass and Miami Counties to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 25 March 2016 (Volume II, Appendix A, Section A.6.1.1) contains a full copy of the Trust Resource Report (USFWS 2016b). Additionally, special status species lists by county were obtained via the USFWS's ECOS to identify species with the potential to occur within Cass and Miami Counties, Indiana (USFWS 2016c). Table 3-6 presents the federally listed species identified through the IPaC and ECOS reviews, as having the potential to occur within Cass and/or Miami Counties.

Table 3-6. Federally Listed Species that Could Occur in Cass and Miami Counties, Indiana

Common Name	Scientific Name	Status		Occurrence at Grissom ARB	USFWS Online Review System
		Federal[a]	State[b]		
Clams					
Rabbitsfoot	*Quadrula cylindrica cylindrica*	FT	SE	No	IPaC, ECOS
Sheepnose mussel	*Plethobasus cyphyus*	FE	-	No	IPaC, ECOS
Mammals					
Indiana bat	*Myotis sodalis*	FE	SE	No	IPaC, ECOS
Northern long-eared bat	*Myotis septentrionalis*	FT	SC	No	IPaC, ECOS

[a] USFWS

[b] Indiana Department of Natural Resources (IDNR)

Key: FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; SC – Indiana State-listed as a species of special concern; SE – Indiana State-listed as endangered

Source: Grissom ARB 2011; USFWS 2015c, d, e, g, 2016b, c; IDNR 2013a, b

No federally or state-listed species are known to inhabit Grissom ARB; however, avian species protected under the Migratory Bird Treaty Act (MBTA) may occur as residents or migrants near the installation. There is no critical habitat on the base (USFWS 2015a).

No aquatic habitat for the rabbitsfoot (*Quadrula cylindrica cylindrica*) or sheepnose mussel (*Plethobasus cyphyus*) occurs on base. Additionally, due to the urbanized and developed nature of land on and surrounding Grissom ARB, there is a lack of suitable roost or foraging habitat for both the Indiana and northern long-eared bat species.

In a letter dated 15 April 2016, the USFWS identified the upland sandpiper (*Bartramia longicauda*), a federal species of conservation concern and Indiana State endangered species, as a successful nesting grassland bird at Grissom ARB (see Volume II, Appendix A, Section A.6.2). Additionally, the USFWS identified the following grassland and shrubland species of conservation concern as successful nesting birds on Grissom ARB: bobolink (*Dolichonyx oryzivorus*), brown thrasher (*Toxostoma rufum*), dickcissel (*Spiza americana*), field sparrow (*Spizella pusilla*), eastern meadowlark (*Sturnella magna*), and grasshopper sparrow (*Ammodramus savannarum*). In July 2015, another federal species of conservation concern and Indiana State endangered species, the northern harrier (*Circus cyaneus*), was observed soaring at Grissom ARB. However, this species forages over large areas, and breeding has not been confirmed at the base.

In a letter dated 4 April 2016, the Indiana Department of Natural Resources (IDNR) identified two Indiana State species of special concern within a half a mile northeast of Grissom ARB: the American badger (*Taxidea taxus*) and the kidneyshell (*Ptychobranchus greenii*) freshwater mussel (see Volume II, Appendix A, Section A.6.1). American badgers are a wide ranging species that prefer open prairie habitat.

3.1.5.4 Wetlands

A base-wide wetlands identification and delineation survey was conducted at Grissom ARB in July 1997. Seven wetlands were identified, totaling approximately two acres, and were field-confirmed by the U.S. Army Corps of Engineers (USACE) Louisville District. Wetlands present on base are located in two distinct areas, to the west and northeast of Runway 05/23. None of the wetlands present on Grissom ARB are near the facilities and infrastructure projects as described in Chapter 2. The locations of the Jurisdictional Waters and Wetlands on Grissom ARB are shown on Figure 3-2 (Grissom ARB 2011).

3.1.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the National Register of Historic Places (NRHP) are known as historic properties.

3.1.6.1 Architectural Resources

Several cultural resource studies have been conducted at Grissom ARB. Based on the results of these studies Grissom ARB determined that no architectural resources were eligible for listing on the NRHP. The Indiana State Historic Preservation Office (SHPO) concurred with this determination (see letter dated 25 July 2012 in Volume II, Appendix A, Section A.4).

3.1.6.2 Archaeological Resources

Grissom ARB has determined that there are no NRHP-eligible archaeological resources on the base. The SHPO concurred with this finding and confirmed that no further surveys are required at the installation (see letter dated 25 July 2012 in Volume II, Appendix A, Section A.4).

3.1.6.3 Traditional Resources

Pursuant to Sections 101(d)(6)(B) and 106 of the National Historic Preservation Act (NHPA) and implementing regulations at 36 *Code of Federal Regulations (CFR)* Section 800.2(c)(2), the USAF consulted on a government-to-government basis with 10 tribes that are culturally affiliated with the installation. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, were asked to provide information on any properties to which they attach religious and cultural significance. There are no known tribal sacred sites or properties of traditional religious and cultural importance in the vicinity of Grissom ARB.

3.1.7 Land Use

Grissom ARB is located in a rural area of Miami and Cass Counties in north-central Indiana, between the cities of Peru and Kokomo. Grissom ARB operates in association with the

Grissom Aeroplex, which provides general aviation and charter service. Land use surrounding the base is predominantly agricultural.

3.1.7.1 Base

Grissom ARB is not one contiguous installation. A number of small parcels exist outside of the main base boundaries. The main cantonment is located north of Runway 05/23. A large portion of the base surrounding the runway and to the west of the cantonment is classified as open space. The primary functional land use on the installation is categorized as Airfield Pavement, which includes the runways, taxiway, and aprons. Limited commercial and community functions exist on base (Grissom ARB 2014d).

Grissom ARB is divided into planning districts based on geographical features, land-use patterns, building types, transportation networks, and mission and/or functional uses. The planning districts at Grissom ARB include an Airfield District, Flightline District, Mission Support District, and Training Area District (Grissom ARB 2014d).

3.1.7.2 Surrounding Areas

The predominant land use surrounding Grissom ARB is agricultural, with the exception of local towns and cities and portions of U.S. 31. Land uses in the local communities, (e.g., Peru, Walton, Galveston, Bunker Hill, and Logansport) and unincorporated communities (e.g., Lincoln, Onward, and Nead) consist primarily of low-density residential property, along with some commercial and industrial property (USAF 2014b).

Adjacent to the airfield, on the northwestern side, is a beech and maple forest conservation area and a residential area, which was part of former base housing. North of the base are residential areas, an elementary school, primarily used by the base, an air museum, a trailer park, and an Indiana Bell office. Public/recreational land uses associated with Pipe Creek also exist on the northern side of the base. The eastern side of the base is more developed and includes residential uses; commercial establishments such as a restaurant, RV sales, and a gas station. The Miami Correctional Facility is located south of the installation on a portion of the former base. Industrial areas are intermixed with agricultural land uses.

Grissom ARB prepared an AICUZ study in 1995. The 1995 AICUZ study was updated in 2014 to present a description of the current noise environment around Grissom ARB. The changes in the updated AICUZ study were based on changes in assigned and transient aircraft operations, and on profiles and modifications to the DoD-approved noise modeling software program (USAF 2014b).

The estimated current off-base area affected by noise levels of 65 dB L_{Adn} or greater is 90 acres (see Section 3.1.1.1). This land consists primarily of open-space/agricultural/low-density property (59 acres). There are 13 acres of industrial land north of the installation and 7 acres of commercial property to the northeast. There is no off-base property within the 75 dB L_{Adn} or greater noise zones.

Miami County is currently in the process of developing a new Comprehensive Plan (Miami County 2015). The current plan was completed in 1999. The Miami County 1999 Master Plan included a policy related to airport noise impacts. The Plan affirmed support for the efforts of the Grissom Redevelopment Authority concerning land use and development criteria in areas that are impacted by airport noise. Specifically, the Plan supported Grissom Redevelopment Authority's criteria that discouraged incompatible land uses at Grissom Aeroplex (USAF 2014b).

The *Cass County Comprehensive Plan* was adopted in July 2009. It does not serve as a development ordinance, but rather as a growth management guide for unincorporated areas of the county (Cass County 2009). This plan provides an analysis of existing development patterns and a public participation program. It also contains the vision, goals, policies, and an implementation program. The community assessment within the *Comprehensive Plan* provides an analysis of existing development patterns within the county. Miami and Cass County and Grissom ARB are currently discussing a Joint Land Use Study (JLUS). Initiation of this study is contingent on federal USAF funding.

3.1.8 Infrastructure

3.1.8.1 Potable Water System

Potable water is provided to Grissom ARB by Peru Utilities via four wells with a combined pumping capacity of 2.2 million gallons per day (MGD) (Grissom ARB 2014d). Grissom ARB has a contract with Peru Utilities to provide a maximum of 0.8 MGD of potable water. The average water use for 2014 at Grissom ARB was 23,000 gallons per day (GPD) (Grissom ARB 2015b). This is approximately 3 percent of the provider's contracted available water supply and 1 percent of overall capacity.

3.1.8.2 Wastewater

Wastewater generated at Grissom ARB is delivered to the sewage treatment plant owned and operated by Peru Utilities. The treatment plant offers primary and secondary treatment processes and has a permitted treatment capacity of 1.75 MGD. Once treated, the plant's effluent is released into Pipe Creek. Historically, the average flow is 30,000 GPD. This flow increases to 215,000 GPD during heavy precipitation events, because of system infiltration. Peru Utilities allows a maximum capacity of 300,000 GPD for this system (Grissom ARB 2014d).

3.1.8.3 Stormwater System

Grissom ARB's drainage system consists of collecting inlets, headwalls, and circular and elliptical culverts that guide stormwater through a combination of paved and unpaved ditches and natural drainages. The underground piping network for the installation consists of corrugated steel pipe and concrete, and reinforced concrete pipes. The wide range of construction materials is indicative of system upgrades and extension projects that have occurred over time.

3.1.8.4 Electrical System

Miami-Cass County Rural Electric Membership Cooperative (REMC) supplies power to the base through a double-end, 69-kilovolt (kV) overhead transmission line. These lines are the Wabash Line and the Walton Line. Either line can supply transformers at the base's substation. A manual switch is located at the substation in case one of the lines fails. The base's main substation is owned and operated by the Miami-Cass County REMC, and is rated at 7.5 megavolts-ampere (mVA). The transformers are fan-cooled, increasing the overall capacity to 10.5 mVA for a maximum of 4 continuous hours. Oil circuit breakers and fuses protect the transformers from overload (Grissom ARB 2014d). The Miami-Cass County REMC has the capacity to provide 11.5 megawatts (MW). The average electric use in 2014 was 1.5 MW. Peak electric demand in 2014 was 2.44 MW. Grissom ARB averaged approximately 13 percent usage of the electricity provider's daily generation capacity, with 21 percent during peak periods (Grissom ARB 2015b).

3.1.8.5 Natural Gas System

Northern Indiana Public Service Company (NIPSCO) provides natural gas to Grissom ARB through a 12-inch polyethylene gas main, which enters the base near the main gate. Natural gas is then distributed via a limited-access, looped main system. The system currently operates at a standard 50 pounds per square inch (psi) with a maximum capacity of 100 psi. Grissom ARB maintains ownership and maintenance of the distribution system. The distribution system consists of a network of underground gas mains ranging from 3 to 8 inches in diameter. Expansion of the system would require enlarging these primary mains to accommodate increased capacity (Grissom ARB 2014d). NIPSCO has set a natural gas supply limit of 167,000 cubic feet (CF) per hour. Capacity and supply are reported to be sufficient for current and future mission requirements. The base natural gas system has a design capacity to provide 4,008 thousand cubic feet (Mcf) per day. The average natural gas use in 2014 at Grissom ARB was 186 Mcf per day. In 2014 Grissom ARB used approximately 5 percent of the provider's average daily capacity (Grissom ARB 2015b).

3.1.8.6 Solid Waste Management

Waste Management of Central Indiana handles collection, transportation, and disposal of municipal solid waste (MSW). Waste Management disposes of MSW in the Cass County-Oakridge Landfill. Grissom ARB averages between 200 and 250 tons of nonhazardous MSW per year, not including construction and demolition (C&D) waste (Woodring 2016a). Approximately 64 percent of the generated waste stream consists of wastes that are recyclable. C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal (Grissom ARB 2002). The Cass County-Oakridge Landfill has more than 2,000,000 cubic yards of capacity (IDEM 2014).

3.1.8.7 Transportation

Regional access to Grissom ARB is provided from the north and south by U.S. 31 and from the east and west by State Highway 218. The nearest interstate highways are Interstate (I)-70, which extends east-west, approximately 50 miles to the south, and I-69, which extends north-south, approximately 35 miles to the east. Figure 2-2 displays the primary routes and regional transportation network in the vicinity of Grissom ARB. In 2011, U.S. 31 had an average daily traffic count of 18,564 vehicles (IN DOT 2011). U.S. 31 is currently undergoing improvements between Indianapolis and South Bend, Indiana, to turn the road into a stoplight-free highway (U.S. 31 Coalition 2016).

3.1.8.7.1 Gate Access

The two primary gates at Grissom ARB are the Main Gate and the West Gate. The Main Gate is at the intersection of Hoosier Boulevard and Harry Foreman Drive; it is the primary access point onto the installation. The West Gate provides limited access on unit training weekends and for other large installation events (Grissom ARB 2014d).

3.1.8.7.2 On-Base Traffic Circulation

The installation transportation network is an integrated system of roadways, parking areas, and pedestrian pathways. The roadways at Grissom ARB provide uninterrupted connections to base operations. Hoosier Boulevard is the primary roadway; it begins at U.S. 31 (Grissom ARB 2014d).

3.1.9 Hazardous Materials and Waste

3.1.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Grissom ARB are managed in accordance with AFI 32-7086, "Hazardous Materials Management," and Grissom ARB Supplement, and are controlled through the base Hazardous Materials Pharmacy (HAZMART). The HAZMART process ensures hazardous materials purchased and approved through the supply system are tracked and reutilized to the maximum extent possible before being declared a waste. Grissom ARB performs annual inspections of each shop to ensure proper management and use of hazardous materials (Grissom ARB 2014a).

As part of the overall Pollution Prevention (P2) program at Grissom ARB, the HAZMART provides centralized management and control of hazardous materials (AFRC 1998). The purpose of the P2 program is to reduce or eliminate the use of hazardous and toxic substances and harmful discharges to the air, land, and water. P2 measures minimize chemical exposure to employees, reduce potential environmental impacts, and reduce costs for material purchasing and waste disposal.

3.1.9.1.1 Aboveground and Underground Storage Tanks

Bulk Jet-A fuel is stored in three aboveground storage tanks (ASTs) in the bulk fuel storage area at Grissom ARB. The capacity of the three ASTs is 1,680,204 gallons. Fuel consumption over the past 3 years has been approximately 14,000,000 gallons (LaBahn 2015). The existing Type II jet fuel hydrant system is being replaced with a new Type III hydrant system and primary feed line from the bulk fuel storage area in 2016. The new system will be rated at 1,800 GPM.

Grissom ARB manages spills and releases through the implementation of the Grissom ARB Hazardous Material Emergency Planning and Response Plan (Grissom ARB 2014a), which meets the requirement for a Facility Response Plan (FRP) and Spill Prevention Control and Countermeasures (SPCC) Plan. This plan provides Grissom ARB with a comprehensive approach to spill prevention and response. The Hazardous Material Emergency Planning and Response Plan outlines activities to be undertaken to minimize the adverse effects of a spill, including notification, containment, decontamination, and cleanup of spilled materials.

3.1.9.1.2 Toxic Substances

Toxic substances, as regulated under the Toxic Substances Control Act (TSCA), include asbestos, lead, and polychlorinated biphenyls (PCBs). For the purposes of this Final EIS, these are evaluated in their common forms (e.g., asbestos-containing materials [ACMs] and lead-based paint [LBP] found in buildings, and as PCBs found in electrical transformers or other mechanical devices).

The Asbestos Management Plan implements AFI 32-1052 policies and establishes procedures for accomplishing asbestos-related activity (Grissom ARB 2010b). An asbestos database is maintained by the Civil Engineering (CE) squadron. All O&M, Military Construction (MILCON), and Simplified Acquisition Bases Engineering Requirement projects are reviewed to determine if ACMs are present in the proposed project location. For any project on base, waste materials containing more than one percent ACM must be disposed of at a permitted off-base landfill by the contractor in accordance with Indiana Special Waste and Federal regulations.

With regard to LBP, Grissom ARB currently has no residential housing, target housing, or child-occupied facilities as defined by the U.S. Department of Housing and Urban Development (HUD). Therefore, all base buildings are designated as non-priority buildings and HUD standards do not apply. The LBP Management Plan provides guidance and establishes procedures for accomplishing LBP-related activities (Grissom ARB 2012). LBP records and project files are maintained by the CE squadron. Renovation, demolition, and requests for self-help projects are reviewed to determine if lead-containing materials are present in the proposed project location. For any project on base, LBP wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill. Grissom ARB is reportedly PCB-free (Walters 2015).

3.1.9.2 Hazardous Waste Management

Grissom ARB is classified as a large-quantity generator (LQG) (Grissom ARB 2013). Typical hazardous wastes generated during O&M activities include solvents, rags, paint, paint thinners and strippers, blasting media, used filters, waste oils cleaners, hydraulic fluids, lubricants, aerosols, and sealants/adhesives.

Hazardous wastes are managed in accordance with the Hazardous Waste Management Plan (Grissom ARB 2013). This plan provides the policies and procedures for the proper management of hazardous wastes generated during base operations and aircraft maintenance as required by Federal and state laws and regulations. In 2015, 10,041 pounds of hazardous wastes were removed from Grissom ARB and disposed of in off-base permitted disposal facilities. However, this volume of hazardous waste was higher than the average of the 2 prior years (4,165 pounds), because the bulk jet fuel tanks were cleaned in 2015 (Woodring 2016b).

3.1.9.3 Environmental Restoration Program

There are 14 Installation Restoration Program (IRP) sites at Grissom ARB, 8 of which have been closed. These sites are administered in accordance with the Management Action Plan. The Management Action Plan presents the comprehensive strategy for implementing response actions necessary to protect human health and the environment in accordance with applicable laws and regulations (Grissom ARB 2015a). Environmental response actions are planned and executed under the IRP in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and other applicable laws. Grissom ARB is not listed on USEPA’s National Priorities List and is not required to enter into a Federal Facilities Agreement (FFA) with the USEPA.

3.1.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Grissom ARB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Cass County and Miami County, Indiana.

3.1.10.1 Baseline Conditions

3.1.10.1.1 Population

The total population in the two-county ROI has decreased since 2010. Between 2010 and 2014, the population in the two-county ROI decreased at an average annual rate of 0.2 percent, with a total decrease of approximately 745 persons over the four-year period (USCB 2010; 2014a) (see Table 3-7). Logansport, the county seat and largest city in Cass County, has an estimated population of 17,933. The City of Peru, the county seat and largest city in Miami County, has an estimated population of 11,199. Both cities have also experienced a decline in population since 2010 (USCB 2010, 2014a).

Table 3-7. Population in the ROI for Grissom ARB

Location	2010	2014	Annual Percent Change (2010–2014)
Cass County, Indiana	38,966	38,730	-0.2%
Miami County, Indiana	36,903	36,394	-0.3%
Total (ROI)	**75,869**	**75,124**	**-0.2%**

Source: USCB 2010, 2014a

As shown in Table 2-4, the total current personnel on base at the 434 ARW at Grissom ARB is 1,715 persons. This includes 47 military, 246 DoD civilians, 110 contractors, and 1,312 part-time Reservists. In addition, there are an estimated 972 military dependents and family members associated with the full-time military and civilian personnel associated with the 434 ARW. Only full-time personnel were considered for this analysis, thus the 1,312 part-time Reservists were not considered part of the work force for this analysis.

3.1.10.1.2 Economic Activity (Employment and Earnings)

Per the most recent 2014 county employment data available from the Bureau of Economic Analysis (BEA), employment totaled 18,731 jobs in Cass County and 10,077 jobs in Miami County (BEA 2015a). The largest employment sector in Cass County was manufacturing (23.6 percent), followed by government and government enterprises (17.7 percent), and retail trade (10.5 percent) (BEA 2015a). The largest employment sector in Miami County was government and government enterprises (27.2 percent), followed by manufacturing (18.6 percent), and retail trade (12.3 percent) (BEA 2015a). Construction accounted for 4.7 percent of total employment in Cass County and 7.4 percent of total employment in Miami County. The 2014 unemployment rate reported by the Bureau of Labor Statistics (BLS) was 5.8 percent in Cass County, 6.8 percent in Miami County, and 5.9 percent in the State of Indiana (BLS 2016a). Per capita personal income in Cass County and Miami County is estimated at $34,249 and $30,334, respectively (BEA 2015b).

Grissom ARB is an important contributor to the local economy through employment of military and civilian personnel, and expenditures for goods and services. The total economic impact of the base on the surrounding communities for 2015 was $124.9 million (Heikkinen 2016). The estimated $27.4 million that Grissom expended on equipment, supplies, contracts, and minor construction had a $25 million impact on local community job creation (Heikkinen 2016).

3.1.10.1.3 Housing

Table 3-8 presents census-derived housing data for Cass and Miami Counties. Cass County had 16,399 total housing units in 2014, of which 9.5 percent (1,640 units) were vacant (USCB 2014b). Miami County had 15,384 total housing units in 2014, of which 15.5 percent (2,138 units) were vacant (USCB 2014b). The median value of owner occupied housing units is estimated at $81,100 in Cass County and $85,100 in Miami County. The median gross monthly rent for occupied units paying rent was $629 in Cass County and $646 in Miami County (USCB 2014b).

Table 3-8. Housing Data in the ROI for Grissom ARB, 2014

Location	Housing Units	Occupied	Vacant
Cass County	16,399	14,759	1,640
Miami County	15,384	13,246	2,138
Total (ROI)	**31,783**	**28,005**	**3,778**

Source: USCB 2014b

No dormitories or on-base housing are currently located on Grissom ARB. No temporary lodging facilities (TLFs) are located on Grissom ARB, because these are not authorized on AFRC bases. The Grissom ARB lodging operation currently has 312 visiting quarter (VQ) rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a permanent change of station (PCS) move (USAF 2015b).

3.1.10.1.4 Education

There are 14 schools in four school corporations in Cass County. During the 2015 to 2016 school year, 7,241 students were enrolled in grades kindergarten through twelve (K-12) (IDOE 2016). The average student-to-teacher ratio in Cass County is estimated at 13.8:1. There are 15 schools in four school corporations in Miami County. During the 2015 to 2016 school year, 7,151 students were enrolled in grades K-12 throughout (IDOE 2016). The average student-to-teacher ratio in Miami County is estimated at 16.2:1. No schools, childcare, or youth programs are currently operated on or provided by Grissom ARB.

3.1.10.1.5 Public Services

Public services in Cass and Miami Counties include law enforcement, fire protection, emergency medical services (EMS), and medical services. Indiana State Police District 16-Peru covers seven counties, including Cass County and Miami County (Indiana State Police 2016). Several fire stations are located throughout the ROI. These include the Logansport and Peru Fire Departments, which provide public safety services for residents of Logansport and Peru, respectively. The Logansport Memorial Hospital, located in Logansport, Cass County, is an 83-bed facility with 113 registered nurses (Consumer Reports 2016). Dukes Memorial Hospital, located in Peru, Miami County, is a 25-bed critical access facility with 443 healthcare professionals (Dukes Memorial Hospital 2016). Both hospitals are located within 20 miles of Grissom ARB.

3.1.10.1.6 Base Services

The 434 Aerospace Medicine Squadron (AMDS) has the capability to fully support the Individual Medical Readiness (IMR) and Personal Health Assessments (PHA) for the USAF population on Grissom ARB. Other base services located on Grissom ARB include a fitness center and a dining facility (DFAC). The 19,000 square foot fitness center has been renovated within the past 5 years and is currently staffed by five full-time equivalent (FTE) civilian positions. The hours of operation are 5:00 A.M. to 7:00 P.M. Mondays thru Fridays, 5:00 A.M. to 8:00 P.M. on Saturday, 5:00 A.M to 2:00 P.M. on Sunday, and closed on non-Unit Training Assembly (UTA) weekends and holidays. The DFAC is only in operation during the Primary and Alternate UTA weekends due to manning of the facility by Traditional Reservists only available during drill weekends. Two on-base food options available during the week include the Services Club-operated Boomers Café and the Exchange Shopette.

3.1.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the “affected area” or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB L_{Adn} or greater resulting from a proposed action that are not currently exposed to those noise levels at baseline conditions as described under the No Action Alternative (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area. As described in

Section 3.1.1.1, there are no people and therefore no minority or low-income populations in the ROI. There are also no noise-sensitive receptors (e.g., schools or hospitals) located within the ROI.

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3.2 SEYMOUR JOHNSON AIR FORCE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the KC-46A MOB 3 mission at Seymour Johnson AFB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

3.2.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Updated baseline operations data was provided by installation POCs in December 2015, and was reviewed and validated by installation POCs in March 2016 after being processed for input to the computer noise model. Under baseline conditions, KC-135 aircraft based at Seymour Johnson AFB conduct 2,568 airfield operations per year, and based F-15E aircraft conduct 55,800 airfield operations per year. Transient aircraft conduct 942 airfield operations per year at Seymour Johnson AFB. An airfield operation occurs each time an aircraft departs from the runway and each time an aircraft approaches the runway. Maximum noise levels (dB L_{Amax}) generated by KC-135 and F-15E aircraft overflights are listed in Table 3-9. KC-135 aircraft are 9 dB quieter than F-15E aircraft during approach and 27 dB quieter than F-15E aircraft during departure at a distance of 1,000 feet.

Table 3-9. Aircraft Maximum Noise Levels at Seymour Johnson AFB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
F-15E	82% NC	92	85	73	63
Takeoff					
KC-135	90% NF	87	80	69	59
F-15E	91% NC	114	105	94	84

Note: 916 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models; F-15E aircraft are equipped with Pratt and Whitney F100-PW-220 engines.
Key: Power Units: NF = fan speed; NC = engine core speed.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 ºF and 70 percent relative humidity.

Approximately 13 percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). These late-night operations are needed to support mission requirements. Based F-15E and transient aircraft conduct 2 percent of airfield operations during acoustic night.

Noise levels reflecting baseline flying operations are shown on Figure 3-3. In accordance with current USAF and DoD policies, the baseline noise levels (L_{Adn}) were created using NOISEMAP (Version 7.2). NOISEMAP accounts for topography effects on noise, and noise levels are calculated for a day with 1/365th of annual operations (known as an “average annual day”). The 65 dB L_{Adn} noise contours published in the 2011 AICUZ report are also shown as a point of reference (USAF 2011). The relatively minor differences between the AICUZ noise contours and the updated baseline noise levels can be attributed to the recent cessation of F-15E demonstration

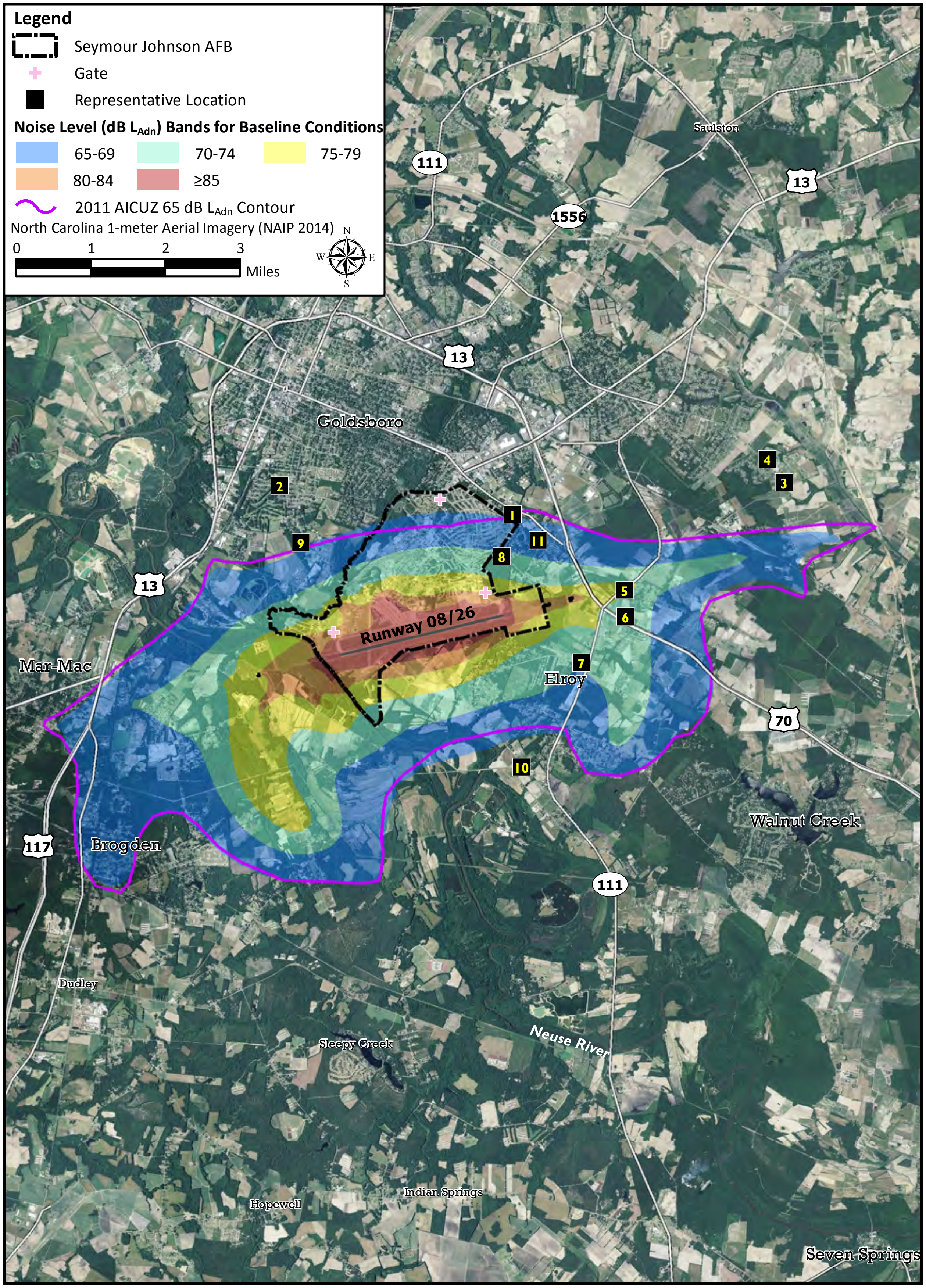

Figure 3-3. Baseline Noise Levels (dB L_{Adn}) at Seymour Johnson AFB

team flying operations, minor updates to KC-135 flight profiles, and the fact that NOISEMAP (Version 7.2) considers topographical features.

The number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} is listed in Table 3-10. At noise levels greater than 65 dB L_{Adn}, not all land uses are considered compatible per USAF and DoD guidelines. Residences are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included in the residence to provide increased outdoor-to-indoor noise level reduction. Residences are not considered compatible at noise levels greater than 75 dB L_{Adn}. Under baseline conditions, 15,669 acres of off-base land are exposed to noise levels greater than 65 dB L_{Adn}, and 2,857 acres are exposed to noise levels greater than 75 dB L_{Adn}.

Table 3-10. Acres Exposed to L_{Adn} Resulting from Baseline Conditions Seymour Johnson AFB

Noise Level (dB L_{Adn})	Area (In Acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	572	8,324	8,896
70 - 74	523	4,488	5,011
75 - 79	551	2,117	2,668
80 - 84	482	600	1,082
≥ 85	843	140	983
Total	**2,971**	**15,669**	**18,640**

Under baseline conditions, an estimated 7,682 off-base residents are affected by noise levels greater than 65 dB L_{Adn}, and an estimated 666 people are affected by noise levels greater than 75 dB L_{Adn} (Table 3-11). Approximately 12 percent of people affected by 65 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise. The prevalence of annoyance increases as noise levels increase. For example, approximately 35 percent of people exposed to 75 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise (Schultz 1978; Finegold et al. 1994).

Table 3-11. Estimated Off-Base Population Exposed to L_{Adn} Resulting from Baseline Conditions at Seymour Johnson AFB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	4,686
70 - 74	2,330
75 - 79	536
80 - 84	69
≥ 85	61
Total	**7,682**

As per a DoD policy memorandum, people exposed to noise at greater than 80 dB L_{Adn} would have an increased likelihood of experiencing noise-induced permanent threshold shift (NIPTS) (USD 2009). The noise metric 24-hour exposure level (L_{eq24}), rather than L_{Adn}, is recommended for use in assessing hearing impairment risk (DNWG 2013). The L_{eq24} metric is equivalent to L_{Adn} but does not add a decibel weighting factor to late-night noise events. The decibel weighting factor is relevant to estimating annoyance, but is not relevant to the physical mechanisms that can result in hearing impairment.

An estimated 109 off-base residents are exposed to noise levels greater than 80 dB L_{eq24} under baseline conditions (Table 3-12) and are at an increased risk of hearing loss per DoD assessment methods (see Appendix B, section B.1.3.1 for discussion of relevant assessment methods and policies). The 109 residents in the affected area were distributed into decibel intervals proportionally based on the locations of residential structures as identified through interpretation of aerial photography. Table 3-12 quantifies hearing loss risk in terms of NIPTS, a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the threshold shift that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at the age of 20 years and lasting 8 hours per day for 5 days per week. Potential NIPTS values are given for individuals of average sensitivity to noise and for individuals that that are highly sensitive (10th percentile). While it is known that people inside their homes would be exposed to less noise and therefore be at less risk of NIPTS, it is not known how much time any given individual spends indoors. Studies indicate that, on average, Americans spend 13 percent of their time outdoors (Klepeis et al. 2001). Table 3-12 lists potential NIPTS as a function of L_{eq24} if the affected persons are fully exposed to the noise level at his or her residence (i.e., outdoors 100 percent of the time) and also lists NIPTS if he or she is outdoors for the national average 13 percent of the day. Changes in hearing levels of less than 5 dB are generally not considered noticeable (USEPA 1974), and there is no known evidence that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual. Furthermore, the variability in audiometric testing (testing of hearing ability) is generally assumed to be ± 5 dB.

Table 3-12. Estimated Off-Base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions at Seymour Johnson AFB

Noise Level (dB L_{eq24})[a]	Estimated Off-Base Population Exposed to Indicated Noise Levels	100 Percent of Time Outdoors		National Average Percent Time Indoors	
		Average NIPTS (dB)[b]	10th Percentile NIPTS (dB)[b]	Average NIPTS (dB)[b]	10th Percentile NIPTS (dB)[b]
80–81	11	3	7	n/a[c]	n/a[c]
81–82	33	3.5	8	n/a[c]	n/a[c]
82–83	11	4	9	1	3.5
83–84	0	4.5	10	1	4
84–85	11	5.5	11	1.5	4.5
85–86	11	6	12	2	5.5
86–87	11	7	13.5	2.5	6.5
87–88	0	7.5	15	3	7
88–89	11	8.5	16.5	3.5	8
89–90	10	9.5	18	4	9
Total	**109**				

[a] Relationships between L_{eq24} and NIPTS were derived from CHABA 1977.
[b] NIPTS values rounded to the nearest 0.5 dB.
[c] Equivalent exposure noise level is less than 75 dB L_{Adn}, below the threshold at which NIPTS has been demonstrated to occur.

At Seymour Johnson AFB, 107 industrial, administrative, and recreational buildings are currently exposed to noise levels greater than 80 dB L_{eq24}. No residential buildings on-base are exposed to noise levels greater than 80 dB L_{eq24}. Hearing loss risk among workers at Seymour Johnson AFB is managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Seymour Johnson AFB.

Aircraft noise levels (dB L_{Adn}) at several representative locations near Seymour Johnson AFB are listed in Table 3-13. The locations, which are shown on Figure 3-3, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the churches studied experience noise levels similar to those experienced at the churches. Six (6) of the 11 locations studied experience baseline noise levels greater than or equal to 65 dB L_{Adn}. Noise sensitive land uses (e.g., schools and residences) are not considered to be compatible at noise levels greater than 65 dB L_{Adn} unless special construction measures are taken to reduce indoor noise levels.

Table 3-13. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Seymour Johnson AFB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Meadow Lane Elementary	65
2	Carver Heights Elementary	59
3	Eastern Wayne Elementary	56
4	Eastern Wayne High	60
5	Miller’s Chapel	76
6	New Hope Friends Church	73
7	Sheridan Forest Worship Center	70
8	Atkinson Chapel Church	70
9	Bible Faith Missionary Baptist	64
10	Harvest Baptist	63
11	Korean Presbyterian Church	68

Local flying guidance restricts aircraft operations between the hours of 10:30 P.M. and 6:00 A.M. to time-critical operations (e.g., alert operations, deployments, and periodic night training exercises). Of the 21 noise complaints made during the 5-year period between 2011 and 2015, 10 complaints were specifically regarding noise generated by F-15E aircraft. The remainder did not specify aircraft type. None of the complaints were specific to KC-135 aircraft noise.

Kinston Regional Jetport is a public airport that is used on a regular basis by aircraft from Seymour Johnson AFB and a wide variety of other military aircraft. The airfield supports 21,112 aircraft operations annually (FAA 2016). Approximately 70 percent of the operations are cargo-type jet aircraft, 20 percent are fighter aircraft, and 10 percent are propeller-driven aircraft (Barkes 2016). Kinston Regional Jetport is located in a lightly-populated area, and noise complaints are received infrequently (Barkes 2016).

3.2.2 Air Quality

Air emissions resulting from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would primarily affect air quality within Wayne County. The proposed operation of KC-46A aircraft at nearby Kinston Regional Jetport in Lenoir County also would affect air quality in the immediate vicinity of this facility and along aircraft flight routes between this location and Seymour Johnson AFB. The North Carolina Department of Environmental Quality (NC DEQ) Division of Air Quality (DAQ) uses the NAAQS and state standards established for total suspended particulates to regulate criteria air pollutant levels. Additional background information on the CAA and NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.2.

The DAQ enforces the national and state ambient air quality standards by monitoring state-wide air quality and developing rules to regulate and permit sources of air emissions. The North Carolina Air Quality Rules are contained in the *North Carolina Administrative Code* Title 15A, Subchapters 2D, 2H, and 2Q (NC DENR 2016).

3.2.2.1 Region of Influence and Existing Air Quality

Wayne County currently attains all of the NAAQS (USEPA 2016a). Lenoir County, which encompasses Kinston Regional Jetport, also attains all NAAQS.

3.2.2.2 Regional Air Emissions

Table 3-14 summarizes annual emissions developed for Wayne County in 2011 as part of the NEI process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) fuel combustion by electrical utilities (NO_x and sulfur oxides [SO_x]), (3) solvent/surface coating usages (VOCs), and (4) fugitive dust (PM_{10}/$PM_{2.5}$).

Table 3-14. Annual Emissions for Wayne County, North Carolina, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Stationary Sources	2,156	3,718	3,135	9,749	5,438	1,597	NA
Mobile Sources	1,860	18,176	2,883	14	186	111	740,809
Total	**4,015**	**21,894**	**6,019**	**9,763**	**5,624**	**1,708**	**740,809**[a]

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Wayne County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

Source: USEPA 2016b

3.2.2.3 Seymour Johnson AFB Emissions

Emissions due to existing operations at Seymour Johnson AFB occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-15 summarizes estimates of the most recent annual operational emissions generated by the 916 ARW at Seymour Johnson AFB. These data were developed in part from the *CY2014 Air Emissions Inventory - Air Program Information Management System - Seymour Johnson Air Force Base, North Carolina* (Zapata Inc. and URS Group, Inc. 2015) and activity data collected for 2015 operations.

Because KC-135 on-wing testing emission data were not available for Seymour Johnson AFB, emission data from KC-135 maintenance activities at Fairchild AFB were used on a per-aircraft basis for activities at Seymour Johnson AFB (AFCEC 2014a). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.2, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Seymour Johnson AFB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Table 3-15. Annual Emissions from Existing Operations of the 916 ARW at Seymour Johnson AFB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC-135 Aircraft Operations	2.76	42.61	40.90	4.23	0.23	0.23	11,794
On-Wing Aircraft Engine Testing – KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,200
AGE	0.05	0.27	0.29	0.00	0.04	0.04	45
GMVs	0.08	1.48	0.70	0.00	0.06	0.03	207
POVs – On Base	0.20	6.54	0.77	0.01	0.10	0.02	515
POVs – Off Base	0.25	10.79	1.43	0.02	0.09	0.03	811
Point and Area Sources	1.97	0.05	0.12	0.01	0.08	0.07	-
Total Emissions[a]	**6.36**	**77.13**	**50.16**	**5.06**	**0.64**	**0.46**	**15,572**

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Wayne County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons

Seymour Johnson AFB operates under DAQ Permit No. 03743R22 (NC DEQ 2015a). Sources that operate under this permit include paint spraying operations, jet engine testing houses, small engines for arresting gear systems, and diesel-powered emergency generators.

3.2.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.2.3.1 Flight Safety

Aircraft flight operations at Seymour Johnson AFB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. No Class A or B mishaps have occurred during the past 3 years at Seymour Johnson AFB. Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between $500,000 and up to $2 million.

The KC-135 and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF Major Commands (MAJCOMs) to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.2.3.1.1 Wildlife Strike Hazard at Seymour Johnson AFB and Vicinity

From 2011 to 2015, Seymour Johnson AFB personnel recorded 290 bird strikes in the airfield and airspace. Approximately 66 percent of the bird strikes were recorded by the 4 Fighter Wing (FW), which conducts operations on low-level routes and also operates at the Dare County Range. The concentration of birds at and around Seymour Johnson AFB poses a substantial risk to flying operations. The terrain, bodies of water, and climate are ideal living conditions for birds year-round, as well as migratory species. Many Seymour Johnson AFB low-level routes and the Dare County Range are located within the Atlantic Flyway, one of the most concentrated areas of migratory birds in the United States.

The 4 FW BASH Plan, which also provides BASH guidelines to 916 ARW aircrews, provides specific guidance and assigns responsibilities in developing an effective bird strike hazard reduction program for Seymour Johnson AFB (Seymour Johnson AFB 2015b).

The BASH Plan is implemented in two phases. Phase I extends from November through August when wildlife activity is generally low. The primary threat during Phase I is from turkey vultures, hawks, and waterfowl. During the rainy periods between December and April, gull activity increases on and around the runway environment. The City of Goldsboro operates a wastewater treatment pond facility off the west end of the runway that attracts more than 1,000 wintering waterfowl between November and April. Phase II extends from August through November, when wildlife activity is increased due to fall migration. The primary threat during Phase II is from flocking blackbirds, swallows, and mourning doves.

The BASH Plan establishes implementation procedures and actions to minimize the potential of bird-aircraft strikes. Such measures include eliminating broad-leaf weeds, maintaining grass heights between 7 and 14 inches, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding (insects are a major food source for birds during much of the year). BASH reduction techniques currently employed by the base include abating nuisance avian species, pyrotechnics, and depredation when necessary.

3.2.3.2 Ground Safety

Seymour Johnson AFB, the City of Goldsboro, and Wayne County Planning Departments work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established to delineate recommended surrounding land uses for the protection of people and property on the ground. Runway 08/26 at Seymour Johnson AFB has CZs encompassing an area 3,000-feet-wide by

3,000-feet-long. APZ I is 3,000-feet-wide by 5,000-feet-long and APZ II is 3,000-feet-wide by 7,000-feet-long. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2011 AICUZ Study. Estimates based on the 2010 census indicate that no individuals reside in the CZs, while 645 persons reside within the APZs, primarily in APZ II (611), west of the base (USAF 2011).

The Seymour Johnson Fire Emergency Services Flight provides 24-hour crash, structural, and emergency medical first response; technical rescue; hazardous material and weapons-of-mass-destruction incident response; and fire prevention, safety, and training/education services to Seymour Johnson AFB. The base is equipped with two fire stations providing emergency resources to both the 4 FW F-15E parking ramp and the 916 ARW hangars and apron. The Fire Emergency Services Flight also has local mutual-aid agreements with the City of Goldsboro Fire Department and the Wayne County Firefighter's Association.

3.2.4 Soils and Water

3.2.4.1 Soil Resources

Seymour Johnson AFB is located in the Coastal Plain region of North Carolina. The Coastal Plain region is dominated by floodplains of the Neuse River and former terraces of the river. The area surrounding the base is flat to gently rolling with elevations ranging from 48 feet to 121 feet AMSL. The greatest topographic relief on the base is along Stoney Creek which defines the northwestern boundary of the base. The base landscape includes a portion of the Neuse River floodplain, which forms the southwest boundary of the base. Twenty-three (23) different soil types in four different soil associations are present on the base. Soils on Seymour Johnson AFB are dominated by Rains sandy loam, Johns sandy loam, Wagram (0-6 percent slopes) sandy loam sand, and Norfolk (0-2 percent slopes) loamy sand (Seymour Johnson AFB 2015a). The well-drained soils are primarily located on the upland areas, and the poorly drained soils tend to be located on former river terrace and floodplain areas on and near the base.

3.2.4.2 Water Resources

3.2.4.2.1 Surface Water

Seymour Johnson AFB is near the center of the Neuse River Basin Watershed (North Carolina Watersheds 2007). The Neuse River Basin Watershed contains more than 3,000 stream miles, has a drainage area of 6,235 square miles, and covers approximately 9 percent of the State of North Carolina. The primary surface waters on and near the base include the Neuse River, an unnamed tributary to the Neuse River to the South, and Stoney Creek to the North. Other surface waters on the base include Hospital Creek, Burge Ditch, Mayfield's Ditch (tributary to Stoney Creek and Burge Ditch), Prison Ditch (tributary to Stoney Creek), Golf Course Ditch and Golf Course Lake (tributary to Burge Ditch), and Bulk Fuels Ditch (tributary to Prison Ditch).

Stoney Creek drains into the Neuse River, which eventually flows into Pamlico Sound. Several former streams on base now flow through culverts, and others have been straightened and channelized. Several small ponds are also located on the base, all of which are associated with the golf course.

Both the Neuse River and Stoney Creek are classified by the North Carolina Division of Water Resources (DWR) as Nutrient Sensitive Waters (NSW). NSW is a supplemental classification intended for waters needing additional nutrient management due to excessive growth of microscopic or macroscopic vegetation. Due to excessive amounts of nutrients such as nitrogen entering this watershed, the DWR has developed special stormwater programs for the Neuse River basin. Although there are no restrictions on watershed development activities, the NSW classification limits nutrient inputs. No waterbodies on or adjacent to the base are designated National Wild and Scenic Rivers, High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW).

Seymour Johnson AFB is not within the North Carolina Coastal Management Zone. The Pamlico Sound is impaired by excessive nutrient loading from point sources, agriculture and urban stormwater runoff. Operations at the base have a small potential to impact the health of Pamlico Sound (Seymour Johnson AFB 2015a).

Stormwater from the base discharges through a network of piped and open-channel stormwater drainage systems that collect and transport rainfall runoff through a system of outfalls into Stoney Creek or directly into the Neuse River (Seymour Johnson AFB 2015d).

The State of North Carolina issued an NPDES Phase I, MS4 Permit (NCS000335) to Seymour Johnson AFB on 1 March 2016, effective 1 April 2016 with an expiration date of 31 March 2021. The permit requirements are rooted in the federal Water Pollution Control Act, the CWA and Phase II stormwater regulations, state statutes, and state regulations adopted by the North Carolina Environmental Management Commission.

The MS4 Permit requires the base to enforce a program to address stormwater runoff from new development and redevelopment projects, including public transportation (roads and bridges) maintained by the installation. Section E includes reference to the NCG010000 permit which establishes requirements for construction sites. Section H includes reference to the NCG150000 permit which applies to various types of industrial activities that occur at Seymour Johnson AFB including deicing activities. Section C of the NCG150000 permit describes the requirements for deicing operations.

Deicing activities are not conducted on a regular basis at Seymour Johnson AFB. Since 2011, less than 2,000 gallons of deicing fluid have been used at Seymour Johnson AFB. If deicing is necessary, the installation conducts deicing activities on impervious surfaces and away from storm drains to prevent deicing effluent from entering the stormwater system. Deicing activities for KC-135 aircraft are currently conducted on the 916 ARW parking ramp.

Stormwater discharge is authorized under the MS4 Permit, but is subject to limitations and monitoring and reporting requirements. Continued operation of oil water separators not associated with wastewater discharges is also authorized. The permit covers current and future activities (post-construction requirements for development and redevelopment projects greater than 1 acre).

Seymour Johnson AFB developed a Comprehensive Watershed Protection Plan (CWPP), which was approved on 11 October 2015 by the North Carolina DWR to meet part or all of the post-construction program requirements. Requirements and status of the CWPP are reported to DWR in the annual stormwater report.

3.2.4.2.2 Groundwater

Groundwater below Seymour Johnson AFB occurs in three aquifers. From shallow to deep, these aquifers have been identified as the surficial aquifer, the Black Creek aquifer, and the Cape Fear aquifer. The unconsolidated aquifer system of the inner Coastal Plain beneath Wayne County and the base is comprised of several imperfectly connected sand bodies (USGS 1997). The surficial unconfined aquifer is underlain by a series of interbedded sands and clays comprising the regional, confined units of the Black Creek aquifer. The productive water zones of the Black Creek aquifer are located approximately 90 feet bgs at the base. Beneath the Black Creek aquifer, the Cape Fear Formation contains the deepest aquifer system in the area. Depth to groundwater within the surficial aquifer ranges from approximately one foot bgs near the Neuse River and its tributaries to about 15 feet bgs in the central portion of the base. The average hydraulic conductivity of the surficial aquifer in the vicinity of Seymour Johnson AFB has been reported to range from 5 to 40 feet per day (Seymour Johnson AFB 2015d). The Black Creek aquifer ranges from less than 100 feet AMSL in western Wayne County to about sea level in the eastern part of the county. The Cape Fear aquifer ranges from about 50 feet above sea level in the western part of Wayne County to about 200 feet below sea level in the eastern part of the county (Winner and Lyke 1986).

Institutional controls associated with ERP sites at Seymour Johnson AFB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.2.4.2.3 Floodplains

Approximately 703 acres of the base is located within the FEMA mapped 500-year floodplain (Seymour Johnson AFB 2015a). The major flood zones are located along Stoney Creek at the northwest boundary of the base and along the Neuse River in the southwest portion of the base (see Figure 3-4).

3.2.5 Biological Resources

3.2.5.1 Vegetation

Seymour Johnson AFB is located in the Southeastern Plains ecoregion of North Carolina. The Southeastern Plains ecoregion consists of irregular-shaped plains with broad interstream areas containing agricultural lands and pastures, woodlands, and forests (Griffith et al. 2002). The installation is divided into improved, semi-improved, and unimproved areas for vegetation management.

Improved areas of the base consist primarily of turf and landscaped grounds surrounding buildings, residences, parks, and recreation fields. Semi-improved areas consist of mixtures of native and non-native plants that are mowed periodically. See Appendix E for common species known to occur in these areas. Unimproved lands include natural communities such as Coastal Plain Bottomland Hardwoods (Brownwater Subtype), Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Levee Forest (Brownwater Subtype), Cypress–Gum Swamp (Brownwater Subtype), and Mesic Mixed Hardwood Forest (Coastal Plain Subtype). All of the natural communities associated with the unimproved areas of Seymour Johnson AFB are degraded, with the exception of a portion of the Coastal Plain Bottomland Hardwoods located in the southeast corner of the base (Brownwater Subtype), which is listed to be of fair quality in the base INRMP (Seymour Johnson AFB 2015a). Vegetation management at Seymour Johnson AFB is guided by the INRMP, the Seymour Johnson General Plan, and the BASH Plan (Seymour Johnson AFB 2008, 2015a, 2015b).

3.2.5.2 Wildlife

Information on wildlife occurring on Seymour Johnson AFB is provided in the INRMP (Seymour Johnson AFB 2015a). Wildlife found at Seymour Johnson AFB includes a diversity of mammal, bird, amphibian, reptile, and fish species. Appendix E contains a partial list of species known to occur at Seymour Johnson AFB.

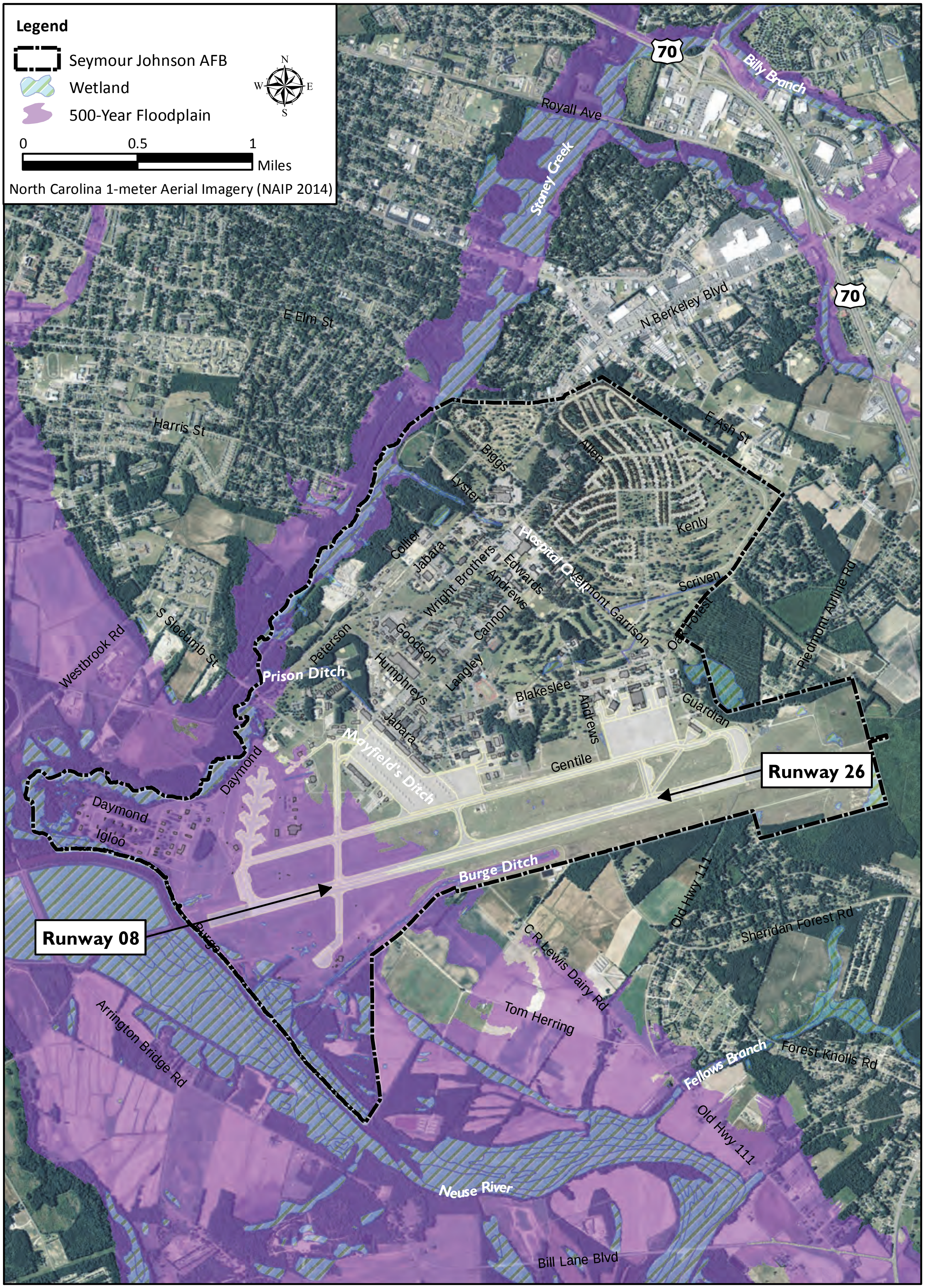

Figure 3-4. Seymour Johnson AFB Water Resources

3.2.5.3 Special-Status Species

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Seymour Johnson AFB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Seymour Johnson AFB. A submission for Wayne County, North Carolina, was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 31 March 2016 (Volume II, Appendix A, Section A.6.2) contains a full copy of the Trust Resource Report (USFWS 2016d). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur in Wayne County, North Carolina (USFWS 2015h). Table 3-16 presents the federally listed species identified though the IPaC and ECOS reviews.

No federally or state-listed species are known to inhabit Seymour Johnson AFB; however, avian species protected under the MBTA could occur as residents or migrants near the installation. There is no critical habitat on the base (USFWS 2015a).

Table 3-16. Federally Listed Species that Could Occur in Wayne County, North Carolina

Common Name	Scientific Name	Status		Occurrence at Seymour Johnson AFB	USFWS Online Review System
		Federal[a]	State[b]		
Clams					
Red-cockaded woodpecker	*Picoides borealis*	FE	E	No	IPaC, ECOS

[a] USFWS
[b] North Carolina Wildlife Resources Commission
Key: FE – listed as endangered under the ESA, E - North Carolina Endangered
Source: Seymour Johnson AFB 2015a, USFWS 2015h, NCWRC 2014

No suitable habitat for the red-cockaded woodpecker is known to occur near the facilities and infrastructure projects described in Chapter 2. Habitat for the red-cockaded woodpecker includes mature pine forests with an open understory. Cavities are excavated in living pine trees, preferably longleaf pine (*Pinus palustris*) or other southern pines generally more than 80 years old (USFWS 2008). Mature loblolly pines (*Pinus taeda*) within the unimproved areas at Seymour Johnson AFB could provide appropriate nesting habitat. However, the availability of foraging habitat is low because forested areas are small and fragmented. A survey completed in 2002 inspected all longleaf pines present on base for signs of red-cockaded woodpecker presence. Per the USFWS, the possibility of the red-cockaded woodpecker becoming established on Seymour Johnson AFB is remote (USFWS 2002).

3.2.5.4 Wetlands

A review of National Wetland Inventory data for Seymour Johnson AFB identified approximately 188 acres of palustrine and riverine wetlands (Seymour Johnson AFB 2015a). The majority of these are associated with the Neuse River and Stoney Creek waterways, located along the northwestern and southwestern installation boundaries, with a few pockets occurring in the interior section of the base (Seymour Johnson AFB 2015a). Although palustrine wetlands are located in the vicinity of the airfield, none are located near the facilities and infrastructures projects described in Chapter 2 (Section 2.5.2.2.1 and Figure 2-7). Wetlands on Seymour Johnson AFB are shown on Figure 3-4.

3.2.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties.

3.2.6.1 Architectural Resources

Historical building inventories at Seymour Johnson AFB have identified two Cold War-era facilities that are potentially eligible for listing in the NRHP. Building 2130 and Building 5015 represent important Cold War-era facilities related to the Strategic Air Command (SAC) bomber mission. Seymour Johnson AFB has concluded that no other NRHP-eligible buildings are present on the installation.

3.2.6.2 Archaeological Resources

In 1978, a comprehensive archaeological survey was conducted on Seymour Johnson AFB. The survey found no archaeological sites on the installation. The SHPO confirmed that no further surveys were required at the installation (see letter from the SHPO dated 9 October 1978, Volume II, Appendix A, Section A.4.2).

3.2.6.3 Traditional Resources

Seymour Johnson AFB has identified one tribe potentially affiliated with the installation. The base has reached out to that tribe in the past as part of the NEPA and Section 106 processes, and the tribe has indicated that they have no interests in projects in Wayne County (see Volume II, Appendix A, Section A.3).

3.2.7 Land Use

Seymour Johnson AFB is located in Wayne County, North Carolina, within the city limits of Goldsboro. The main base occupies approximately 3,243 acres. Land use immediately surrounding the base is a mix of residential, commercial, agricultural, and industrial (Seymour Johnson AFB 2008).

3.2.7.1 Base

Seymour Johnson AFB consists of two groupings of land: the main base and other off-base parcels, which support its mission (Seymour Johnson AFB 2008). About half of the base is dedicated to the airfield. Industrial functions, recreational areas, community support functions, open space, and housing areas occupy much of the remainder of the base on the north side of the airfield. Land use on the south side of the base is primarily open space, industrial areas (fire training area and firing range), and water.

Seymour Johnson AFB has been working closely with Goldsboro and Wayne County officials to avoid future encroachment (Seymour Johnson AFB 2008). Wayne County has addressed accident potential concerns with the adoption of a countywide zoning ordinance that restricts density within the APZs and requires high noise notifications for new housing subdivisions.

3.2.7.2 Surrounding Areas

Portions of the base boundary and southern city limits are coincident. Because the base is along the southern boundary of Goldsboro, the majority of the development is north of the base. Mixed residential and commercial establishments border the base to the north and east, especially in the vicinity of U.S. 70 (Business) and Berkeley Boulevard. Agricultural land and some housing developments are adjacent to the base to the east and south. To the west are the Neuse River and large former sewage treatment lagoons. Immediately to the northwest is a buffer strip of open space along Stoney Creek, and residential uses are located farther to the northwest. Northwest of that are residential uses (USAF 2011).

The USAF provides land use recommendations and guidelines for compatible use to local jurisdictions through the AICUZ program. The 1993 Seymour Johnson AFB AICUZ study was updated in 2011 (USAF 2011). The update presents and documents all changes to the AICUZ for the period of 1993 to 2011 that resulted from changes to the mix of aircraft using Seymour Johnson AFB (both transient and based), as well as changes to the operational tempo.

The noise exposure area from aircraft operations is generally focused to the east, west, and south of the runway, away from Goldsboro's population center. Based on review of the existing noise levels (see Section 3.2.1.1), it is estimated that the off-base area affected by noise levels of 65 dB L_{Adn} or greater is 15,669 acres. The affected land is mainly open/agriculture/low-density residential (9,793 acres) and residential (3,455 acres). The remaining acreage is a mix of commercial, industrial, public, recreational, and other uses.

The City of Goldsboro exercises extra-territorial zoning to one mile beyond its city limits. Most of the area south of the base is zoned for open space or agricultural, low-density residential, or industrial uses. An area of residential activity, including mobile homes and single-family residential dwelling south of the runway, is exposed to noise levels greater than 75 dB L_{Adn} (USAF 2011).

Although much of Wayne County is not zoned, the area around the base and outside of Goldsboro's extra-territorial jurisdiction is zoned. Additionally, the county adopted a noise overlay zoning district in 2005 and has a design manual for structures erected after 2005 for the purpose of incorporating noise attenuation into building construction within the district. The majority of the land exposed to noise levels of 65 dB L_{Adn} or greater in Wayne County is rural, including agricultural with scattered rural residential uses (USAF 2011).

A JLUS for Seymour Johnson AFB is currently being prepared. The JLUS will address compatibility planning in the northeast North Carolina region. The primary objective is to reduce conflicts between Seymour Johnson AFB/Dare County Range and areas affected by aircraft operations while accommodating new growth and economic development, sustaining economic vitality, protecting public health and safety, and sustaining the operational missions of the base (Matrix Design Group 2016).

3.2.8 Infrastructure

3.2.8.1 Potable Water System

Potable water is provided to Seymour Johnson AFB by the City of Goldsboro. The City of Goldsboro can supply 2 MGD to the base. In addition, Seymour Johnson AFB has 2.1 million gallons (MG) of storage on base. Potable water consumption from 2011 through 2013 averaged 0.47 MGD, with a peak demand of 1.18 MGD (Seymour Johnson AFB 2014a). This amounted to 23 percent of the base water system capacity at average daily use and 59 percent of base capacity at peak daily demand. The overall condition of the potable water system is considered adequate for current mission requirements (Hartsfield 2016).

3.2.8.2 Wastewater

Effluent from Seymour Johnson AFB is discharged to the City of Goldsboro wastewater treatment plant (WWTP). The WWTP capacity is 14.2 MGD, with 1.5 MGD reserved for the base. Between January 2012 and June 2013, the average effluent flow was approximately 0.395 MGD. Peak effluent flow was approximately 1.2 MGD (Seymour Johnson AFB 2014a). This average daily discharge was approximately 33 percent of the reserved flow at average daily discharge (3 percent of total capacity) and 80 percent of the reserved flow (8 percent of total capacity) at peak daily discharge. The overall condition of the sanitary sewer system is considered adequate for current mission requirements (Seymour Johnson AFB 2014a).

3.2.8.3 Stormwater System

Stormwater from the base is discharged via a series of drainage ditches and storm sewers through a series of outfalls and into Stoney Creek or directly into the Neuse River. The base operates under a North Carolina NPDES stormwater permit, which covers the industrial outfalls from the base to Stoney Creek and the Neuse River (Seymour Johnson AFB 2014b). The overall system is rated adequate (Abrams 2016).

3.2.8.4 Electrical System

Duke Progress Energy provides electrical service to Seymour Johnson AFB through a 115-kV substation located near the Wayne Manor Housing Area. The estimated supply limit is 19.3 MW. The Seymour Johnson 115-kV substation servicing the base has a maximum capacity of 31,000 kilovolt-ampere (kVA) (24.8 MW). Seymour Johnson AFB used 55.8 megawatt hours (MWh) of electricity in 2015. The electrical system on base is rated as adequate (Czuba 2016).

3.2.8.5 Natural Gas System

The natural gas system at Seymour Johnson AFB is supplied by Piedmont Natural Gas through natural gas lines owned by Progress Energy (main base) and the base (family housing). Seymour Johnson AFB used 124 million cubic feet (MMcf) of natural gas in 2015. The natural gas system is rated as adequate and does not represent a constraint to future development on Seymour Johnson AFB (Czuba 2016).

3.2.8.6 Solid Waste Management

Seymour Johnson AFB contracts with a commercial waste hauler for pick up and disposal of MSW. The base operates a recycling program that meets the minimum requirements of state laws requiring recycling of cardboard, plastic bottles, and wooden pallets. Yard waste from the housing area is separated, hauled off base, and composted. MSW from Seymour Johnson AFB is transported to the Wayne County landfill. The life expectancy of this landfill is projected to be 2031. C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal.

3.2.8.7 Transportation

Regional access to Seymour Johnson AFB is provided by U.S. Highway 70 (U.S. 70), and Business U.S. 70. Figure 2-8 displays the primary routes and regional transportation network in the vicinity of Seymour Johnson AFB. U.S. 70 extends east-west and is located approximately 0.5 miles from the northern base boundary. The average daily traffic volume on U.S. 70 near the main gate in 2014 was 14,000 vehicles per day (NC DOT 2014). U.S. 70 provides access to I-95 approximately 19 miles to the northwest. I-95 connects major cities up and down the east coast.

3.2.8.7.1 Gate Access

Vehicle access to the base is provided through three gates: the Berkeley/Main Gate, Oak Forest/East Gate, and Slocomb/West Gate. The Main Gate is located at the northern end of the base on Wright Brothers Avenue near Business U.S. 70.

3.2.8.7.2 On-Base Traffic Circulation

The primary arterial roads moving traffic onto and off of the base are Wright Brothers Avenue and South Slocumb Street. All other roads on Seymour Johnson AFB feed into these two primary roads.

3.2.9 Hazardous Materials and Waste

3.2.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Seymour Johnson AFB are managed in accordance with AFI 32-7086, "Hazardous Materials Management," and are controlled through the base HAZMART. This process provides centralized management of the procurement, handling, storage, and issuance of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials.

3.2.9.1.1 Aboveground and Underground Storage Tanks

The Seymour Johnson AFB SPCC Plan describes the measures implemented to prevent petroleum product discharges from occurring and prepares the base to respond in a safe, effective, and timely manner to mitigate the impacts of an uncontrolled discharge. Seymour Johnson AFB made a determination under 40 *CFR* 112.20(f), as recorded in the "Certification of Applicability of Substantial Harm Criteria," that the facility does not pose a risk of substantial harm. Therefore, an FRP is not required for Seymour Johnson AFB (Seymour Johnson AFB 2014b). The SPCC Plan and Installation Emergency Management Plan (IEMP) address roles, responsibilities, and response actions for all major spills (Seymour Johnson AFB 2014c).

Seymour Johnson AFB has 11 ASTs with capacities greater than 10,000 gallons. These ASTs are located at the bulk fuel storage area (5), Type III Fuel Hydrant System (2), GOV gas station (3), and AGE Ready Line (1). These ASTs are used to store Jet-A, gasoline, and diesel. Seymour Johnson AFB also manages 9 underground storage tanks (USTs). The total Jet-A storage capacity at Seymour Johnson AFB is approximately 4,500,000 gallons (Seymour Johnson AFB 2014c). Seymour Johnson AFB used approximately 43,400,000 gallons of Jet-A in 2015, with the 916 ARW KC-135 mission using approximately 5,500,000 gallons. Seymour Johnson AFB receives fuel through a commercial pipeline and commercial tank trucks. Jet-A is delivered to the KC-135 aircraft parking ramp fuel hydrants from the Type III fuels storage ASTs via the Type III fuel hydrant system. The F-15 parking ramp fuel hydrants are supplied with Jet-A from the USTs at Pumphouse #2 (Seymour Johnson AFB 2014c).

3.2.9.1.2 Toxic Substances

The Asbestos Operating Plan establishes management responsibilities and procedures to ensure personnel and USAF facilities are not exposed to excessive levels of airborne asbestos fibers. The plan also describes how the base will carry out ACM-related work (Seymour Johnson AFB 1997). The CE squadron maintains a permanent file documenting asbestos related activities. Based on the plan, all proposed facility construction, repair, maintenance, demolition, and renovation or self-help projects must be reviewed, to the extent possible, to identify the presence of ACM prior to work beginning. Work on ACM projects would only be performed by individuals with current accreditation from the NC DEQ and training in accordance with OSHA and USEPA standards. For any project on base, ACM wastes are removed by the contractor performing the work and handled and disposed of in accordance with Federal, state, and local regulations at a waste disposal site authorized to accept such waste.

A Lead-Based Paint Management Plan is no longer required at Seymour Johnson AFB (Owen 2016). The base complies with all Federal, state, and local requirements regarding LBP and lead containing materials, activities, and hazards. None of the electrical transformers at this base have PCB containing oil (Young 2011). However, there may be PCBs in caulking and sealants in some facilities (Owen 2016).

3.2.9.2 Hazardous Waste Management

Seymour Johnson AFB is classified as an LQG. Typical hazardous wastes generated during O&M activities include flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, blast media, waste paint-related materials, and other miscellaneous wastes.

Hazardous waste generated, stored, transported, treated, or disposed of by Seymour Johnson AFB is regulated by the State of North Carolina under authority granted to the state by the USEPA. The base was issued a Hazardous Waste Management Permit by the State of North Carolina Division of Waste Management on 24 September 2015 (NC DEQ 2015b). This permit shall remain in effect for 10 years from that date.

Hazardous wastes at Seymour Johnson AFB are managed in accordance with the Hazardous Waste Management Plan (Seymour Johnson AFB 2015f). This plan covers the control and management of hazardous wastes from the point the material becomes a hazardous waste to the point of ultimate disposal, as required by Federal and state laws and regulations. In 2015, the base generated approximately 25,500 pounds of hazardous waste, which was disposed of at off-base permitted disposal facilities.

3.2.9.3 Environmental Restoration Program

There are 63 ERP sites at Seymour Johnson AFB that are administered in accordance with the Management Action Plan. The Management Action Plan describes the integrated, coordinated approach of conducting the ERP activities required at the installation (Seymour Johnson AFB 2016). Environmental response actions are planned and executed under the ERP in a manner consistent with CERCLA and other applicable laws. Seymour Johnson AFB is not listed on the USEPA's National Priorities List.

3.2.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of new facilities, and renovations and modifications to existing facilities at Seymour Johnson AFB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Wayne County, North Carolina.

3.2.10.1 Baseline Conditions

3.2.10.1.1 Population

Population estimates for Wayne County totaled 124,093 persons in 2014 (USCB 2014a). Between 2010 and 2014, the county population increased at an average annual rate of 0.3 percent, with a total increase of approximately 1,470 persons over the four-year period (USCB 2010; 2014a). The City of Goldsboro has an estimated population of 35,908 (USCB 2014a). The population of Goldsboro has declined since 2010 (Table 3-17).

Table 3-17. Population in the ROI for Seymour Johnson AFB

Location	2010	2014	Annual Percent Change (2010–2014)
Goldsboro City	36,437	35,908	-0.4%
Wayne County	122,623	124,093	0.3%
North Carolina	9,535,483	9,750,405	0.6%

Source: USCB 2010; 2014a

As shown in Table 2-8, the total current personnel at the 916 ARW is 1,141 persons. This includes 4 military, 28 DoD civilians, 268 dual status technicians, 14 contractors, and 1,095 part-time Reservists. In addition, there are an estimated 488 military dependents and family members associated with the full-time military and civilian personnel associated with the 916 ARW. Only full-time personnel were considered for this analysis, thus the 1,095 part-time Reservists were not considered part of the work force for this analysis.

3.2.10.1.2 Economic Activity (Employment and Earnings)

In 2014 employment in Wayne County totaled 57,409 jobs (BEA 2015a). The largest employment sector in Wayne County was government and government enterprises (24.2 percent), followed by healthcare and social assistance (12.1 percent), and retail trade (11.4 percent) (BEA 2015a). Construction accounted for 3.9 percent of total employment. The 2014 unemployment rate reported by the BLS was 6.3 percent for Wayne County (BLS 2016a). The county unemployment rate was higher than the state (5.9 percent) (BLS 2016b). Per capita personal income in Wayne County is estimated at $35,181 (BEA 2015b).

Seymour Johnson AFB is an important contributor to the Wayne County economy through employment of military and civilian personnel, and expenditures for goods and services. The total economic impact of the base on the surrounding communities in 2014 was $594,536,645 and 9,523 local jobs created. The payroll for military, DoD civilians, and other base personnel exceeded $411.8 million. Approximately $2.8 million worth of MILCON and $83.8 million of O&M expenditures also occurred on base in 2014 (Seymour Johnson AFB 2015e).

3.2.10.1.3 Housing

Table 3-18 presents census-derived housing data for Wayne County. Wayne County had an estimated 53,074 total housing units in 2014, of which 10.5 percent (5,594 units) were vacant (USCB 2014b). The median value of owner occupied housing units in Wayne County is estimated at $108,000. The median gross rent for occupied units paying rent was $705 (USCB 2014b).

Table 3-18. Housing Data in the ROI for Seymour Johnson AFB, 2014

Location	Housing Units	Occupied	Vacant
Wayne County	53,074	47,480	5,594

Source: USCB 2014b

There are three housing options available at Seymour Johnson AFB: privatized housing, unaccompanied housing, and housing in the local community. Military family housing at Seymour Johnson AFB is privatized and owned by Corvias Military Living. Dormitories are available on base and currently run at an 86 percent occupancy rate. Seymour Johnson AFB's lodging operation currently has 9 distinguished visiting quarter (DVQ) rooms, 83 VQ rooms, and 69 TLF rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move. Annual occupancy for lodging is approximately 78 percent (USAF 2015c).

3.2.10.1.4 Education

The Wayne County Public School (WCPS) District serves the county. WCPS District had a total enrollment of 19,588 students during the 2013 to 2014 school year (NC Report Card 2016).

No schools are currently located on Seymour Johnson AFB. Students of military families that choose to live in privatized housing are zoned to attend Meadow Lane Elementary, Greenwood Middle School, or Eastern Wayne High School (USAF 2016). Combined, these schools had 149 classroom teachers and a total enrollment of 2,252 students during the 2012 to 2013 school year. Both Meadow Lane Elementary and Eastern Wayne High School had a greater number of students than the average number of students in similarly sized schools in the district and the state. During the 2012 to 2013 school year, legislation mandated that class sizes for grades 4 through 12 would not restrict the number of students per class size (NC Report Card 2016). The 4th Force Support Squadron operates the Child Development Center (CDC). The CDC has capacity for 174 children, with a current waitlist of 10 children. The condition of the facility is adequate, but it is in need of infrastructure improvements. Family child care (home care) and youth programs are also available at Seymour Johnson AFB.

3.2.10.1.5 Public Services

The Wayne County Office of Emergency Services is comprised of five primary functions of responsibility. These include the fire marshal, emergency management, EMS, enhanced 911 communications, and security (Wayne County 2016). These functions work together to provide public services to Wayne County. Law enforcement services are provided by the Wayne County Sheriff's Department and the Goldsboro Police Department, which services more than 39,000 citizens who live and work in Goldsboro (Goldsboro 2016). The Goldsboro Fire Department is comprised of five separate stations that service Wayne County and the City of Goldsboro. The Wayne Memorial Hospital located in Goldsboro serves the communities of Wayne County and is located approximately 6 miles from Seymour Johnson AFB.

3.2.10.1.6 Base Services

The 4th Medical Group provides primary and specialty outpatient medical care and dental services for approximately 10,500 beneficiaries, including active-duty members, retirees, and their families in the Goldsboro, North Carolina, area.

Other base services include a DFAC, flight kitchen, recreational programs, fitness center, and youth and family services. There is one full-service DFAC which operates three meals per day. A flight kitchen also offers lunch, dinner, a midnight meal, and can provide ground support meals as needed. Recreation facilities include golf, bowling, parks, campgrounds, and other indoor/outdoor recreation activities. Youth and family services on base include youth programs for children ages 9 to 18 (USAF 2015c).

3.2.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the "affected area" or ROI. Populations exposed to average noise levels of 65 dB L_{Adn} or greater are considered adversely affected. The affected area (or ROI) represents off-base residential areas which experience annual average noise levels of 65 dB L_{Adn} or greater. The baseline affected area was mapped using the noise levels described in Section 3.1. Section 3.1 provides a description of the method applied to calculate the proportion of the population in the affected area.

Table 3-19 provides baseline demographic conditions in Wayne County, where Seymour Johnson AFB is located. As shown in Table 3-19, Wayne County has a higher proportion of minority and low-income populations than the State of North Carolina and the nation (Figure 3-5).

Table 3-19. Minority and Low-Income Populations Near Seymour Johnson AFB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of North Carolina	9,750,405	3,455,877	35.4%	1,716,071	17.6%
Wayne County	124,093	55,985	45.1%	27,920	22.5%

Source: USCB 2014a; 2014c

Under baseline conditions, off-base residential areas within the 65 dB L_{Adn} or greater noise levels extend into 17 census block groups. There is an estimated population of 7,682 people within this area. Of those, 56.9 percent (4,371 people) are minority and 36.0 percent (2,768 people) are low-income persons. Table 3-20 presents low-income populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-21 presents minority populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-22 presents the youth and elderly population data comparable to that provided for the low-income and minority populations. Noise-sensitive receptors located within the 65 dB L_{Adn} or greater noise level under baseline conditions are shown on Figure 3-5. The boundaries of Meadow Lane Elementary are located within the 65 dB L_{Adn} threshold under baseline conditions. During the 2012 to 2013 school year, Meadow Lane Elementary had 695 students enrolled and 44 classroom teachers for a student to teacher ratio of 16:1 (NC Report Card 2016).

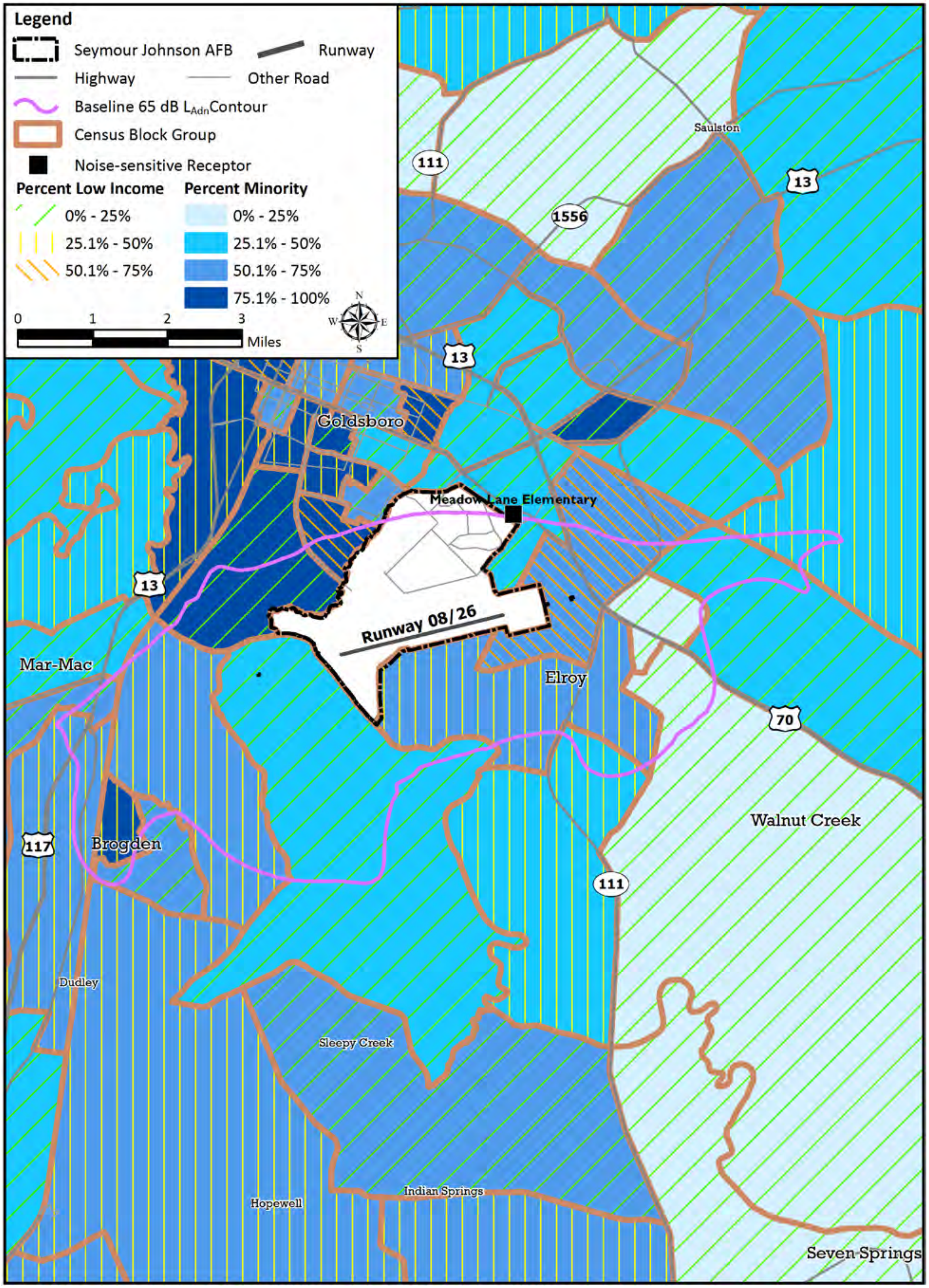

Figure 3-5. Minority and Low-Income Populations Near Seymour Johnson AFB

Table 3-20. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
371910003022	10	28.6%
371910004011	6	11.3%
371910004012	32	21.3%
371910004013	77	19.2%
371910004021	613	58.1%
371910004022	746	42.4%
371910004023	59	30.7%
371910006011	627	36.3%
371910006012	134	25.5%
371910006013	47	17.0%
371910006022	3	1.6%
371910009022	115	29.1%
371910009023	10	25.6%
371910013021	73	20.9%
371910014003	0	0.0%
371910014005	152	59.8%
371910015002	64	23.0%
Total	**2,768**	**36.03%**

Table 3-21. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Minority	
	Number	Percent
371910003022	13	37.1%
371910004011	16	30.2%
371910004012	32	21.3%
371910004013	46	11.5%
371910004021	581	55.1%
371910004022	908	51.6%
371910004023	96	50.0%
371910006011	1,112	64.3%
371910006012	413	78.5%
371910006013	201	72.6%
371910006022	82	43.9%
371910009022	233	59.0%
371910009023	25	64.1%
371910013021	138	39.4%
371910014003	1	100.0%
371910014005	239	94.1%
371910015002	235	84.5%
Total	**4,371**	**56.9%**

Table 3-22. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
371910003022	9	5
371910004011	9	8
371910004012	44	19
371910004013	23	108
371910004021	287	99
371910004022	370	217
371910004023	44	27
371910006011	422	138
371910006012	75	99
371910006013	86	31
371910006022	29	34
371910009022	80	46
371910009023	8	7
371910013021	58	82
371910014003	0	0
371910014005	71	29
371910015002	81	63
Total	**1,696**	**1,012**

Key: Youth = under 18; Elderly = 65 and over.

3.3 TINKER AIR FORCE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Tinker AFB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB.

3.3.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Updated data on baseline operations were provided by pilots, ATC personnel, and other installation POCs in December 2015. After being processed for input to the computer noise model, the information was reviewed to confirm accuracy. KC-135 aircraft based at Tinker AFB conduct 2,399 airfield operations per year under baseline conditions. Other based aircraft conduct 18,708 operations per year. Aircraft involved in depot maintenance conduct 4,468 operations per year, and transient aircraft conduct 4,988 operations per year. Airfield operations are counted each time an aircraft departs from the runway and each time an aircraft approaches the runway.

Maximum noise levels (dB L_{Amax}) generated by based KC-135, E-3, and E-8 aircraft overflights are listed in Table 3-23. Table 3-23 also includes noise levels of aircraft that visit the base for depot maintenance (i.e., B-1, B-52H, E-3, E-8, KC-135). KC-135 aircraft are quieter than all of the other aircraft types listed. In 2014, the USAF published an environmental analysis document describing the effects of constructing and operating a KC-46A depot maintenance facility at Tinker AFB (USAF 2014c). KC-46A aircraft are expected to begin operations as part of the depot maintenance mission in 2018. KC-46A aircraft are about 9 dB quieter than KC-135 aircraft during approach at a distance of 1,000 feet and generate about the same noise level during departure.

Table 3-23. Aircraft Maximum Noise Levels at Tinker AFB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
E-3	1.5 EPR	99	89	74	64
E-8	1.25 EPR	94	84	67	55
B-1	90% RPM	92	84	73	62
B-52H	2625 LBS/HR	96	86	70	57
KC-46A	55% N1	74	66	55	44
KC-135	90% NF	87	80	69	59
E-3	1.87 EPR	101	93	81	71
E-8	1.85 EPR	98	89	76	66
B-1	97.5% RPM A/B	118	110	98	89

Table 3-23. Aircraft Maximum Noise Levels at Tinker AFB (Continued)

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
B-52H	1.55 EPR	104	95	81	70
KC-46A	92% N1	87	78	65	55

Note: 507 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.
Key: Power Units: A/B = afterburner; N1 = engine speed at location 1; NF = fan speed; EPR = engine pressure ratio; LBS/HR = pounds of fuel burned per hour; RPM = revolutions per minute.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 ºF and 70 percent relative humidity.

Eleven (11) percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). The E-3 and E-8 aircraft conduct approximately 10 percent of operations during acoustic night. Aircraft at the base for depot maintenance and transient aircraft rarely conduct flights during acoustic night.

In accordance with current USAF and DoD policies, baseline L_{Adn} were created using NOISEMAP (Version 7.2). NOISEMAP accounts for topography effects on noise, and are calculated for an average annual day. The baseline L_{Adn} shown on Figure 3-6 reflects flying operations and static engine runs associated with the KC-46A depot maintenance mission, which would begin operations in 2018. KC-46A aircraft would conduct about 3,600 airfield operations per year, about 60 percent of the 6,103 total operations conducted as part of the depot mission.

Figure 3-6 also includes the 65 dB L_{Adn} noise contours as published in the 2006 AICUZ update as a point of reference (USAF 2006). Operational changes since publication of the 2006 AICUZ report, including a reduction in based aircraft operations tempo and the addition of the KC-46A depot maintenance mission, are part of the reason for the change in noise levels extent between the AICUZ report and the updated baseline. Changes in standard USAF noise calculation methodology that have occurred since 2006 also affect contour extent. The 2006 AICUZ contour was calculated to represent an average busy day, whereas current USAF policy is to model average annual day. Average annual day evenly distributes all flying operations across all days of the year. The average busy day method represents a day in which flying operations are more concentrated, and yields slightly higher noise levels than average annual day. Also, in keeping with standard noise methodology as of 2006, the AICUZ noise contours were not calculated to take into account the effects of varied topography on the spreading of noise. The updated baseline L_{Adn} reflects current USAF policy, which requires inclusion of topographic effects in calculation of L_{Adn}.

The numbers of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} are listed in Table 3-24. Residences and other noise-sensitive land uses are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included in the residence to provide increased outdoor-to-indoor noise level reduction. Several noise-sensitive land uses are considered compatible at noise levels greater than 75 dB L_{Adn}.

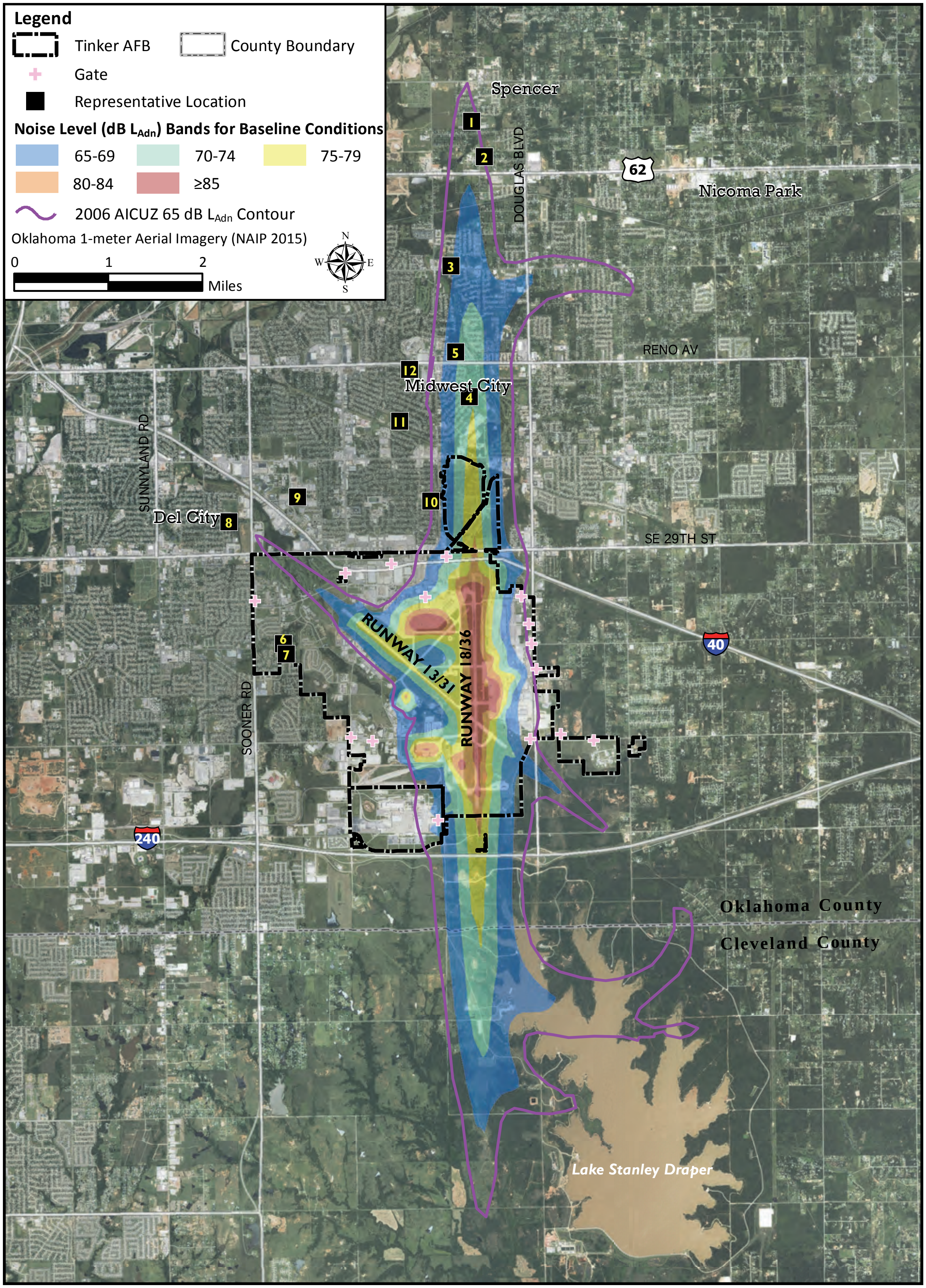

Figure 3-6. Baseline Noise Levels (dB L_{Adn}) at Tinker AFB

Table 3-24. Acres Exposed to Noise Resulting from Baseline Conditions at Tinker AFB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	762	1,674	2,436
70 - 74	646	743	1,389
75 - 79	613	163	776
80 - 84	339	6	345
≥ 85	264	0	264
Total	**2,624**	**2,586**	**5,210**

An estimated 5,264 off-base residents are affected by noise levels greater than 65 dB L_{Adn} under baseline conditions (Table 3-25). Approximately 12 percent of people affected by 65 dB L_{Adn} can be expected to be highly annoyed by the noise. The prevalence of annoyance increases as noise levels increase. For example, approximately 35 percent of people exposed to 75 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise (Schultz 1978; Finegold et al. 1994).

Table 3-25. Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Tinker AFB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	3,859
70 - 74	1,390
75 - 79	15
80 - 84	0
≥ 85	0
Total	**5,264**

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base residents under baseline conditions. Five industrial buildings located along the Tinker AFB flightline are currently exposed to noise levels greater than 80 dB L_{Adn}. Hearing loss risk among workers at Tinker AFB is managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Tinker AFB.

Aircraft noise levels (dB L_{Adn}) at several representative locations near Tinker AFB are listed in Table 3-26. The locations, which are shown on Figure 3-6, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the schools studied experience noise levels similar to those experienced at the schools. Three of the 12 locations studied experience baseline noise levels greater than 65 dB L_{Adn}. Noise sensitive land uses (e.g., schools and residences) are not considered compatible at noise levels between 65 and 75 dB L_{Adn} unless special construction measures are taken to reduce indoor noise levels.

Table 3-26. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Tinker AFB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Star Spencer High School	62
2	Spencer Road Christian School	62
3	Willow Brook Elementary School	66
4	Steed Elementary School	74
5	Midwest City Library	70
6	Child Development Center (CDC) West	42
7	Tinker Elementary School	44
8	Kerr Middle School	53
9	Rose State College	59
10	Eastside Elementary School	59
11	Country Estates Elementary School	58
12	Monterey Middle School	59

Local flying guidance restricts operations during the hours of 11:00 P.M. to 6:00 A.M. to scheduled departures, scheduled full-stop landings (i.e., no second approaches), taxi operations, and idle power static engine runs for most aircraft types. Based KC-135 and E-6 aircraft, which are equipped with relatively quiet high-bypass turbofan engines, are authorized to conduct practice approaches as late as 2:00 A.M. However, only up to two total aircraft per night are permitted to conduct patterns after 11:00 P.M.

Several additional restrictions have been imposed in order to minimize noise impacts. Aircrews are not permitted to make low-altitude practice circling approaches to Runway 18. These approaches require the aircraft to maneuver at low altitude over a heavily populated area. Aircrews avoid direct overflight of Soldier Creek School while school is in session. Aircrews approaching Runways 13 or 18 are not permitted to descend below 2,000 feet AMSL until within 2 miles of the runway. Afterburner use is restricted to emergencies, initial departures, and times when the use is required in accordance with aircraft technical orders. Finally, aircrews conducting practice approaches on Runway 36 are instructed to climb to 2,500 feet AMSL prior to initiating turns from runway headings.

From 2010 to 2015, Tinker AFB has received an average of three noise complaints per year. Of these complaints, about one-third are related to noise sources other than Tinker AFB aircraft operations.

3.3.2 Air Quality

Air emissions produced from construction and operation of the proposed MOB 3 mission at Tinker AFB would primarily affect air quality within Oklahoma County. In Oklahoma, the Air Quality Division (AQD) of the Oklahoma Department of Environmental Quality (ODEQ) is responsible for enforcing air pollution regulations. The AQD uses the NAAQS to regulate air quality within Oklahoma. Additional background information on the CAA and NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.3.

The AQD enforces the NAAQS by monitoring air quality state-wide and developing rules to regulate and permit sources of air emissions. The Oklahoma Air Pollution Control Rules are found in the *Oklahoma Administrative Code* Title 252, Chapter 100 (Air Pollution Control).

3.3.2.1 Region of Influence and Existing Air Quality

Currently, Oklahoma County is in attainment for all of the NAAQS (USEPA 2016a).

3.3.2.1.1 Regional Air Emissions

Table 3-27 summarizes estimates of the annual emissions generated by Oklahoma County in 2011 (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages and petroleum industries (VOCs), (3) fuel oil combustion (SO_x), and (4) fugitive dust from unpaved roads and construction activities (PM_{10}/$PM_{2.5}$).

Table 3-27. Annual Emissions for Oklahoma County, Oklahoma, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Stationary Sources	15,335	12,666	6,444	689	29,482	4,884	NA
Mobile Sources	13,457	141,719	21,881	155	1,695	915	6,588,286
Total	**28,792**	**154,385**	**28,325**	**844**	**31,177**	**5,799**	**6,588,286**[a]

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Oklahoma County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

Source: USEPA 2016b

3.3.2.1.2 Tinker AFB Emissions

Operational emissions resulting from existing operations at Tinker AFB occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-28 summarizes estimates of the most recent (2015) annual operational emissions generated by the KC-135 at Tinker AFB. These data were developed in part from the *Final - Tinker Air Force Base 2009 Mobile Source Emission Inventory* (CH2MHill 2010), 2013 stationary source emissions for Tinker AFB (ODEQ 2014a), and activity data collected for 2015 operations.

Table 3-28. Annual Emissions from Existing Operations of the 507 ARW at Tinker AFB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC-135 Aircraft Operations	1.60	26.30	47.90	4.38	0.24	0.24	12,213
On-Wing Aircraft Engine Testing - KC-135	0.53	7.69	2.98	0.39	0.02	0.02	1,100
AGE	0.02	0.14	0.15	0.00	0.02	0.02	24
Nonroad Equipment	0.06	1.39	0.28	0.00	0.02	0.01	97
POVs – On Base	0.01	0.34	0.04	0.00	0.01	0.00	28
POVs – Off Base	0.75	34.58	4.63	0.06	0.30	0.09	2,633
Point and Area Sources	23.69	11.10	14.55	1.02	1.22	0.89	NA
Total Emissions[a]	**26.67**	**81.55**	**70.53**	**5.86**	**1.82**	**1.27**	**16,096**

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Oklahoma County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons; NA - Not available.

Because KC-135 on-wing testing emission data were not available for Tinker AFB, emission data from KC-135 maintenance activities at Fairchild AFB were used on a per-aircraft basis for activities at Tinker AFB (AFCEC 2014a). Emission data from the usage of AGE by the 507 ARW were also not available and are thus based on a per-aircraft usage of AGE by KC-135 aircraft at Seymour Johnson AFB (Zapata Inc. and URS Group, Inc. 2015). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.3, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Tinker AFB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Tinker AFB is an existing major source with permitted stationary source emissions of VOCs, CO, and NO_x that exceed 250 tons per year. The base operates under Title V Permit No. 2009-394-TVR (ODEQ 2014b). Emissions from the maintenance of aircraft, specifically the use of solvents; paint stripping; surface coating; jet engine testing (in test cells); inspection and repair of fuel cells and tanks; fuel combustion in boilers, heaters and emergency generators; and evaporation of VOCs from fuel storage and handling, are included in the Title V permitting. Tinker AFB is also subject to the annual reporting requirements of CO_2e from stationary source fuel combustion, as required by the USEPA Mandatory Reporting of Greenhouse Gases Rule.

3.3.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.3.3.1 Flight Safety

Aircraft flight operations at Tinker AFB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. There has been one recorded KC-135-related mishap in the vicinity of Tinker AFB during the past 10 years.

The KC-135 aircraft and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF MAJCOMs to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.3.3.1.1 Wildlife Strike Hazard at Tinker AFB and Vicinity

Between 2007 and 2012, Tinker AFB personnel recorded 141 bird strikes in the airfield and airspace (USAF 2014c). The 72 ABW BASH Plan, which also provides guidance to 507 ARW aircrews, provides specific guidance and assigns responsibilities in developing an effective bird strike hazard reduction program for the Tinker AFB local flying area (Tinker AFB 2014a).

The primary species controlled under Tinker AFB's BASH program are Canada geese, egrets, gulls, rock doves, European starlings, herons, waterfowl, and non-avian species such as beavers, and coyotes. Control of wildlife species on Tinker AFB for the purposes of BASH is generally limited to habitat management and harassment techniques, though sometimes the use of lethal control measures is required. Tinker AFB maintains a depredation permit for the take of these problematic species (USAF 2014c).

3.3.3.2 Ground Safety

Tinker AFB, Oklahoma City, Midwest City, and Del City; Oklahoma County; and planning departments work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established at military airfields to delineate recommended surrounding land uses for the protection of people and property on the ground. Runways 18/36 and 13/31 at Tinker AFB have CZs encompassing an area 3,000-feet-wide by 3,000-feet-long. APZ I is 3,000-feet-wide by 5,000-feet-long and APZ II is 3,000-feet-wide by 7,000-feet-long. The boundaries of the CZs and APZs have been used by local governments in planning documents for the purposes of identifying incompatible development. Midwest City and Del City have incorporated supplemental regulations that specifically address development within APZ I into their conventional zoning ordinances. Oklahoma City's zoning ordinances address height restriction zones around airports and airport environ zones created by existing and potential noise impact (USAF 2006).

Tinker AFB Fire and Emergency Services provides fire and crash response at Tinker AFB. Tinker AFB Fire and Emergency Services is also part of a state-wide mutual-aid agreement which coordinates with local fire departments throughout the state, ensuring availability of additional support if required.

3.3.4 Soils and Water

3.3.4.1 Soil Resources

Tinker AFB is located in the Central Redbed Plains section of the Central Lowland Physiographic Province, which is characterized by broad level flat plains and bottomlands crossed by small- to medium-sized watercourses and gently rolling hills. Elevations at Tinker AFB range from approximately 1,200 feet AMSL (Crutcho Creek - northwestern portion of Tinker AFB) to 1,310 feet AMSL (southeast portion of Tinker AFB). The elevation of the airfield is approximately 1,291 feet AMSL.

Thirty-four (34) different soil types in five different soil associations are present on the base. Soils on Tinker AFB are deep, well-drained clay and loamy soils that are all conducive of construction. In the area of the 507 ARW ramp, soils are mainly comprised of the Renthin-Urban Land Complex and Urban Land Complex. Renthin Complex soils are very deep and deep well-drained clayey soils in areas of urban land. Urban Land Complex soils are also well-drained and usually comprised of fill material.

3.3.4.2 Water Resources

3.3.4.2.1 Surface Water

Primary surface water features at Tinker AFB fall into three primary discharge basins: (1) Crutcho Creek Drainage Basin, (2) Elm Creek Drainage Basin, and (3) Hog Creek Drainage Basin. The majority of the installation drains north into the Crutcho Creek Drainage Basin, which flows north into the North Canadian River. Eventually the North Canadian River combines with the Arkansas and Mississippi Rivers. Crutcho Creek extends through a culvert under the 507 ARW parking ramp. Elm and Hog Creek Drainage Basins flow south of Tinker AFB into the Little River, which forms confluences with the South Canadian, Arkansas, and Mississippi Rivers. The Elm Creek Drainage Basin is a sensitive watershed, because it supplies Lake Stanley Draper, a drinking water supply reservoir. Lake Stanley Draper is located approximately one-half mile south of the base boundary. Sixteen (16) small retention ponds and 6 detention basins have been constructed on Tinker AFB. Surface water features are shown on Figure 3-7.

The latest Oklahoma Water Quality Standards (OWQS), as established by the Oklahoma Water Resources Board (OWRB 2015), have designated beneficial uses for streams on and near Tinker AFB. Designated beneficial uses for listed surface water bodies are prescribed in Title 785 of the Oklahoma Administrative Code (OAC) Chapter 45, Appendix A.5, which was recently revised in 2015. Water bodies present on and near Tinker AFB are located in Water Quality Management Basin 5 and are listed in Appendix A.5 of Title 785 of the OAC.

Some sections of the North Canadian River and Crutcho Creek, along with Lake Stanley Draper, are considered impaired waters according to the State of Oklahoma's 2014 Integrated Report (ODEQ 2016). Where Crutcho Creek enters the North Canadian River, the river is classified into Categories 4a and 5a. Category 4a indicates that a Toxic Maximum Daily Load (TMDL) study has been completed, and Category 5a indicates that the TMDL study is underway or will be scheduled. Although a TMDL study for bacteria was completed on this reach in 2010, TMDL studies for turbidity and Escherichia coli (E-coli) are underway or will be scheduled (ODEQ 2016). Crutcho Creek is also classified as Category 5a for bacteria, E-coli, and dissolved oxygen. Lake Stanley Draper is classified as Category 5a for turbidity and mercury. Kuhlman Creek and Soldier Creek are classified as Category 3 and are not considered impaired. Waterbodies classified under this category have insufficient to no data and information to determine if any designated use is attained.

Tinker AFB is considered to be a federal aviation facility and is therefore required by the ODEQ to possess stormwater discharge permits. Tinker AFB has 11 permitted discharge points that fall into one of the following two permit categories: (1) NPDES permit for source pollution, or (2) construction site permit for all construction sites.

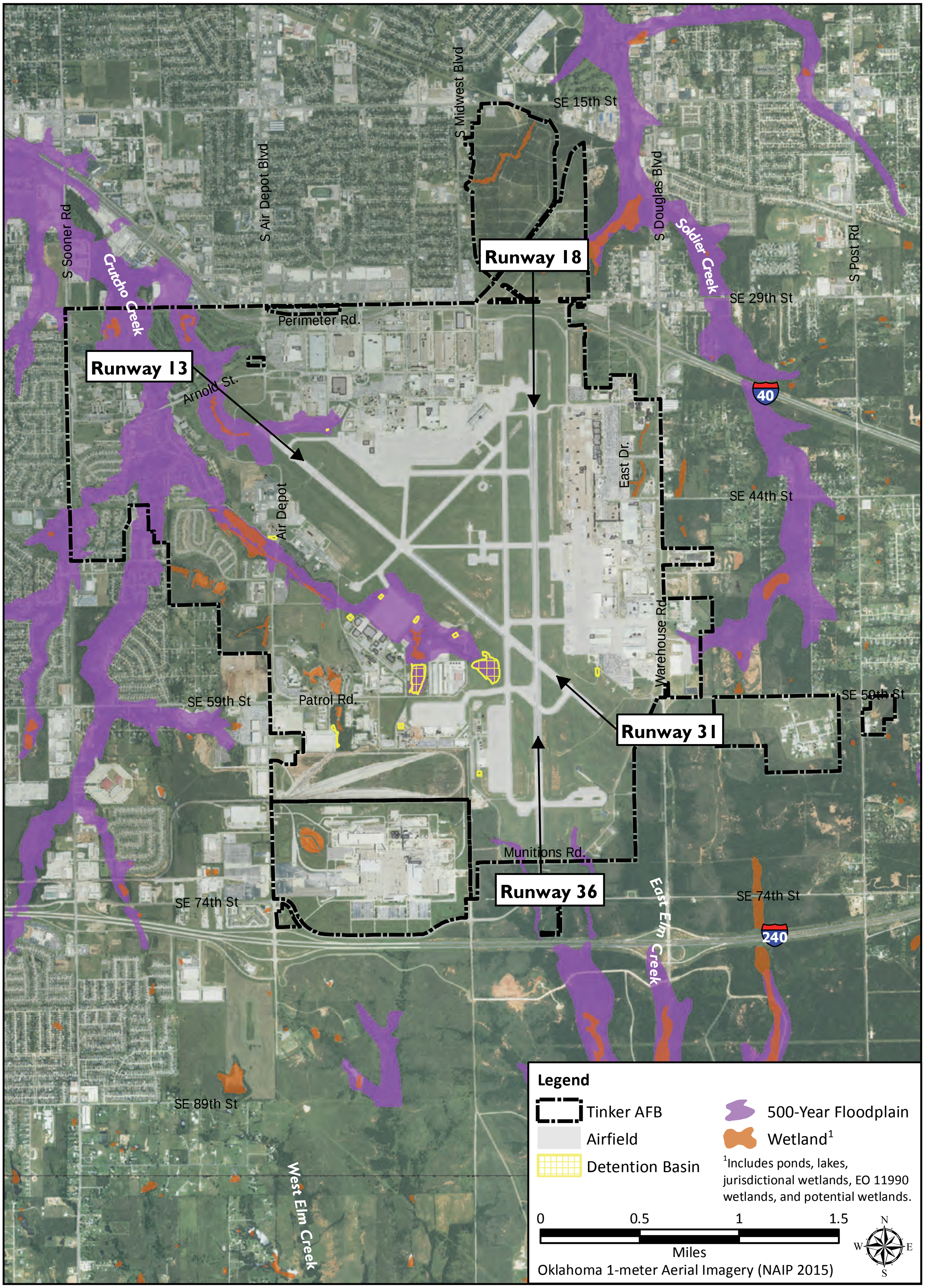

Figure 3-7. Tinker AFB Water Resources

Because a variety of different aircraft are operated by different tenants on Tinker AFB, deicing occurs at different locations across the installation. Each tenant that conducts deicing operations is required to maintain a deicing fluid recovery plan per Tinker AFB Plan 32-1002. For the purposes of this EIS, only the deicing operations that occur on the 507 ARW parking ramp are included in this analysis. The 507 ARW has not conducted deicing operations since 2009 (Jones 2016). If deicing is necessary, it is conducted on the 507 ARW parking ramp. Runoff drain covers are used to prevent deicing fluid from entering the drains, and a recovery vehicle is used after deicing is complete to recover spent deicing fluid. The spent deicing fluid is then transported to a large recovery tank on Tinker AFB for recycling or proper disposal.

Stormwater discharged at Tinker AFB is regulated by the following stormwater permits from ODEQ:

- General Permit (OKR10) for Stormwater Discharges from Construction Activities within the State of Oklahoma (September 2012).
- General Permit (OKR04) for Phase II Small Municipal Separate Storm Sewer System Discharges within the State of Oklahoma (November 2015).
- General Permit (OKR05) for Stormwater Discharges from Industrial Facilities under the Multi-Sector Industrial General Permit within the State of Oklahoma (September 2011).
- Oklahoma Pollutant Discharge Elimination System (OPDES) Permit No. OK0000809 (August 2012).

On a weekly basis, Tinker AFB collects and analyzes water samples from all creeks on the installation. These samples are acquired to monitor compliance with OWQS assigned to each creek under the NPDES and stormwater permits. In addition to analytical monitoring, other conditions are noted at each creek outfall during the field visit. These parameters include: clarity, odors, algae growth, presence of foam, and presence of oil sheen. All of these results and visual indicators are used to locate and eliminate illicit or harmful discharges. Surface water degradation is primarily due to accidental spills and non-point source pollution. The most common examples include: sediment from soil erosion associated with construction/demolition activities, oil/fluid runoff from parking lots, runoff from areas treated with fertilizers and pesticides, chemical substances and fuel from spills associated with industrial and aircraft activities, and deicing compounds from roadways, taxiways, runways, ramp areas, and aircraft.

3.3.4.2.2 Groundwater

Groundwater below Tinker AFB occurs in the Central Oklahoma Aquifer, also referred to as the Garber-Wellington Aquifer. The Garber-Wellington Aquifer underlies all or portions of eight counties, including Oklahoma County. With the exception of Oklahoma City, the major communities in central Oklahoma rely entirely or partially on groundwater from this aquifer. In addition, more than 20,000 homeowners use groundwater from this aquifer for household or domestic uses (USGS 2016).

The Garber-Wellington Aquifer has a maximum thickness of approximately 1,000 feet. Four groundwater-bearing units are located in the area: the Hennessey water bearing zone, upper saturated zone (USZ), lower saturated zone (LSZ), and the producing zone (PZ). The USZ, LSZ, and PZ are associated with the Garber-Wellington Aquifer. The Hennessey Group is the shallowest bedrock formation underlying Tinker AFB. Depth to shallow groundwater at Tinker AFB has been reported to range from a few feet to about 70 feet (USACE 2012). Groundwater in the upper 200 feet of this aquifer is typically unconfined, while groundwater at greater depths is partly confined or confined (USGS 2013). The PZ is the zone utilized for drinking water by Tinker AFB. The Tinker AFB water supply distribution system is comprised of 26 water wells ranging from a depth of 700 to 900 feet (USAF 2007). Based on a review of Tinker AFB cross-section maps, the groundwater PZ of the Garber-Wellington begins at a depth of approximately 200 feet bgs.

Institutional controls associated with ERP sites at Tinker AFB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.3.4.2.3 Floodplains

Although two drainages to Lake Stanley Draper have small associated floodplains on Tinker AFB, floodplains on the base are primarily related to Crutcho Creek (Figure 3-8) floodplains. Three tributaries to Crutcho Creek (West Crutcho Creek, East Crutcho Creek, and Kuhlman Creek) extend through different parts of Tinker AFB.

The USACE completed a study in 2002 to map floodplains on Tinker AFB. Crutcho Creek and its tributaries are all bounded by the 500-year floodplain, which affects approximately 462 acres of land on the base, much of which is associated with Crutcho Creek.

With regard to the existing 507 ARW aircraft parking ramp area of the installation, although no buildings are located in the 500-year floodplain, the entire aircraft parking ramp and associated detention basins are located in the 500-year floodplain of East Crutcho Creek. East Crutcho Creek originates east of the 507 ARW parking ramp, extends under the parking ramp through a concrete culvert, and terminates into Crutcho Creek on the base approximately 1.25 miles northwest of the 507 ARW parking ramp.

In 2013, the USACE completed a hydrology and hydraulics study for activation of the KC-46A maintenance depot. The study identified stormwater detention options for discharge to East Crutcho Creek which included modification of the existing Fire Detention Pond as needed and/or constructing a detention basin on the west side of the 507th ramp (USACE 2013).

3.3.5 Biological Resources

3.3.5.1 Vegetation

Tinker AFB is located within the Central Great Plains ecoregion of Oklahoma (OFS 2013). The Central Great Plains ecoregion is characterized by rolling grassland prairies and oak savanna habitats. Much of the original native tallgrass and mixed grassland once surrounding Tinker AFB was converted into cropland and rangeland, with woody vegetation and invasive plant species encroaching into and eliminating most of the remaining grassland areas. Remaining areas of prairie habitat are rare and isolated (Tinker AFB 2015a).

Tinker AFB is located in a suburban area outside of Oklahoma City, Oklahoma. The base and the area surrounding the base are heavily urbanized, with little unimproved grounds. The airfield and adjacent areas of Tinker AFB are dominated by cool-season, nonnative grasses. Areas outside of the airfield are comprised primarily of improved grounds and include turfgrass and ornamental trees and shrubs. Unimproved grounds include natural woodland and grassland areas, ponds, wetlands, creeks, and other areas where natural vegetation is allowed to grow essentially unimpeded by maintenance activities (Tinker AFB 2015a). See Appendix E for a list of common species known to occur at Tinker AFB. Vegetation management at Tinker AFB is guided by the INRMP, the Installation Development Plan (IDP), and the BASH Plan (Tinker AFB 2005, 2014a, 2015a).

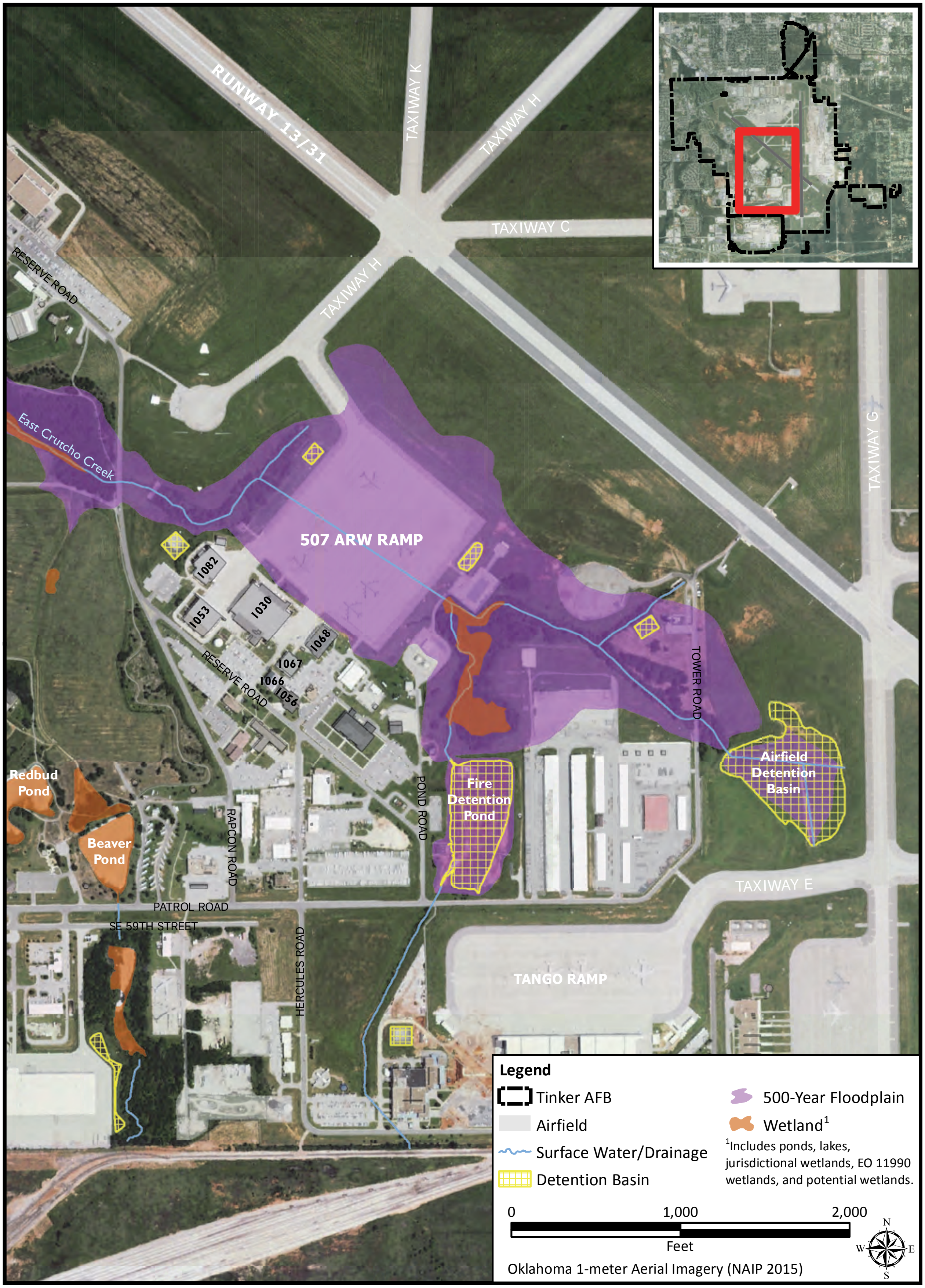

Figure 3-8. Tinker AFB Floodplains

Tinker AFB has created a green infrastructure network. This network provides interconnected areas of habitat, such as wetlands, woodlands, grasslands, and other natural areas of base-wide significance (Tinker AFB 2015a). This green infrastructure network currently covers 1,033 acres.

3.3.5.2 Wildlife

Information on wildlife occurring on Tinker AFB is provided in the INRMP (Tinker AFB 2015a). Common wildlife documented on the base includes a variety of mammals, birds, reptiles, amphibians, and fish species. See Appendix E for a list of common species known to occur at Tinker AFB.

3.3.5.3 Special-Status Species

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Tinker AFB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Tinker AFB. A submission for Oklahoma County, Oklahoma was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 17 March 2016 (Volume II, Appendix A, Section A.6.3) contains a full copy of the Trust Resource Report (USFWS 2016e). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur within Oklahoma County, Oklahoma (USFWS 2015i). Table 3-29 presents the federally listed species identified through the IPaC and ECOS reviews.

Table 3-29. Federally Listed Species that Could Occur in Oklahoma County, Oklahoma

Common Name	Scientific Name	Status		Occurrence at Tinker AFB	USFWS Online Review System
		Federal[a]	State[b]		
Birds					
Whooping crane	*Grus americana*	FE	-	No	IPaC, ECOS
American peregrine falcon	*Falco peregrinus anatum*	FR	-	No	IPaC, ECOS
Piping plover	*Charadrius melodus*	FT	-	Yes	IPaC, ECOS
Least tern	*Sterna antillarum*	FE	-	No	IPaC, ECOS
Red knot	*Calidris canutus rufa*	FT	-	No	IPaC, ECOS
Fish					
Arkansas river shiner	*Notropis girardi*	FT	-	No	IPaC, ECOS

[a] USFWS
[b] Oklahoma Department of Wildlife Conservation (ODWC)
Key: FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; FR – federally recovered species
Source: ODWC 2011a, b, c, d; Tinker AFB 2014, 2015; USFWS 2011b, 2014a, b, 2015d, e; USFS 2016

One federally threatened species and several Oklahoma County State Species of Special Concern have been documented at Tinker AFB. Many birds protected under the MBTA could also occur as residents or migrants near the base. There is no critical habitat on Tinker AFB (USFWS 2015a).

One federally threatened species, the piping plover (*Charadrius melodus*), has been documented at Tinker AFB. This documentation was the result of a bird/aircraft strike in 2009. USFWS officials were contacted, and the plover carcass was sent to the Smithsonian to verify identification. No other piping plovers have been observed loafing or foraging on Tinker AFB property.

According to the Oklahoma Natural Heritage Inventory (OHNI), there are no other records of piping plover occurrences in Oklahoma County and only two nests have ever been recorded in Oklahoma (Boyd 1991). According to the USFWS, "in 1987 and 1988 piping plovers nested at Optima Reservoir, Oklahoma (67 FR 176 57638, September 11, 2002). Optima Lake is located on the Beaver River in Texas County (i.e., in the panhandle of Oklahoma), approximately 250 miles northwest of Tinker AFB.

Most records for the piping plover in Oklahoma are for birds migrating across the state from north to south or south to north. According to the USFWS-approved Oklahoma Comprehensive Wildlife Strategy, in the Cross Timbers Region, this species is only known from "Large River" and "Herbaceous Wetland" habitats, neither of which occur on Tinker AFB. The potential for piping plover to forage, nest, or loaf in this region is listed as low, with the species considered rare (ODWC 2005). No other federally endangered bird species have been observed on or flying over Tinker AFB (Tinker AFB 2015a). In 2008-2009, Virginia Polytechnic Institute and State University conducted a comprehensive avian study, seasonally evaluating 44 circular variable radius plots on Tinker AFB. Although this study documented 137 avian species on Tinker AFB, no piping plovers were identified (St. Germain 2010).

Several State Species of Special Concern have been documented on Tinker AFB. These species include five birds (barn owl [*Tyto alba*], burrowing owl [*Athene cuniicularia*], migrant loggerhead shrike [*Lanius ludovicianus migrans*], piping plover, and Swainson's hawk [*Buteo swainsoni*]); one lizard (Texas horned lizard [*Phyrnosoma cornutum*]); and one plant (Oklahoma penstemon [*Penstemon oklahomensis*]) (Tinker AFB 2015a).

More than 380 Texas horned lizards have been documented within the extreme southwestern portion of the base in an area designated as Reserve 3. Reserve 3 is not near the facility and infrastructure projects described in Chapter 2. Biologists and researchers at Tinker AFB, Southern Illinois University, and Oklahoma State University have worked cooperatively since 2003 to conduct studies to provide a better understanding of the horned lizard ecology and life history at Tinker AFB. Radio-telemetry mark-recapture studies are performed to track lizard distribution, habitat use, and population status, as well as survival and density estimates on base (Tinker AFB 2015a).

The Oklahoma penstemon is endemic to Oklahoma and North Texas and is found at several locations on Tinker AFB. The Oklahoma penstemon is located in fragmented remnant native prairie communities, primarily in the southeast portion of the base, including the airfield, Cyber Engineering Installation Group (at Southeast 59th Street), and within the leased land immediately adjacent to and south of Landfill 6. Another small population occurs in the northeastern portion of Glenwood. However, the species does not occur near the facilities and infrastructure projects in Chapter 2.

Tinker AFB has conducted evaluations at the base to identify all special status species habitat within the base boundary (Tinker AFB 2015a). These evaluations also included habitat for plants and wildlife that Tinker AFB has identified as species at risk. Species at risk include the special status species described above, as well as additional species identified by base natural resource personnel. The INRMP lists the forested floodplain west of the 507 ARW ramp as an area of species at risk habitat and designates it as black willow shrubland. This shrubland provides habitat for migratory and resident bird populations (Tinker AFB 2015a).

3.3.5.4 Wetlands

There are 42 identified wetland areas on Tinker AFB, encompassing approximately 38 acres of land (Tinker AFB 2015a). A study was conducted in 2003 to evaluate the health and quality of these wetland areas (Tinker AFB 2015a). Only two wetlands (Greenway and Prairie Ponds) were classified as high quality wetlands based on the Ohio Rapid Assessment Method for Wetlands and the USEPA's Rapid Bioassessment Protocol. Both of these wetland areas are located outside of the facilities and infrastructure projects as described in Chapter 2 (see Figure 3-9).

During the early planning stages of this project, a potential wetland area was identified west of the 507 ARW aircraft parking ramp and adjacent to an unnamed tributary to East Crutcho Creek. An evaluation by USACE regulatory personnel on 3 March 2016 determined this area was not a wetland but a forested floodplain; the unnamed tributary to East Crutcho Creek was classified as a jurisdictional waterway (USACE 2016).

3.3.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties.

3.3.6.1 Architectural Resources

A number of architectural inventories have been conducted on Tinker AFB (Tinker AFB 2011), including a recent survey to determine Section 110 eligibility for select buildings greater than 50 years of age. Tinker AFB has five buildings that are NRHP-eligible individually and one NRHP-eligible historic district with seven contributing buildings (Table 3-30).

Table 3-30. NRHP-Eligible Buildings at Tinker AFB

Building Number	Construction Date	Description	Individually Eligible?	Historic District
1	1942	Depot Supply	Yes	No
208	1942	Steam Plant	Yes	No
230	1942	Airplane Repair Building	Yes	No
240	1942	Flight Test Hangar/Base Operations	Yes	No
3001	1943	Douglas Assembly Building	Yes	Douglass Cargo Aircraft Manufacturing
3105	1943	Paint Building	No	Douglass Cargo Aircraft Manufacturing
3113	1943	Woodworking Building	No	Douglass Cargo Aircraft Manufacturing
3202	1943	Fire Pump Station	No	Douglass Cargo Aircraft Manufacturing
3203	1943	Fire Protection Water Storage Tank	No	Douglass Cargo Aircraft Manufacturing
3204	1943	Switch Gear House	No	Douglass Cargo Aircraft Manufacturing
3303	1943	Pump House	No	Douglass Cargo Aircraft Manufacturing
4029	1951	Combat Control Center	Yes	No

Source: Tinker AFB 2011

3.3.6.2 Archaeological Resources

100 percent of Tinker AFB property has been surveyed for archaeological resources (Tinker AFB 2011), resulting in the identification of four archaeological sites. Three of the sites are eligible for listing in the NRHP. The sites are located on the western portion of the base

outside the potential area of effect for the proposed MOB 3 beddown. SHPO has concurred with the findings of past archaeological surveys (Tinker AFB 2011).

3.3.6.3 Traditional Resources

Pursuant to Sections 101(d)(6)(B) and 106 of the NHPA and implementing regulations at 36 *CFR* Section 800.2(c)(2), the USAF consulted on a government-to-government basis with five tribes that are culturally affiliated with the installation. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, were asked to provide information on any properties to which they attach religious and cultural significance. There are no known tribal sacred sites or properties of traditional religious and cultural importance in the vicinity of Tinker AFB.

3.3.7 Land Use

Tinker AFB encompasses 5,580 acres and is located entirely within the boundaries of Oklahoma County, Oklahoma. The main portion of Tinker AFB is located within the incorporated city limits of Oklahoma City. Centered 10 miles southeast of downtown, Tinker AFB is bordered to the north by Interstate 40 and 29th Street, to the east by Douglas Boulevard, to the south by 74th Street, and to the west by Sooner Road. Incorporated areas immediately surrounding the base include Midwest City to the north and Del City to the northwest. The majority of the land surrounding the base can be characterized as moderate-density urban developed, with areas of undeveloped land south of the installation (Tinker AFB 2005).

3.3.7.1 Base

Since World War II, land use patterns at Tinker AFB have evolved as missions and requirements have changed or expanded. Tinker AFB's runways separate the base into several distinct, functional land use areas. The airfield land use classifications comprise the majority of the existing land use on-base. Industrial land uses are consolidated in a few contiguous areas; the largest is the Northside Industrial District located between Arnold Street and the northern base boundary. Additional industrial areas are located in the South Forty District and the Eastside Depot Maintenance District. Administrative land uses are located along Arnold Street, with additional areas located in other land use classifications throughout the base. Community (commercial) facilities are located in the Northside Industrial District and the West Community District. The community (service) land use is predominant in the West Community District and in one area in the Eastside Depot Maintenance District. Housing is located in the western section of the base in and adjacent to the West Community District, separate from noise generating activities, but convenient to community service facilities. Outdoor recreation uses are located in the West Community District and in the northwest corner of the base. The remainder of the existing land use consists of open space. Even though open space is a predominant land use (996 acres), the majority of its potential use is constrained by IRP sites, environmental districts, and airfield buffers (Tinker AFB 2005).

3.3.7.2 Surrounding Areas

As shown on Figure 3-6, the area surrounding Tinker AFB is mostly developed, consisting primarily of residential areas and mixed commercial uses. The area south of the base is less developed and includes the nearby Lake Stanley Draper and outdoor recreation areas. Midwest City is primarily composed of residential areas with small businesses (e.g., convenience stores, automotive repair shops, and rental storage) in neighborhoods adjoining the base. Del City is also composed primarily of residential areas and small businesses. Four elementary schools, three junior high schools, three high schools, and one junior college are within 3 miles of the northern base boundary. No major agricultural operations are present on base or within the immediate area surrounding Tinker AFB (USAF 2006). A major industrial site, the former General Motors Assembly Plant, is at the southern base boundary. Tinker AFB has been converting the former plant into a maintenance facility called the Tinker Aerospace Complex.

According to the installation AICUZ study, the estimated off-base area affected by noise levels of 65 dB L_{Adn} or greater is 2,586 acres (USAF 2006) (see Section 3.3.1.1). This includes land use within the Tinker AFB CZs and APZs. Incompatible land use includes residential and school use. Residential uses exist within the 70 to 79 dB L_{Adn} noise exposure zone north of 29th Street in Midwest City. Residential uses also exist within the 70 to 79 dB L_{Adn} noise exposure zone to the north of the base. Homes that have the recommended measure in place to reduce interior noise levels are considered compatible (USAF 2006).

In 2008, a JLUS (sponsored by the Association of Central Oklahoma Governments) was prepared for Midwest City, Del City, Oklahoma City, Spencer, Choctaw, Nicoma Park, Oklahoma County, Cleveland County, Oklahoma Strategic Military Planning Commission, and Tinker AFB (ACOG 2008). The purpose of the JLUS was to evaluate the current status of the implementation of recommendations issued in the 2006 AICUZ study for Tinker AFB and to recommend additional actions by local governments to improve land use decisions that could affect the missions of Tinker AFB.

3.3.8 Infrastructure

3.3.8.1 Potable Water System

Tinker AFB receives potable water from three different sources. Groundwater wells drawing from the Garber-Wellington mudstone/sandstone aquifer supply approximately 6.5 MGD, at 75 percent of their rated capacity. The Lake Stanley Draper water system serves as a secondary source of water and an additional 5 MGD is available from the Oklahoma City water system. The water storage capacity of the five elevated tanks located at Tinker AFB is 3.0 MG (Tinker AFB 2005). Current average daily water use is 0.75 MGD, which is 12 percent of the base system capacity from the wells and 7 percent of total available supply. The general condition of the water supply and distribution system is good (Tinker AFB 2005).

3.3.8.2 Wastewater

The industrial wastewater system on the Tinker AFB provides adequate collection of wastewater from industrial facilities and activities and treatment as required prior to discharge to Oklahoma City's sanitary sewerage system. The industrial wastewater system typically receives and treats 0.9 MGD of wastewater. After treatment effluent from the plant combines with domestic wastewater and is released to the Oklahoma City municipal WWTP (Tinker AFB 2005).

The general condition of the sanitary sewer collection system is fair. Sewer mains need to be slip-lined or replaced due to consistent pipe failures. In certain cases, full replacement and upsizing of sewer pipes are needed to accommodate future development. The Tinker AFB sanitary sewerage consists entirely of a wastewater collection system. There are no septic systems, and the base no longer operates a WWTP (Tinker AFB 2005). In 2015, Tinker AFB generated 0.95 MGD in non-industrial wastewater.

3.3.8.3 Stormwater System

The storm drainage system at Tinker AFB is a combination of natural and built features (e.g., curbs and gutters, culverts, and pipes). These features convey stormwater to two primary areas: Crutcho Creek and the South Forty District. Due to poor percolation qualities of soil on Tinker AFB, rainfall events can cause surface water problems. Stormwater from the Northside Industrial District and northeast portions of the installation are conveyed to Crutcho Creek, while storm water from the west is conveyed to the South Forty. The system of retention ponds and basins in the southern part of the Crutcho Creek drainage basin (South Forty District) works well to control potential flooding. The South Forty District has natural and constructed retention areas to control runoff and flooding (Tinker AFB 2005). The deicing detention basin located on the west side of the 507 ARW ramp is no longer used as part of the current deicing procedures at Tinker AFB.

3.3.8.4 Electrical System

Oklahoma Gas and Electric (OG&E) Company supplies electrical power to Tinker AFB through a looped 138 kV transmission line. Approximately 76 percent of the single-conductor power lines are underground. Tinker AFB has approximately 72 installed generators that provide backup power to key buildings. Additional backup is provided by an 80-MW natural gas peaking plant and standby generator owned by OG&E. The peaking plant and standby generator provides an isolated secondary power source to the base. The electrical supply to Tinker AFB is adequate, and the electrical distribution system is in good condition (Tinker AFB 2005). Between 2010 and 2014, Tinker AFB averaged approximately 37,059 MWh per month, or 1,218 MWh per day (Tinker AFB 2015c).

3.3.8.5 Natural Gas System

Tinker AFB purchases natural gas through a government-wide supply contract administered by Defense Energy Supply Center. Geary Energy is the current natural gas supply contractor. Oklahoma Natural Gas Company delivers natural gas to the base at three metered delivery points, and pressure is regulated at a range of 40 to 50 pounds per square inch gauge (psig). Although the natural gas supply to the installation is adequate to meet existing needs and provide for future expansion, many natural gas lines and valves are old and deteriorated and have been recommended to be replaced and upgraded (Tinker AFB 2005). The current Tinker AFB natural gas demand is 9.7 MMcf per year (Tinker AFB 2015c).

3.3.8.6 Solid Waste Management

MSW and C&D waste generated at Tinker AFB is collected and transported off base by a local qualified contractor (Tinker AFB 2003). This waste is currently disposed of at the Southeast Landfill (Permit No. 3555028), which is located approximately 7 miles from the base (ODEQ 2004). The landfill has an expected remaining life of approximately 10 years (Weaver Boos Consultants, LLC-Southwest 2011).

Tinker AFB has an active recycling program in place. Nonhazardous solid waste from military family housing, dormitories, industrial shops, offices, tenants, and contractors is recycled. Recyclable materials are collected and transported by a contractor to a facility off of base property (Tinker AFB 2003). C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal.

3.3.8.7 Transportation

Regional access to Tinker AFB is provided by I-40 and I-240, which extend east to west to the north and south of the base. The nearest north-south interstate highway is I-35, which is the major north-south highway corridor in Oklahoma and is less than 5 miles west of the base. Three local arterial roadways (Sooner Road, Southeast 29th Street, and Douglas Boulevard) provide access to the base. Sooner Road is a four-lane arterial that extends along the western border of the base in a north-south direction. Southeast 29th Street is an east-west arterial that provides access to Tinker Gate at Air Depot Boulevard and to Eaker Gate on F Avenue. Douglas Boulevard is a north-south, four-lane arterial that provides access to the base at the Lancer Gate, which is the primary gate on the eastern side of the base (Tinker AFB 2005).

Figure 2-11 shows the primary routes and regional transportation network in the vicinity of Tinker AFB. Where I-40 passes to the north of Tinker AFB, the average daily traffic count was 44,600 vehicles per day in 2014 (OKDOT 2014).

3.3.8.7.1 Gate Access

There are 11 entry gates to Tinker AFB. Two gates, Tinker Gate and Lancer Gate, are open 24 hours per day, 7 days per week. A commercial vehicle gate near Gott Gate provides a single access point for delivery vehicles and heavy equipment entering the base (Tinker AFB 2005).

3.3.8.7.2 On-Base Traffic Circulation

The transportation network at Tinker AFB consists of a series of arterial, collector, and local roadway networks. The arterial network is a system of two- to four-lane roads supporting the majority of traffic circulation onto and around the base. The major arterial roads are Air Depot Boulevard, East Drive, Arnold Street, and Patrol Road. The collector network is primarily a two-lane network that provides access to mission and support facilities. The collectors provide access to the arterial road network. The major collectors for Tinker AFB are McNarney Avenue, Reserve Road, and Mitchell Avenue (Tinker AFB 2005).

3.3.9 Hazardous Materials and Waste

3.3.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Tinker AFB are managed in accordance with AFI 32-7086, “Hazardous Materials Management,” and are controlled through the base HAZMART. This process provides centralized management of the procurement, handling, storage, and issuance of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials. The HAZMART process includes review and approval by USAF personnel to ensure users are aware of exposure and safety risks. P2 measures are likely to minimize chemical exposure to employees, reduce potential environmental impacts, and reduce costs for material purchasing and waste disposal.

3.3.9.1.1 Aboveground and Underground Storage Tanks

Four bulk fuel yards (273, 290, 507, and 3700) and the Airborne Warning and Control System (AWACS) Alert Area have a combined capacity of approximately 4.4 MG of JP-8. The 507 ARW fuel yard facility has a capacity of approximately 220,000 gallons of JP-8 and is located southwest of the 507 ARW ramp. The 507 ARW fuel yard is supported by a Type III hydrant system that dispenses JP-8 at up to 1,800 GPM from six outlets located on the 507 ARW ramp. The 507 ARW fuel hydrant system also receives JP-8 via pipeline from the 273 fuel yard.

The 273 fuel yard has a capacity of approximately 3.2 MG of Jet-A. Other ASTs and USTs on the base are used to store JP-5, gasoline, diesel, bio-diesel, used oil, deicing fluid, fuel oil, and hydraulic oil.

All of the tanks at Tinker AFB are managed in accordance with the base Oil and Hazardous Substance Integrated Contingency Plan (ICP) (Tinker AFB 2007), which satisfies the SPCC, FRP, CERCLA, Emergency Planning and Community Right-to-Know Act (EPCRA), Resource Conservation and Recovery Act (RCRA), OSHA, and USAF requirements. This plan addresses storage locations and proper handling procedures for all hazardous materials to minimize the potential for spills and releases. The Tinker AFB Oil and Hazardous Substance ICP also addresses spill response training, procedures, equipment, and notification procedures, as well as the roles, responsibilities, and response actions for all major spills. In 2015, Tinker AFB used approximately 28.4 MG of Jet-A. Tinker AFB primarily receives Jet-A through a commercial pipeline. Jet-A is transported on base to various hydrant systems by pipeline to hydrant outlets, or by four tanker trucks.

3.3.9.1.2 Toxic Substances

The Tinker AFB Asbestos Management Plan establishes procedures and provides guidance for the identification of ACMs; the management of facilities with ACMs; the protection of personnel from the hazards associated with ACMs; and the removal, encapsulation, or enclosure of ACMs (Tinker AFB 2012). An asbestos database is maintained by the CE directorate. The design, maintenance, repair, demolition, renovation, minor construction, or MILCON on existing facilities are reviewed to determine if ACM is present in the proposed work area. For each project on base, ACM wastes are removed by licensed contractors and disposed of in accordance with state and Federal regulations at a permitted off-base landfill.

The LBP Management Plan (Tinker AFB 2010) provides documentation for all LBP management efforts and the mechanism for oversight of the LBP Management Program. Tinker AFB has completed an initial survey of buildings with LBP abatement at all high-priority facilities. The base ensures proper maintenance and monitoring of the LBP still present on the installation. As with ACM, the CE directorate maintains an LBP database to document the location of LBP on Tinker AFB. All demolition, renovation, and maintenance projects are reviewed to determine if lead-containing materials are present in the proposed work area. All LBP wastes are disposed of in accordance with state and Federal regulations. The base complies with all Federal, state, and local requirements regarding LBP activities and hazards. Tinker AFB is reportedly PCB-free (Kline 2015).

3.3.9.2 Hazardous Waste Management

Tinker AFB is classified as an LQG. Typical hazardous wastes generated during O&M activities include aerosol cans, antifreeze and antifreeze filters, batteries, fuel and oil filters, fluorescent lamps, oil-water separator sludge, paint/primer-related wastes, plastic/glass bead blaster filters, rags with oil or fuel, solvents, and used oil and fuels.

Hazardous wastes at Tinker AFB are managed in accordance with Tinker AFB Instruction 32-7004 (Tinker AFB 2015b). This instruction presents information and guidance associated with implementing a hazardous waste management program as required by Federal and state laws and regulations. In 2015, the base generated approximately 1.2 million pounds of hazardous waste, which was disposed of at permitted off-base disposal facilities.

3.3.9.3 Environmental Restoration Program

Tinker AFB is divided into four groundwater management units (GMUs). Within these GMUs, there are currently 13 ERP sites. Environmental response actions are planned and executed under the ERP in a manner consistent with CERCLA and other applicable laws. Tinker AFB was listed on the USEPA's National Priorities List in July of 1987.

3.3.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Tinker AFB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Oklahoma County, Oklahoma.

3.3.10.1 Baseline Conditions

3.3.10.1.1 Population

Population estimates for Oklahoma County totaled 743,145 persons in 2014 (USCB 2014a). Between 2010 and 2014, the county population increased at an average annual rate of 0.8 percent, with a total increase of approximately 24,512 persons over the four-year period (USCB 2010; 2014a). With an estimated population of 600,729 in 2014, Oklahoma City experienced an annual 0.9 percent increase over the 4-year period from 2010 to 2014. The populations of Oklahoma City, Oklahoma County, and the State of Oklahoma have all increased during this timeframe (USCB 2014a) (Table 3-31).

Table 3-31. Population in the ROI for Tinker AFB

Location	2010	2014	Annual Percent Change (2010–2014)
Oklahoma City	579,999	600,729	0.9%
Oklahoma County	718,633	743,145	0.8%
Oklahoma	3,751,351	3,818,851	0.4%

Source: USCB 2010; 2014a

As shown in Table 2-12, the total current personal authorized at the 507 ARW at Tinker AFB is 1,032 persons. This includes 3 military, 27 DoD civilians, 214 dual status technicians, 0 contractors, and 1,002 part-time Reservists. In addition, there are an estimated 397 military dependents and family members associated with the full-time military and civilian personnel associated with the 507 ARW. Only full-time personnel were considered for this analysis, thus the 1,002 part-time Reservists were not considered part of the work force for this analysis.

3.3.10.1.2 Economic Activity (Employment and Earnings)

Per the most recent 2014 county employment data available from the BEA, employment in Oklahoma County totaled 2,281,984 jobs. The largest employment sector in Oklahoma County was government and government enterprises (16.2 percent), followed by retail trade (9.9 percent), and healthcare and social assistance (9.3 percent) (BEA 2015a). Construction accounted for 5.6 percent of total employment. The 2014 unemployment rate reported by the BLS was 4.2 percent in Oklahoma County and 5.9 percent in the State of Oklahoma (BLS 2016a, 2016b). Per capita personal income in Oklahoma County is estimated at $51,038 (BEA 2015b).

Tinker AFB is an important contributor to the Oklahoma County economy through employment of military and civilian personnel, and through expenditures for goods and services. The base supports 26,000 military and civilian employees and 33,000 secondary jobs. The total economic impact of Tinker AFB statewide is estimated at $3.51 billion (Tinker AFB 2016).

3.3.10.1.3 Housing

Table 3-32 presents census-derived housing data for Oklahoma County. Oklahoma County had an estimated 324,171 total housing units in 2014, of which 11.2 percent (36,173 units) were vacant (USCB 2014b). Approximately 80 percent of the total housing units in Oklahoma County are located in Oklahoma City. The median value of owner occupied housing units in Oklahoma County is estimated at $129,800. The median gross monthly rent for occupied units paying rent was $768 (USCB 2014b).

Table 3-32. Housing Data in the ROI for Tinker AFB, 2014

Location	Housing Units	Occupied	Vacant
Oklahoma County	324,171	287,998	36,173

Source: USCB 2014b

There are three housing options available at Tinker AFB: privatized housing, unaccompanied housing, and housing in the local community. Military family housing at Tinker AFB is privatized and owned by Balfour Beatty Communities. Tinker AFB's lodging operation currently has 139 VQ rooms and 39 TLF rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move. Annual occupancy for lodging is approximately 78 percent (USAF 2015d).

3.3.10.1.4 Education

There are 24 public school districts with 226 schools in Oklahoma County. During the 2015 to 2016 school year, the total enrollment throughout the county was 139,814 students (OKDOE 2016a). School-aged children who reside on base would attend Tinker Elementary School, Jarman Middle School, or Midwest City High School. The three schools are part of the Midwest City-Del City Independent School District. During the 2015 to 2016 school year, the district had a total enrollment of 14,574 students (OKDOE 2016a).

3.3.10.1.5 Public Services

Public services in Oklahoma County include law enforcement, fire protection, EMS, and medical services. Oklahoma County emergency management staff and volunteers are trained in damage assessment, severe storm spotting, public relations, and other specialized skills useful during major emergencies and disasters and not otherwise readily available to Oklahoma County jurisdictions (Oklahoma County 2004). Law enforcement in Oklahoma County includes the Oklahoma County Sheriff's Department and the Oklahoma City Police Department. Oklahoma County has two rural fire protection districts, the Hickory Hills Fire Protection District and the Deer Creek Fire Protection District. Several medical facilities are readily available to serve the communities in Oklahoma City. The nearest hospital to the base, Integris Hospital, is located approximately 9 miles from Tinker AFB.

3.3.10.1.6 Base Services

The 72nd Medical Group offers a full range of wellness and prevention services for all organizations assigned to or located on Tinker AFB. Other base services include a DFAC, recreation and fitness centers, and youth and family services. The Morale, Welfare, and Recreation (MWR) services and facilities are in good condition and support the base population of 26,000 personnel. There are no reported capacity constraints identified with the current dining and recreational facilities. Tinker AFB has three CDCs with approximately 300 spaces. The current wait list of 50 children is anticipated to be reduced once minor renovations to the existing facilities are completed (USAF 2015d).

3.3.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the "affected area" or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB L_{Adn} or greater resulting from a proposed action that are not currently exposed to those noise levels under the under the baseline conditions, as described under the No Action Alternative (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area.

Table 3-33 provides baseline demographic conditions in Oklahoma County, where Tinker AFB is located. As shown in Table 3-33, Oklahoma County has a higher proportion of minority and low-income populations than the State of Oklahoma and the nation (Figure 3-9).

Table 3-33. Minority and Low-Income Populations Near Tinker AFB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of Oklahoma	3,818,851	1,230,880	32.2%	645,385	16.9%
Oklahoma County	743,145	308,920	41.6%	137,481	18.5%

Source: USCB 2014a; 2014c.

Under baseline conditions, off-base residential areas within the 65 dB L_{Adn} or greater noise contours extend into 13 census block groups. There is an estimated population of 5,264 persons within this area. Of those, 54.8 percent (2,887 persons) are minority and 23.5 percent (1,239 persons) are low-income persons. Table 3-34 presents low-income populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-35 presents minority populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-36 presents the youth and elderly population data comparable to that provided for the low-income and minority populations. Noise-sensitive receptors located within the 65 dB or greater L_{Adn} are shown on Figure 3-9. Two off-base schools, Steed Elementary School and Willow Brook Elementary School, are currently exposed to noise levels of 65 dB L_{Adn} or greater. Steed Elementary School is part of the Midwest City-Del City Independent School district. During the 2015 to 2016 school year, the school had a total enrollment of 425 students (OKDOE 2016b). Willow Brook Elementary School is part of the Oklahoma City Public School District. During the 2015 to 2016 school year, the school had a total enrollment of 523 students (OKDOE 2016b).

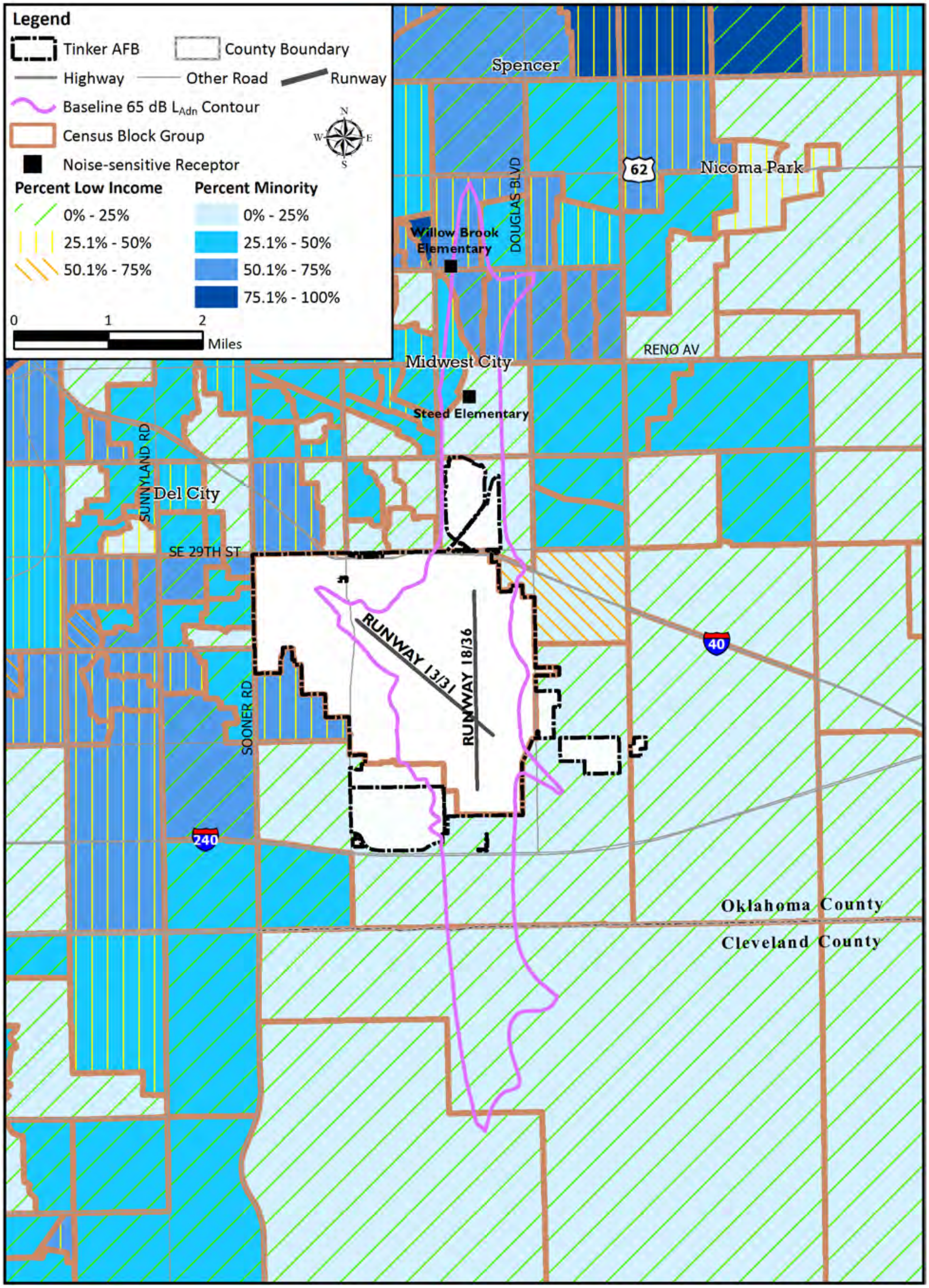

Figure 3-9. Minority and Low-Income Populations Near Tinker AFB

Table 3-34. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
400272023011	1	7.7%
400272023014	0	0.0%
401091074032	0	0.0%
401091074033	4	21.1%
401091076061	24	33.3%
401091077032	88	18.0%
401091077033	38	4.1%
401091080081	387	28.6%
401091080082	85	16.7%
401091080083	401	31.8%
401091080093	0	0.0%
401091080112	6	31.6%
401091080113	205	35.2%
Total	**1,239**	**23.5%**

Table 3-35. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Minority	
	Number	Percent
400272023011	2	15.4%
400272023014	0	0.0%
401091074032	0	0.0%
401091074033	6	31.6%
401091076061	8	11.1%
401091077032	129	26.3%
401091077033	431	46.3%
401091080081	825	61.1%
401091080082	175	34.4%
401091080083	898	71.2%
401091080093	5	33.3%
401091080112	4	21.1%
401091080113	404	69.4%
Total	**2,887**	**54.8%**

Table 3-36. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
400272023011	3	2
400272023014	0	0
401091074032	0	0
401091074033	4	4
401091076061	19	5
401091077032	74	107
401091077033	300	94
401091080081	498	184
401091080082	78	85
401091080083	352	90
401091080093	3	2
401091080112	2	5
401091080113	214	52
Total	**1,547**	**630**

Key: Youth = under 18; Elderly = 65 and over.

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3.4 WESTOVER AIR RESERVE BASE

This section describes the conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Westover ARB and, where applicable, in areas surrounding the base. Due to the ongoing conversion of the C-5B fleet to the quieter C-5M aircraft, it was necessary to establish a baseline condition and a No Action Alternative condition. While the No Action Alternative condition represents the complete conversion, the baseline does not and only represents noise resulting from C-5B aircraft. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Westover ARB.

3.4.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

In November 2015, updated baseline operations data were provided by pilots, ATC personnel, and other installation POCs. After processing for input into the computer noise model, the information was validated by installation POCs to confirm accuracy. C-5B aircraft based at Westover ARB conduct 1,724 airfield operations per year under baseline conditions. Transient military aircraft conduct 8,243 operations per year, and civilian aircraft conduct 7,044 operations per year. Airfield operations are counted each time an aircraft departs from the runway and each time an aircraft approaches the runway.

Table 3-37 lists maximum noise levels (dB L_{Amax}) generated by based C-5B aircraft, the three most common transient military aircraft, and aircraft representing the most common civilian users of the airfield. The 439 Airlift Wing (AW) has recently begun conversion of its entire C-5B fleet to the C-5M aircraft. The C-5M, which is substantially quieter than the C-5B, is scheduled to be replaced by 2019. C-5B aircraft are 18 dB louder than transient F-16 aircraft during approach at a distance of 1,000 feet, but are 2 dB quieter than an F-16 during departure.

Flying operations at Westover ARB occur primarily on Tuesdays and Thursdays in two blocks of 4 hours each. When evening flights are conducted, they typically occur between 5:00 P.M. and 9:00 P.M. The airport closes at 11:00 P.M., and it is rare that operations occur during the late-night period between 10:00 P.M. and 7:00 A.M (i.e., acoustic night).

Table 3-37. Aircraft Maximum Noise Levels at Westover ARB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{max}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
C-5B	2.85 EPR	104	94	78	65
C-21	70.4% NC	70	62	51	42
C-130	932 CTIT	84	77	66	57
F-16	83.5% NC	86	78	66	56
Business jet (Cessna 500)	305 LBS	64	56	46	37
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29

Table 3-37. Aircraft Maximum Noise Levels at Westover ARB (Continued)

Aircraft	Power Setting	A-weighted Maximum Noise Level (L_{max}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
C-5B	92% NF	104	94	79	68
C-21	96% NC	84	76	64	54
C-130	977 CTIT	85	77	66	57
F-16	93% NC	106	98	86	76
Business jet (Cessna 500)	1554 LBS	76	69	58	49
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 439 AW C-5 aircraft currently operating at Westover ARB are B models; representative F-16 aircraft equipped with Pratt and Whitney F100-PW-229 engine.
Key: Power Units: NF = fan speed; NC = engine core speed; CTIT = turbine inlet temperature in degrees Celsius; LBS = pounds of thrust; RPM = revolutions per minute, EPR = Engine Pressure Ratio.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 ºF and 70 percent relative humidity.

In accordance with current USAF and DoD policies, contours of L_{Adn} reflecting all ongoing aircraft operations were created using NOISEMAP (Version 7.2). NOISEMAP accounts for the effects of topography on noise, and are calculated for an average annual day (i.e., a day with 1/365th of annual operations). Contours of L_{Adn} reflecting baseline flying operations are shown on Figure 3-10. The 2013 AICUZ update 65 dB L_{Adn} noise contour are also shown as a point of reference (USAF 2013a). Changes in operations since publication of the 2013 AICUZ report include minor increases in C-5B and transient military operations. The effect of the operations tempo increases to noise levels are more than offset by the effects of the changes in noise modeling methods since 2013. The 2013 AICUZ contours were calculated to represent an average busy day, meaning that based flying unit total annual operations are averaged over weekdays only. Because this calculation methodology concentrates aircraft noise in fewer days, the calculated noise level is higher. The methodology used to calculate the 2013 AICUZ contours also differed in that calculations did not take into account the effects of varied topography on the spreading of noise. Therefore, the current noise modeling methods used to calculate baseline noise levels (i.e., modeling average annual day and use of topographic effects) result in lower calculated noise levels than were shown in the 2013 AICUZ report.

The number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} is listed in Table 3-38. Residences and other noise-sensitive land uses are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included to provide increased outdoor-to-indoor noise level reduction. Noise-sensitive land uses are never considered compatible at noise levels greater than 75 dB L_{Adn}.

Table 3-38. Acres Exposed to Noise Resulting from Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	320	419	739
70 - 74	369	44	413
75 - 79	208	1	209
80 - 84	158	0	158
≥ 85	84	0	84
Total	**1,139**	**464**	**1,603**

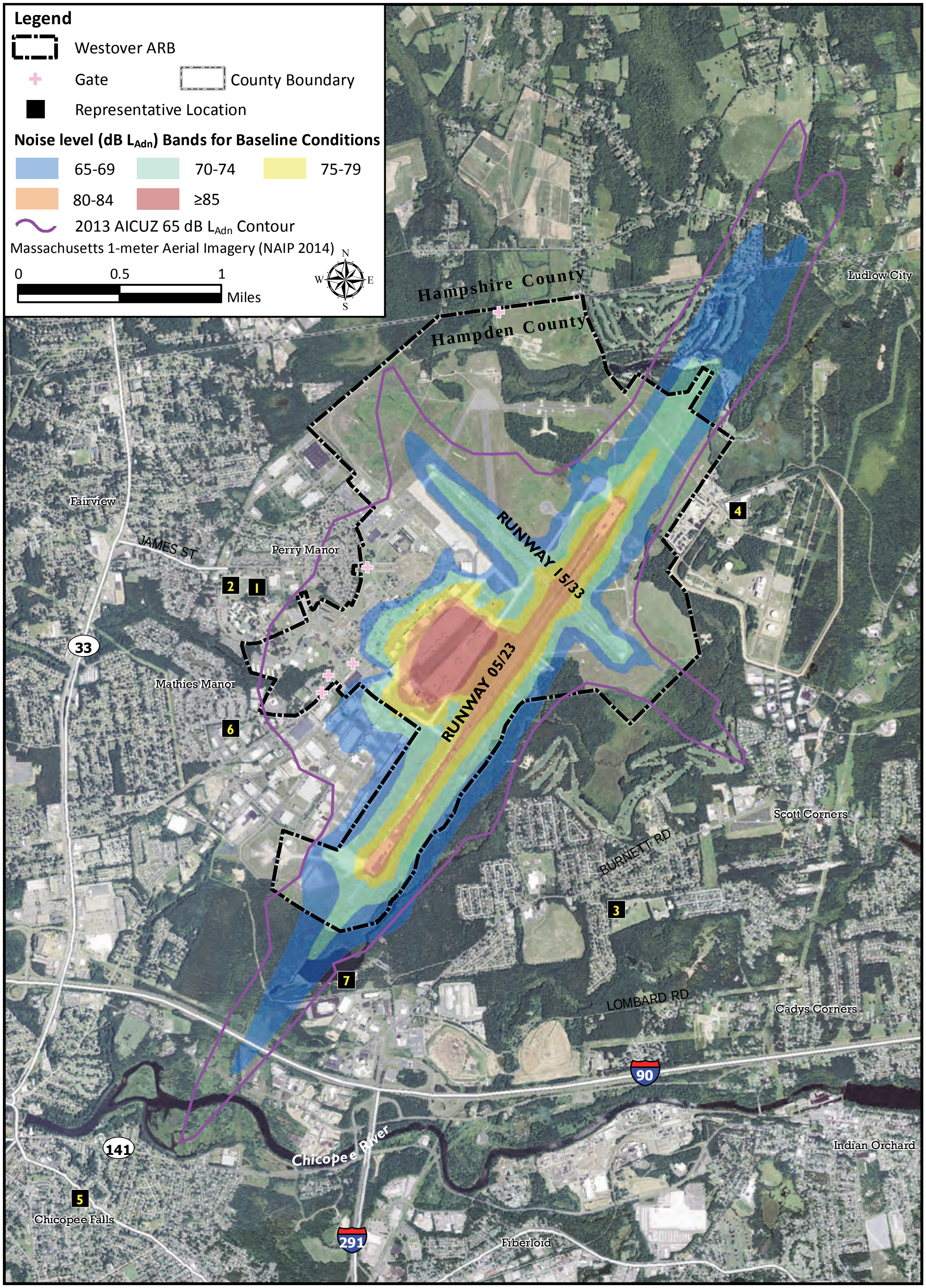

Figure 3-10. Baseline Noise Levels (dB L_{Adn}) at Westover ARB

An estimated 38 people are affected by noise levels greater than 65 dB L_{Adn} under baseline conditions (Table 3-39). Approximately 12 percent of people affected by 65 dB L_{Adn} can be expected to be highly annoyed by the noise.

Table 3-39. Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	38
70 - 74	0
75 - 79	0
80 - 84	0
≥ 85	0
Total	**38**

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base residents under baseline conditions. The five industrial buildings on Westover ARB exposed to noise levels greater than 80 dB L_{Adn} are all located along the flightline in areas known to be exposed to high noise levels. Hearing loss risk among workers at Westover ARB is managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Westover ARB.

Aircraft noise levels (dB L_{Adn}) at several representative locations near Westover ARB are listed in Table 3-40. The locations, which are shown on Figure 3-10, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the schools studied experience noise levels similar to those experienced at the schools. None of the 7 locations studied experience baseline noise levels greater than 65 dB L_{Adn}. The land uses at these locations are all considered compatible with the noise levels to which they are exposed per USAF land use guidelines.

Table 3-40. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Westover ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Bowie School	47
2	Selser School	46
3	Litwin Elementary	46
4	Hampden County Sheriff's Department	55
5	Belcher Elementary	56
6	Porter and Chester Institute	52
7	Chicopee Reservoir Beach	61

Restrictions have been imposed on flying operations at Westover ARB in order to minimize noise impacts. Afterburner-equipped aircraft are instructed to terminate afterburner use as soon as practical after departure. Intersection departures (i.e., aircraft beginning takeoff roll from a location other than the beginning of the runway) are not permitted except in cases where the aircraft would be expected to reach 1,000 feet AMSL prior to reaching the base boundary. Runway 23 is used when winds allow. Use of Runway 23 directs aircraft over sparsely populated areas north of the installation. From 2011 to 2015, an average of four noise complaints per year has been received by the Public Affairs Office at Westover ARB.

3.4.2 Air Quality

Air emissions produced from construction and operation of the proposed MOB 3 mission at Westover ARB would primarily affect air quality within Hampden County. In Massachusetts, the Massachusetts Department of Environmental Protection (Mass DEP) is responsible for enforcing air pollution regulations. The Mass DEP uses the NAAQS to regulate air quality within Massachusetts. Additional background information on the CAA and the NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.4.

The Mass DEP enforces the NAAQS by monitoring state-wide air quality and developing rules to regulate and permit stationary sources of air emissions. The Massachusetts Air Quality Regulations and Standards are contained in Title 310, Chapters 6 through 8 and 60 of the *Code of Massachusetts Regulations* (Mass DEP 2016).

3.4.2.1 Region of Influence and Existing Air Quality

The USEPA classifies Hampden County as in attainment of all NAAQS (USEPA 2016a). The County was in nonattainment of the 1997 O_3 NAAQS, but it now attains the 2008 O_3 NAAQS. This change in attainment designation occurred on 6 April 2015 when the USEPA revoked the 1997 O_3 NAAQS and finalized implementation of the 2008 O_3 NAAQS (USEPA 2015a). The urban area of Springfield historically did not attain the NAAQS for CO. However, the urban area of Springfield now attains this standard and is known as a CO maintenance area. Westover ARB is outside of this CO maintenance area to the north by approximately two miles.

3.4.2.2 Regional Air Emissions

Table 3-41 summarizes annual emissions developed for Hampden County in 2011 as part of the NEI process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages (VOCs), (3) fuel oil combustion (SO_x), (4) residential wood burning (CO, PM_{10}/$PM_{2.5}$), and (5) fugitive dust from unpaved roads (PM_{10}/$PM_{2.5}$).

Table 3-41. Annual Emissions for Hampden County, Massachusetts, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Stationary Sources	6,783	11,133	3,409	2,365	12,008	2,963	NA
Mobile Sources	4,807	45,959	6,896	46	564	325	1,998,104
Total	**11,590**	**57,092**	**10,305**	**2,411**	**12,572**	**3,288**	**1,998,104**[a]

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Hampden County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons; NA = not available

Source: USEPA 2016b

3.4.2.3 Westover ARB Emissions

Air emissions at Westover ARB occur from the activities associated with the C-5B 439 AW and transient aircraft operations. The main sources of existing emissions occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-44 summarizes estimates of the most recent annual operational emissions generated by Westover ARB (2013 through 2015). These data were developed in part from the *2013 Mobile Air Emissions Inventory for Westover ARB* (AFCEC 2016), *Air Emissions Report – 2013 Yearly Calculations* (Westover ARB 2015a), *2014 GHG Submission Report to the Mass DEP* (Westover ARB 2015b), and activity data collected for 2015 operations. The air quality analysis uses the data in Table 3-42 to define baseline emissions for Westover ARB. Volume II, Appendix D, Section D.4, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Westover ARB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Westover ARB operates under a 50 percent Facility Emissions Cap, which requires annual facility emissions to remain below 25 tons per year of VOC or NOx, or 50 tons per year of any other regulated air pollutant; 5 tons per year of a single HAP; 12.5 tons per year of any combination of HAPs; and 50 percent of any lesser threshold for a single HAP that the USEPA may establish by rule (Mass DEP 2006).

Table 3-42. Annual Emissions from Existing Operations at Westover ARB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Aircraft Operations	14.89	144.26	695.19	29.35	36.62	18.64	NA
AGE	1.86	4.55	20.02	0.21	1.01	0.98	NA
GMVs/Nonroad Equipment	0.40	3.84	5.34	0.02	0.49	0.25	1,480
POVs – On Base	0.07	2.03	0.29	0.00	0.03	0.01	181
POVs – Off Base	0.91	36.07	5.79	0.07	0.37	0.14	3,004
Point and Area Sources	1.56	4.00	5.92	0.07	0.46	0.37	5,561
Total Emissions[a]	**19.70**	**194.76**	**732.55**	**29.71**	**38.99**	**20.39**	**10,227**

[a] GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Hampden County are incomplete.

Key: CO_2e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

3.4.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.4.3.1 Flight Safety

Aircraft flight operations at Westover ARB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. Westover ARB has had only two Class B mishaps and zero Class A mishaps associated with C-5 operations on or around the airfield in the past 10 years. Both of the Class B mishaps were engine component failures. Neither was due to conditions around/on the airfield or related to bird/wildlife-aircraft strike hazard (Westover ARB 2014b, Westover ARB 2015e). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between $500,000 and up to $2 million.

The C-5 aircraft and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF MAJCOMs to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.4.3.1.1 Wildlife Strike Hazard at Westover ARB and Vicinity

Bird-aircraft strikes (as well as other animal strikes) on the runway, during takeoffs and landings, and in the airspace have been documented as an ongoing hazard to aircraft. Between 2010 and 2015, Westover ARB recorded 93 bird strikes at the airfield or in the airspace (Westover ARB 2015e). Westover ARB has a BASH Plan that identifies several approaches to reduce BASHs, including grounds maintenance, physical removal of the birds, and improving flight crew awareness. The Flight Safety Office is responsible for BASH monitoring and improvement, and all units are required to abide by the BASH Plan (Westover ARB 2014b). The Westover ARB BASH Plan contains control measures for specific bird hazards that are likely from species common to the area and migratory species. For bird species prevalent in the airfield environs, the installation has developed a set of management tools that include mowing grasslands, application of plant growth regulators, and, if needed, use of pre-emergent herbicides and prescribed burns (USAF 2015a).

3.4.3.2 Ground Safety

Westover ARB, the City of Chicopee, and the Town of Ludlow work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established to delineate recommended surrounding land uses for the protection of people and property on the ground. The primary runway (05/23) and the crosswind runway (15/33) at Westover ARB have CZs encompassing an area 3,000-feet-wide by 3,000-feet-long. APZ I is 3,000-feet-wide by 5,000-feet-long and APZ II is 3,000-feet-wide by 7,000-feet-long. A portion of the CZs (250 acres) are not base property, and portions in Chicopee are zoned as single-family residential and residential/agricultural. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2013 AICUZ Study. While no individuals reside in the CZs, there are a total of 1,084 acres of residential development in the APZs (USAF 2015d).

Westover ARB Fire Emergency Services provides fire and crash response at Westover ARB. It also provides response to structural fires and hazardous material incidents at the base, and is party to mutual-aid support agreements with eight nearby fire departments (Chicopee, Granby, Hamden, Holyoke, Ludlow, South Hadley Districts 1 and 2, and Springfield).

3.4.4 Soils and Water

3.4.4.1 Soil Resources

Westover ARB is located in the New England Province of the Appalachian Highlands physiographic region. The area surrounding the base is characterized by gently rolling terraces that flank the Connecticut River, with elevations ranging from 230 to 245 feet AMSL. The Berkshire Hills bound Westover ARB to the west, with low hills associated with the Worcester Plateau to the east. Soils underlying Westover ARB are primarily of the Urban Land Hinkley-Windsor association. Soils in this association are predominantly covered by urban areas, with most of the foundation for these soils being Hinkley and Windsor soils. Both Hinkley and Windsor soils are course textured, comprised of gravel and/or sand. These soil types are very permeable and excessively drained (USDA 1975).

3.4.4.2 Water Resources

3.4.4.2.1 Surface Water

Westover ARB is located in the Chicopee River Watershed, which is the largest of the 27 major drainage basins in Massachusetts (EEA 2016a). The Chicopee River Watershed drains more than 720 square miles of central Massachusetts before connecting with the Connecticut River in the City of Chicopee. Major surface water bodies near Westover ARB include the Connecticut River to the West, the Chicopee River to the South, and Wade Pond to the North. On Westover ARB, Cooley Brook, Stony Brook, and Willimansett Brook are the predominant surface water drainages. Cooley Brook flows south from a large wetland area along the southeastern boundary of the base through the Chicopee Reservoir in Chicopee Memorial State Park, ultimately emptying into the Chicopee River. The reservoir is approximately 16 acres and is less than 1,500 feet from the end of Runway 23 (Westover ARB 1995).

Westover ARB is situated on a local high point, which allows stormwater to flow away from the base. Westover ARB discharges stormwater via ten outfalls under a Multi-Sector General Permit (MSGP) issued on 4 June 2015. Stormwater runoff in the south and southeast part of the base discharges through six outfalls into Cooley Brook. Stormwater runoff from the west side of the base is discharged through one outfall which serves as the headwater for Willimansett Brook. The northern part of Westover ARB discharges through one outfall into Stony Brook. Stony Brook is listed as impaired by E. coli, turbidity, and non-native macrophytes on the Massachusetts Integrated List of Waters (EEA 2016b). A TMDL has not been established for Stony Brook (EEA 2016b). Cooley Brook is not identified as impaired on the Massachusetts Integrated List of Waters (EEA 2016b). Outfalls are visually inspected on a quarterly basis. Although the outfall that contributes to Stony Brook (011a) required sampling in the past, Westover ARB has since determined that it is not a significant source of E. coli to Stony Brook and therefore sampling is no longer required, unless future USEPA permit renewals require repeating the sampling and source assessments.

Westover ARB is not required to meet numeric effluent discharge limits because such limitations are not contained in the MSGP. The MSGP allows for the development of a SWPPP to control pollution contributions to stormwater at Westover ARB. The SWPPP includes an evaluation of potential sources of stormwater pollution, such as outside material storage, potential for spills and leaks, and aircraft deicing operations. As part of the SWPPP, Westover ARB implements a variety of different actions to minimize aircraft deicing fluid pollution.

Westover ARB performs aircraft deicing/anti-icing operations primarily on the East Ramp. The aprons, taxiways, and runways are deiced with potassium acetate (liquid) and sodium acetate (granular). The base uses a non-triazole-based propylene glycol deicing fluid mixed as a 60/40 percent glycol/water ratio. Westover ARB currently uses less than 100,000 gallons of aircraft deicing fluid per year. Westover ARB implements a variety of control practices for aircraft deicing which includes personnel training in the proper application methods to prevent over use of deicing fluid along with the use of new Globemaster deicing trucks with metered and more accurate spray nozzles, fluid heating capabilities and enclosed cabs to apply fluid more effectively. Aircraft deicing effluent from the East ramp is primarily discharged through Outfall 1, where it is partially bioremediated in a submerged flow constructed wetland before discharging to Cooley Brook. The MSGP requires airports that use more than 100,000 gallons of glycol-based aircraft deicing fluid and/or 100 tons or more of urea on an average annual basis to conduct stormwater monitoring. Because the base does not use these chemicals in these quantities, storm water monitoring is not required.

The wastewater discharge permit with the Chicopee Water Pollution Control Authority (CWPCA) also allows for the discharge of aircraft deicing effluent with certain conditions. The conditions require pH to be between 5.5 and 9.5 and the discharge cannot contain any oxygen demanding pollutants (BOD) at a flow rate and/or concentration which will cause interference with the City treatment works (including sludge disposal), or which exceeds any limits established by the superintendent. This permit also stipulates pre-notification and during periods of aircraft deicing discharge to the CWPCA effluent monitoring equipment at sanitary sewer Outfall number 21A be continually operated and appropriately maintained.

3.4.4.2.2 Groundwater

Groundwater below Westover ARB has been identified from a shallow sand and gravel aquifer and a deeper bedrock aquifer. Thickness of the shallow aquifer is generally 25 to 85 feet. This aquifer occurs above lacustrine and glacial till deposits ranging in thickness from 10 to 270 feet. The lacustrine deposits overlie the bedrock aquifer, which is comprised of crystalline and sedimentary rocks.

The depth to groundwater in the shallow aquifer ranges from 5 to 20 feet bgs. Although the shallow aquifer is classified as a non-potable drinking water source, the deeper aquifer is used by nearby residences as a source of drinking water. The depth to water in the deeper aquifer is approximately 150 feet bgs.

Institutional controls associated with ERP sites at Westover ARB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.4.4.2.3 Floodplains

No FEMA floodplain mapping has occurred at Westover ARB. Streams that flow through Westover ARB and have floodplains mapped outside the base boundary include Stoney Brook and Cooley Brook. Stoney Brook is located on the northeast corner of the base and Cooley Brook flows southwest along the southeast border of the base. A GIS analysis was performed using the FEMA FIRM 100-year base floodplain elevations for Stoney and Cooley Brooks. In compliance with EO 13690, an additional three feet was added to those elevations to identify the locations of areas that have an elevation of three feet above the 100-year floodplain. These locations were then plotted using digital elevation models to identify areas near the existing 100-year floodplain that were greater than the 100-year floodplain base elevations and less than or equal to the 100-year plus three feet elevation. The results are shown on Figure 3-11.

3.4.5 Biological Resources

3.4.5.1 Vegetation

Westover ARB is located within the Eastern Broadleaf Forest (Oceanic) Province (Bailey 1995). This ecoregion is characterized by temperate deciduous forests dominated by tall, broadleaf trees. Historically, the forests in the area of Westover ARB were dominated by white oak (*Quercus alba*) and red oak (*Quercus rubra*). However, these areas were logged and cleared for agricultural uses (e.g., row crops and tobacco) in the 1800s. Farming and urban development have resulted in limited forest acreage in the vicinity of the base.

Turf grasses and various broad-leaf weeds are the dominate vegetation type in the improved areas of Westover ARB. A variety of shrubs and trees are also present within the improved areas on Westover ARB. Deciduous woodlands, native grasslands, and open wetlands are present in the unimproved areas of the base. Appendix E contains a list of common species known to occur at Westover ARB. Vegetation management at Westover ARB is guided by the INRMP, the IDP, and the BASH Plan (Westover ARB 2014a, 2014b, 2014c).

3.4.5.2 Wildlife

Information on wildlife occurring on Westover ARB is provided in the INRMP (Westover ARB 2014a). Wildlife habitat within the improved and semi-improved areas on Westover ARB is limited due to the extensive development (i.e., much of the native vegetation has been disturbed or replaced with managed landscapes). However, a variety of mammal, bird, amphibian, reptile, and fish species have been observed within or in the vicinity of unimproved grounds. Appendix E contains a partial list of species known to occur at Westover ARB.

3.4.5.3 Special-Status Species

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Westover ARB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Westover ARB. A submission for Hampden County, Massachusetts was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 29 March 2016 (Volume II, Appendix A, Section A.6.4) contains a full copy of the Trust Resource Report (USFWS 2016f). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur in Hampden County, Massachusetts. Table 3-43 presents the federally listed species identified through the IPaC and ECOS reviews.

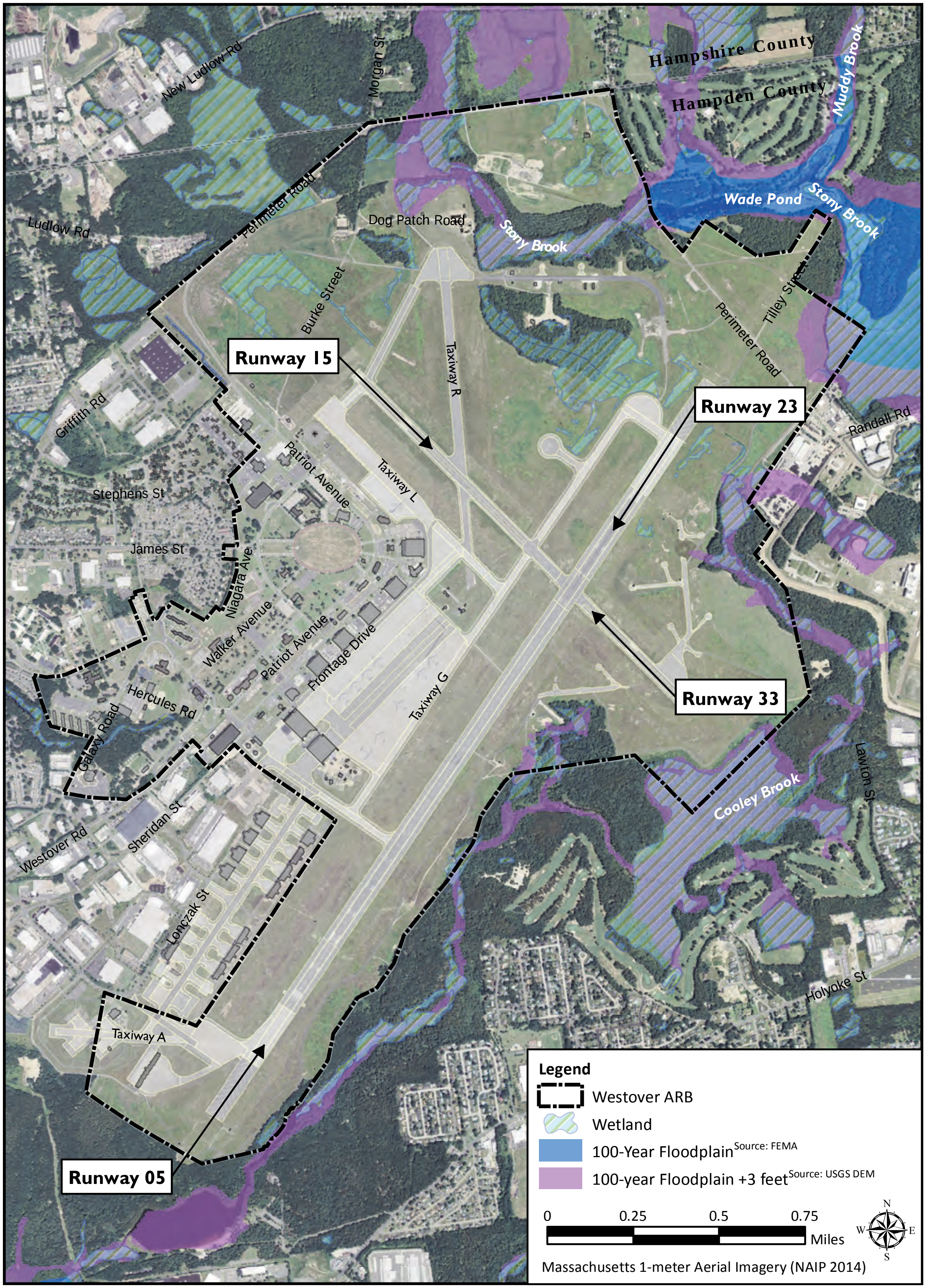

Figure 3-11. Westover ARB Water Resources

Table 3-43. Federally Listed Species that Could Occur in Hampden County, Massachusetts

Common Name	Scientific Name	Status		Occurrence at Westover ARB	USFWS Online Review System
		Federal[a]	State[b]		
Clams					
Dwarf wedgemussel	*Alasmidonta heterodon*	FE	E	No	ECOS
Flowering Plants					
Small whorled pogonia	*Isotria medeoloides*	FT	E	No	IPaC, ECOS
Mammals					
Northern long-eared bat	*Myotis septentrionalis*	FT	E	No	IPaC, ECOS

[a] USFWS

[b] Massachusetts Division of Fisheries and Wildlife (MDFW) Natural Heritage and Endangered Species Program

Key: FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; E – Massachusetts endangered

Source: USFWS 2015b, 2015d, 2015f, 2015j; Westover ARB 2014a, MDFW 2016

No federally listed threatened or endangered species are known to occur at Westover ARB; however, several state-listed species have been documented from the base. Many birds protected under the MBTA could occur as residents or migrants near Westover ARB. There is no critical habitat known to occur on base (USFWS 2015a).

No aquatic habitat for the dwarf wedgemussel occurs on base. Additionally, there is no known suitable habitat for the small whorled pogonia at Westover ARB. Habitat for the small whorled pogonia includes older hardwood stands of beech, birch, maple, oak, hemlock, and hickory that do not occur on base. While potential foraging habitat may be available, no known roosting habitat for the northern long-eared bat occurs on base. The northern long-eared bat was not detected during base-wide surveys completed in 1995 (Westover ARB 2014a).

Several state-listed plant and animal species and suitable habitats were documented on Westover ARB during a 1995 survey conducted by the Massachusetts Division of Fisheries and Wildlife (MDFW). Included among the species documented were eight birds, three amphibians, four reptiles, one invertebrate, and three plants (Westover ARB 2014a).

Birds – State-listed bird species observed include the upland sandpiper *(Bartramia longicauda)*, grasshopper sparrow *(Ammodramus savannarum)*, vesper sparrow (*Pooecetes gramineus*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), blackpoll warbler (*Dandroica striata*), Cooper's hawk (*Accipiter cooperii*), and sharp-shinned hawk (*Accipiter striatus*). The upland sandpiper, grasshopper sparrow, and vesper sparrow were documented in the native grassland communities within the unimproved grounds at Westover ARB. Raptors species (the northern harrier, Cooper's hawk, and sharp-shinned hawk) were observed during the fall, when there is an influx of migrant raptor species. The loggerhead shrike and blackpoll warbler were observed foraging or migrating through the base (Westover ARB 2014a).

Amphibians – State-listed amphibian species observed include the blue-spotted salamander (*Ambystoma laterole*), four-toed salamander (*Hemidactylium scutatum*), and eastern spadefoot toad (*Scaphiopus holbrookii*). Both salamander species were documented within the forested wetlands on Westover ARB (Westover ARB 2014a). Suitable habitat for the eastern spadefoot toad was identified on base (Westover ARB 2014a). The toad species requires dry, sandy loam soils characteristic of pitch pine barrens, coastal oak woodlands, or sparse shrub growth, interspersed with temporary ponds (MDFW 2015). This could include the pitch pine/scrub oak habitat on the base.

Reptiles – State-listed reptile species observed include the spotted turtle (*Clemmys guttata*). The spotted turtle was documented in the northern forested wetlands on the base. While species were not observed, suitable habitat was identified for the wood turtle (*Clemmys muhlenbergii*), hognose snake (*Heterodon platirhinos*), and eastern box turtle (*Terrapene carolina*). Suitable habitat for the wood turtle, eastern hognose snake, and eastern box turtle could occur within wooded areas on Westover ARB (Westover ARB 2014a).

Invertebrate – One state-listed invertebrate species, the pine barrens zanclognatha moth (*Zanclognatha marta*), has been documented within the pitch pine/scrub oak habitat on base (Westover ARB 2014a).

Plants – State-listed plant species observed include the Hartford fern (*Lygodium palmatum*), wild lupine (*Lupinus perennis*), and large whorled pogonia (*Isotria verticillata*). The Hartford fern has been identified within several forest stands on Westover ARB. The wild lupine has been documented within the open grassland areas in the northeastern portion of the base. Two colonies of the large whorled pogonia occur within the wooded areas on Westover ARB (Westover ARB 2014a).

3.4.5.4 Wetlands

No wetlands occur near the facilities and infrastructure projects described in Chapter 2. A base-wide wetlands survey conducted in June–July 1997 identified and delineated jurisdictional wetlands present on Westover ARB. Thirty-three wetlands totaling approximately 144 acres were documented, representing all federally regulated wetland resources on the base (Westover ARB 2014a). The wetlands are located in a variety of landscapes ranging from forested areas to open grasslands, with the largest amount of wetland acreage connected to the Stony Brook wetland complex. Figure 3-11 shows the location of the Jurisdictional Waters and Wetlands on Westover ARB.

3.4.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties. The USAF used this information to determine whether any such resources are eligible for the NRHP.

3.4.6.1 Architectural Resources

Numerous architectural inventories have been conducted on Westover ARB (Westover ARB 2004a). Westover ARB identified the Westover ARB Historic District (Historic District) as eligible for listing on the NRHP. This evaluation included 39 contributing resources, including seven individually-eligible buildings. On 1 November 1995, the Massachusetts Historical Commission (MHC) concurred with the Historic District determination of eligibility under Criteria A and C for its associations with military operations during World War II and the Cold War era, and for the survival of historic building and structure types representative of air base design from those historic periods (MHC Opinion, 1 November 1995; MHC Inventory Form CHI.AA/LUD.G). The MHC is the Commonwealth of Massachusetts’ SHPO.

The period of significance for the Historic District is defined as 1939-1974, after which the boundaries of the air base started to diminish as land was sold back to the local community. Since the boundary of the Historic District was not identified in the initial Historic District NRHP nomination, the MHC recommends that Westover ARB adopt the 1974 installation boundary as the Historic District boundary in an update of the nomination. Only buildings and structures that were more than 50 years old in 1995 are identified as contributing to the Historic District in the current MHC inventory forms. However, for the purposes of this undertaking, all buildings and infrastructure dating to the period of significance within the former 1974 Westover ARB boundary are considered as contributing to the Historic District, unless evaluated otherwise.

3.4.6.2 Archaeological Resources

Reconnaissance surveys for archaeological resources have been conducted on Westover ARB since 1981 (Westover ARB 2004a). A 1981 survey identified 11 areas with the potential to contain archaeological sites dating to the prehistoric and historic periods (Cox 1981). Based on subsurface testing, four prehistoric archaeological sites (19HD58, 19HS214, 19HD219, 19HD223) and one historic archaeological site (Cooley Brook site) were identified. A subsequent 1994 intensive archaeological survey of 16 areas within Westover ARB determined that site 19HD58 no longer exists on the installation, sites 19HD214 and 19HD219 are not eligible for the NRHP, and site 19HD223 and the Cooley Brook site are potentially eligible for the NRHP (Jones et al. 1994).

In addition to the identification of the known sites, the 11 archaeologically sensitive areas identified in the previous surveys are considered to have the potential for significant archaeological resources. These areas are located around the perimeter of the installation, approximately 1 mile from the 439 AW parking ramp and the area of potential effect (APE).

3.4.6.3 Traditional Resources

Pursuant to Sections 101(d)(6)(B) (54 *USC*. 302706) and 106 (54 *USC*. 306108) of the NHPA, its implementing regulations at 36 *CFR* § 800.2(c)(2), EO 13175, Department of Defense Instruction (DoDI) 4710.02, and AFI 90-2002, the USAF consulted on a government-to-government basis with five tribes that are culturally affiliated with the installation’s lands. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, were asked to provide information on any properties to which they attach religious and cultural significance. There are no known tribal sacred sites or properties of traditional religious and cultural importance in the vicinity of Westover ARB.

3.4.7 Land Use

Westover ARB is a joint-use military and civilian airfield located in western Massachusetts. The installation consists of approximately 2,100 acres of land in the City of Chicopee and the Town of Ludlow. Granby and South Hadley are located to the north in Hampshire County, and the City of Springfield is located to the south. Westover ARB is partnered with the Westover Metropolitan Airport under a joint-use agreement with the Westover Metropolitan Development Corporation, a nonprofit industrial development corporation that operates the airport. Land use surrounding the base is mixed. Intensive development has increased to the south and west of the base, with industrial and low-to-medium density residential uses to the north and east. Rural open space and agricultural areas dominate the landscape northeast of the base.

3.4.7.1 Base

Westover ARB is almost entirely classified as public/quasi-public land use (Westover 2014c). Several parts of the base, predominantly the northern edge adjacent to Granby, are classified as open/agricultural/low-density and wetland. The primary functional land use on the installation is categorized as airfield. The main cantonment is north of the primary runway, Runway 05/23. As with most AFRC installations, limited commercial and community functions exist on base. The Westover ARB IDP divides the base into planning districts based on geographical features, land-use patterns, building types, transportation networks, and mission and/or functional uses. The planning districts identified at Westover ARB include the Airfield District, Community District, Flightline District, Historic Core District, Joint Use District, Mission Support District, and a Training Area District (Westover ARB 2014c).

3.4.7.2 Surrounding Areas

Intensive development has increased to the south and west of Westover ARB, and industrial and low- to medium-density residential development occupies the north and east (see Figure 3-12). Residential, industrial, and open/agricultural/low-density are the dominant land uses closest to the base in the City of Chicopee. The open/agricultural uses to the south contain forest and wetland. The Chicopee Reservoir and the Chicopee Country Club golf course are part of Chicopee Memorial State Park, which abuts the base to the south and east. Land use just west of the base, near the southern end of Runway 05/23, is classified as industrial and includes the Westover Industrial Airpark (Westover ARB 2014c).

In 2004, the Westover ARB/Westover Metropolitan Airport JLUS Update was published (Westover ARB 2004b). The 2004 JLUS report updated the original Westover JLUS prepared in 1995 and included noise exposure contours prepared for an existing (2002) condition and forecast future (2007) condition. One of the main goals of the 2004 JLUS Update was to encourage the communities surrounding Westover ARB to develop and adopt zoning overlay districts to prohibit future development in the CZs and limit the types of development within the APZs, or areas identified as greater than 65 dB L_{Adn} noise zones. However, only the Town of Ludlow has implemented an Aircraft Flight Overlay Zoning District.

The current AICUZ study for Westover ARB was completed in 2013 and is an update to the previous study completed in 1996 (USAF 2013a). The estimated off-base area affected by noise levels of 65 dB L_{Adn} or greater is 464 acres (see Section 3.4.1). The majority of this acreage is associated with open/agricultural/low-density, recreational, and public/semi-public land uses. Approximately 25 acres in the residential land use category are also affected within the 65-69 dB L_{Adn}.

3.4.8 Infrastructure

3.4.8.1 Potable Water System

The City of Chicopee provides potable water to Westover ARB via a 16-inch water main pipeline. A 500,000-gallon elevated storage tank is used to maintain pressure and flow in the event of fire-fighting activities. In addition to the main pipeline, an emergency water supply is available via an 8-inch line (Westover ARB 2014c). The average daily water use between 2010 and 2014 was 0.13 MGD. Peak water use occurs at Westover ARB during the summer months; in July 2012 water usage peaked at 0.27 MGD. Additional potable water supply is available from the City of Chicopee (Westover ARB 2015f).

3.4.8.2 Wastewater

The City of Chicopee owns the sanitary sewer lines on base except for those within 5 feet of base facilities; the base owns the lines from the 5-foot line to the buildings. The entire system is gravity fed, connecting to the City of Chicopee system via an 18-inch main pipeline (Westover ARB 2014c). The City of Chicopee's system has a total capacity of 15.5 MGD (Moriarty 2015b). The average daily wastewater discharge from 2010 to 2014 was 0.12 MGD, or 1 percent of the wastewater treatment system capacity. The reported peak wastewater discharge was 0.27 MGD in July 2012, or 2 percent of the wastewater treatment system capacity. Additional wastewater capacity is available from the City of Chicopee (Westover ARB 2015f).

3.4.8.3 Stormwater System

The storm drainage system at Westover ARB was overhauled in 2012. The system provides adequate drainage to sustain surface water runoff and prevent flooding.

3.4.8.4 Electrical System

Chicopee Electric Lighting supplies electricity to the base. The electrical distribution system is privatized and has capacity to meet existing and future energy needs (Westover ARB 2014c). Average electric demand from 2010 to 2014 was 2.3 MWh per day, with peak demand of 2.79 MWh per day occurring during December 2010 (Westover ARB 2015i).

3.4.8.5 Natural Gas System

Columbia Gas of Massachusetts provides natural gas to the Westover ARB natural gas distribution system. The distribution system was replaced in 1991 and provides reliable gas service to all facilities on base. All heated facilities have been converted to individual heating systems, allowing the base to take advantage of the most economical and efficient method of heating (Westover ARB 2014c). In 2014, Westover ARB used 128 MMcf of natural gas (Westover ARB 2015i).

3.4.8.6 Solid Waste Management

MSW and recycling materials are collected and transported off of the installation by a combined refuse and recycling contract. In 2013, Westover ARB produced 883.3 tons of nonhazardous MSW and 52.54 tons of hazardous waste. In 2013, the diversion rate for nonhazardous MSW at Westover ARB was 62.3 percent (Westover ARB 2014c). Wastes disposed of at Westover ARB consist only of materials that cannot be recycled. C&D debris is prohibited from Massachusetts landfills. The Integrated Solid Waste Management Plan (Westover ARB 2015d) provides the details of recycling or disposal methods for all wastes generated at Westover ARB. MSW from Westover ARB is transported to the F&G Transfer Station near East Windsor, Connecticut, where the materials are sorted for further transfer to recycling centers or landfills located outside of the state. C&D waste and non-recurring MSW generated during construction or demolition activities are the responsibility of the construction contractor (Westover ARB 2015d).

3.4.8.7 Transportation

Primary access to Westover ARB is provided by Memorial Drive, which is a two-lane highway that extends along the western border of the base in a north-south direction. Figure 2-14 displays the regional transportation network in the vicinity of Westover ARB. I-90, also known as the Massachusetts Turnpike, is a toll highway located south of Westover ARB. The Massachusetts Turnpike extends east-west across the state of Massachusetts.

3.4.8.7.1 Gate Access

The two primary gates at Westover ARB are the James Street Gate and the Industrial Drive Gate. The Industrial Drive Gate provides a truck inspection point and a visitor center. Truck traffic entering the Industrial Drive Gate has quick access to the supply building and industrial areas of the base (Westover ARB 2014c).

3.4.8.7.2 On-Base Traffic Circulation

The transportation system on Westover ARB is an integrated system of roadways and pedestrian pathways. In addition to Ellipse Drive, the primary roadway is Patriot Avenue (Westover ARB 2014c).

3.4.9 Hazardous Materials and Waste

3.4.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Westover ARB are managed in accordance with the *Hazardous Materials Emergency Planning and Response (HAZMAT) Plan for Westover Air Reserve Base* and are controlled by the HAZMART (Westover ARB 2011). The HAZMART provides a centralized point through which most hazardous materials are delivered to Westover ARB. Upon receipt, hazardous materials are bar-coded prior to distribution for tracking and inventory purposes. Empty bar-coded hazardous material containers are returned to the HAZMART for tracking purposes.

3.4.9.1.1 Aboveground and Underground Storage Tanks

Bulk Jet-A fuel is stored in two ASTs at the Bulk Fuels AST Farm. There are 12 USTs associated with the Jet-A hydrant system and one (1) UST containing Jet-A at the AGE refueling area, building 7045 (Westover ARB 2011). The bulk Jet-A storage capacity at Westover ARB is approximately 2,277,000 gallons. The estimated annual Jet-A fuel consumption is approximately 5,250,000 gallons (Gale 2015).

There are various other ASTs and active and regulated USTs on Westover ARB that store gasoline, diesel fuel, fuel oil, glycol, aqueous film forming foam, hydraulic oil, potassium acetate, propane, and reclaimed Jet-A fuel (Westover ARB 2011). The *Hazardous Materials Emergency Planning and Response (HAZMAT) Plan for Westover Air Reserve Base* addresses on-base storage locations and the proper handling procedures for petroleum, oils, and lubricants (including Jet-A used by the aircraft) to minimize and respond to potential spills and releases (Westover ARB 2011).

3.4.9.1.2 Toxic Substances

The Asbestos Management Plan (Westover ARB 2013a) implements AFI 32-1052 policies and establishes procedures for accomplishing asbestos-related activities. An asbestos database is maintained by the CE squadron. The design of building alteration projects and requests for self-help projects are reviewed to determine if ACM is present in the proposed work area. For each project on base, ACM wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill.

The LBP Management Plan (Westover ARB 2013b) provides guidance and establishes procedures for the management of LBP. As with ACM, the CE squadron maintains an LBP database to document the location of LBP on Westover ARB. The design of building alteration projects and requests for self-help projects are reviewed to determine if lead-containing materials are present in the proposed work area. For every project on Westover ARB, LBP wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill. Electrical transformers at Westover ARB reportedly do not contain PCBs (Moriarty 2015a).

3.4.9.2 Hazardous Waste Management

Westover ARB is classified as an LQG. Typical hazardous wastes generated during maintenance and operations activities include solvents, contaminated fuels and oils, paint/coatings, stripping chemicals, toxic metals, waste paint-related materials, universal wastes, and other miscellaneous wastes (USAF 2015f).

Hazardous wastes at Westover ARB are managed in accordance with the *U.S. Air Force Hazardous Waste Management Plan, Westover Air Force Base* (USAF 2015f). This plan provides guidance, policies, and procedures associated with implementing a hazardous waste management program as required by Federal and state laws and regulations. In 2015, the base generated approximately 18,900 pounds of Federally regulated (28,000 pounds of state-regulated) hazardous waste, which was disposed of at permitted off-base disposal facilities.

3.4.9.3 Environmental Restoration Program

The ERP at Westover ARB started in 1982 with a Phase I Records Search that identified 21 ERP sites, two areas of concern, and two compliance restoration sites. Eighteen (18) sites have been closed with concurrence from the Mass DEP (Westover ARB 2015g). The sites include landfills, fire training areas, fuel spills, fuel pipelines, and an industrial waste treatment plant. Petroleum is the primary contaminant in soil and groundwater. Westover ARB is not listed on the USEPA's National Priorities List. The ERP at Westover ARB is currently managed by Air Force Civil Engineer Center (AFCEC) in accordance with the Management Action Plan (Westover ARB 2015g). The Management Action Plan describes the history of the ERP and technical and strategic issues.

3.4.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Westover ARB as they relate to the population, employment, earnings, housing, education, and public services. The ROI for this analysis is Hampden County and Hampshire County, Massachusetts.

3.4.10.1 Baseline Conditions

3.4.10.1.1 Population

The total population in the two-county ROI has increased since 2010 at an average annual rate of 0.2 percent, with a total increase of approximately 5,205 persons over the 4-year period from 2010 to 2014 (USCB 2010; 2014a) (see Table 3-44). Hampden and Hampshire Counties and their largest population centers (Springfield and the Town of Amherst, respectively) have all experienced population increases during this 4-year period (Table 3-46) (USCB 2010; 2014a).

Table 3-44. Population in the ROI for Westover ARB

Location	2010	2014	Annual Percent Change (2010–2014)
Amherst town	37,819	39,260	0.9%
Springfield	153,060	153,836	0.1%
Hampden County	463,490	466,447	0.2%
Hampshire County	158,080	160,328	0.4%
Total (ROI)	621,570	626,775	0.2%

Source: USCB 2010; 2014a

The total number of base employees at Westover ARB in 2015 was 3,345 (Westover ARB 2015c). As shown in Table 2-15, there are 2,654 personnel on Westover ARB. This includes 66 military, 333 DoD civilians, 416 dual status technicians, 231 contractors, and 2,024 part-time Reservists. In addition, there are an estimated 1,324 military dependents and family members associated with the full-time military and civilian personnel associated with the 439 AW. Only full-time personnel were considered for this analysis, thus the 2,024 part-time Reservists were not considered part of the work force for this analysis.

3.4.10.1.2 Economic Activity (Employment and Earnings)

In 2014, employment totaled 256,383 jobs in Hampden County and 89,751 jobs in Hampshire County (BEA 2015a). The largest employment sector in Hampden County was healthcare and social assistance (19.8 percent), followed by government and government enterprises (14.0 percent), and retail trade (10.4 percent) (BEA 2015a). The largest employment sector in Hampshire County was government and government enterprises (20.8 percent), followed by healthcare and social assistance (12.1 percent), and education (11.3 percent) (BEA 2015a). Construction accounted for 4.7 percent of total employment in Hampden County and 4.1 percent of total employment in Hampshire County. The 2014 unemployment rate reported by the BLS was 7.8 percent in Hampden County, 5.0 percent in Hampshire County, and 5.9 percent in the State of Massachusetts (BLS 2016a, 2016b). Per capita, personal income in Hampden County and Hampshire County is estimated at $43,407 and $42,490, respectively (BEA 2015b).

Westover ARB is an important contributor to the local economy through employment of military and civilian personnel, and through expenditures for goods and services. Westover ARB has an annual payroll of $124 million. The estimated value of indirect jobs totaled $46.2 million in 2015, and the base experienced a net increase of $6 million in construction and related expenditures from the previous year. The total economic impact of the base on the surrounding communities in 2015 was $221 million (Westover ARB 2015c).

3.4.10.1.3 Housing

Table 3-45 presents census-derived housing data for Hampden County and Hampshire County. Hampden County had 191,992 total housing units in 2014, of which 7.4 percent (14,256 units) were vacant (USCB 2014b). Hampshire County had 62,767 total housing units in 2014, of which 6.4 percent (3,991 units) were vacant (USCB 2014b). The median value of owner-occupied housing units is estimated at $196,600 in Hampden County and $261,700 in Hampshire County. The median gross monthly rent for occupied units paying rent was $807 in Hampden County and $946 in Hampshire County (USCB 2014b).

Table 3-45. Housing Data in the ROI for Westover ARB, 2014

Location	Housing Units	Occupied	Vacant
Hampden County	191,992	177,736	14,256
Hampshire County	62,767	58,776	3,991
Total (ROI)	254,759	236,512	18,247

Source: USCB 2014b

There are no dormitories or on-base housing currently located on Westover ARB (USAF 2015d). No TLFs are located on Westover ARB or authorized on AFRC bases. The Westover ARB, lodging operation currently has 423 VQ rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move (USAF 2015d).

3.4.10.1.4 Education

There are 24 public school districts throughout Hampden and Hampshire Counties. These districts had a total enrollment of approximately 81,853 students in grades K-12 during the 2015 to 2016 school year (MADESE 2016). The Springfield Public School District in Hampden County has a total enrollment of 25,479 students and a student-to-teacher ratio of 12.9:1, which is less than the state average of 13.3:1. The Amherst Public School District in Hampshire County has a total enrollment of 1,182 students and a student-to-teacher ratio of 10.7:1 (MADESE 2016). No schools, childcare, or youth programs are currently operated or provided by Westover ARB.

3.4.10.1.5 Public Services

Public services in Hampden and Hampshire Counties include law enforcement, fire protection, EMS, and medical services. Law enforcement in Hampden County includes the Hampden County Sheriff's Department and the Hampden Town Police Department, while the Hampshire County Sheriff's Office is responsible for coordinating law enforcement activities within Hampshire County. The Hampden County Fire Department is a volunteer fire department serving a 20-mile radius within Hampden Town. The Amherst Fire Department and the Belchertown Fire Department serve Hampshire County. There are several hospitals located in Hampden County, including Noble Hospital (located approximately 12.8 miles from Westover ARB) and Shriners Hospital for Children (located approximately 8.4 miles from Westover ARB). Cooley Dickinson Hospital (located approximately 11.4 miles from Westover ARB) is the main hospital serving Hampshire County.

3.4.10.1.6 Base Services

The 439 AMDS has the capability to fully support the IMR and PHA for Wing population (USAF 2015e). Other base services include a fitness center and MWR activities, including outdoor recreation and a bowling center. The 27,259 square foot fitness center has been renovated within the past 10 years and is currently staffed by five FTE civilian positions. The hours of operation are 6:00 A.M. to 8:00 P.M. Mondays thru Fridays, 5:30 A.M. to 6:00 P.M. on Saturday, 5:30 A.M. to 4:00 P.M. on Sunday, and closed on non-UTA weekends and holidays. There is no military DFAC located on Westover ARB. Several on-base food options are available during the week, including the Services Consolidated Club, Services Bowling Center Grill, Services Grinders Coffee & Snack Bar, and the Exchange Shopette (USAF 2015e).

3.4.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the "affected area" or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB L_{Adn} or greater resulting from a proposed action that are not currently exposed to those noise levels under the baseline conditions (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area.

Table 3-46 provides baseline demographic conditions in Hampden and Hampshire Counties, where Westover ARB is located. The minority population in Hampden and Hampshire Counties ("Two Counties Combined") is comparatively greater than the state percentage, but less than the national percentage. Low-income persons compose a greater proportion of the two-county area population than the state and national populations (Table 3-46 and Figure 3-12).

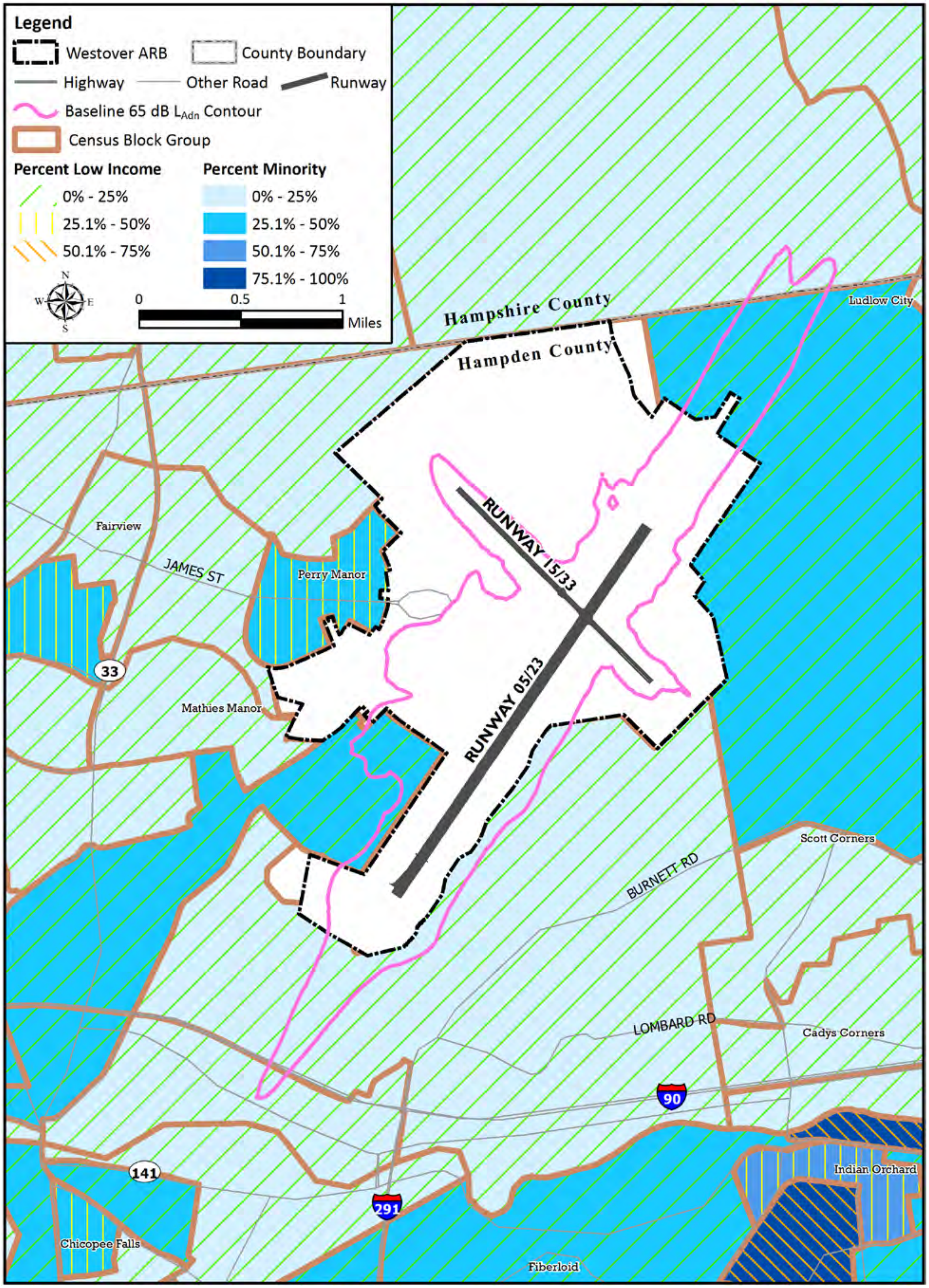

Figure 3-12. Minority and Low-Income Populations Near Westover ARB

Table 3-46. Minority and Low-Income Populations Near Westover ARB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of Massachusetts	6,657,291	1,664,647	25.0%	772,246	11.6%
Hampden County	466,447	158,244	33.9%	82,561	17.7%
Hampshire County	160,328	23,566	14.7%	22,286	13.9%
Two Counties Combined	626,775	181,810	29.0%	104,671	16.7%

Source: USCB 2014a; 2014c

Under baseline conditions, off-base residential areas within the 65 dB L_{Adn} or greater extend into 3 census block groups. There is an estimated population of 38 people within this area. Of those, 5.3 percent (2 persons) are minority and 7.9 percent (3 persons) are low-income. Table 3-47 presents low-income populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-48 presents minority populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-49 presents the youth and elderly population data comparable to that provided for the low-income and minority populations.

Table 3-47. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
250138104141	0	0.0%
250138106011	0	0.0%
250158209004	3	13.0%
Total	**3**	**7.9%**

Table 3-48. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Minority	
	Number	Percent
250138104141	0	0.0%
250138106011	1	7.1%
250158209004	1	4.3%
Total	**2**	**5.3%**

Table 3-49. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
250138104141	0	0
250138106011	4	2
250158209004	6	4
Total	**10**	**6**

Key: Youth = under 18; Elderly = 65 and over.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter presents the analysis of the potential environmental consequences from the proposed beddown of KC-46A aircraft in support of the Third Main Operating Base (MOB 3) mission at four different active-duty U.S. Air Force (USAF) installations. As in Chapter 3, the expected geographic scope of the potential environmental consequences is identified as the region of influence (ROI). This chapter considers both direct and indirect effects of implementation of the action alternatives. Resource definitions, as well as the regulatory setting and methodology of analysis, are contained in Volume II, Appendix B. Baseline conditions (refer to Chapter 3) of each relevant environmental resource area are described to provide the public and agency reviewers a meaningful point from which they can compare future potential environmental, social, and economic effects. The No Action Alternative is also evaluated. Under the No Action Alternative there would be no change in based aircraft at Grissom Air Reserve Base (ARB), Seymour Johnson Air Force Base (AFB), or Tinker AFB. At Westover ARB, the C-5 mission would continue; however, the model of C-5 aircraft would change. As part of a previously scheduled program that is not connected to the proposed KC-46A MOB 3 beddown process, all Westover ARB-based C-5B aircraft are being replaced with C-5M aircraft. Cumulative effects are described in Chapter 5.

4.1 GRISSOM AIR RESERVE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Grissom ARB. Section 2.5.1.2 describes the facilities and infrastructure, personnel, and flight operations requirements of the proposed KC-46A MOB 3 mission and the specific actions at Grissom ARB that would be required to implement the mission. As described in Section 4.5, the No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented at Grissom ARB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Grissom ARB would continue as described for baseline conditions. The 434th Air Refueling Wing (ARW) would continue to fly their aerial refueling missions with a Primary Aerospace Vehicles Authorized (PAA) of 16 KC-135 aircraft and the personnel described under baseline conditions.

4.1.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would result from implementation of the proposed KC-46A MOB 3 mission. Contours of A-weighted day-night average sound level (L_{Adn}) resulting from the proposed MOB 3 mission at Grissom ARB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by the Air Force Civil Engineer Center (AFCEC). Additional details of the methodologies used to calculate noise levels and assess noise impacts are contained in Volume II, Appendix B, Section B.1.3.

The proposed KC-46A MOB 3 mission at Grissom ARB would replace the existing KC-135 aircraft. There would be no change in the operations of the other aircraft operating at Grissom ARB or the collocated Grissom Aeroplex. KC-46A aircraft are 9 decibels (dB) quieter than KC-135 aircraft during approach and roughly equal in loudness during departure at a distance of 1,000 feet (Table 4-1). Several military transient aircraft that visit Grissom ARB are louder than both the KC-46A and KC-135. Civilian aircraft, which consist primarily of propeller-driven and small jet aircraft, are generally quieter than the KC-46A and KC-135.

Table 4-1. Aircraft Noise Level Comparison at Grissom ARB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
C-5B	85% NF	104	94	78	65
C-17	1.08 EPR	85	76	64	55
Business jet (Cessna 500)	305 LBS	64	56	46	37
Dual propeller (Cessna 441)	30% RPM	70	62	52	44
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
C-5B	4.68 EPR	104	94	79	68
C-17	1.35 EPR	91	83	72	64
Business jet (Cessna 500)	1,554 LBS	76	69	58	49
Dual propeller (Cessna 441)	100% RPM	73	67	58	51
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 434 ARW KC-135s are R models, which are quieter than older models.
Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; EPR = engine pressure ratio; LBS = pounds of thrust; RPM = revolutions per minute.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (ºF) and 70 percent relative humidity.

KC-46A aircrews would use the same flying procedures (e.g., ground tracks, altitude profiles) currently used by KC-135 aircrews. Tactical flight procedure practice, which could include steep descents and spiraling departures, is primarily accomplished in flight simulators by both KC-135 and KC-46A aircrews. KC-135 aircrews very rarely fly tactical operations in the aircraft, but it is estimated that approximately 3 percent of KC-46A aircraft flying operations would be tactical.

KC-46A aircrews would fly 17 percent fewer annual airfield operations than are flown by KC-135 aircrews under baseline conditions. Implementation of the proposed MOB 3 mission would result in a 9 percent net reduction in the number of airfield operations flown by all aircraft. Training sorties for MOB 3 aircrews would mirror current flying operations. Under normal circumstances, aircrews would fly during weekdays and on non-holiday weekends. Flying during acoustic night (10:00 P.M. to 7:00 A.M.) would comprise 5 percent of total KC-46A flying operations. This would be a decrease from the 19 percent of total KC-135 operations currently flown during acoustic night. Noise generated between 10:00 P.M. and 7:00 A.M. has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

Areas that would be exposed to elevated noise levels with implementation of the proposed MOB 3 mission are compared to baseline conditions on Figure 4-1. Details of the methods used to calculate noise levels and the population affected by elevated noise are contained in Volume II, Appendix B, Section B.1.3.

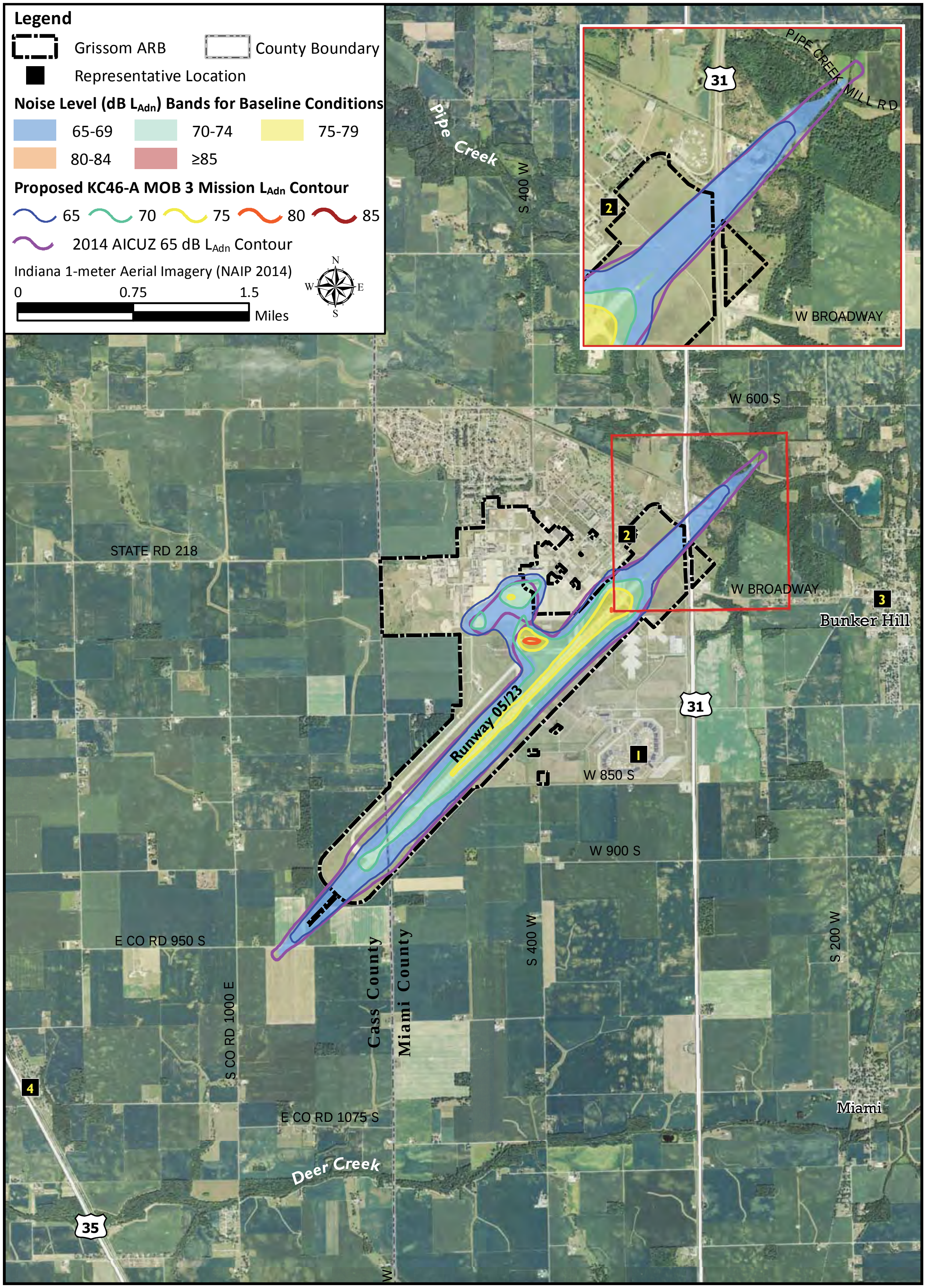

Figure 4-1. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Grissom ARB

Implementation of the proposed MOB 3 mission would decrease the number of off-base acres affected by noise levels greater than 65 dB L_{Adn} by 23 percent, from 90 to 69 (see Table 4-2). The off-base area affected by noise levels greater than 65 dB L_{Adn} would be primarily open space and would not include any residences. A commercial development located directly across U.S. Highway 31 (U.S. 31) from the base is exposed to noise levels between 65 and 70 dB L_{Adn} under baseline conditions and would continue to be exposed to the same range of noise levels with implementation of the proposed MOB 3 mission. Commercial developments are compatible at 65-70 dB L_{Adn} according to USAF land use guidelines. No off-base residents would be exposed to noise levels greater than 65 dB L_{Adn}. The number of on-base acres affected by noise levels greater than 65 dB L_{Adn} would increase by 5 acres (a 1 percent increase). On-base areas that would be newly exposed to noise levels greater than 65 dB L_{Adn} are along the flightline and are not generally considered noise-sensitive.

Table 4-2. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Grissom ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	320	86	406	309	65	374	-11	-21	-32
70 - 74	204	4	208	203	4	207	-1	0	-1
75 - 79	67	0	67	82	0	82	+15	0	+15
80 - 84	0	0	0	2	0	2	+2	0	+2
≥ 85	0	0	0	0	0	0	0	0	0
Total	**591**	**90**	**681**	**596**	**69**	**665**	**+5 (+1%)**	**-21 (-23%)**	**-16 (-2%)**

Note: "+" indicates an increase and "-" indicates a decrease.

People exposed to 80 dB L_{Adn} over a very long period, with no barriers to the noise (i.e., consistently outdoors), are at an increased risk of noise-induced permanent threshold shift (NIPTS), commonly referred to as hearing loss (USD 2009). No off-base areas would be affected by 80 dB L_{Adn} noise levels with implementation of the proposed MOB 3 mission. The only on-base areas that would be exposed to noise levels greater than 80 dB L_{Adn} are on or adjacent to airfield surfaces, and no structures on-base would be affected by this level of noise. Hearing loss risk among people working in high-noise environments on Grissom ARB would continue to be assessed and managed in accordance with U.S. Department of Defense (DoD), Occupational Safety and Health Administration (OSHA), and National Institute for Occupational Safety and Health (NIOSH) regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Grissom ARB are presented in Table 4-3 for baseline conditions and the proposed MOB 3 mission. Noise levels at the locations studied would remain the same or decrease slightly with implementation of the proposed MOB 3 mission.

Table 4-3. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Grissom ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Miami Correctional Facility	Less than 45[a]	Less than 45[a]	No change
2	Dental Office	57	57	No change
3	First Baptist Church	Less than 45[a]	Less than 45[a]	No change
4	Town of Lincoln	61	60	-1

[a] Forty-five (45) dB L_{Adn} is a typical ambient noise level experienced in small towns (USEPA 1974). Aircraft noise levels below ambient noise levels do not contribute substantially to overall noise levels and are listed as 'less than 45.'

Note: "+" indicates an increase and "-" indicates a decrease.

Construction and demolition (C&D) activities in support of the proposed MOB 3 mission would be conducted in the context of an active Air Force Reserve Command (AFRC) base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of equipment mufflers and would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people living or working on-base near the construction sites may notice and be annoyed by the noise. However, noise impacts would not be substantial enough to be considered significant.

The noise impacts of the proposed MOB 3 mission would be minimal and would not be perceived as significant. No mitigation measures are proposed at this time.

4.1.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Grissom ARB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.1.1, of this Final Environmental Impact Statement (EIS) includes estimations of criteria pollutant emissions, hazardous air pollutants (HAPs), and greenhouse gases (GHGs) from proposed sources at Grissom ARB. GHGs are reported as carbon dioxide equivalent (CO_2e).

Air quality impacts from the proposed MOB 3 mission at Grissom ARB were reviewed for significance relative to Federal, state, and local air pollution standards and regulations. In the case of criteria pollutants for which the ROI is in attainment of the National Ambient Air Quality Standards (NAAQS), the analysis used the Prevention of Significant Deterioration (PSD) threshold for new major sources of 250 tons per year of that pollutant as an indicator of significance or non-significance of projected air quality impacts. In the case of criteria pollutants for which the ROI does not attain an NAAQS, the analysis used the pollutant threshold that requires a conformity determination for that region. This criterion is being used only to determine if an impact occurs as the area is in attainment and neither a PSD analysis nor a conformity determination is required.

If projected emissions exceeded a PSD or conformity threshold, further analysis was conducted to determine whether impacts would be significant. In such cases, if proposed emissions (1) would not be expected to contribute to an exceedance of an ambient air quality standard or (2) would conform to the approved State Implementation Plan (SIP), then impacts would not be significant.

The project region within Miami County attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these areas.

Construction – The proposed MOB 3 mission at Grissom ARB would require construction and/or renovation of airfield facilities, including training facilities, hangars, aircraft parking ramps, and maintenance facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions (as particulate matter less than or equal to 10 micrometers in diameter [PM_{10}] or particulate matter less than or equal to 2.5 micrometers in diameter [$PM_{2.5}$]) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions for the proposed MOB 3 mission.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the U.S. Environmental Protection Agency (USEPA) NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and Leadership in Energy and Environmental Design (LEED) Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels (Countess Environmental 2006). The standard construction practices for fugitive dust control could include the following:

1. Use water trucks to keep areas with vehicle movement damp enough to minimize the generation of fugitive dust.
2. Minimize the amount of disturbed ground area at a given time.
3. Suspend all soil disturbance activities when winds exceed 25 miles per hour (mph) or when visible dust plumes emanate from the site, and stabilize all disturbed areas with water application.
4. Designate personnel to monitor the dust control program and to increase watering, as necessary, to minimize the generation of dust.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Grissom ARB would begin in 2017 and would be completed in 2018.

Operations – Sources associated with operation of the proposed MOB 3 mission at Grissom ARB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) aerospace ground equipment (AGE), (3) onsite government motor vehicles (GMVs) and privately owned vehicles (POVs), (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.1.1). Emissions from on-wing testing of KC-46A aircraft engines were based on a per-aircraft basis for maintenance activities proposed for the KC-46A First Main Operating Base (MOB 1) mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. Specific activity data needed to estimate emissions from the usage of AGE for the KC-46A are not available. Therefore, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Grissom ARB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from mobile fuel transfer operations and stationary and area sources were estimated by multiplying existing emissions generated at Grissom ARB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019, after the completion of all construction activities required for the proposed MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 434 ARW, which the proposed MOB 3 mission would replace, at Grissom ARB (see Table 3-5).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.1.2.1 Air Quality Consequences

Table 4-4 presents estimates of emissions that would result from the infrastructure changes (see Table 2-3) for the proposed MOB 3 mission at Grissom ARB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions resulting from the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-4. Total Construction Emissions from the Proposed MOB 3 Mission at Grissom ARB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Demolition	0.04	0.14	0.37	0.00	0.48	0.07	103
Building Construction/Renovations	0.84	4.37	6.06	0.01	5.12	1.07	1,192
Parking Ramp - Remove Existing Asphalt	0.02	0.06	0.21	0.00	0.03	0.01	35

Table 4-4. Total Construction Emissions from the Proposed MOB 3 Mission at Grissom ARB (Continued)

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Parking Ramp - Pour Concrete	0.02	0.70	0.12	0.00	0.07	0.01	34
Parking Ramp - Re-Stripe	0.00	0.03	0.04	0.00	0.03	0.01	6
Total Emissions	**0.92**	**5.29**	**6.78**	**0.01**	**5.74**	**1.16**	**1,370**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_{2e} (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-5 summarizes the annual emissions that would result from the proposed MOB 3 mission operations at Grissom ARB. These data show that the net increase in emissions due to operation of the proposed MOB 3 mission at Grissom ARB would not exceed any PSD threshold used to indicate significance or insignificance. In addition, these emission increases would amount to no more than 7 percent of any total criteria pollutant generated within Miami County in 2011 (see Table 3-4). Therefore, the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-5. Annual Operations Emissions from the Proposed MOB 3 Mission at Grissom ARB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC-46A Aircraft Operations	21.41	84.06	299.96	16.55	1.08	0.92	45,725
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.05	0.30	0.31	0.00	0.04	0.04	72
GMVs	0.03	1.29	0.16	0.00	0.03	0.01	139
POVs – On Base	0.03	1.45	0.11	0.00	0.03	0.01	146
POVs – Off Base	0.21	15.91	1.30	0.01	0.18	0.05	1,495
Point and Area Sources	0.39	0.15	0.48	0.02	0.04	0.04	NA
Total Proposed MOB 3 Mission Emissions	**33.69**	**142.86**	**321.04**	**18.27**	**1.55**	**1.21**	**52,007**
Existing 434 ARW Emissions	**(6.60)**	**(109.90)**	**(196.02)**	**(17.40)**	**(1.19)**	**(1.08)**	**(49,567)**
Proposed MOB 3 Mission Minus 434 ARW Emissions	**27.09**	**32.96**	**125.02**	**0.86**	**0.36**	**0.13**	**2,510**
Operational Emissions Increases Fraction of Miami County Emissions	**0.01**	**0.004**	**0.07**	**0.02**	**0.0001**	**0.0001**	**0.01**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: SO_x – sulfur oxides; CO_{2e} (mt) = carbon dioxide equivalent in metric tons; NA = not available; N/A = not applicable.

Operation of the proposed MOB 3 mission at Grissom ARB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. These sources would be mobile and intermittent in nature, and in the case of KC-46A flight operations, they would occur up to an altitude of 3,000 feet above ground level (AGL) and across several square miles that comprise the Grissom ARB airspace and adjoining aircraft flight patterns. As a result, these emissions would be adequately dispersed through a large volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Therefore, operation of the proposed MOB 3 mission would produce minimal ambient impacts of HAPs in a localized area at Grissom ARB.

4.1.2.2 Climate Change Effects

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-4 shows that construction for the proposed MOB 3 mission at Grissom ARB would produce a total of 1,370 metric tons of CO_2e emissions. Table 4-5 shows that operation of the proposed MOB 3 mission at Grissom ARB would result in a net increase of 2,510 metric tons per year of CO_2e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Grissom ARB, the following considers how climate change may impact proposed operations at Grissom ARB. For Grissom ARB, the projected climate change impacts of concern are increased temperatures and precipitation, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Midwest region surrounding Grissom ARB will experience warmer temperatures and an increase in precipitation, particularly heavier rainfall events. One of the main outcomes of these conditions will be increased flooding in the region, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure. Warmer temperatures also will increase heat wave intensity and frequency, increase humidity, degrade air quality, and reduce water quality, resulting in an increase in public health risks.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by Executive Orders (EOs) and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.1.3 Safety

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Grissom ARB with implementation of the proposed KC-46A MOB 3 mission. While the KC-46A aircraft is a new introduction to the USAF tanker fleet, this aircraft is based on the existing commercial Boeing 767 (B-767) Jetliner, which has been used in commercial service since 1982. As of April 2016, the B-767 has been in 15 mishaps worldwide (Aviation Safety Network 2016). The commercial accident rate of the B-767 is 0.43 per flight cycle (defined as per million takeoffs) (Boeing 2015). This commercial accident rate is measuring the type of accidents comparable to a USAF Class A accident. As is the case with the KC-135 (also based upon a commercial airframe, the Boeing 707), it is expected that, over time, the accident rate of the KC-46A will be similar to that of the B-767. Additionally, accident rates for military versions of commercial airframes have been historically lower for the military versions than for their commercial counterparts.

4.1.3.1 Flight Safety

Aircraft Mishaps – The addition of 12 KC-46A aircraft would result in a decrease in airfield operations and accident potential compared to those generated by the existing 16 KC-135 aircraft at Grissom ARB. KC-46A operations within the airfield would occur under similar procedures currently in use for the KC-135 mission. Current safety policies and procedures at the base ensure the lowest possible potential for aircraft mishaps. These safety policies and procedures would continue upon implementation of the proposed MOB 3 mission.

As discussed previously, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based. Using the accident rate of 0.43 per flight cycle, it is projected that the probability of a KC-46A Class A accident in the vicinity of the airfield would be less than one accident every 100 years (see Volume II, Appendix B, Section B.3.3.1). Replacement of 16 KC-135 aircraft with 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents at Grissom ARB.

Therefore, implementation of the proposed MOB 3 mission at Grissom ARB is not anticipated to result in any net increase in safety risks associated with aircraft mishaps or result in any increase in the risks of occurrence of those mishaps.

Bird/Wildlife-Aircraft Strike Hazard – Grissom ARB has an ongoing Bird/Wildlife-Aircraft Strike Hazard (BASH) program. To address bird/wildlife-aircraft strikes, the USAF has developed the Avian Hazard Advisory System to monitor bird activity and forecast bird strike risks. Using Next Generation Radar (NEXRAD) and models developed to predict bird movement, the Avian Hazard Advisory System is an online, near-real-time geographic information system (GIS) used for bird strike risk flight planning across the continental United States (CONUS) and Alaska.

Additionally, as part of an overall strategy to reduce bird/wildlife-aircraft strike risks, the USAF has developed a Bird Avoidance Model using GIS technology as a tool for analysis and correlation of bird habitat, migration, and breeding characteristics with key environmental and manmade geospatial data. The model was created to provide USAF pilots and flight schedulers/planners with a tool for making informed decisions when selecting flight routes in an effort to protect human lives, wildlife, and equipment during air operations. This information is integrated into required pilot briefings, which take place prior to any sortie.

With proposed KC-46A flight operations expected to be similar to, and fewer than, those currently conducted by KC-135 aircrews at Grissom ARB, the overall potential for bird/wildlife-aircraft strikes is not anticipated to be significantly greater than current levels. All safety actions currently in place for existing KC-135 training would continue for KC-46A training. Grissom ARB personnel have developed aggressive procedures designed to minimize the occurrence of bird/wildlife-aircraft strikes, and have documented detailed procedures to monitor and react to heightened risk of bird strikes (Grissom ARB 2010a). When bird/wildlife-aircraft strike risks increase, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed-pattern pattern work) in the airfield and airspace environments. Special briefings are provided to pilots when the potential for bird strikes is high within the airspace. KC-46A pilots would be subject to these procedures. Therefore, no significant impact would occur related to BASH issues.

4.1.3.2 Ground Safety

Although emergency and mishap response plans would be updated, no aspects of the proposed KC-46A MOB 3 mission at Grissom ARB are expected to create new or unique ground safety issues. Operations and maintenance (O&M) procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed MOB 3 mission at Grissom ARB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Grissom ARB airfield safety conditions would still be similar to baseline conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

Capability for fire response is located on base and in nearby communities. As described in Section 3.1.3.2, the base Fire Department will continue to be party to mutual-aid support agreements with the nearby communities. These functions would continue to occur as they have under current conditions. The decrease in aircraft operations would decrease the risk of mishaps in training areas, including over the clear zones (CZs) and accident potential zones (APZs). See Volume II, Appendix B, Figure B-1, for the typical generic CZ and APZ dimensions. The base prioritizes compatible land use planning with surrounding jurisdictions to manage future incompatible development.

4.1.4 Soils and Water

4.1.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur within the Grissom ARB boundary. All of the construction, demolition and renovation identified on Figure 2-4 would occur on previously disturbed areas. As shown in Table 2-3, the total potential disturbed area for the projects associated with the proposed MOB 3 mission would be less than 5 acres (new construction). Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling. These minor, short-term changes to soils would not result in significant impacts.

4.1.4.2 Water Resources

Less than 5 acres of impervious surface would be added to the existing 517 acres of impervious surface on the installation (Grissom ARB 2014c). Although this additional impervious surface would increase sheet flow and stormwater runoff, the total impervious surface on base would increase by less than 1 percent. This increase in impervious surface would not result in significant long-term, adverse impacts to water resources on Grissom ARB.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with Unified Facilities Criteria (UFC) 3-210-10, Low Impact Development (LID) (as amended, 2016) and the Energy and Independence Security Act (EISA) Section 438 (42 *United States Code [USC]* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or Federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

The Grissom ARB Storm Water Pollution Prevention Plan (SWPPP) identifies all of the outfalls on base along with both base-wide and site specific control measures. This plan also identifies control practices that would be followed for spill prevention and response, routine inspection of discharge at sites and proper training.

Prior to construction activities, Grissom ARB or the construction contractor would submit a Notice of Intent (NOI) notifying the Indiana Department of Environmental Management (IDEM) that the proposed construction would be completed in a manner consistent with the "permit conditions" established by Rule 5. Rule 5 is the General Stormwater Permit that applies to all construction activity in Indiana resulting in a disturbance of one acre or more. In addition to publication of the NOI, the public would also be notified of the projects in a local newspaper. As part of this process, a site-specific Construction Plan/SWPPP, describing measures to be implemented prior to construction, would be prepared. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

No changes to existing aircraft deicing procedures are anticipated to be necessary with implementation of the proposed KC-46A MOB 3 mission. The current deicing process and containment system is capable of accommodating the KC-46A MOB 3 mission deicing requirements (USAF 2015b).

Based on the location of the proposed activities, as depicted on Figure 2-4, no sensitive groundwater or surface water resources are located within the areas of the base proposed for the KC-46A MOB 3 mission and significant impacts to water resources would not result from implementation of the proposed MOB 3 mission.

4.1.4.3 Floodplains

Based on the results of the GIS analysis as described in Section 3.1.4.2.3 to identify the 100-year floodplain plus three feet elevation, no floodplains are near the 434 ARW ramp, where the construction, demolition and renovation is proposed to occur. Therefore, significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.5 Biological Resources

4.1.5.1 Vegetation

Activities associated with demolition, construction, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands at Grissom ARB. These improved areas are already disturbed from ongoing routine maintenance and/or landscaping activities and are of low ecological value. Semi-improved and unimproved lands would not be affected. Therefore, potential impacts to vegetation resulting from implementation of the proposed KC-46A MOB 3 mission at Grissom ARB are anticipated to be minor and short-term.

4.1.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes.

Because the improved areas proposed for development are highly disturbed, these areas provide very little habitat for wildlife species. However, some adaptable wildlife species (e.g. eastern cottontails, raccoons, and various bird species) could use these urban-type areas.

Noise resulting from the proposed construction would be localized, short-term, and only during daylight hours. The site is a military industrial land use with frequent elevated noise levels. Wildlife in the areas proposed for construction and near the airfield is already exposed to elevated noise under baseline conditions.

Although some new improved areas on base would be exposed to noise levels above 65 dB L_{Adn}, the number of off-base acres affected by these noise levels would decrease by 21 acres. Therefore, no significant impacts to wildlife are anticipated to result from implementation of the proposed MOB 3 mission.

Aircraft operations associated with the proposed KC-46A MOB 3 mission would decrease by 17 percent. This decrease would reduce the aircraft strike potential for birds (including migratory species) and other wildlife. The BASH plan for Grissom ARB establishes procedures and actions to minimize bird/wildlife-aircraft strikes.

4.1.5.3 Special-Status Species

The upland sandpiper, a Federal species of conservation concern and an Indiana state endangered species, was identified by the U.S. Fish and Wildlife Service (USFWS) as a documented nesting species at Grissom ARB. An adult pair was observed on the ground near the perimeter fence. Additionally, six other avian species of conservation concern that use grassland and shrub habitats were identified, although the exact nesting locations were not specified. These species include the bobolink, brown thrasher, dickcissel, field sparrow, eastern meadowlark, and grasshopper sparrow. In July 2015, the northern harrier was also observed soaring at Grissom ARB, but breeding has not been confirmed at the base.

No conflicts between special-status species or other breeding birds with aircraft are currently known to occur on base (USFWS 2016a). The proposed construction, demolition and renovation would not occur in upland sandpiper nesting habitat. The Grissom ARB BASH Plan (Grissom ARB 2010a) establishes species-specific procedures and actions to minimize risks to these species of conservation concern. Continued adherence to the base’s BASH Plan would minimize the risk of bird-aircraft strikes. In a letter dated 4 April 2016, the Indiana Department of Natural Resources (IDNR) identified the American badger and the kidneyshell mussel as two state species of concern known from within 0.5 mile of Grissom ARB. As described in Section 4.1.4 standard erosion control measures would be implemented and no impacts to the kidneyshell mussel are anticipated. In addition, the IDNR noted that impacts to the badger or its habitat are unlikely to result from implementation of the proposed MOB 3 mission (IDNR 2016). Therefore, impacts to endangered species or USFWS species of special concern are not anticipated to result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.5.4 Wetlands

Because, no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.6 Cultural Resources

There are no National Register of Historic Places (NRHP)-listed or eligible cultural resources at Grissom ARB. Indiana State Historic Preservation Office (SHPO) concurred with the USAF determination that there are no historic properties resources within the area of potential effect (APE) for the KC-46A MOB 3 mission (see letter dated 18 April 2016, Volume II, Appendix A, Section A.5.1.1). Because ground-disturbing activities would occur in previously disturbed areas, it is extremely unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with Section 106 of the National Historic Preservation Act (NHPA).

No Section 106 impacts to tribal resources or traditional cultural properties would result from implementation of the MOB 3 mission. As required by Sections 101(d)(6)(B) and 106 of the NHPA, implementing regulations at 36 *Code of Federal Regulations* (*CFR)* Section 800.2(c)(2), EO 13175, Department of Defense Instruction (DoDI) 4710.02, and Air Force Instruction (AFI) 90-2002, Grissom ARB initiated Section 106 government-to-government consultation with 10 different tribes to identify traditional cultural properties. Volume II, Appendix A, Section A.3, contains a record of these consultations. The consultation correspondence included an invitation to participate in the National Environmental Policy Act (NEPA) process, and an invitation to consult directly with the Grissom ARB base Commander regarding any comments, concerns, or suggestions (see letter dated 29 March 2016, Volume II, Appendix A, Section A.3). Four tribes responded with no objections to the USAF's finding of no adverse impact. Additional efforts were made to contact the remaining six non-responsive tribes without success (see Table A-1 in Volume II, Appendix A, Section A.3). While the USAF values its relationship with all tribes and will continue to consult on other planning efforts or matters of known or potential interest to tribes, Section 106 consultation on the proposed KC-46A MOB 3 mission at Grissom ARB is now complete.

4.1.7 Land Use

4.1.7.1 Physical Development

The proposed C&D projects and renovations to existing facilities at Grissom ARB would all occur within the existing Flightline District and Mission Support District, which includes airfield pavement, aircraft O&M, and community service land use categories. Because the proposed C&D projects and facility modifications would not result in any changes to the existing land use categories, there would be no direct land use impacts. The physical changes and daily activities on the ground would be confined to the base. The proposed projects would have no land use impacts to off-base areas.

Physical development (i.e., construction activity) on the base could result in short-term effects (e.g., noise, dust, and traffic) on existing land use and activities. The base would require contractors to use standard construction practices to reduce construction-related effects, especially around housing and community areas, schools, and daycare facilities. Such practices could include measures to control the hours for operating equipment, use of properly maintained equipment and sound-muffling fixtures, proper siting of equipment operating and staging areas (away from sensitive locations), selection of truck and delivery routes, and speed limits for construction and worker vehicles.

4.1.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Grissom ARB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No noise-related impacts to land use would occur because implementation of the proposed KC-46A MOB 3 mission at Grissom ARB would result in a 21-acre decrease in land exposed to noise levels greater than 65 dB L_{Adn}. These decreases occur at the northern and southern extents of the 65 dB L_{Adn} noise contour over forested or agricultural lands (Figure 4-1). No off-base residential property is exposed to noise levels greater than 65 dB L_{Adn}.

No significant impacts to land uses on or off base would result from implementation of the proposed MOB 3 mission.

4.1.8 Infrastructure

Refer to Section 3.1.8 for a description of existing infrastructure system capacities and conditions at Grissom ARB. Table 2-4 provides changes in population that would result from implementation of the proposed MOB 3 mission at Grissom ARB. These projected changes in population and development were used to determine potential impacts to infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.1.8.1 Potable Water System

Based on the average usage rate of 125 gallons per day (GPD) (UFC 3-230-03) per person, it is anticipated that the change in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.07 million gallons per day (MGD) (125 GPD x 545). Use of the 125 GPD per person is a conservative measure of water use, as these numbers reflect the average residential use, which includes showering, laundry, and other non-drinking uses of water. This increase, combined with the existing water use (0.023 MGD), would not exceed Grissom's ARB current contract with Peru Utilities water system for 0.8 MGD and impacts would be less than significant.

4.1.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate, the proposed increase in population would increase wastewater discharge from Grissom ARB by 0.07 MGD (120 GPD x 545). Even under current peak flow conditions (0.2 MGD), this increase in wastewater discharge would be below the 0.3 MGD discharge limit in place with the Peru Utilities and impacts would be less than significant. As noted in Section 3.1.8.2, most of the peak flow is based on infiltration into the sewer system during precipitation events.

4.1.8.3 Stormwater System

Table 2-6 lists the projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 5 acres (the area for new construction), and impacts would be less than significant. The largest area of disturbance would be associated with the new 2-bay hangar.

During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. The SWPPP would need to be amended if a change in design, construction, operation, or maintenance would have significant effect on the potential for discharge of pollutants to the waters of the State of Indiana. During the short-term construction period for the proposed MOB 3 mission, the contractor would be required to comply with the new SWPPP and applicable statutes, standards, regulations, and procedures regarding stormwater management during construction. Additional stormwater requirements are described in Section 3.1.4.

4.1.8.4 Electrical System

The U.S. Energy Information Administration (USEIA) estimates that the average household in Indiana uses 1.09 megawatt hours (MWh) per month (USEIA 2014). Converting this rate to an hourly rate and assuming 217 new households (i.e. one new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Grissom ARB by 0.3 megawatt (MW). This increase would not exceed the Rural Electric Membership Cooperative supply limit of 11.5 MW and impacts would be less than significant.

4.1.8.5 Natural Gas System

The USEIA estimates that the average person in Indiana uses 23.7 thousand cubic feet (Mcf) of natural gas per year (USEIA 2016). This rate was converted to an hourly usage and then multiplied by the increase in population (545) to estimate that natural gas use would increase at Grissom ARB by 1.5 Mcf per hour. This increase, combined with the existing natural gas use at Grissom ARB (7.75 Mcf), would not exceed the Northern Indiana Public Service Company supply limit of 167 Mcf per hour and impacts would be less than significant.

4.1.8.6 Solid Waste Management

Using methodology developed by the USEPA (USEPA 2009b), it is estimated that implementation of the proposed MOB 3 mission would generate approximately 6,163 tons of C&D debris for recycling or removal to landfills. Application of the 60 percent DoD target diversion rate (DoD 2012) for C&D debris would result in approximately 3,698 tons being reused or recycled and approximately 2,465 tons (4,930 cubic yards) placed in the Cass County-Oakridge Landfill or other landfills in the region. The Cass County-Oakridge Landfill has more than 2,000,000 cubic yards remaining capacity and would be able to accommodate the material resulting from the proposed MOB 3 mission (IDEM 2014). Additional personnel and dependents associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of municipal solid waste (MSW) from the base. C&D debris, including debris contaminated with hazardous waste, asbestos-containing material (ACM), lead-based paint (LBP), or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.1.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Grissom ARB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities, along with construction crews, would access the base via the Main Gate or the West Gate. Construction-related traffic would comprise only a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with these activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the proposed facility and infrastructure project projects. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time and by using the South Gate instead of the Main Gate. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term or significant impacts on transportation infrastructure are anticipated.

Implementation of the proposed KC-46A MOB 3 mission at Grissom ARB would result in an increase of 217 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 24 percent increase in daily commuting traffic to and from the base. In addition to the increase in personnel, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. The increase in base mission personnel could increase congestion and queuing at the Main Gate during morning and evening rush hours. To minimize this, the base could adjust the schedule of operations to accommodate this increase, and/or provide additional personnel at the gate to process security checks during peak hours, if necessary. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.1.9 Hazardous Materials and Waste

4.1.9.1 Hazardous Materials Management

The USAF has developed a Hazardous Materials Management Plan (HMMP) for the KC-46A program. This plan details the strategy for integrating hazardous materials management into the KC-46A system. The USAF will actively pursue efforts to minimize or eliminate the use of various materials, including hexavalent chromium, cadmium, and halon. The KC-46A is the first aircraft in the Air Mobility Command (AMC) inventory to be completely free of ozone-depleting substances (ODS), including handheld fire extinguishers. The corrosion protection program for the KC-135 uses hexavalent chromium on both the interior and exterior. The KC-46A corrosion control program only uses hexavalent chromium on the interior of the aircraft. Specific alternatives to cadmium plating are currently being implemented for use on KC-46A aircraft. These include zinc-nickel plating in lieu of cadmium for plating on bearings and bushings when required. Standard materials (e.g., cleaning solvents, sealants, adhesives, and paints) may be required for routine maintenance and repairs. The preference will be to use the least hazardous material when alternates are available.

Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through Hazardous Materials Pharmacies (HAZMARTs) are adequate to handle the changes anticipated with the replacement of the KC-135 mission (16 aircraft) with the KC-46A MOB 3 mission (12 aircraft). The reduction of aircraft and operations would decrease the use and consumption of hazardous materials at Grissom ARB, resulting in beneficial environmental impacts.

4.1.9.1.1 Aboveground and Underground Storage Tanks

The proposed replacement of 16 KC-135 aircraft with 12 KC-46A aircraft and the decrease in operations at Grissom ARB would potentially decrease the maximum daily consumption of Jet-A. The new Type III system would enhance fuel delivery at the base. Some of the new and remodeled facilities would require the addition of new aboveground storage tanks (ASTs) and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to oil-water separators (OWSs), if required, to contain uncontrolled releases of petroleum products. The MOB 3 mission would require demolition of Buildings 437 and 438 to clear space for the construction of the new hangar. An AST associated with a generator for Building 437 and two ASTs (generator and aqueous film-forming film) associated with Building 438 would be removed. The *Grissom ARB Hazardous Material Emergency Planning and Response Plan* (Grissom ARB 2014b) would be amended to incorporate any changes in facility design, construction operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products to the environment.

4.1.9.1.2 Toxic Substances

Demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Grissom ARB. ACMs have been positively identified inside Buildings 209, 437, and 438. Volume II, Appendix F, Table F-1, contains a list of buildings proposed for modification with the implementation of the KC-46A MOB 3 mission and their potential to contain ACMs.

Prior to initiating demolition and renovation projects, exposed friable asbestos would be removed in accordance with applicable Federal, state, local, and USAF rules and regulations. Before initiating the ACM removal work, IDEM Office of Air Quality and USEPA notifications would be completed. Work on ACM projects would only be conducted by persons with current certificates of training in accordance with standards established by OSHA and the USEPA. Asbestos abatement contractors must be licensed by the IDEM. All ACM wastes would be disposed of at a waste disposal site authorized to accept such waste. Additionally, the handling and disposal of ACM wastes would be performed in accordance with the *Grissom ARB Asbestos Management Plan* (Grissom ARB 2010b), and in compliance with Federal, state, and local regulations. Transport and disposal documentation records, including signed manifests, would also be required.

According to standard operating procedures, LBP surveys are conducted prior to any renovation or demolition activities. Buildings 209 and 437 are known to contain LBP. Based on years of construction, seven additional buildings proposed for renovation or demolition have the potential to contain LBP. Volume II, Appendix F, Table F-1, contains a list of buildings proposed for modification with the implementation of the MOB 3 mission at Grissom ARB and their potential to contain LBP. Demolition of structures known to contain LBP would be conducted in accordance with applicable regulations. Because no multi-family housing, target housing, or child-related facilities are located on base, notification to IDEM of lead-abatement projects is not required. Disposal of any lead-containing wastes would be conducted in accordance with Federal regulations, including the Toxic Substances Control Act (TSCA) and the Occupational Safety and Health Act. These wastes would be accompanied by a waste manifest and disposed of at an approved, off-base disposal facility.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the KC-46A MOB 3 mission at Grissom ARB. Long-term benefits from removal of toxic substances are anticipated.

4.1.9.2 Hazardous Waste Management

Grissom ARB would continue to be classified as a large-quantity generator (LQG) and generate hazardous wastes during various O&M activities. Hazardous waste disposal procedures, including off-base disposal procedures, are adequate to handle a potential decrease in quantity and thus would remain the same. Hazardous waste anticipated to be generated by the proposed KC-46A MOB 3 mission would be consistent with waste generated by the existing KC-135 mission. Waste materials associated with maintenance activities include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. Operations involving hexavalent chromium, cadmium, and halon (i.e., ODS) have been eliminated or minimized to the extent possible (Boeing 2013). Hazardous materials such as trichloroethane (TCE) have available alternates and would not be required for the KC-46A MOB 3 mission. No new hazardous materials would be added that exceed Grissom ARB’s current hazardous waste processes.

The proposed replacement of 16 KC-135 aircraft with 12 KC-46A aircraft and the decrease in operations at Grissom ARB would potentially decrease the generation of hazardous waste, resulting in a positive environmental impact.

4.1.9.3 Environmental Restoration Program

Of the 14 Installation Restoration Program (IRP) sites located at Grissom ARB, 2 sites have the potential to be impacted by the C&D activities proposed for Grissom ARB. No monitoring wells would be impacted by proposed C&D activities.

The proposed MOB 3 mission would require the demolition of Buildings 437 and 438 to clear space for the new hangar construction. The proposed MOB 3 mission would also require the renovation of Buildings 434 (Fuselage Trainer [FuT]), 436 (Alternate Mission Equipment [AME]), and 439 (Maintenance/Various Shops). These C&D activities would require the removal of four OWSs (OWS 437N, 437S, 438N and 438S) and would potentially impact an additional six (OWS 434N, 434S, 436N, 436S, 439N, and 439S). All these OWSs are included in IRP site OT-045, which consists of 22 OWSs located throughout the installation. IRP site OT-045 is closed with No Further Response Action Planned. Institutional controls at the site include restriction of access to members of the public and to base personnel, shallow groundwater consumption restrictions, and digging permit requirements. The USAF would coordinate with the AFCEC restoration office before any construction, renovation, demolition, or modification projects are initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with the current Environmental Impact Analysis Process (EIAP) as specified in AFI 32-7061.

Building 663 is near IRP site PL-758, Low Point Drain Box #2. Lead in the groundwater is the main contaminant of concern at this site. Planned renovations for Building 663 would include interior renovations only, and no subsurface disturbance would occur. Therefore no impacts to PL-758 would occur.

During C&D activities, there is the possibility that undocumented contaminated soils or groundwater may be present. If encountered, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

Grissom ARB would coordinate with the IDEM prior to any construction activities on an active IRP site. No significant impacts to IRP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near IRP sites.

4.1.10 Socioeconomics

4.1.10.1 Population

The current personnel at Grissom ARB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-4. Implementation of the proposed MOB 3 mission would potentially add up to 202 full-time mission personnel (not including contractors) and 328 military and DoD civilian dependents to the ROI, resulting in a 0.7 percent increase in the total ROI population. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population.

4.1.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-4, implementation of the proposed MOB 3 mission at Grissom ARB would increase the full-time work force assigned to Grissom ARB by 217 total personnel (including contractors). Using the Impact Analysis for Planning (IMPLAN) model, the direct effect of 217 full-time personnel at Grissom ARB would have an estimated indirect and induced effect of approximately 29 jobs. Indirect and induced jobs would be created in industries such as limited-service restaurants, nursing and community care facilities, full-service restaurants, retail, hospitals, individual and family services, personal care services, and real estate. With a 2014 unemployment rate of 5.8 percent in Cass County and 6.8 percent in Miami County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide limited economic benefits. The USAF estimates that $117.8 million in military construction (MILCON) expenditures would be associated with implementation of the proposed MOB 3 mission at Grissom ARB. The majority of MILCON expenditures ($114.8 million) would occur in 2017, with and an estimated $3 million occurring in 2019. The total expenditures could generate approximately 1,197 jobs, primarily within the construction industry or related industries, including retail stores (i.e., non-store retailers, miscellaneous store, general merchandise, and gasoline stations) and wholesale trade. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 33,591 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of $117.8 million at Grissom ARB would generate an estimated $11.4 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.1.10.3 Housing

Although no dormitories are currently located on Grissom ARB, Building 473 (Table 2-3) would be renovated to provide housing for first-term Airmen/single Airmen. Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 202 off-base housing units. Based on the number of vacant housing units in the ROI, in is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.1.10.4 Education

As described in Section 2.5.1.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 197 dependents would be of school age and would enter any of the eight school corporations in the ROI. The projected number of incoming students would represent a 1.4 percent increase of the current total enrollment. Based on the number of school corporations and schools in the ROI, as well as class size for the state, it is anticipated that the schools in the ROI would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.1.10.5 Public Services

Cass County and Miami County represent a large community with police, fire, and other services. Implementation of the proposed MOB 3 mission would add approximately 530 USAF-related personnel and dependents, which represents approximately a 0.7 percent increase in the total ROI population. While demand for public services in the ROI would increase with the projected change in population, it is anticipated that these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small (less than 1 percent]).

4.1.10.6 Base Services

Base services on Grissom ARB are in good condition; however, several base services would require additional manpower and facilities to accommodate the incoming personnel associated with the proposed MOB 3 mission. No forms of childcare or youth programs are currently available on Grissom ARB. However, several childcare and youth programs are available in communities located within 7 to 15 miles of Grissom ARB. It is anticipated that these childcare and youth programs would support the needs of incoming personnel. A military dining facility is located on the installation but has limited operational hours. Personnel associated with the proposed MOB 3 mission would utilize commercial dining facilities outside of Grissom ARB.

To accommodate the personnel increase that would occur with implementation of the proposed MOB 3 mission, extended operational hours for the fitness center could be required. Should operational hours be adjusted, up to two additional full time employee (FTE) positions would be required at the fitness center. The USAF identified that up to one additional FTE position would also be needed to fully support the Airmen & Family Readiness (A&FR) program. By meeting the additional manpower and facility requirements that have been identified, Grissom ARB would be able to support the personnel increase that would occur with implementation of the proposed MOB 3 mission.

4.1.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes areas that are exposed to noise levels of 65 dB L_{Adn} or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.1.11 indicates that no people are currently exposed to noise levels of 65 dB L_{Adn} or greater.

Aircraft-generated noise levels of 65 dB L_{Adn} or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise. Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

Analysis of the proposed MOB 3 mission noise contours relative to the baseline contours at Grissom ARB indicates that no people would be exposed to any additional noise levels greater than baseline levels; thus no disproportionate impacts would occur. In addition, no youth or elderly populations, on or off-base, would be exposed to increased noise levels.

4.2 SEYMOUR JOHNSON AIR FORCE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Seymour Johnson AFB. Section 2.5.2 describes the facilities and infrastructure, personnel, and flight operations requirements of the KC-46A MOB 3 mission and the specific actions at Seymour Johnson AFB that would be required to implement this mission. As described in Section 4.5, the No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented at Seymour Johnson AFB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Seymour Johnson AFB would continue as described for baseline conditions. The 916 ARW would continue to fly aerial refueling missions with a PAA of 16 KC-135 aircraft.

4.2.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would result from implementation of the proposed KC-46A MOB 3 mission. The L_{Adn} noise levels resulting from the proposed MOB 3 mission at Seymour Johnson AFB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section are contained in Volume II, Appendix B, Section B.2.1.

The proposed KC-46A MOB 3 mission at Seymour Johnson AFB would replace the entire fleet of KC-135 aircraft currently assigned to the 916 ARW with KC-46A aircraft, but the operations of other aircraft would remain unchanged. At a distance of 1,000 feet, KC-46A aircraft are 9 dB quieter than KC-135 aircraft during approach and roughly equal in loudness during departure (Table 4-6). F-15E aircraft are 18 dB louder during approach and 27 dB louder during departure than KC-46A aircraft. In an acoustic environment including both KC-46A and F-15E aircraft operations, the operations of the F-15E aircraft would be much more noticeable.

Table 4-6. Aircraft Noise Level Comparison at Seymour Johnson AFB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
F-15E	82% NC	92	85	73	63
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
F-15E	91% NC	114	105	94	84

Notes: 916 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.
4 FW F-15E aircraft depart using afterburner power; however, afterburner is de-selected soon after liftoff, and the remainder of climb-out is accomplished using power setting at or near 92% NC.
Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; NC = engine core speed.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (ºF) and 70 percent relative humidity.

In general, KC-46A aircrews would use the same ground tracks and altitude profiles currently flown by KC-135 aircrews at Seymour Johnson AFB. Tactical flight procedures, including spiraling climb-out over the base and non-standard approaches to land, are almost entirely practiced in flight simulators by both KC-135 and KC-46A aircrews. KC-135 aircrews very rarely practice tactical flight operations during actual flights. KC-46A aircrews would conduct tactical procedure training in the aircraft slightly more frequently (approximately 3 percent of total operations).

KC-46A aircrews would fly 68 percent more airfield operations annually than are flown by KC-135 aircrews under baseline conditions (see Table 2-9). However, F-15E aircraft operations comprise the vast majority of total operations at Seymour Johnson AFB such that the net effect of the proposed MOB 3 mission would be a 3 percent change in the total operations flown. Similar to ongoing KC-135 operations, KC-46A operations would only occur on non-holiday weekdays under normal conditions. KC-46A aircrews would fly 5 percent of total operations during acoustic night (10:00 P.M. to 7:00 A.M.), a decrease from the 13 percent of KC-135 operations currently flown during acoustic night. Noise generated during acoustic night has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

F-15E aircraft operations are both louder and more frequent than either the ongoing operations of KC-135 aircraft or the proposed operations of KC-46A aircraft. F-15E operations are the primary factor determining the overall noise levels and extent of noise contours near Seymour Johnson AFB. Additionally, while implementation of the proposed MOB 3 mission would increase aircraft operations at Seymour Johnson AFB, KC-46A aircraft landing operations are quieter than KC-135 landing operations (see Table 4-6). The proposed replacement of the KC-135 fleet with KC-46A aircraft would have very little effect on L_{Adn} (Figure 4-2).

Implementation of the proposed KC-46A MOB 3 mission would decrease the number of on-base acres affected by noise greater than 65 dB L_{Adn} by 1 acre (<1 percent change) and increase the number of off-base acres affected by noise greater than 65 dB L_{Adn} by 1 acre (<1 percent change) (Table 4-7). The total number of acres affected by noise greater than 65 dB L_{Adn}, including both on-base and off-base area, would not change. The estimated off-base population affected by noise levels greater than 65 dB L_{Adn} would increase by 1 person (<1 percent change from 7,682 to 7,683) (Table 4-8). The methods used to calculate noise levels, and the population affected by elevated noise levels, are described in detail in Volume II, Appendix B, Section B.1.3.

Table 4-7. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	572	8,324	8,896	572	8,322	8,894	0	-2	-2
70 - 74	523	4,488	5,011	523	4,489	5,012	0	+1	+1
75 - 79	551	2,117	2,668	549	2,118	2,667	-2	+1	-1
80 - 84	482	600	1,082	477	601	1,078	-5	+1	-4
≥ 85	843	140	983	849	140	989	+6	0	+6
Total	**2,971**	**15,669**	**18,640**	**2,970**	**15,670**	**18,640**	**-1 (<-1%)**	**+1 (<+1%)**	**0**

Note: "+" indicates an increase and "-" indicates a decrease.

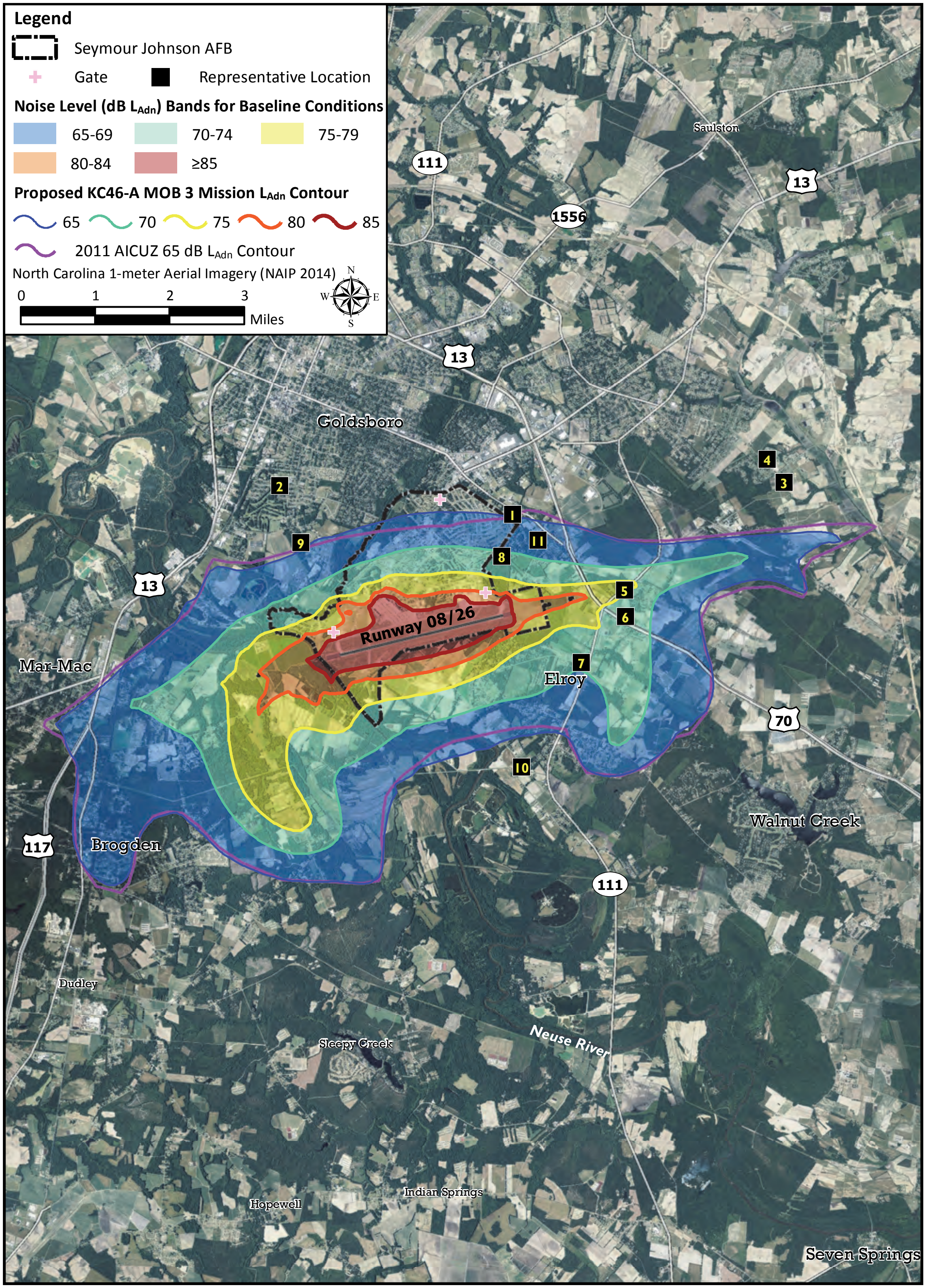

Figure 4-2. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Seymour Johnson AFB

Table 4-8. Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
65 - 69	4,686	4,686	0
70 - 74	2,330	2,330	0
75 - 79	536	537	+1
80 - 84	69	69	0
≥ 85	61	61	0
Total	**7,682**	**7,683**	**+1 (<+1%)**

Note: "+" indicates an increase and "-" indicates a decrease.

The estimated off-base population exposed to noise levels greater than 80 dB L_{eq24} would not change with implementation of the proposed MOB 3 mission and the same 107 on-base buildings affected by noise levels greater than 80 dB L_{eq24} under baseline conditions would be affected with implementation of the proposed MOB 3 mission (Table 4-9). Hearing loss risk among people working in high-noise environments on Seymour Johnson AFB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure. Because no new areas would be exposed to noise levels greater than 80 dB L_{eq24}, there would be no additional risk of hearing loss with implementation of the proposed MOB 3 mission. The current level of risk would remain unchanged with implementation of the proposed MOB 3 mission.

Aircraft noise levels at several representative locations surrounding Seymour Johnson AFB are presented in Table 4-10. Noise levels would change by less than 1 dB at all of the locations studied.

Table 4-9. Estimated Off-base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions and the Proposed MOB 3 Mission

Noise Level (dB L_{eq24})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
80-81	11	11	No change
81-82	33	33	No change
82-83	11	11	No change
83-84	0	0	No change
84-85	11	11	No change
85-86	11	11	No change
86-87	11	11	No change
87-88	0	0	No change
88-89	11	11	No change
89-90	10	10	No change
Total	**109**	**109**	**No change**

Table 4-10. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Seymour Johnson AFB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Meadow Lane Elementary	65	65	0
2	Carver Heights Elementary	59	59	0
3	Eastern Wayne Elementary	56	56	0
4	Eastern Wayne High	60	60	0
5	Miller's Chapel	76	76	0
6	New Hope Friends Church	73	73	0
7	Sheridan Forest Worship Center	70	70	0
8	Atkinson Chapel Church	70	70	0
9	Bible Faith Missionary Baptist	64	64	0
10	Harvest Baptist	63	63	0
11	Korean Presbyterian Church	68	68	0

C&D in support of the proposed MOB 3 mission would be conducted in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise. However, noise impacts would not be substantial enough to be considered significant.

Practice approaches by KC-46A aircrews at Kinston Regional Jetport would result in a noise level increase that would not be perceived as significant. Kinston Regional Jetport currently supports approximately 21,000 airfield operations per year, including approximately 1,000 operations conducted by Seymour Johnson AFB-based KC-135 aircraft. With implementation of the MOB 3 mission, KC-46A aircrews would conduct approximately 1,600 airfield operations per year. KC-46A aircrews would follow the same procedures as existing KC-135 aircrews, and operations during the late-night time period between 10:00 P.M. and 7:00 A.M. would continue to be rare. Approximately 9,000 of the operations ongoing under baseline conditions are conducted by fighter aircraft or large military jet aircraft, which are assumed to be as loud as or louder than the KC-46A. Potential noise level changes associated with 600 additional KC-46A operations in this context were estimated at 0.3 dB L_{Adn} or less using formulae described in Volume II, Appendix B, Section B.1.3. This change in dB L_{Adn} is minimal and would not be expected to be perceived as significant.

Noise impacts under the proposed MOB 3 mission at Seymour Johnson AFB (aircraft and C&D noise) would be minimal and would not be expected to be perceived as significant. No mitigation measures are proposed at this time.

4.2.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.2.1, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Seymour Johnson AFB.

The immediate area surrounding Seymour Johnson AFB within Wayne County currently attains all of the NAAQS. The area of Kinston Regional Jetport within Lenoir County, which is proposed for use as an auxiliary airfield for KC-46A aircraft operations, also attains all NAAQS. Therefore, the analysis separately applied the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts to each of these areas. This criterion is being used only to determine if an impact occurs, as the area is in attainment and a PSD analysis is not required.

Construction – The proposed MOB 3 mission at Seymour Johnson AFB would require construction and/or renovation of airfield facilities, including training facilities, hangars, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Seymour Johnson AFB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes the standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Seymour Johnson AFB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.2.1). Emissions from on-wing testing of KC-46A aircraft engines were based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).

2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Seymour Johnson AFB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from mobile fuel transfer operations and stationary and area sources were estimated by multiplying existing emissions generated at Seymour Johnson AFB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019 after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 916 ARW, which the MOB 3 mission would replace at Seymour Johnson AFB (see Table 3-15).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.2.2.1 Air Quality Consequences

Table 4-11 presents estimates of emissions from the infrastructure changes (see Table 2-7) for the MOB 3 mission at Seymour Johnson AFB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in 1 year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-11. Total Construction Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Demolition	0.05	0.17	0.46	0.00	0.61	0.09	131
Building Construction	0.88	4.61	6.39	0.01	5.40	1.12	1,258
Building 4822 Renovation	0.00	0.00	0.01	0.00	0.00	0.00	2
Total Emissions	0.93	4.78	6.86	0.01	6.01	1.21	1,391
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_2e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-12 summarizes the annual operational emissions within Wayne County that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The data in Table 4-12 show that the net increase in emissions from the replacement of existing KC-135 aircraft operations with operations from 12 KC-46A aircraft would not exceed any PSD threshold. In addition, these emission increases would amount to no more than 2 percent of any total criteria pollutant generated within Wayne County in 2011 (see Table 3-14). Therefore, implementing the proposed MOB 3 mission at Seymour Johnson AFB would not result in significant impacts.

Table 4-12. Annual Operations Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC-46A Aircraft Operations	21.58	78.63	142.91	8.81	0.62	0.54	24,149
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE – KC-46A	0.04	0.21	0.22	0.00	0.03	0.03	51
GMVs	0.26	7.43	2.57	0.01	0.33	0.12	1,423
POVs – On Base	0.08	5.12	0.32	0.00	0.10	0.02	513
POVs – Off Base	0.10	8.78	0.61	0.01	0.09	0.02	810
Point and Area Sources	3.31	0.09	0.20	0.01	0.14	0.11	NA
Total Proposed MOB 3 Mission Emissions	**36.92**	**139.97**	**165.56**	**10.53**	**1.47**	**0.98**	**31,446**
Existing 916 ARW Emissions	**(6.36)**	**(77.13)**	**(50.16)**	**(5.06)**	**(0.64)**	**(0.46)**	**(15,572)**
Proposed MOB 3 Mission Minus 916 ARW Emissions	**30.56**	**62.84**	**115.39**	**5.46**	**0.82**	**0.52**	**15,874**
Operational Emissions Increases Fraction of Wayne County Emissions	**0.01**	**0.003**	**0.02**	**0.001**	**0.0001**	**0.0003**	**0.02**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: SO_x – sulfur oxides; CO_2e (mt) = carbon dioxide equivalent in metric tons; NA = not available; N/A = not applicable.

4.2.2.1.1 Auxiliary Airfields

Emissions from the operation of KC-46A aircraft would occur within the immediate areas of Kinston Regional Jetport and aircraft flight routes between this area and Seymour Johnson AFB. Table 4-13 summarizes the annual emissions that would result from proposed KC-46A aircraft operations at the Kinston Regional Jetport. These data show that the increase in KC-46A emissions at this location would not exceed a PSD threshold. In addition, these emissions would amount to no more than 5 percent of any total criteria pollutant generated within Lenoir County in 2011. KC-46A aircrews from Seymour Johnson AFB would use other auxiliary airfields on only an occasional basis, and these operations would result in only minor increases in emissions at those locations. Therefore, KC-46A operations at auxiliary airfields under the proposed MOB 3 mission would not result in significant impacts.

Table 4-13. Annual Emissions from the Proposed MOB 3 Mission at the Auxiliary Airfield Near Seymour Johnson AFB, 2019

Auxiliary Airfield	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Kinston Regional Jetport	**0.40**	**4.94**	**94.04**	**4.67**	**0.28**	**0.23**	**13,007**
Operational Emissions Fraction of Lenoir County Emissions	**0.0002**	**0.0004**	**0.05**	**0.02**	**0.0001**	**0.0003**	**0.04**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: SO_x – sulfur oxides; CO_2e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Operation of the proposed MOB 3 mission at Seymour Johnson AFB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. These sources would be mobile and intermittent in nature, and in the case of KC-46A flight operations, they would occur up to an altitude of 3,000 feet AGL and across several square miles that comprise the Seymour Johnson AFB airspace and adjoining aircraft flight patterns. As a result, these emissions would be adequately dispersed through a large volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Therefore, operation of the proposed MOB 3 mission would produce minimal ambient impacts of HAPs in a localized area at Seymour Johnson AFB.

4.2.2.2 Climate Change Effects

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-11 shows that construction for the proposed MOB 3 mission at Seymour Johnson AFB would produce a total of 1,391 metric tons of CO_2e emissions. Tables 4-12 and 4-13 show that operation of the proposed MOB 3 mission at Seymour Johnson AFB would result in a net increase of 28,881 metric tons per year of CO_2e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB, the following considers how climate change may impact proposed operations at Seymour Johnson AFB. For Seymour Johnson AFB, the projected climate change impact of concern is increased temperatures, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Southeast region surrounding Seymour Johnson AFB will mainly experience warmer temperatures and a resulting increase in the frequency, intensity, and duration of extreme heat events. This increased heat will negatively affect public health, natural and built environments, energy, agriculture, and forestry.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.2.3 Safety

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Seymour Johnson AFB with implementation of the proposed KC-46A MOB 3 mission.

4.2.3.1 Flight Safety

Aircraft Mishaps – The proposed KC-46A MOB 3 mission at Seymour Johnson AFB would replace the existing KC-135 mission. As described in Section 4.1.3, the KC-46A is a variant of the existing B-767 aircraft. The B-767 has a proven safety record.

As described in Section 4.1.3, the accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (the B-767). Using the comparable Class A accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Operation of the KC-46A is not anticipated to create additional flight safety risks, because the KC-46A would utilize the existing KC-135 flight patterns and existing air refueling (AR) tracks. Replacement of 16 KC-135 aircraft with 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents at Seymour Johnson AFB.

Therefore, implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or in any increase in the risks of occurrence of those mishaps, even with increased flight operations.

Bird/Wildlife-Aircraft Strike Hazard – The increase of operations associated with the beddown of KC-46A would increase the risk of bird/wildlife-aircraft strike risks at Seymour Johnson AFB.

Seymour Johnson AFB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to bird/wildlife-aircraft strike hazard issues.

4.2.3.2 Ground Safety

Although emergency and mishap response plans would be updated, no aspects of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB are expected to create new or unique ground safety issues. O&M procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Seymour Johnson AFB airfield safety conditions would still be similar to baseline conditions. As indicated in Section 3.2.3.2, the base Fire Department will continue to be party to mutual-aid support agreements with nearby communities. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

As indicated in Section 3.2.7, there is incompatible residential development within the APZ. Seymour Johnson AFB would continue working with communities and developers to highlight the Air Installations Compatible Use Zones (AICUZ) guidelines. See Volume II, Appendix B, Figure B-1 of the Final EIS, for the typical generic CZ and APZ dimensions.

4.2.4 Soils and Water

4.2.4.1 Soil Resources

All of the C&D activities associated with implementing the proposed KC-46A MOB 3 mission would occur within the Seymour Johnson AFB boundary. The disturbed area for the projects associated with the proposed KC-46A MOB 3 mission would be less than 5 acres (new construction).

All of the proposed construction, renovation, and demolition activities would occur in areas already developed and/or previously disturbed by excavation near the northern end of the runway.

Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.2.4.2 Water Resources

The construction projects would follow the principles outlined in Sections 8 and 9 of the Seymour Johnson AFB Stormwater Plan (SWP) titled "*Construction Stormwater Management and Post-Construction Site Runoff Controls*" in accordance with the Seymour Johnson AFB National Pollutant Discharge Elimination System (NPDES) Permit NCS0000335; Section E (Seymour Johnson AFB 2015c). Section E of NPDES Permit NCS0000335 references the NPDES North Carolina Department of Environmental Quality (NC DEQ) General Construction Permit NCG010000. For a project to be covered under Permit NCG010000, the project must have an Erosion and Sediment Control Plan approved by the NC DEQ Division of Land Resources Erosion and Sediment Control Program. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

The areas planned for development as part of the proposed MOB 3 mission are located in subbasin 12, which has an existing impervious surface of approximately 106 acres (Seymour Johnson AFB 2015a). Less than 5 acres of impervious surface would be added to the existing impervious surface of this subbasin resulting in less than a 5 percent increase in impervious surface in subbasin 12 and a less than one percent increase of impervious surface over the entire installation. Although the additional impervious surface would increase sheet flow and stormwater runoff, the demolition projects undertaken at Seymour Johnson AFB since 2007 have decreased the amount of impervious surface on base by 65.15 acres. The addition of less than 5 acres of impervious surface would result in a net decrease in impervious surface (Seymour Johnson AFB 2015a).

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 *USC* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

The Stormwater Plan (SWP) for Seymour Johnson AFB also identifies control practices to be followed for spill prevention and response, routine inspection of discharges at sites, and proper training of employees. NPDES Permit NCS000335 requires the base to develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to 1 acre, and from projects that disturb less than 1 acre but are part of a larger common plan of development or sale that discharge into the small MS4 for the base.

No changes to the existing aircraft deicing operations would be necessary with implementation of the proposed KC-46A MOB 3 mission. KC-46A deicing activities would be conducted away from storm drains to prevent deicing effluent from entering the stormwater system.

As part of the proposed beddown, the SWP would be revised to include an evaluation of deicing procedures and a revision to the SWP to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems if required. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.

Regarding the North Carolina Coastal Area Management Act, the USAF submitted a negative Federal Consistency Determination letter to the NC DEQ, Division of Coastal Management on 3 May 2016. The letter documented that Wayne and Lenoir Counties are not in the 20 coastal counties and the implementation of the proposed MOB 3 mission would not affect coastal areas. In a letter dated 4 May 2016, the NC DEQ, Division of Coastal Management concurred with the USAF negative determination letter and indicated that a Federal Consistency Determination is not necessary (see letter dated 4 May 2016, Volume II, Appendix A, Section A.2.4). Significant impacts to water resources at Seymour Johnson AFB would not result from implementation of the proposed MOB 3 mission.

4.2.4.3 Floodplains

Significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission because there are no floodplains near the 916 ARW parking ramp where the infrastructure development is proposed.

4.2.5 Biological Resources

4.2.5.1 Vegetation

All of the proposed projects would occur in developed or disturbed areas within the improved grounds on base. Therefore, no significant impacts to vegetation are anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. The areas planned for development for the proposed MOB 3 mission at Seymour Johnson AFB provide little wildlife habitat, and the proposed projects would result in no significant impacts to wildlife populations.

Noise resulting from the proposed construction would be localized, short-term and only during daylight hours. Wildlife in the areas proposed for construction and near the airfield is already exposed to aircraft noise under baseline conditions.

Airfield operations are anticipated to increase at Seymour Johnson AFB. An increase in operations would increase the potential for bird/wildlife-aircraft strikes. However, continued adherence to the base's BASH Plan (Seymour Johnson AFB 2015b) would minimize the risk of strikes. Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would increase off-base areas exposed to noise levels greater than 65 dB L_{Adn} by 1 acre. Significant impacts to wildlife are not anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.3 Special-Status Species

Because no special-status species and/or designated critical habitat occur at Seymour Johnson AFB, no impacts to special-status species are anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.4 Wetlands

Because no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

4.2.6 Cultural Resources

Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would include the construction of one new two-bay hangar along the existing 916 ARW flightline area. Construction of this facility would require the demolition of Building 4911 and Hangar 4909. New construction would also be required for an expansion to Building 4906 to house the AFE function. Renovations would be required in five buildings (4810, 4822, 4828, 4908, and 4916) to accommodate mission personnel and equipment storage. Building 4901 would be used to house the Combat Crew Communication, but no renovations would be required. Seymour Johnson AFB has determined that none of these facilities are NRHP-eligible, and the SHPO has concurred with this finding (see letters dated 14 June 2016 and 21 February 2017, Volume II, Appendix A, Section A.5.2).

No impacts to archaeological resources are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB. The base has been inventoried for archaeological resources, and no NRHP-eligible archaeological resources have been identified within the installation boundaries. Because ground-disturbing activities would occur in previously disturbed areas, it is extremely unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with Section 106 of the NHPA.

Because Buildings 2130 and 5015 are located outside the APE, there would be no direct impact to historic properties. Indirect impacts on cultural resources from population increase or visual intrusions would be extremely unlikely. With implementation of the proposed KC-46A MOB 3 mission, the population would increase by a small amount relative to the existing population at the base and in the Goldsboro metropolitan area. New construction would occur in the context of an active USAF base, where changes in the infrastructure are common. The viewshed of remaining historic properties would not be affected by the proposed construction.

There are no tribal resources located at Seymour Johnson AFB or in Wayne County. Seymour Johnson AFB has previously initiated consultation with the Eastern Band of the Cherokee Nation. The tribe has indicated that they have no interests in projects in Wayne County (see email dated 17 April 2014 in Volume II, Appendix A, Section A.3).

4.2.7 Land Use

4.2.7.1 Physical Development

The physical development associated with the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would occur adjacent to the flightline where airfield and aircraft O&M support activities occur on a daily basis. None of the physical development associated with implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would impact land use. Subsequent O&M activities for the proposed KC-46A MOB 3 mission would conform to current and future land uses on the base. The physical changes and daily activities on the ground would be confined to the base. The proposed on-base development would have no impact to off-base areas.

4.2.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Seymour Johnson AFB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No noise-related impacts to land use would occur because implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would result in a 1-acre increase in land exposed to noise levels greater than 65 dB L_{Adn}. This additional 1 acre of land is not located near any sensitive receptors. The anticipated noise increase to this 1-acre area would not cause unsafe conditions and would not change or conflict with any current or planned land uses in this area. None of the sensitive receptors identified on Figure 4-2 would experience any increases in noise as a result of implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

No impacts to land use on or near Kinston Regional Jetport would occur because the KC-46A aircrews would follow the same procedures currently used by KC-135 aircrews at that location. No other changes are proposed at Kinston Regional Jetport. No significant impacts to land use on or off base would result from implementation of the proposed KC-46A MOB 3 mission.

4.2.8 Infrastructure

Refer to Section 3.2.8 for a description of existing infrastructure system capacities and conditions at Seymour Johnson AFB. Table 2-10 provides changes in population that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.2.8.1 Potable Water System

Based on the average usage rate of 125 GPD (UFC 3-230-03) per person, it is anticipated that the increase in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.01 MGD (125 GPD x 115). This increase, combined with the existing peak usage (1.18 MGD) at Seymour Johnson AFB would not exceed the City of Goldsboro water system capacity of 2.0 MGD and impacts would be less than significant.

4.2.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Based on this rate, the proposed increase in population would increase wastewater discharge from Seymour Johnson AFB by 0.01 MGD (120 GPD x 115). Even under peak flow conditions (1.18 MGD), the increase in wastewater discharge would be below the 1.5 MGD that the City of Goldsboro reserves for Seymour Johnson AFB and impacts would be less than significant.

4.2.8.3 Stormwater System

The proposed MOB 3 mission would require demolition of facilities and construction of new facilities. This would take place within the existing developed base flightline and cantonment areas. Table 2-9 identifies projects associated with the proposed MOB 3 mission. The total disturbed area associated with these projects would not exceed 5 acres (the area for new construction), and impacts would be less than significant.

During the short-term construction period for the proposed MOB 3 mission, all contractors would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. Additional stormwater requirements are described in Section 3.2.4.

4.2.8.4 Electrical System

The USEIA estimates that the average household in North Carolina uses 1.1 MWh per month (USEIA 2014). Converting this rate to an hourly rate and assuming 53 new households (i.e. one new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Seymour Johnson AFB by 0.1 MW. This increase, combined with the historical electrical demand (8.57 MW), at Seymour Johnson AFB would not exceed the Duke Progress Energy supply limit of 19.3 MW and impacts would be less than significant.

4.2.8.5 Natural Gas System

The USEIA estimates that the average person in North Carolina uses 7.6 Mcf of natural gas per year (USEIA 2016). Based on this rate, the proposed increase in population (115) would increase natural gas use at Seymour Johnson AFB by 0.1 Mcf per hour or 8.28 Mcf per year. This increase represents a less than 0.01 percent increase in the 2014 natural gas usage of (121 million cubic feet [MMcf]). Impacts would be less than significant.

4.2.8.6 Solid Waste Management

All solid waste is collected and transported off site for disposal. Off-base contractors completing any C&D projects at Seymour Johnson AFB would be responsible for disposing of waste generated by these activities. Using methodology developed by the USEPA (USEPA 2009b), it is estimated that implementation of the proposed MOB 3 mission would result in 7,305 tons of C&D debris. Additional personnel and dependents associated with the proposed MOB 3 mission would also generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Disposal of the debris would be completed through an integrated C&D debris diversion approach or removal to landfills. The integrated C&D debris diversion approach includes reuse, recycling, volume reduction/energy recovery, and similar diversion actions. The DoD has set a target C&D debris diversion rate of 60 percent by fiscal year 2015 (DoD 2012). Applying this target diversion rate to the potential amount of C&D debris would result in 4,383 tons of C&D debris being diverted for reuse or recycling and 2,922 tons being placed in landfills. The Wayne County Landfill has sufficient capacity to accommodate this material. Based on current usage, this landfill has an expected closure date of 2031.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.2.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Seymour Johnson AFB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Construction-related traffic would comprise a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with these activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the proposed facility and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term impacts to on- or off-base transportation systems are anticipated.

Implementation of the proposed MOB 3 mission at Seymour Johnson AFB would result in a minor increase of 53 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would result in a less than 1 percent increase in daily commuting traffic to and from the base. In addition to the personnel-related traffic increase, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. This increase in base mission personnel could increase congestion and queuing during morning and evening rush hours. To minimize the potential for adverse impacts, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gates to process security checks during peak hours. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result as a result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.9 Hazardous Materials and Waste

4.2.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management protocol specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would not add any new hazardous materials that would exceed the base's current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the replacement of the KC-135 mission with the KC-46A MOB 3 mission.

4.2.9.1.1 Aboveground and Underground Storage Tanks

New and remodeled facilities would require the addition of new ASTs to support generators, as well as new hazardous material and waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. AST 4909-1 (generator tank) would be removed with the demolition of Building 4909. The Seymour Johnson AFB Spill Prevention, Control, and Countermeasures (SPCC) Plan and Installation Emergency Management Plan (IEMP) would subsequently need to be revised to incorporate any changes in facility design, construction operation, or maintenance that materially affects the potential for an uncontrolled release of petroleum products (Seymour Johnson AFB 2014b, 2014c).

4.2.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission. Any renovation, construction, or demolition project proposed at Seymour Johnson AFB would be reviewed to determine if ACM is present. As shown in Volume II, Appendix F, Table F-2, Hangar 4909 and Buildings 4810, 4828, and 4908 are proposed for modification and contain ACM. All handling and disposal of ACM wastes would be performed in accordance with the Seymour Johnson AFB *Asbestos Operating Plan* (Seymour Johnson AFB 1997) and in compliance with Federal, state, and local regulations. Before initiating any demolition or ACM work, required notifications to the Health Hazards Control Unit of the North Carolina Department of Health and Human Services, Division of Public Health, would be completed. This notification and an Asbestos Permit application (if applicable) must be submitted 10 days before beginning work. Work on ACM projects would only be conducted by persons accredited by the State of North Carolina and with current certificates of training in accordance with standards established by OSHA and the USEPA. All ACM wastes would be disposed of at an approved landfill.

All renovation and C&D projects proposed at Seymour Johnson AFB would be reviewed to determine if LBP or lead containing materials are present, and whether such materials would be disturbed. To the extent possible, the presence of lead within the work area would be identified prior to work beginning. Hangar 4909 and Buildings 4810, 4828, and 4908 are proposed for modification and are known to contain LBP or lead-containing material. Volume II, Appendix F, Table F-2, contains a list of three additional buildings proposed for modification that have the potential to contain lead. If the presence of lead containing material in the project work area is unknown, the shop and real property records would be reviewed to determine the presence of lead. If the presence of lead containing material in the work area is still unknown, sampling and analysis for lead would be conducted. The handling and disposal of lead wastes would be conducted in accordance with the Seymour Johnson AFB Hazardous Waste Management Plan (HWMP) (Seymour Johnson AFB 2015f), and in compliance with Federal, state, and local requirements and regulations.

Because some of the buildings proposed for renovation or demolition were constructed prior to 1980, it is assumed that those buildings could include polychlorinated biphenyl (PCB)-containing materials (caulks and sealants). The buildings that would be affected by demolition and renovation, their years of construction, and the potential for PCB-containing materials to be present are summarized in Volume II, Appendix F, Table F-2. The base indicated that some sealants and caulks on Seymour Johnson AFB have tested positive for PCBs. If PCB-containing materials are present, these materials would be removed, handled, and disposed of in accordance with Federal and state regulations and the Seymour Johnson AFB HWMP (Seymour Johnson AFB 2015f).

Although minor increases in the management requirements for ACM, LBP, or PCB removal are anticipated, no adverse impacts are anticipated to result from implementation of the KC-46A MOB 3 mission at Seymour Johnson AFB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.2.9.2 Hazardous Waste Management

Section 4.1.9.2 describes the hazardous waste management specific to the KC-46A aircraft. Seymour Johnson AFB would continue to operate as an LQG and would generate hazardous wastes during various O&M activities associated with the proposed KC-46A MOB 3 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. No new hazardous materials would be added that exceed the base's current hazardous waste processes. The Seymour Johnson AFB HWMP (Seymour Johnson AFB 2015f) would be updated to reflect any change in disposal procedures or any changes of hazardous waste generators and waste accumulation points. No adverse impacts are anticipated from the potential increase in volume of hazardous waste. All hazardous wastes would be handled and managed in accordance with Federal, state, and local regulations.

4.2.9.3 Environmental Restoration Program

There are 63 Environmental Restoration Program (ERP) sites at Seymour Johnson AFB that are administered in accordance with the Management Action Plan. None of the proposed construction, demolition, or renovation projects associated with the proposed KC-46A MOB 3 mission at Seymour Johnson AFB are on or directly adjacent to active ERP sites. However, there is the possibility that undocumented contaminated soils and/or groundwater from historical fuel spills may be present. If encountered during C&D-related excavations, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

4.2.10 Socioeconomics

4.2.10.1 Population

The current personnel at Seymour Johnson AFB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-8. Implementation of the proposed MOB 3 mission would potentially add up to 38 full-time mission personnel (not including contractors) and 62 military and DoD civilian dependents to Wayne County, resulting in an approximate 0.08 percent county population increase. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population and would not be migrating to the area.

4.2.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-8, implementation of the proposed MOB 3 mission at Seymour Johnson AFB would increase the full-time work force assigned to Seymour Johnson AFB by 53 total personnel (including contractors). Using the IMPLAN model, the direct effect of 53 full-time personnel at Seymour Johnson AFB would have an estimated indirect and induced effect of approximately 22 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, retail, offices of physicians, nursing, and real estate. With a 2014 unemployment rate of 6.3 percent in Wayne County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that $103.4 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The majority of MILCON expenditures ($98.4 million) would occur in 2017, with an estimated $5 million occurring in 2019. The total expenditures could generate 1,144 jobs, primarily within the construction industry or related industries, including maintenance and renovation, wholesale trade, retail stores (i.e., non-store retailers, miscellaneous store, general merchandise, and gasoline stations), hospitals, and limited-service and full-service restaurants. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 53,587 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of $103.4 million at Seymour Johnson AFB would generate an estimated $13.7 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.2.10.3 Housing

Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 38 off-base housing units. Based on the number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.2.10.4 Education

As described in Section 2.5.2.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 37 dependents would be of school age and would enter any of the schools in the Wayne County Public School (WCPS) District. The projected number of incoming students would represent a 0.19 percent increase of the current total enrollment in the district. Based on the size of the school district in the ROI, as well as class size for the state, it is anticipated that the schools in the Wayne County would have the capacity to support the incoming population. Students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. Based on current funds spent per student in the district, an additional $8,823 per student could be required from funding sources to support the incoming student population.

4.2.10.5 Public Services

Wayne County represents a large community with police, fire, and other services. The estimated addition of 100 USAF-related personnel and dependents would represent a 0.08 percent increase of the existing Wayne County population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 0.1 percent]).

4.2.10.6 Base Services

Because the proposed MOB 3 mission would replace the existing KC-135 mission, base services have adequate capacity under the existing infrastructure. Some facilities could require infrastructure improvements in the near future. A new child development center (CDC) facility is currently in the base plans for construction.

4.2.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The environmental justice analysis focuses on populations in the affected area. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes those areas that are exposed to noise levels of 65 dB L_{Adn} or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.2.11 provides baseline conditions of the number of minority, low-income, youth, and elderly populations currently exposed to noise levels of 65 dB L_{Adn} or greater.

Aircraft-generated noise levels of 65 dB L_{Adn} or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise. Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

In accordance with USAF EIAP guidelines, the community of comparison (COC) in environmental justice analysis is the “smallest set of Census data encompassing the ROI for each resource and is used to establish appropriate threshold for comparison analysis” (USAF 2014a). For minority, low-income, youth, and elderly populations, the most recent American Community Survey (ACS) data for census block groups was used for the ROI. Wayne County is the county that encompasses the affected area is therefore defined as the COC for the environmental justice analysis for Seymour Johnson AFB.

The potential for disproportionate impacts to minority or low-income populations was determined by comparing the percent of each population in the respective ROI with the percent of each population in the respective COC. If the ROI percentage is less than the COC percentage, then there would be no disproportionate impacts. If, however, the ROI percentage is greater than or equal to the COC percentage, disproportionate effects could be present and could require mitigation (USAF 2014a).

Analysis of the noise contours resulting from implementation of the proposed MOB 3 mission relative to the baseline contours at Seymour Johnson AFB indicates that no minority or low-income persons, on or off-base, would be exposed to noise levels greater than baseline conditions. Therefore, implementation of the proposed MOB 3 mission at Seymour Johnson AFB would not result in disproportionate impacts on these populations. In addition, no youth (under 18) or elderly (65 and over) individuals would be exposed to increased noise levels.

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4.3 TINKER AIR FORCE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Tinker AFB. Section 2.5.3 describes the facilities and infrastructure, personnel, and flight operations requirements of the KC-46A MOB 3 mission and the specific actions at Tinker AFB that would be required to implement this mission. As described in Section 4.5, the No Action Alternative would mean that the KC-46A MOB 3 mission would not be implemented at Tinker AFB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Tinker AFB would continue as described for baseline conditions. The 507 ARW would continue their aerial refueling mission as described under baseline conditions.

4.3.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would occur with implementation of the proposed KC-46A MOB 3 mission. The L_{Adn} noise levels resulting from the proposed MOB 3 mission at Tinker AFB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section can be found in Volume II, Appendix B, Section B.1.3.

The proposed KC-46A MOB 3 mission at Tinker AFB would replace the KC-135 aircraft with the KC-46A aircraft. Other operations ongoing at Tinker AFB under baseline conditions would remain unchanged. At a distance of 1,000 feet, KC-46A aircraft are 9 dB quieter during approach and roughly equal in loudness during departure compared to the KC-135 aircraft that currently operate at Tinker AFB (Table 4-14). The aircraft that operate at Tinker AFB during depot maintenance (i.e., E-3, E-8, F-35, B-1, and B-52H) are all louder than the KC-46A.

KC-46A aircrews would use the same flying procedures (e.g., ground tracks, altitude profiles) currently used by KC-135 aircrews. Tactical flight procedures, which may include non-standard approaches and spiraling climb-outs, are almost entirely practiced in flight simulators by both KC-135 and KC-46A aircrews. While KC-135 operations rarely include tactical training in the aircraft, approximately 3 percent of KC-46A operations would be tactical.

Table 4-14. Aircraft Noise Level Comparison at Tinker AFB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
E-3	1.5 EPR	99	89	74	64
E-8	1.25 EPR	94	84	67	55
B-1	90% RPM	92	84	73	62
B-52H	2,625 LBS/HR	96	86	70	57

Table 4-14. Aircraft Noise Level Comparison at Tinker AFB (Continued)

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
E-3	1.87 EPR	101	93	81	71
E-8	1.85 EPR	98	89	76	66
B-1	97.5% RPM A/B	118	110	98	89
B-52H	1.55 EPR	104	95	81	70

Note: 507 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.
Key: Power Units: N1 = engine speed at location 1; NF = fan speed; EPR = engine pressure ratio; RPM = revolutions per minute; LBS/HR = pounds of fuel burned per hour; A/B = afterburner
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59ºF and 70 percent relative humidity.

KC-46A aircrews would fly 168 percent more airfield operations annually than are flown by KC-135 aircrews under baseline conditions. In the context of an airfield supporting more than 36,000 aircraft operations per year, this would amount to less than a 13 percent increase in total annual aircraft operations at Tinker AFB. The days of the week on which KC-46A aircrews would fly would be the same as those on which KC-135 aircrews currently fly. Furthermore, KC-46A aircrews would fly the same percentage (11 percent) of total operations during acoustic night (i.e., between 10:00 P.M. and 7:00 A.M.) as KC-135 aircrews. Noise generated during acoustic night has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

Areas that would be exposed to elevated noise levels with implementation of the proposed MOB 3 mission are compared to baseline conditions on Figure 4-3. The methodology used to calculate noise levels is described in Volume II, Appendix B, Section B.1.3.

The number of off-base acres affected by noise levels greater than 65 dB L_{Adn} would increase by 7 acres (from 2,586 to 2,593) (see Table 4-15). On-base acreage affected by noise levels greater than 65 dB L_{Adn} would increase by 29 acres (a 1 percent increase, from 2,624 to 2,653 acres). Changes in noise levels would be minor, for several reasons. Although the proposed MOB 3 mission would include about 4,000 more airfield operations per year than the existing KC-135 mission, the increase would occur in the context of an airfield supporting 36,000 total aircraft operations. Additionally, the proposed KC-46A operations would be quieter than the operations of the existing KC-135 aircraft, the other based aircraft types (i.e., E-3 and E-8), and the aircraft that operate at Tinker AFB as part of depot maintenance (i.e., E-3, E-8, F-35, B-1, and B-52 H), as well as many of the aircraft that visit the base as transients (see Table 4-14).

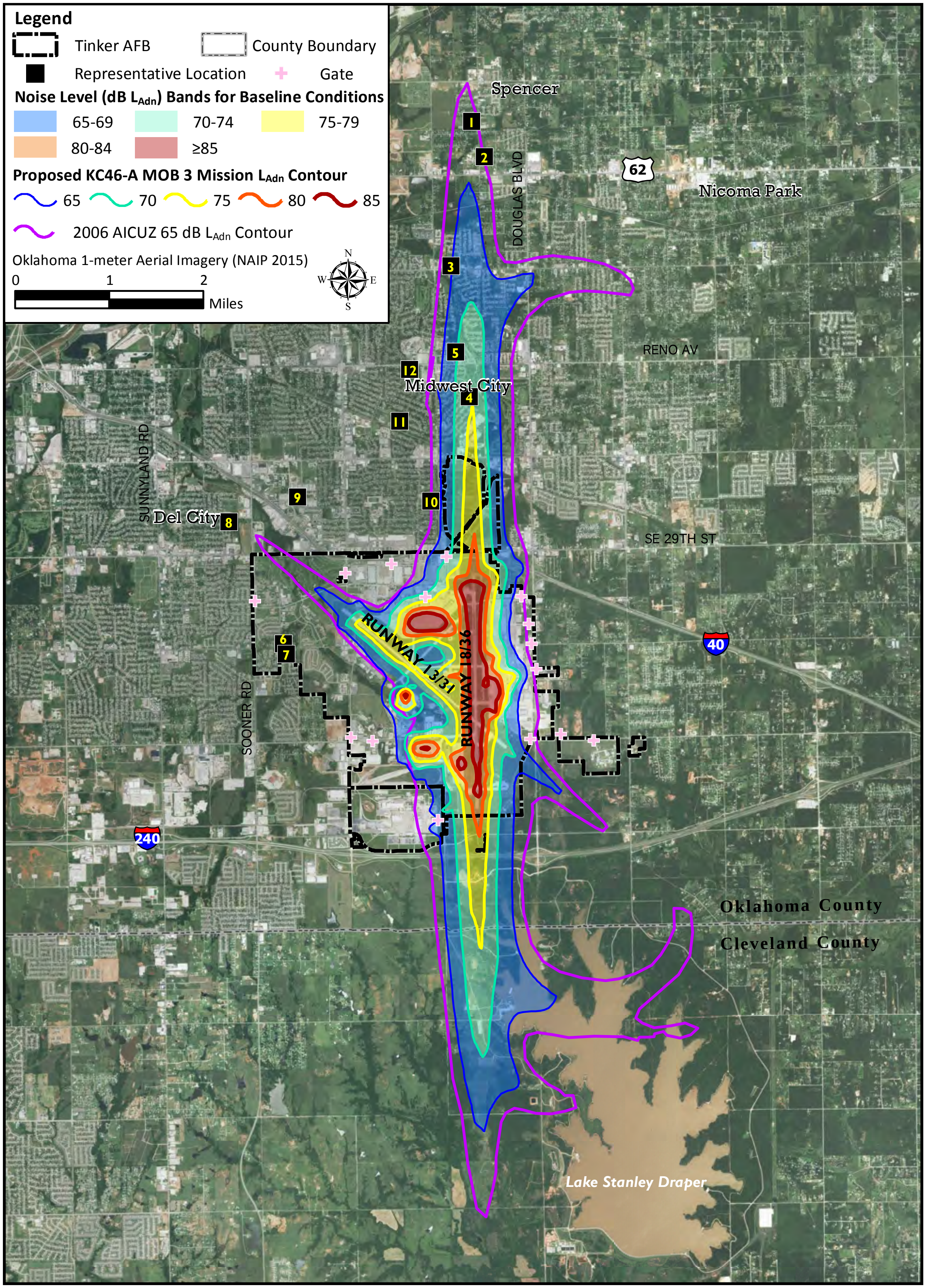

Figure 4-3. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Tinker AFB

Table 4-15. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	762	1,674	2,436	736	1,677	2,413	-26	+3	-23
70 - 74	646	743	1,389	669	745	1,414	+23	+2	+25
75 - 79	613	163	776	633	164	797	+20	+1	+21
80 - 84	339	6	345	348	7	355	+9	+1	+10
≥ 85	264	0	264	267	0	267	+3	0	+3
Total	**2,624**	**2,586**	**5,210**	**2,653**	**2,593**	**5,246**	**+29 (+1%)**	**+7 (<+1%)**	**+36 (+1%)**

Note: "+" indicates an increase and "-" indicates a decrease.

As presented in Table 4-16, the estimated off-base population affected by noise levels greater than 65 dB L_{Adn} would increase by 6 persons (less than 1 percent, from 5,264 to 5,270 persons). Methods used to estimate the number of people affected are described in Volume II, Appendix B, Section B.1.3.

Table 4-16. Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
65 - 69	3,859	3,865	+6
70 - 74	1,390	1,390	0
75 - 79	15	15	0
80 - 84	0	0	0
≥ 85	0	0	0
Total	**5,264**	**5,270**	**+6 (<+1%)**

Note: "+" indicates an increase and "-" indicates a decrease.

According to current DoD policy, persons exposed to 80 dB L_{Adn} over a very long period, with no barriers to the noise, are at an increased risk of NIPTS, commonly referred to as hearing loss (USD 2009). Although noise levels exceeding 80 dB L_{Adn} would affect 1 additional acre of off-base land, examination of aerial photography and land use data indicates that no persons reside in this area. On-base areas that are affected by noise levels greater than 80 dB L_{Adn} include areas along the flightline. No additional buildings would be affected by noise levels greater than 80 dB L_{Adn} with implementation of the proposed MOB 3 mission. Hearing loss risk among people working in high-noise environments on Tinker AFB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Tinker AFB are presented in Table 4-17. Noise levels would change by less than 1 dB at all of the locations studied.

Table 4-17. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Tinker AFB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Star Spencer High School	62	62	0
2	Spencer Road Christian School	62	62	0
3	Willow Brook Elementary School	66	66	0
4	Steed Elementary School	75	75	0
5	Midwest City Library	70	70	0
6	CDC West	42	42	0
7	Tinker Elementary School	44	44	0
8	Kerr Middle School	53	53	0
9	Rose State College	59	59	0
10	Eastside Elementary School	43	43	0
11	Country Estates Elementary School	58	58	0
12	Monterey Middle School	59	59	0

C&D activities in support of the proposed MOB 3 mission would be conducted in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of equipment mufflers and would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise, but noise impacts would not be substantial enough to be considered significant.

Noise impacts resulting from the proposed MOB 3 mission at Tinker AFB would not be expected to be perceived as significant. No mitigation measures are proposed at this time.

4.3.2 Air Quality

The following air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Tinker AFB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.3.1, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Tinker AFB.

Oklahoma County, which encompasses Tinker AFB, currently attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these areas. This criterion is being used only to determine if an impact occurs, as the area is in attainment and a PSD analysis is not required.

Construction – The proposed MOB 3 mission at Tinker AFB would require construction and/or renovation of airfield facilities, including training facilities, hangars, ramps, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Tinker AFB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors,* AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes the standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Tinker AFB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.3.1). Emissions from on-wing testing of KC-46A aircraft engines are based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Tinker AFB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from stationary and area sources were estimated by multiplying existing emissions generated at Tinker AFB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs. To be consistent, the analysis uses this approach to estimate stationary and source emissions at each of the four bases. In general landings and take-offs are a good indicator of operational tempo at an AFB. However, it is expected that this approach overestimates emissions from the proposed MOB 3 mission at Tinker AFB because aircraft maintenance and non-aircraft operations dominate base activities.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019 after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 507 ARW, which the MOB 3 mission would replace, at Tinker AFB (see Table 3-28).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.3.2.1 Air Quality Consequences

Table 4-18 presents estimates of emissions that would occur from infrastructure changes (see Table 2-11) for the proposed MOB 3 mission at Tinker AFB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-18. Total Construction Emissions for the Proposed MOB 3 Mission at Tinker AFB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Demolition	0.04	0.13	0.35	0.00	0.46	0.07	99
Building Construction/Renovations	0.89	4.67	6.48	0.01	5.47	1.14	1,284
Ramp and Shoulder Expansion - Pour Concrete	0.01	0.30	0.05	0.00	0.05	0.01	16
Ramp and Shoulder - Re-Stripe	0.04	0.21	0.27	0.00	0.27	0.05	47
Total Emissions	**0.98**	**5.31**	**7.15**	**0.01**	**6.25**	**1.27**	**1,447**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_2e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-19 summarizes the annual operational emissions within Oklahoma County that would result from implementation of the proposed MOB 3 mission at Tinker AFB. These data show that the net increase in emissions from the replacement of existing KC-135 aircraft operations with operations from 12 KC-46A aircraft would not exceed 250 tons per year for VOCs, CO, sulfur oxides (SO_x), PM_{10}, or $PM_{2.5}$. In addition, these emission increases would amount to no more than 2 percent of any total criteria pollutant generated within Oklahoma County in 2011 (see Table 3-27). Therefore, implementing the proposed MOB 3 mission at Tinker AFB would not result in significant impacts to these pollutant levels. However, these data also show that the net increase in NO_x emissions would exceed 250 tons per year. KC-46A aircraft operations and point and area source emissions would be the primary contributors to these emission increases.

Table 4-19. Annual Operations Emissions from the Proposed MOB 3 Mission at Tinker AFB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	**CO**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e (mt)**
KC-46A Aircraft Operations	20.12	78.25	263.71	14.65	0.96	0.82	40,444
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.05	0.28	0.29	0.00	0.04	0.04	68
GMVs	0.03	1.40	0.18	0.00	0.02	0.01	129
POVs – On Base	0.01	0.66	0.04	0.00	0.01	0.00	69
POVs – Off Base	0.40	36.41	2.53	0.02	0.38	0.10	3,372
Point and Area Sources	68.12	31.91	41.84	2.92	3.51	2.55	NA
Total Proposed MOB 3 Mission Emissions	**100.30**	**188.64**	**327.32**	**19.28**	**5.08**	**3.66**	**48,581**
Existing 507 ARW Emissions	**(26.67)**	**(81.55)**	**(70.53)**	**(5.86)**	**(1.82)**	**(1.27)**	**(16,096)**
Proposed MOB 3 Mission Minus 507 ARW Emissions	**73.63**	**107.09**	**256.78**	**13.42**	**3.26**	**2.39**	**32,485**
Operational Emissions Increase Fraction of Oklahoma County Emissions	**0.003**	**0.001**	**0.01**	**0.02**	**0.0001**	**0.0004**	**0.005**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_2e (mt) = carbon dioxide equivalent in metric tons; NA = not available N/A = not applicable.

Emissions of NO_x resulting from implementation of the proposed MOB 3 mission within Oklahoma County were compared to the most recent Oklahoma County emissions inventory (2011) to determine the relative magnitude of these emissions and their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. The NO_x emission increases that would result from the proposed KC-46A operations would amount to approximately 1 percent of the total NO_x emissions generated by Oklahoma County in 2011 (see Table 3-27). The overwhelming majority of NO_x emissions that would result from the proposed MOB 3 mission would occur from intermittent KC-46A aircraft operations up to an altitude of 3,000 feet AGL and across several square miles that comprise the Tinker AFB airspace and adjoining aircraft flight patterns. These emissions would substantially disperse through this volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Given that Oklahoma County attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to a NAAQS exceedance (emissions and regional area concentrations are directly related). Therefore, the proposed MOB 3 mission at Tinker AFB would not result in significant impacts to air quality.

Operation of the proposed MOB 3 mission at Tinker AFB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and point and area sources would generate the majority of HAPs. As described for the aforementioned NO_x impacts, emissions of HAPs from proposed KC-46A operations would disperse in the atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Emissions of HAPs from point and area sources would occur from a variety of sources at locations throughout Tinker AFB, including boilers, solvent usages, and paint stripping and applications. The numerous locations of these sources and their intermittent operations would result in dispersed ambient concentrations of HAPs. As a result, the combined emissions from all MOB 3 mission sources at Tinker AFB would be expected to produce minimal ambient impacts of HAPs in a localized area.

Early in planning, the USAF reconsidered operational assumptions and projections to avoid or reduce potential impacts to the extent feasible. This resulted in the development of alternatives that reduced the emissions of criteria pollutants to the extent feasible by reducing the number of near-field operations (e.g., landings and take-offs). At this time, the USAF is not aware of any other feasible mitigations that could be applied to further reduce the emissions impact from KC-46A aircraft operations and on-wing engine testing activities.

4.3.2.2 Climate Change Effects

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-18 shows that construction for the proposed MOB 3 mission at Tinker AFB would produce a total of 1,447 metric tons of CO_2e emissions. Table 4-19 shows that operation of the proposed MOB 3 mission at Tinker AFB would result in a net increase of 32,485 metric tons per year of CO_2e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Tinker AFB, the following considers how climate change may impact proposed operations at Tinker AFB. For Tinker AFB, the projected climate change impact of concern is increased temperatures and aridity, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the southern Plains region surrounding Tinker AFB will experience warmer temperatures and decreasing precipitation. These conditions will produce more frequent extreme events (e.g., heat waves, droughts, and scarcities of water supplies).

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.3.3 Safety

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Tinker AFB with implementation of the proposed KC-46A MOB 3 mission. Tinker AFB has hosted many large aircraft missions in the past, and large aircraft airfield provisions remain in place.

4.3.3.1 Flight Safety

Aircraft Mishaps – As described in Section 4.1.3, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (B-767). Using the accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Therefore, implementation of the KC-46A MOB 3 mission at Tinker AFB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or in any increase in the risks of occurrence of those mishaps.

Because the KC-46A would utilize the existing KC-135 flight patterns and the existing AR tracks, the KC-46A is not anticipated to create additional flight safety risks. The proposed basing of 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents.

Bird/Wildlife-Aircraft Strike Hazard – The proposed addition of 12 KC-46A aircraft and the associated operations would increase the risk of bird/wildlife-aircraft strike hazards at Tinker AFB. Tinker AFB has hosted multiple large aircraft missions in the past and is familiar with implementation of BASH programs and the risk of bird/wildlife-aircraft strike hazard events in the regional area. Ongoing elements of the Tinker AFB BASH Plan (Tinker AFB 2014a) would continue, with updates as required to address the operations of the KC-46A.

Tinker AFB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to bird/wildlife-aircraft strike hazard issues.

4.3.3.2 Ground Safety

Although mishap and emergency response plans would be updated, no aspects of the proposed KC-46A MOB 3 mission at Tinker AFB are expected to create new or unique ground safety issues. O&M procedures conducted by base personnel would change from current conditions and procedures with AFIs modified for the KC-46A. All current activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission at Tinker AFB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented. Proposed construction, renovation, and infrastructure improvement projects related to the KC-46A MOB 3 mission would be consistent with established APZs, and no significant impacts related to APZs would occur. See Volume II, Appendix B, Figure B-1, for the typical generic CZ and APZ dimensions.

KC-46A operations would occur in an airfield environment similar to the current operational environment at Tinker AFB. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Tinker AFB airfield safety conditions would still be similar to baseline conditions. As indicated in Section 3.3.3.2, the base Fire Department will continue to be party to mutual-aid support agreements with nearby communities. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

As indicated in Section 3.3.3, there is incompatible residential development in the APZs at Tinker AFB. Tinker AFB would continue working with communities and developers to highlight the AICUZ guidelines.

4.3.4 Soils and Water

4.3.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur within the Tinker AFB boundary, and all of this work would occur on previously disturbed areas.

The total disturbed area for the projects proposed as part of the KC-46A MOB 3 mission would be less than 8 acres (new construction). The proposed projects include the removal of a small deicing fluid recovery basin that is no longer used.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. The *Tinker AFB Storm Water Pollution Prevention Plan* (Tinker AFB 2014b) describes control practices that are generally used at the base to reduce the potential for soil erosion and sediment transport off site. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.3.4.2 Water Resources

The proposed 507 ARW ramp expansion would impact approximately 45 linear feet of East Crutcho Creek. The existing culvert would be expanded and fill material for the foundation of the ramp expansion would be placed in the creek. East Crutcho Creek is a jurisdictional water of the United States, and according to the Tulsa District of the U.S. Army Corps of Engineers (USACE), this work would be permitted using Nationwide Permit 39. Because impacts to East Crutcho Creek would be less than 300 linear feet, no mitigation would be required (Ware 2016).

A Finding of No Practicable Alternative (FONPA) would be prepared for this project should Tinker AFB be selected for the proposed MOB 3 mission. The FONPA would be prepared in accordance with 32 *CFR* 989 and AFI 32-7064, "Integrated Natural Resources Management."

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 *USC* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

Less than 8 acres of impervious surface would be added to the existing impervious surface on the installation. Although the additional impervious surface would increase sheet flow and stormwater runoff, it would not result in long-term adverse impacts to water resources on Tinker AFB.

All necessary permits would be obtained prior to construction of the proposed MOB 3 projects including an Oklahoma Department of Environmental Quality (ODEQ) permit to discharge stormwater associated with construction activities under OPDES General Permit OKR10. Tinker AFB or the construction contractor would submit an NOI under the NPDES procedures and would prepare a site-specific SWPPP describing control measures to be implemented prior to construction. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

The *Tinker AFB Storm Water Pollution Prevention Plan* (Tinker AFB 2014b) identifies control practices to be followed to minimize or eliminate pollutant discharges from industrial activities into the stormwater runoff leaving the base by implementing control practices at potential stormwater pollutant sources.

Implementation of the SWPPP will maintain Tinker AFB’s compliance with the stormwater discharge prohibitions, effluent limitations, and receiving water limitations specified in the ODEQ’s Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities (OKR05) and with the illicit discharge detection and elimination minimum control measure in the ODEQ’s General Permit for Phase II Small Municipal Separate Storm Sewer System (MS4) Discharges (OKR04). The SWPPP also provides for the proper training of employees and would be updated to reflect the land disturbance associated with the proposed KC-46A MOB 3 development projects.

No significant impacts to water resources at Tinker AFB are anticipated to result from implementation of the proposed MOB 3 mission.

4.3.4.3 Floodplains

Minor adverse impacts to floodplains are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB. EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, requires the USAF to avoid, to the extent practicable, any possible long-and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development when there is a practicable alternative. This EO also encourages Federal agencies to plan projects considering a larger flood zone (e.g., the 500-year floodplain). Because the base has mapped the 500-year floodplain, the vertical flood elevation and corresponding horizontal floodplain will be determined using the 500-year floodplain.

Due to the location of KC-135 infrastructure, specific mission requirements, and operation and maintenance facilities necessary to support the proposed KC-46A MOB 3 mission at Tinker AFB, the existing 507 ARW parking ramp would be expanded in place.

Approximately 3.5 acres of the 500-year floodplain would be impacted by ramp expansion (Figure 4-4). During the facility planning, floodplains were identified and avoided where possible. However, due to the extent of the 500-year floodplain on Tinker AFB, particularly around the existing 507 ARW parking ramp, there are no practicable alternatives to expanding the aircraft parking ramp in the 500-year floodplain. Providing adequate parking for the proposed KC-46A MOB 3 aircraft at Tinker AFB is restricted by a variety of different factors, of which the most important are described as follows.

- Operational efficiencies (e.g., existing refueling infrastructure and aircraft storage and maintenance facilities) dictate that KC-46A aircraft be located on the existing aircraft parking ramp area. Due to the extent of the Federal Emergency Management Agency (FEMA) 500-year floodplain, no other locations outside of the floodplain meet this requirement.

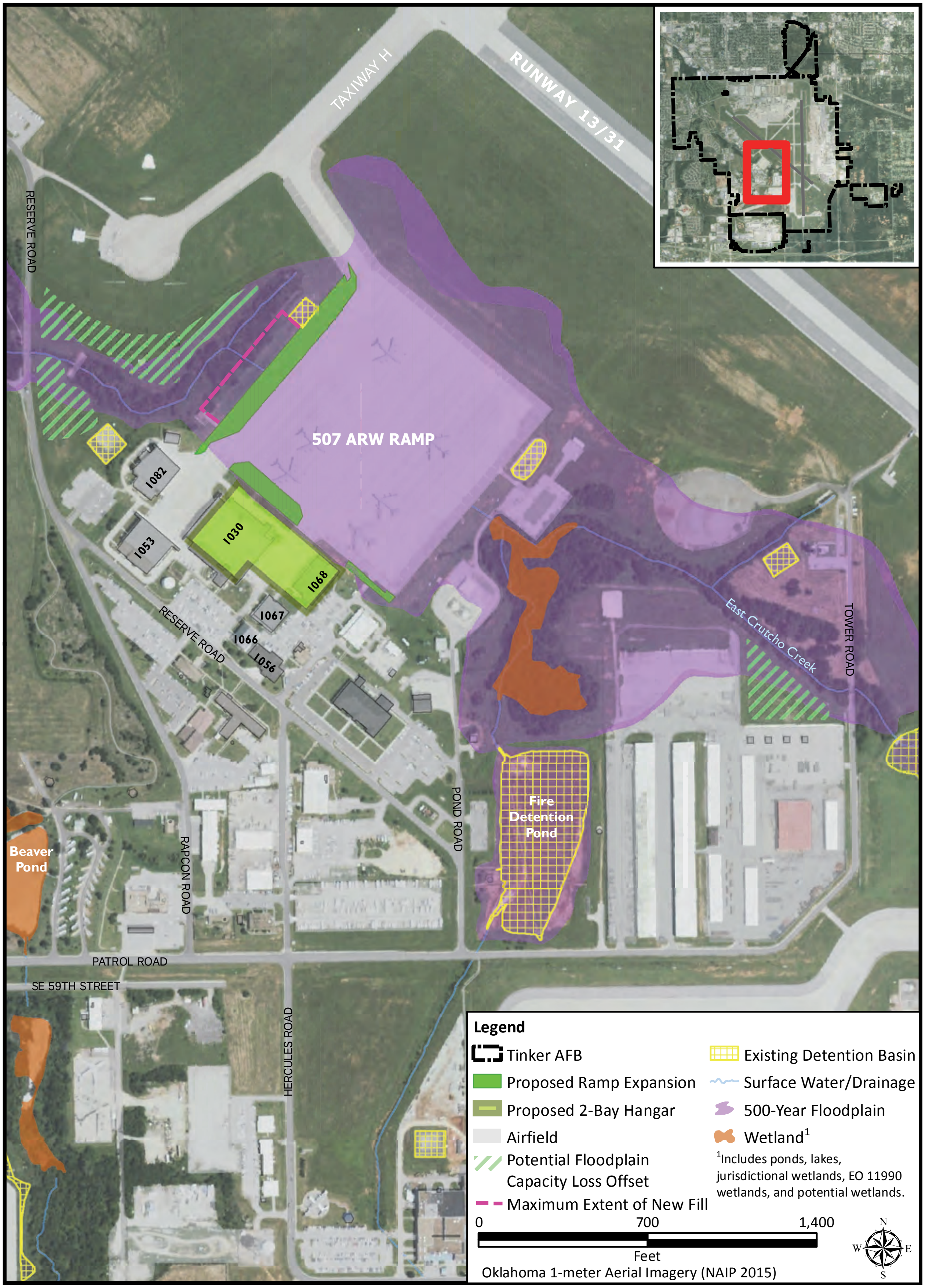

Figure 4-4. Floodplains Near the Proposed 507 ARW Ramp at Tinker AFB

- No other areas are available for parking the proposed KC-46A aircraft on Tinker AFB where these aircraft can be refueled and prepared for training and global mobility missions.
- Access between facilities and the ramps/taxiways cannot exceed a 1-percent slope.

Facility planners considered all of these factors and determined there were no other practicable alternatives for adequate parking for the proposed KC-46A MOB 3 aircraft on Tinker AFB. Following ramp expansion, the disturbed ground would be returned to its pre-construction condition (e.g., elevation, topography, and vegetation).

In order to avoid altering the elevation, function, and capacity of the 500-year floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion. Potential excavation locations for floodplain capacity offset are shown on Figure 4-4. Prior to excavation, utility lines (e.g., natural gas and communications) would be relocated as necessary. In addition, groundwater monitoring wells associated with the ERP program could require removal or replacement. If wells are impacted, the base would coordinate with the regulatory agencies to identify the appropriate course of action for each well.

Use of excavated material adjacent to and from within the same floodplain would ensure that the elevation of floodwaters would not be affected by the proposed ramp expansion. Although modeling using the Hydrologic Engineering Center's River Analysis System or similar system would be used to model the floodplain, no net loss of floodplain elevations, function, or capacity is anticipated. In addition, Tinker AFB would adhere to flood risk management standards detailed in EO 13690, as well as policies and procedures outlined in the *Tinker AFB INRMP* (Tinker AFB 2015a).

To the maximum extent practical, land disturbance in floodplains has been avoided. A FONPA would be prepared should Tinker AFB be selected for the proposed MOB 3 mission. The FONPA would be prepared in accordance with 32 *CFR* 989 and EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*.

Although short-term, minor effects on water resources could result from work in the floodplain of East Crutcho Creek, significant, long-term, adverse effects on water resources at Tinker AFB are not anticipated to result from implementation of the proposed KC-46A MOB 3 mission.

4.3.5 Biological Resources

4.3.5.1 Vegetation

Activities associated with the construction, demolition, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands. Vegetation in these areas are primarily non-native and of low ecological value. These areas are already disturbed for ongoing, routine maintenance and/or landscaping activities. Therefore, no significant impacts to vegetation are anticipated to result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. Noise produced during construction, renovation, and demolition activities would result in short-term, minor impacts to wildlife.

Implementation of the proposed MOB 3 mission at Tinker AFB would increase aircraft operations. Noise impacts resulting from an increase in operations are anticipated to be minimal compared to the existing aircraft noise at Tinker AFB. Continued adherence to the base's BASH Plan (Tinker AFB 2014b) would minimize the potential for bird-aircraft strikes. Significant impacts to wildlife would not occur from implementation of the proposed MOB 3 mission at Tinker AFB.

Although the number of aircraft operations associated with the proposed MOB 3 mission would increase, the noise resulting from these operations would be minor in that only seven additional acres of land off-base would be affected by noise levels greater than 65 dB L_{Adn}. Therefore, only short-term, minor impacts to wildlife are anticipated to result from the implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.3 Special-Status Species

Tinker AFB is located near the middle part of the Central Flyway for migratory birds and a variety of different species that are protected under the Migratory Bird Treaty Act (MBTA) are known from this area. In May 2009, the partial remains of a federally threatened piping plover were identified as resulting from an aircraft strike (Tinker AFB 2015a). No additional piping plovers have been identified on Tinker AFB and there are no known nesting records for this species in Oklahoma County (USFWS 2011a). This occurrence is considered rare because they are strictly a spring and fall migratory species in Oklahoma.

On 5 May 2016, the USFWS Oklahoma Ecological Services Field Office (OKESFO) submitted a comment to the project website that indicated the list of species provided in the USAF letter dated 17 March 2016 is accurate and they concur with the species listed (see Volume II, Appendix A, Section A.6) (USFWS 2016g). The OKESFO stated that they do not concur with the "No Effect" determination for the piping plover. The comment indicated that with an increase in aircraft operations, the potential for bird-aircraft strikes would not decrease and the potential exists for additional takes. The comment also expressed concern about other federally-listed migratory birds.

Although increased aircraft operations could increase the potential for future bird strikes, the USAF has not observed a one-to-one correlation between increased aircraft operations and increased bird strikes. Increases in bird strikes at USAF installations are more correlated to migration times (http://www.af.mil/News/ArticleDisplay/tabid/223/Article/112337/bird-migration-season-increases-bird-strike-risks.aspx) (Tinker 2014a). Additional documentation indicates that increases in bird-aircraft strikes are generally not attributable to an increase in aircraft operations (https://www.co.sutter.ca.us/pdf/cs/pc/NBHCP_Final_EIR-EIS_Vol_1.pdf).

In response to the USFWS website comment, the USAF submitted a letter to the USFWS on 5 August 2016 (see Volume II, Appendix A, Section A.6). This letter indicated the USAF's intent to prepare a Biological Assessment (BA) to facilitate the regulatory review of potential impacts to threatened and endangered species (the piping plover in particular) resulting from the proposed MOB 3 mission. The letter identified the ROI and indicated that, in addition to the piping plover, the following federally listed species would be included in the BA: least tern, interior population (*Sterna antillarum*) – endangered; whooping crane (*Grus americana*) – endangered; and red knot (*Calidris canutus rufa*) – threatened.

After evaluation of the data for the species mentioned above, the USAF instead prepared a Biological Evaluation (BE) for these same species (See Volume II, Appendix A, Section A.6). The BE was submitted to the USFWS on 19 September 2016. Based on the information contained in the BE, the USAF determined that should Tinker AFB be selected for the proposed

KC-46A MOB 3 mission, implementation of the mission may affect, but is not likely to adversely affect, the least tern, the whooping crane, the red knot, or the piping plover. For the least tern, the whooping crane, and the red knot, this determination is based on the lack of observation of these species at Tinker AFB, the lack of suitable habitat at Tinker AFB, and the migratory nature (thus only temporary presence) of these species in areas surrounding Tinker AFB.

The determination for the piping plover is based on the fact that more than 192,000 aircraft operations have occurred at Tinker AFB since the single piping plover was struck by an aircraft in 2009, with no additional piping plover sightings or strikes occurring in the last 7 years. In addition, no nesting occurrence is known for this species at Tinker AFB or in Oklahoma County, and suitable nesting habitat for piping plover does not occur at Tinker AFB or in Oklahoma County. Any piping plovers occurring in the region are anticipated to be temporary migrants. The likelihood of another piping plover strike is considered extremely unlikely and is therefore discountable (USFWS 1998).

Implementation of the proposed MOB 3 mission at Tinker AFB would increase total annual aircraft operations by less than 13 percent. Tinker AFB currently implements numerous measures to minimize the potential for bird strikes. Since 2001, Tinker AFB has contracted with United States Department of Agriculture (USDA) Wildlife Services to provide daily wildlife control services for Tinker AFB. On a daily basis, two USDA biologists are on Tinker AFB to prevent birds from using the installation. The USDA biologists conduct special runway surveys for bird activity during or immediately following rainfall events. They conduct bird metric surveys using methodology contained within the Integrated Natural Resources Management Plan (INRMP) and the Memorandum of Understanding between the USDA and USAF for these services. These biologists document information such as date, time, weather conditions, species observed, species activity, direction of movement, location on airfield, and control methods, if applicable. They also perform small-scale passive services, such as eliminating roosting sites, bird/wildlife proofing buildings and hangars, and excluding bird/wildlife access to culverts. As needed, for non-special status species, the biologists employ active control methods (e.g., the use of pyrotechnics to disperse hazardous migrating bird populations). They are responsible for renewing and reporting on the bird depredation permit issued by the USFWS for basewide bird control, and they conduct migratory bird protection training on the installation.

Additional measures include quickly filling or repairing any areas of standing water or restricted drainage on the airfield, and seeding or sodding any bare, non-grassy areas resulting from erosion or construction that could create habitat or a food source for birds. All grass areas on the airfield and CZs are managed at a uniform height of 7-14 inches. Areas near the airfield with a variety of grass species are mowed when the average grass height, not including seed heads, exceeds tolerances. Most grass seeds found on the airfield are less desirable as a food source for birds. Grounds maintenance crews begin mowing areas adjacent to runways and finish in the infield or outer most grass areas. This causes insects and other animals to move away from aircraft takeoff and landing areas. The Natural Resources group at Tinker AFB has also identified species-specific measures to minimize bird use of the airfield. For example, the installation has removed fish-producing ponds near the airfield to reduce the presence of waterfowl species such as mergansers and loons.

With regard to aircraft flight operations, all flying organizations on Tinker AFB are updated on bird activity on a daily basis. The USAF implements a variety of different operational minimization measures during migration (spring and fall) to prevent bird strike. These involve changing pattern altitudes, changing pattern directions to avoid bird concentrations, and avoiding takeoffs/landings at dawn/dusk. During times of high bird activity, Flight Commanders strongly consider reducing or eliminating flight operations within one hour before and after sunrise and sunset.

During times of high bird activity, additional measures can be implemented by air traffic controllers in the Tower to avoid bird strike. These include rescheduling local training or transition elsewhere, raising altitude en-route to low-level or training areas, limiting time on low-level routes to the minimum required for accomplishing training requirements, and selection of low-level routes or training areas based on bird hazard data from the USAF BASH team internet website (e.g., the Bird Avoidance Model, Avian Hazard Advisory System or Low-Level Route Analysis). USAF air traffic controllers also have the authority to discontinue multiple approaches and require aircraft to make full-stop landings only (i.e., no touch and go landings).

Of the six State Species of Special Concern documented on Tinker AFB, only the barn owl, burrowing owl, loggerhead shrike, and Swainson's hawk have potential to migrate through the this area of the Central Flyway. However, continued adherence to the measures described above would minimize the risk of aircraft strike. No nesting habitat for these species occurs on Tinker AFB. In addition to the INRMP and BASH Programs, Tinker AFB complies with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds.*

Because the proposed construction, demolition, and renovation would not occur in the southwestern portion of the base, impacts to the Texas horned lizard would not occur. Populations of Texas horned lizards will continue to be closely monitored at the base.

The proposed facilities and infrastructure changes would not occur within the known Oklahoma penstemon habitat located in the southeastern portion of the base, within the leased land immediately adjacent to and south of Landfill 6, or the near the northeastern portion of Glenwood. Therefore, implementation of the proposed MOB 3 mission at Tinker AFB would not adversely affect this special status plant species.

Approximately 1 acre of forested floodplain habitat would be impacted by the proposed ramp expansion to the west of the 507 ARW ramp. This area is described in the base INRMP as habitat for migratory bird species at risk. The species at risk are defined by the base for the purposes of natural resource management. No Federal or state-listed species are known to use this habitat. Approximately 1,033 acres of habitat for species at risk occur at Tinker AFB. The loss of 1 acre of habitat represents less than 0.1 percent of the available habitat. In order to minimize potential impacts to migratory birds, removal of trees in the vicinity of the proposed parking ramp would not occur during the migratory bird breeding season (1 April – 31 July.)

No significant, adverse impacts to special-status species are anticipated to result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.4 Wetlands

No wetlands occur within the immediate areas proposed for development and no direct, significant impacts to wetlands are anticipated. Wetlands are located upstream and downstream of the 507 ARW Ramp. During construction, control measures identified in a site specific stormwater pollution prevention plan would be implemented to minimize impacts to these wetland areas. Short-term, indirect, minor impacts to wetlands could result from implementation of the proposed MOB 3 mission at Tinker AFB.

While no wetlands are located within the area proposed for development, East Crutcho Creek is located in the area proposed for development. Potential impacts to East Crutcho Creek are discussed in Section 4.3.4.

4.3.6 Cultural Resources

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would include construction of two new facilities and additional ramp space. The largest new construction project would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities (Hangar 1053 and Buildings 1056 and 1082) and within the hydrant fueling system on the existing KC-135 ramp. None of these facilities are in the Historic District, and none are eligible for NRHP listing (Section 3.3.6.1, Table 3-30). The Oklahoma SHPO concurred that there are no known historic properties within the APE of the proposed KC-46A MOB 3 mission at Tinker AFB (see letter dated 6 April 2016, Volume II Appendix A, Section A.5.3).

Tinker AFB has determined that no historic properties would be affected. The SHPO has concurred with this finding and requested additional concurrence on archaeological resources from the Oklahoma Archaeological Survey (OAS). The OAS concluded that prior to any construction, an archaeological field inspection would be required (see letter dated 19 May 2016, Volume II, Appendix A, Section A.5.3). Should Tinker AFB be selected for the proposed MOB 3 mission, an archaeological field inspection of the construction area would be completed.

If any archaeological discoveries were to occur, either during field surveys, or unanticipated or inadvertent discoveries during construction activities, the USAF would comply with Section 106 of the NHPA.

No Section 106 impacts to tribal resources or traditional cultural properties would result from implementation of the MOB 3 mission. As required by Sections 101(d)(6)(B) and 106 of the NHPA, implementing regulations at 36 *CFR* Section 800.2(c)(2), EO 13175, DoDI 4710.02, and AFI 90-2002, Tinker AFB initiated Section 106 government-to-government consultation with five tribes to identify traditional cultural properties. Volume II, Appendix A, Section A.3, contains a record of these consultations. The consultation correspondence included an invitation to participate in the NEPA process, and an invitation to consult directly with the Tinker AFB base Commander regarding any comments, concerns, and suggestions (see letter dated 28 March 2016, Volume II, Appendix A, Section A.3).

The Osage Nation responded on 20 May 2016 with no objections to the USAF's finding of no adverse impact. The Seminole Nation of Oklahoma expressed an interest in discussing the project with the Commander of Tinker AFB. Col Stephanie Wilson of Tinker AFB met with Chief Harjo of the Seminole Nation of Oklahoma on 5 August 2016. Although Chief Harjo was interested in small business opportunities for the Seminole Nation of Oklahoma, he had no comments or concerns specific to the proposed KC-46A MOB 3 mission. Additional efforts were made to contact the remaining three non-responsive tribes without success (see Table A-1 in Volume II, Appendix A, Section A.3). While the USAF values its relationship with all tribes and will continue to consult on other planning efforts or matters of known or potential interest to tribes, Section 106 consultation on the proposed KC-46A MOB 3 mission at Tinker AFB is now complete.

4.3.7 Land Use

4.3.7.1 Physical Development

The proposed C&D projects and renovations to existing facilities at Tinker AFB would all occur within the flightline area where existing airfield and aircraft O&M support activities are located. Because the physical development associated with implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would not result in any changes to existing land use categories, no direct land use impacts would occur. Indirect effects from construction (e.g., noise, dust, and traffic) could result from implementation of the MOB 3 mission. However, these effects would be temporary and minor. The physical changes and daily activities on the ground would be confined to Tinker AFB. Implementation of the proposed projects on Tinker AFB would have no impacts to off-base land use.

4.3.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Tinker AFB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

Even though aircrews associated with the proposed MOB 3 mission would fly more airfield operations per year than are flown by KC-135 aircrews under baseline conditions, the K-46A is slightly quieter during approach and roughly equal in loudness during departure. Depot maintenance aircraft at Tinker AFB are all louder than the KC-46A (see Section 4.3.1.1). The total geographic area exposed to noise from MOB 3 aircraft operations compared to baseline conditions is shown on Figure 4-3. Implementation of the proposed MOB 3 mission would increase off-base lands to noise greater than 65 dB L_{Adn} by 7 acres from 2,586 to 2,593. The anticipated noise increase to these off-base areas would not cause unsafe conditions and would not change or conflict with any existing or planned land uses in this area.

Comprehensive plans, zoning ordinances and other legislative tools used by the communities surrounding the base generally support compatible land use planning and provide for review and protection of the areas surrounding the airfield. Tinker AFB also continues to work with the member communities of the Association of Central Oklahoma Governments by implementing recommended actions from the 2008 Joint Land Use Study (JLUS) and other base planning activities. Although an additional 7 acres and 6 residents would be exposed to noise levels above 65 dB L_{Adn}, no significant impacts to on- or off-base land use would result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.8 Infrastructure

Refer to Section 3.3.8 for a description of existing infrastructure system capacities and conditions at Tinker AFB. Table 2-13 provides changes in population that would result from implementation of the proposed MOB 3 mission at Tinker AFB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.3.8.1 Potable Water System

Using the average usage rate of 125 GPD (UFC 3-230-03) per person, it is anticipated that the change in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.1 MGD per day (125 GPD x 784). This increase, combined with the existing daily water demand (0.75 MGD) at Tinker AFB would not exceed the base's water system capacity of 6.5 MGD and impacts would be less than significant.

4.3.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate the proposed increase in population would increase daily wastewater discharge from Tinker AFB by 0.1 MGD (120 GPD x 784). This increase, combined with the existing daily wastewater discharge (1.02 MGD), would not exceed the Oklahoma City wastewater system capacity of 101 MGD and impacts would be less than significant.

4.3.8.3 Stormwater System

The proposed MOB 3 mission would require demolition of facilities and construction of new facilities. This would take place within the existing developed base flightline and cantonment areas. Table 2-12 identifies projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 8 acres (the area for new construction), and impacts would be less than significant. During the short-term construction period for the proposed MOB 3 mission, all contractors would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. Additional stormwater requirements are described in Section 3.3.4.

4.3.8.4 Electrical System

The USEIA estimates that the average household in Oklahoma uses 1.1 MW per month (USEIA 2014). Converting this rate to an hourly rate and assuming 308 new households (i.e. 1 new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Tinker AFB by 0.5 MW. This increase is a small fraction of the 50.8 MW that Tinker AFB has averaged between 2011 and 2014, and impacts would be less than significant.

4.3.8.5 Natural Gas System

The USEIA estimates that the average person in Oklahoma uses 17.8 Mcf of natural gas per year (USEIA 2016). Using this rate, the proposed increase in population (784) would increase natural gas use at Tinker AFB by 1.6 Mcf per hour or 14,016 Mcf per year. This increase is approximately 0.1 percent of the current 9.7 MMcf per year currently used at Tinker AFB and impacts would be less than significant.

4.3.8.6 Solid Waste Management

Using methodology developed by the USEPA to determine the amount of C&D debris, implementation of the proposed MOB 3 mission would result in 11,796 tons of C&D debris (USEPA 2009b). Solid waste generated from the proposed C&D activities would consist of building materials such as concrete, metals (e.g., conduit, piping, and wiring), and lumber.

Disposal of the debris would be completed through an integrated C&D debris diversion approach or removal to landfills. The integrated C&D debris diversion approach includes reuse, recycling, volume reduction/energy recovery, and similar diversion actions. The DoD has set a target C&D debris diversion rate of 60 percent by fiscal year 15 (DoD 2012). Application of the DoD target diversion rate would result in 7,077 tons of C&D debris being diverted for reuse or recycling and 4,718 tons being placed in landfills. It is anticipated that the Southeast Landfill would be able to accommodate this short-term minor increase in capacity. Additional personnel and dependents associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.3.8.7 Transportation

Implementation of the proposed MOB 3 mission at Tinker AFB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities would access the base via the commercial vehicle gate.

Construction-related traffic would minimally add to the total existing traffic volume in the area and on base. Increased traffic associated with C&D activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces. Additionally, intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the base and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities are complete. As a result, no long-term impacts to on- or off-base transportation infrastructure are anticipated.

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would result in an increase of 308 in on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 3 percent increase in daily commuting traffic to and from the base. In addition to the increase in personnel, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. This increase in base mission personnel could increase congestion and queuing at the gates during morning and evening rush hours. To minimize the potential for adverse impacts, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gates to process security checks during peak hours. Regional access roads and the on-base road network have adequate capacity to absorb the minor amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.3.9 Hazardous Materials and Waste

4.3.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would not add any new hazardous materials that exceed the base's current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the proposed KC-46A MOB 3 mission, but would be expanded to meet the increased use.

4.3.9.1.1 Aboveground and Underground Storage Tanks

The replacement of eight KC-135 aircraft with 12 KC-46A aircraft at Tinker AFB has the potential to increase the maximum daily consumption of Jet-A. The potential increase in fuel consumption would be supported by the current infrastructure at the base. New and remodeled facilities would require the addition of ASTs for use with generators and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. The Tinker AFB Oil and Hazardous Substance Integrated Contingency Plan (ICP) would be amended to capture any changes in facility design, construction, operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products (Tinker AFB 2007).

4.3.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Tinker AFB. Any renovation, construction, or demolition proposed at Tinker AFB would be reviewed to determine if ACM is present. Volume II, Appendix F, Table F-3, contains a list of the seven buildings proposed for modification and their potential to contain ACMs. Additional testing would be conducted where no data exist. All testing and data collection would be conducted in accordance with the *Asbestos Management Plan* (Tinker AFB 2012). Any exposed friable asbestos would be removed in accordance with USAF policy and applicable health laws, regulations, and standards. Written notification to the ODEQ is required for all demolition work and renovation work involving asbestos above certain quantities, per 40 *CFR* 61.145(a) and 61.145(b) (Tinker AFB 2012). Additionally, the handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

All renovation, construction, or demolition projects proposed at Tinker AFB would be reviewed to determine if LBP is present, and whether LBP would be disturbed in the performance of the work. Volume II, Appendix F, Table F-3, contains a list of the seven buildings that would be affected by demolition or renovation, the years of construction, and the potential for LBP. In accordance with the LBP Management Plan (Tinker AFB 2010), any required renovation or demolition activities (e.g., sanding, scraping, or other disturbances of the paint) that could generate lead dust would not be performed without prior LBP testing. All handling and disposal of wastes would be in compliance with Federal and state regulations.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.3.9.2 Hazardous Waste Management

Section 4.1.9.1 describes the hazardous waste management specific to the KC-46A aircraft. Tinker AFB would continue to operate as an LQG and would generate hazardous wastes during various O&M activities associated with the proposed KC-46A MOB 3 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. No new hazardous materials would be added that exceed the base's current hazardous waste processes. No adverse impacts are anticipated from the increased volume of hazardous waste. All hazardous wastes would be handled and managed in accordance with Tinker AFB Instruction 32-7004 (Tinker AFB 2015b), and Federal, state, and local regulations.

4.3.9.3 Environmental Restoration Program

Tinker AFB is divided into four groundwater management units (GMUs). Within these GMUs, there are currently 13 ERP sites. No ERP sites occur in the vicinity of the proposed facilities and infrastructure improvements associated with the KC-46A MOB 3 mission at Tinker AFB (see Section 2.5.3 and Figure 2-11).

The proposed project area is within Site CG038 Southwest Contaminated Groundwater Management Unit. This site is defined for the purposes of investigating solvent and hexavalent chromium groundwater contamination from a variety of sources. Groundwater in the area is typically encountered at approximately 10 feet below ground surface (bgs) and may be encountered during C&D-related excavations. Projects associated with the proposed KC-46A MOB 3 mission at Tinker AFB could require the modification or the abandonment and replacement of three groundwater monitoring wells (2-410B, 2-418B, and 2-542B) associated with the Basewide Groundwater Monitoring Program.

The USAF would coordinate with the AFCEC restoration office before any construction, renovation, demolition, or modification projects are initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with current EIAP processes, as specified in AFI 32-7061. The USAF would ensure that these projects are coordinated with ongoing remediation or investigation activities at any ERP site. However, if existing plans and procedures are followed, there would be no anticipated impacts on these ERP sites.

During C&D activities, there is the potential to encounter contaminated soil and groundwater in areas associated with ERP sites. There is also the possibility that undocumented contaminated soils or groundwater from historical fuel spills may be present. If encountered, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

Tinker AFB would coordinate with the ODEQ prior to any construction activities on an active ERP site. No significant impacts to ERP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near ERP sites.

4.3.10 Socioeconomics

4.3.10.1 Population

The current personnel at Tinker AFB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-12. Implementation of the proposed MOB 3 mission would potentially add up to 293 full-time mission personnel (not including contractors) and 476 military and DoD civilian dependents to Oklahoma County, resulting in an approximate 0.1 percent county population increase. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population and would not be migrating to the area.

4.3.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-12, implementation of the proposed MOB 3 mission at Tinker AFB would increase the full-time work force assigned to Tinker AFB by 308 total personnel (including contractors). Using the IMPLAN model, the direct effect of 308 full-time personnel at Tinker AFB would have an estimated indirect and induced effect of approximately 94 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, real estate, wholesale trade, physician offices, general merchandise retail, nursing and care facilities, and other restaurants. With a 2014 unemployment rate of 4.2 percent in Oklahoma County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that $101 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Tinker AFB. MILCON expenditures would be funded in 2017. The total expenditures could generate 968 jobs, primarily within the construction industry or related industries, including maintenance and repair construction, retail stores (i.e., nonstore retailers, miscellaneous store, general merchandise, gasoline stations), wholesale trade, and real estate. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 365,832 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of $101 million at Tinker AFB would generate an estimated $31.2 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.3.10.3 Housing

Assuming all incoming full-time mission personnel (not including contractors) would require off-base housing, there would be a potential need for 293 off-base housing units. Based on the number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.3.10.4 Education

As described in Section 2.5.3.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 286 dependents would be of school age and would enter any of the schools in Oklahoma County. The incoming students would represent a 0.2 percent increase of the current total enrollment in the district. Based on the size of the school district in the ROI, as well as class size for the state, it is anticipated that the schools in Oklahoma County would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.3.10.5 Public Services

Oklahoma County represents a large community with police, fire, and other services. The estimated addition of 769 USAF-related personnel and dependents would represent a 0.1 percent increase of the existing Oklahoma County population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 1 percent]).

4.3.10.6 Base Services

Because the proposed MOB 3 mission would replace the existing KC-135 mission, base services have adequate capacity under the existing infrastructure. Some facilities would require infrastructure improvements in the near future.

4.3.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area is defined as those areas that are exposed to noise levels of 65 dB L_{Adn} or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.3.11 provides baseline conditions of the number of minority, low-income, youth and elderly populations currently exposed to noise levels of 65 dB L_{Adn} or greater.

Aircraft-generated noise levels of 65 dB L_{Adn} or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as those areas affected by aircraft noise.

Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

In accordance with USAF EIAP guidelines, the COC in environmental justice analysis is the “smallest set of Census data encompassing the ROI for each resource and is used to establish appropriate threshold for comparison analysis” (USAF 2014a). For minority, low-income, youth, and elderly populations, the most recent ACS data for census block groups was used for the ROI. Oklahoma County is the county that encompasses the affected area and is therefore defined as the COC for the environmental justice analysis for Tinker AFB. Disproportionate impact is inherent for all youth and elderly populations. The extent to which youth and the elderly will be impacted is disproportionate due to their inherent vulnerabilities.

The potential for disproportionate impacts to minority or low-income populations was determined by comparing the percent of each population in the respective ROI with the percent of each population in the respective COC. If the ROI percentage is less than the COC percentage, then there would be no disproportionate impacts. If, however, the ROI percentage is greater than or equal to the COC percentage, disproportionate effects could be present and could require mitigation (USAF 2014a).

Analysis of the noise contours resulting from implementation of the proposed MOB 3 mission relative to the baseline contours at Tinker AFB indicates that populations of minority and low-income persons would be exposed to noise levels comparable to those occurring under the baseline conditions (Table 4-20). Implementation of the proposed MOB 3 mission would result in a net change of six additional people within the affected area. The 7 acres of affected area results in a slight change in the number of minority (an overall increase of two) and low-income (an overall decrease of one) individuals residing under the noise contours (Table 4-20). Therefore, implementation of the proposed MOB 3 mission at Tinker AFB is not anticipated to result in disproportionate impacts to these populations.

Based on the most recent census data, two additional youth (under 18) individuals and one additional elderly (65 and over) individual reside within the affected area under the proposed MOB 3 mission (Table 4-21). Pursuant to EO 13045, due to age-related physiological differences in types and levels of exposure, the evaluation of environmental impacts to children (youth under 18) is different from the evaluation of environmental impacts to adults (e.g., because children breathe more rapidly than adults and their bodies are not yet fully developed, they have different responses to environmental impacts). Although two additional youth (under 18) individuals and one additional elderly (65 and over) individual would be exposed to additional noise, the resulting impacts would not be considered significant.

Table 4-20. Off-Base Minority and Low-Income Populations in the 65 dB L_{Adn} or Greater ROI (Affected Area), Tinker AFB

Geographic Unit	Percent Minority	Change in Number of Minority Persons from Baseline (Affected Area)	Percent Low-Income	Change in Number of Low-Income Persons from Baseline (Affected Area)
United States	37.2%	N/A	15.6%	N/A
State of Oklahoma	32.2%	N/A	16.9%	N/A
Oklahoma County (COC)	41.6%	N/A	18.5%	N/A
Census Block Group (GEOID) (ROI)				
400272023011	15.4%	No change	7.7%	No change
400272023014	0.0%	No change	0.0%	No change
401091074032	50.0%	+1	0.0%	No change
401091074033	31.6%	No change	21.1%	No change
401091076061	10.8%	No change	32.4%	No change
401091077032	26.3%	No change	18.0%	No change
401091077033	46.2%	No change	4.1%	No change
401091080081	61.1%	No change	28.6%	-1
401091080082	34.4%	No change	16.7%	No change
401091080083	71.1%	+2	31.9%	+3
401091080093	33.3%	+1	0.0%	No change
401091080112	21.1%	No change	26.3%	-1
401091080113	69.4%	-2	35.1%	-2
Total	**54.8%**	**+2**	**23.5%**	**-1**

Notes: Each census block group is a separate ROI and each separate ROI is compared with the COC to ascertain potential for disproportionate effect. There is no comparison of the Total ROIs to the COC following USAF 2014 EJ guidelines (USAF 2014a).
"+" indicates an increase and "-" indicates a decrease.
Key: N/A = not applicable.

Table 4-21. Off-Base Youth and Elderly Populations in the 65 dB L_{Adn} or Greater ROI (Affected Area), Tinker AFB

Census Block Group (GEOID)	Total Youth	Total Elderly
400272023011	0	0
400272023014	0	0
401091074032	0	0
401091074033	0	0
401091076061	0	0
401091077032	0	0
401091077033	+1	+1
401091080081	-1	0
401091080082	0	0
401091080083	+2	0
401091080093	+1	0
401091080112	0	0
401091080113	-1	0
Total	**+2**	**+1**

Note: "+" indicates an increase and "-" indicates a decrease.
Key: Youth = under 18; Elderly = 65 and over.

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4.4 WESTOVER AIR RESERVE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Westover ARB. Sections 2.4.4.2 and 2.4.4.3, respectively, describe the facilities and infrastructure, personnel, and flight operation requirements of the proposed MOB 3 mission and the specific actions at Westover ARB that would be required to implement the mission.

As described in Section 4.5, the No Action Alternative represents complete conversion of the C-5B fleet to the quieter C-5M aircraft. The baseline does not represent the conversion and only represents noise resulting from C-5B aircraft. The No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented, and no facility or personnel changes would occur at Westover ARB at this time.

4.4.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would occur with implementation of the proposed MOB 3 mission. The L_{Adn} noise contours resulting from the proposed MOB 3 mission at Westover ARB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section are contained in Volume II, Appendix B, Section B.1.3.

KC-46A aircraft are substantially quieter than the C-5B aircraft operating at Westover ARB under baseline conditions. At a distance of 1,000 feet, KC-46A aircraft are 30 dB quieter than the C-5B aircraft during approach and 18 dB quieter during departure (Table 4-22). Recent progress in turbofan jet engine technology allows dramatic reductions in noise level while still providing sufficient engine thrust. The engines on the KC-46A aircraft incorporate these recent technological advances, while the engines of C-5B aircraft feature older technology.

Table 4-22. Aircraft Noise Level Comparison at Westover ARB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
C-5B	2.85 EPR	104	94	78	65
C-5M	75% N1	86	78	67	57
C-21	70.4% NC	70	62	51	42
C-130	932 CTIT	84	77	66	57
F-16	83.5% NC	86	78	66	56
Business jet (Cessna 500)	305 LBS	64	56	46	37
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29

Table 4-22. Aircraft Noise Level Comparison at Westover ARB (Continued)

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
KC-46A	92% N1	87	78	65	55
C-5B	92% NF	104	94	79	68
C-5M	95% N1	88	80	69	60
C-21	96% NC	84	76	64	54
C-130	977 CTIT	85	77	66	57
F-16	93% NC	106	98	86	76
Business jet (Cessna 500)	1554 LBS	76	69	58	49
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: Aircraft airspeed is 160 knots. Aircraft operate at various airspeeds in and around the airfield; representative F-16 aircraft equipped with Pratt and Whitney F100-PW-229 engine.
Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; NC = engine core speed; CTIT = combustion turbine inlet temperature in Celsius; EPR = engine pressure ratio; LBS = pounds of thrust; RPM = revolutions per minute.
Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59ºF and 70 percent relative humidity.

As part of a previously-scheduled program that is not connected to the KC-46A beddown process, all Westover ARB-based C-5B aircraft are being converted to the C-5M model. The conversion is scheduled to be completed by 2019, roughly coinciding with the beginning of the proposed KC-46A operations should Westover ARB be selected for the MOB 3 mission. Therefore, while C-5B operations are a part of baseline conditions, noise level analysis of the proposed MOB 3 mission and No Action Alternative reflects operations of based C-5M aircraft. C-5M aircraft are equipped with new engines; the aircraft are 18 dB quieter than C-5B aircraft during landing and 16 dB quieter during takeoff (Table 4-22). This replacement, which is a separate action from the proposed MOB 3 mission implementation, will result in substantial decreases in overflight noise levels near Westover ARB.

Several types of transient aircraft visit Westover ARB. Some of these aircraft are louder than KC-46A aircraft. KC-46A aircraft would be louder than most of the civilian aircraft collocated at the Westover Metropolitan Airport. These aircraft primarily consist of propeller-driven and small jet aircraft.

KC-46A aircraft are 12 dB quieter than C-5M aircraft on arrival and 1 dB quieter during departure at a distance of 1,000 feet (Table 4-22). In summary, the primary noise-generating aircraft (i.e., the C-5B) will be entirely replaced by an aircraft that is quieter; however, the replacement aircraft (C-5M) is still louder than the KC-46A.

KC-46A aircrews would use the same flight procedures (e.g., ground tracks, altitude profiles) currently used by C-5 aircrews. Tactical flight procedures, which could include steep descents and spiraling departures, are almost entirely practiced in flight simulators by both C-5 and KC-46A aircrews. C-5 aircrews would continue to conduct 8 percent of second approaches as tactical procedures. Approximately 3 percent of all types of KC-46A operations would be tactical.

The 7,032 airfield operations conducted by KC-46A aircrews would be additive to the 17,011 airfield operations currently conducted resulting in a 41 percent increase in total annual operations conducted. Under normal circumstances, KC-46A aircrews would only fly on Tuesdays and Thursdays, mirroring the current C-5 flying schedule.

Flying during acoustic night (10:00 P.M. to 7:00 A.M.) would comprise 5 percent of total KC-46A flying operations. This equates to 352 airfield operations per year during acoustic night, or about two approaches and two departures each night flying occurs (i.e., Tuesdays and Thursdays). Noise generated between 10:00 P.M. and 7:00 A.M. has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

Noise levels (L_{Adn}) resulting from the No Action Alternative, baseline conditions and the proposed MOB 3 mission were calculated using methods described in Volume II, Appendix B, Section B.1.3 (Figure 4-5). As described in Volume II, Appendix B, Section B.1, social surveys have found a correlation between the time-averaged noise level (as measured in L_{Adn}) and the percentage of the affected population that is highly annoyed. Sixty-five (65) dB L_{Adn} is the noise level at which a about 13 percent of the population can be expected to be annoyed by noise, and 65 dB L_{Adn} has been adopted by the USAF and several other Federal agencies as the level above which noise-sensitive land uses are not considered compatible. The reaction of an individual to noise cannot be accurately predicted, because the response is subjective and depends on the characteristics of the individual as the circumstances in which the noise event occurs. For example, a person engaged in activities that can be disrupted by noise (e.g., conversation, sleeping, or watching television) is more likely to become annoyed than a person that is not.

As noted previously, differences between baseline conditions and the proposed MOB 3 mission include both the conversion of the C-5B fleet to C-5M aircraft and the addition of KC-46A aircraft operations. The reduction in noise levels associated with the C-5 conversion would negate the increases in noise levels associated with the proposed KC-46A MOB 3 aircraft operations. The net effect of the two changes would be a 396-acre decrease in off-base land exposed to noise levels greater than 65 dB L_{Adn} from 464 acres under baseline conditions to 68 acres under the proposed MOB 3 mission (85 percent decrease). The number of on-base acres affected by noise levels greater than 65 dB L_{Adn} would decrease by 373 (33 percent decrease from 1,139 to 766) (see Table 4-23).

Table 4-23. Acres Exposed to Noise Resulting from the No Action, the Proposed MOB 3 Mission and Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels														
	No Action			Proposed MOB 3 Mission			Baseline			Change (Baseline to No Action)			Change (Baseline to Proposed MOB 3 Mission)		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 – 69	252	50	302	260	52	312	320	419	739	-68	-369	-437	-60	-367	-427
70 – 74	201	15	216	200	15	215	369	44	413	-168	-29	-197	-169	-29	-198
75 – 79	149	1	150	162	1	163	208	1	209	-59	0	-59	-46	0	-46
80 – 84	59	0	59	62	0	62	158	0	158	-99	0	-99	-96	0	-96
≥ 85	82	0	82	82	0	82	84	0	84	-2	0	-2	-2	0	-2
Total	**742**	**66**	**808**	**766**	**68**	**834**	**1,139**	**464**	**1,603**	**-397 (-35%)**	**-398 (-86%)**	**-795 (-50%)**	**-373 (-33%)**	**-396 (-85%)**	**-769 (-48%)**

Note: "+" indicates an increase and "-" indicates a decrease.

No off-base residential areas would be affected by noise levels greater than 65 dB L_{Adn}, thus no residents would be affected by these noise levels (Table 4-24). The methods used to estimate the affected population are described in Volume II, Appendix B, Section B.1.

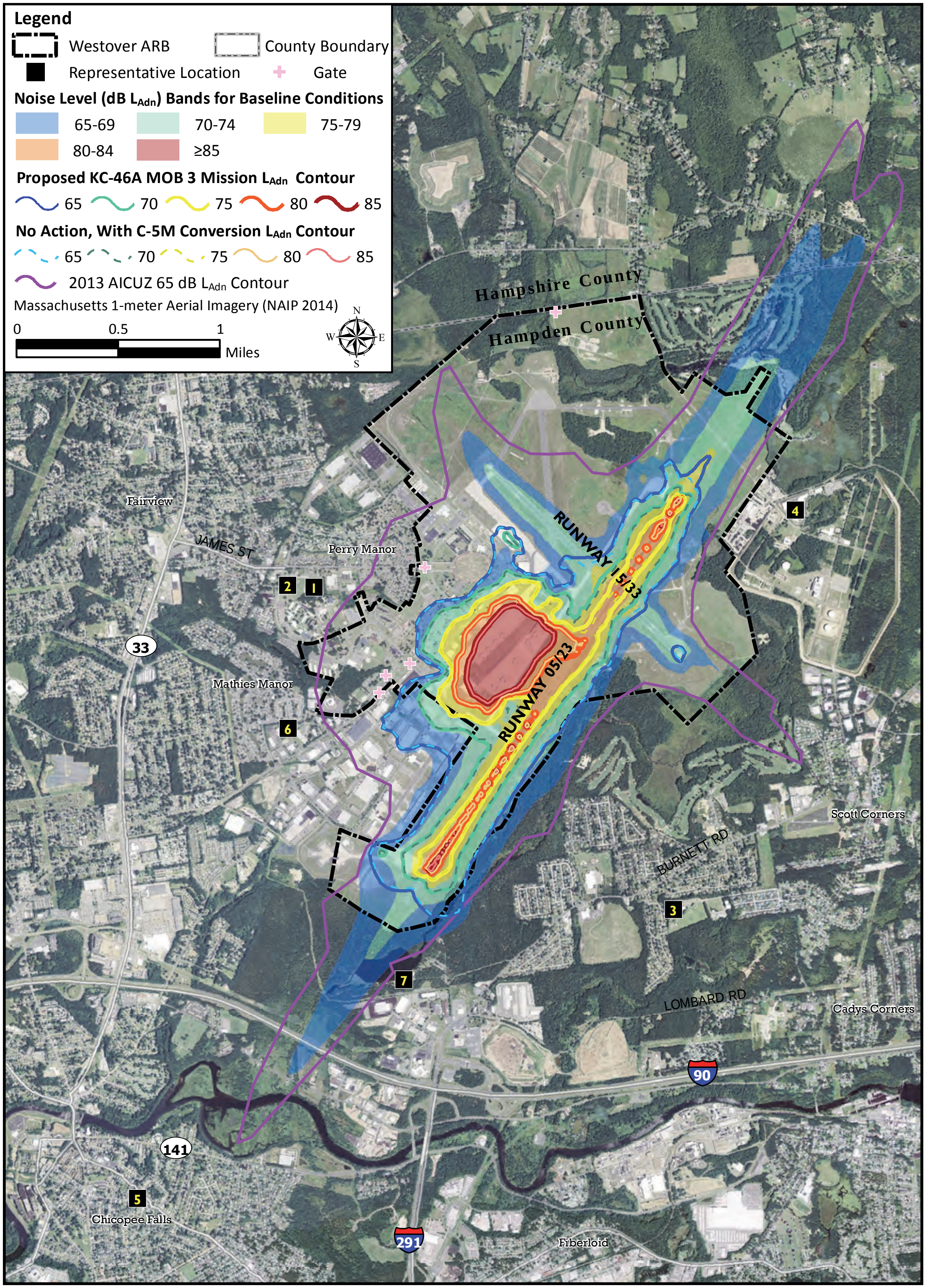

Figure 4-5. No Action, Baseline, and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Westover ARB

Table 4-24. Estimated Off-Base Population Exposed to Noise Resulting from the No Action, Proposed MOB 3 Mission and Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels				
	No Action	Proposed MOB 3 Mission	Baseline Condition	Change (Baseline to No Action)	Change (Baseline to Proposed MOB 3 Mission)
65 – 69	0	0	38	-38	-38
70 – 74	0	0	0	0	0
75 – 79	0	0	0	0	0
80 – 84	0	0	0	0	0
≥ 85	0	0	0	0	0
Total	**0**	**0**	**0**	**-38**	**-38**

Note: "+" indicates an increase and "-" indicates a decrease.

According to current DoD policy, persons exposed to 80 dB L_{Adn} over a very long period, with no barriers to the noise, are at an increased risk of NIPTS, commonly referred to as hearing loss (USD 2009). Noise levels in excess of 80 dB L_{Adn} would not occur at off-base locations. On-base acres affected by noise levels greater than 80 dB L_{Adn} include areas along the flightline. The same 12 flightline buildings affected by noise greater than 80 dB L_{Adn} under baseline conditions would also be affected with implementation of the proposed MOB 3 mission. Hearing loss risk among people working in high-noise environments on Westover ARB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

After conversion of the C-5B to C-5M and implementation of the proposed MOB 3 mission, aircraft noise levels at several representative locations surrounding Westover ARB would decrease 3 to 9 dB L_{Adn} (Table 4-25). Noise levels at all of the locations would remain below 65 dB L_{Adn}.

Table 4-25. Cumulative Aircraft Noise Levels Resulting from the No Action Alternative, the Proposed MOB 3 Mission and Baseline Conditions at Representative Locations Near Westover ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})				
		No Action	Proposed MOB 3 Mission	Baseline	Change (Baseline to No Action)	Change (Baseline to Proposed MOB 3 Mission)
1	Bowie School	39	42	47	-8	-5
2	Selser School	37	41	46	-9	-5
3	Litwin Elementary	37	37	46	-9	-9
4	Hampden County Sheriff's Department	48	48	55	-7	-7
5	Belcher Elementary	48	48	56	-8	-8
6	Porter and Chester Institute	49	49	52	-3	-3
7	Chicopee Reservoir Beach	55	55	61	-6	-6

Note: "+" indicates an increase and "-" indicates a decrease.

C&D activities in support of the proposed mission would take place in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of mufflers and would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to occur during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise, but noise impacts would not be expected to be considered significant.

Aircraft noise levels (L_{Adn}) resulting from the proposed MOB 3 mission at Westover ARB would reflect the concurrent conversion of the C-5B fleet to quieter C-5M aircraft, and resulting noise levels would be less than those resulting from baseline conditions. While the addition of KC-46A operations during acoustic night would be noticed and considered annoying by some people, the decrease that would occur in L_{Adn}, associated with combined effects of C-5M conversion and proposed MOB 3 mission implementation, suggests an overall reduction in the percentage of the population that would be highly annoyed by aircraft noise.

4.4.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Westover ARB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the increase in emissions from the projected KC-46A operations, as the proposed MOB 3 mission would not replace any existing operations at Westover ARB. Volume II, Appendix D, Section D.4.1, of this Final EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Westover ARB.

The immediate area surrounding Westover ARB within Hampden County currently attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these regions. The northern boundary of the Springfield City maintenance area for CO extends to within about 2 miles of the southern portion of Westover ARB. The proposed MOB 3 mission at Westover ARB would generate commuter vehicle trips from this area. In addition, some KC-46A landings and take-offs and closed pattern operations below 3,000 feet AGL would traverse the northwest portion of this CO maintenance area. Therefore, the analysis also estimated the amount of emissions from these proposed sources that would occur within this area. The analysis used the applicable conformity thresholds for this area (i.e., 100 tons per year of CO) as an indicator of significance. This criterion is being used only to determine if an impact occurs, as the area is in attainment and neither a PSD analysis or conformity determination is required.

Construction – The proposed MOB 3 mission at Westover ARB would require construction and/or renovation of airfield facilities, including training facilities, hangars, taxiways, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Westover ARB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Westover ARB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.4.1). Emissions from on-wing testing of KC-46A aircraft engines are based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Westover ARB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from stationary and area sources were estimated by multiplying existing emissions generated at Westover ARB from these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019, after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually turnover in the future to newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for Westover ARB (see Table 3-42).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.4.2.1 Air Quality Consequences

Table 4-26 presents estimates of emissions that would occur from infrastructure changes (see Table 2-15) for the MOB 3 mission at Westover ARB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-26. Total Construction Emissions for the Proposed MOB 3 Mission at Westover ARB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2e (mt)
Demolition	0.04	0.14	0.37	0.00	0.48	0.07	103
Building Construction/Renovations	1.14	5.97	8.29	0.01	7.00	1.46	1,627
Parking Ramp Taxi Lane – Remove Asphalt	0.08	0.32	1.02	0.00	0.23	0.06	184
Parking Ramp Taxi Lane Repair – Pour Concrete	0.07	2.42	0.40	0.00	0.24	0.04	109
Parking Ramp Taxi Lane – Re-Stripe	0.31	1.74	2.23	0.00	2.19	0.44	388
POV Parking for 2-Bay Hanger – Asphalt	0.00	0.02	0.04	0.00	0.08	0.01	11
Total Emissions	**1.65**	**10.60**	**12.35**	**0.02**	**10.22**	**2.08**	**2,422**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_2e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-27 summarizes the annual operational emissions within Hampden County that would result from implementation of the proposed MOB 3 mission at Westover ARB. These data show that the increase in emissions from the addition of 12 KC-46A aircraft would not exceed 250 tons per year for VOCs, CO, SO_x, PM_{10}, or $PM_{2.5}$. In addition, these emission increases would amount to no more than 1 percent of any total criteria pollutant generated within Hampden County in 2011 (see Table 3-41). Therefore, implementing the proposed MOB 3 mission at Westover ARB would not produce significant impacts to these pollutant levels. However, these data also show that the increase in NO_x emissions would exceed 250 tons per year. KC-46A aircraft operations and on-wing engine testing activities would be the primary contributors to these emission increases.

Table 4-27. Annual Operations Emissions from the Proposed MOB 3 Mission at Westover ARB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2e (mt)
KC 46A Aircraft Operations	12.09	53.51	329.07	17.21	1.07	0.91	47,749
On-Wing Aircraft Engine Testing – KC-46A	1.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.02	0.11	0.11	0.00	0.02	0.01	26
GMVs	0.04	0.58	0.68	0.00	0.08	0.03	328
POVs – On Base	0.01	0.39	0.03	0.00	0.01	0.00	43
POVs – Off Base	0.08	6.56	0.55	0.00	0.07	0.02	667
Point and Area Sources	0.57	1.45	2.15	0.03	0.17	0.14	2,019
Total Proposed MOB 3 Mission Emissions	**24.38**	**102.32**	**351.32**	**18.92**	**1.58**	**1.26**	**55,332**
Operational Emissions Increase Fraction of Hampden County Emissions	**0.002**	**0.002**	**0.034**	**0.01**	**0.0001**	**0.0004**	**0.03**
PSD Threshold	**250**	**250**	**250**	**250**	**250**	**250**	**N/A**

Key: CO_2e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Emissions of NO_x resulting from implementation of the MOB 3 mission within Hampden County were compared to the most recent Hampden County emissions inventory (2011) to determine the relative magnitude of these emissions and their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. The NO_x emission increases that would result from the proposed KC-46A operations would amount to approximately 4 percent of the total NO_x emissions generated by Hampden County in 2011 (see Table 3-41). The overwhelming majority of NO_x emissions that would result from the proposed MOB 3 mission would occur from intermittent KC-46A aircraft operations up to an altitude of 3,000 feet AGL and across several square miles that comprise the Westover ARB airspace and adjoining aircraft flight patterns. These emissions would be adequately dispersed through this volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Given that Hampden County attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to a NAAQS exceedance. Therefore, the proposed MOB 3 mission at Westover ARB would not produce significant air quality impacts.

Because the Springfield City CO maintenance area is adjacent to Westover ARB, the following evaluates the potential for operations of the proposed MOB 3 mission to increase CO emissions within this area. Proposed sources that would operate within this area would include project commuter traffic and KC-46A aircraft during landings and take-offs and closed pattern operations below 3,000 feet AGL. Only a portion of the project personnel that would work at Westover ARB and reservists would commute through the Springfield City CO maintenance area, as many of them would live west and north of this area. To be conservative, it was assumed that 50 percent of the total project commuting activities would occur within the Springfield City CO maintenance area, which would generate 3.28 tons per year of CO emissions within this area. Review of the KC-46A flight profiles determined that approximately 6.3 percent of the total annual landings and take-offs and 2.1 percent of closed pattern operations are below 3,000 feet AGL within the Springfield City CO maintenance area. The associated emissions due to these operations would amount to a total of 0.40 tons per year of CO. Therefore, the analysis estimates that the total CO emissions generated by the MOB 3 mission at Westover ARB within the Springfield City CO maintenance area would equate to 3.68 tons per year. This increase in CO emissions would remain well below the applicable conformity threshold of 100 tons per year for CO. As a result, the proposed MOB 3 mission at Westover ARB would not produce significant CO impacts within the Springfield City CO maintenance area.

Operation of the proposed MOB 3 mission at Westover ARB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. As described for proposed NO_x impacts, since proposed KC-46A operations would occur intermittently over a large volume of atmosphere, they would be expected to produce minimal ambient impacts of HAPs in a localized area.

Early in planning, the USAF reconsidered operational assumptions and projections to avoid or reduce potential impacts to the extent feasible. This resulted in the development of alternatives that reduced the emissions of criteria pollutants to the extent feasible by reducing the number of near-field operations (e.g., landings and take-offs). At this time, the USAF is not aware of any other feasible mitigations that could be applied to further reduce the emissions impact from KC-46A aircraft operations and on-wing engine testing activities.

4.4.2.2 Climate Change Effects

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-26 shows that construction for the proposed MOB 3 mission at Westover ARB would produce a total of 2,422 metric tons of CO_2e emissions. Table 4-27 shows that operation of the proposed MOB 3 mission at Westover ARB would result in an increase of 55,332 metric tons per year of CO_2e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Westover ARB, the following considers how climate change may impact proposed operations at Westover ARB. For Westover ARB, the projected climate change impact of concern is increased temperatures, as documented in *Climate Change Impacts in the United States – The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Northeast region surrounding Westover ARB will experience warmer temperatures and an increase in precipitation, particularly heavier rainfall events. One of the main outcomes of these conditions will be increased flooding in the region, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure. Warmer temperatures will also increase heat wave intensity and frequency, increase humidity, degrade air quality, and reduce water quality, resulting in an increase in public health risks.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.4.3 Safety

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Westover ARB with implementation of the proposed KC-46A MOB 3 mission. The addition of 12 aircraft associated with the MOB 3 mission would cause an increase in airfield operations and could increase both flight and ground safety risk.

The MOB 3 mission would be a new mission at Westover ARB, resulting in additional, new aircraft operations, which could increase safety consequences.

4.4.3.1 Flight Safety

Aircraft Mishaps – Although there would be an increase in operations with the addition of the MOB 3 mission, KC-46A aircraft would utilize similar flight patterns as those used by the C-5B mission on approach and departure. As described in Section 4.1.3, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (B-767). Using the accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Implementation of the KC-46A MOB 3 mission at Westover ARB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or any increase in the risks of occurrence of those mishaps.

Bird/Wildlife-Aircraft Strike Hazard – The addition of 12 aircraft could slightly increase the risk of aircraft accidents due to bird/wildlife-aircraft strikes. Ongoing elements of the Westover ARB BASH Plan would continue (Westover ARB 2014b).

Westover ARB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to BASH issues.

4.4.3.2 Ground Safety

Although emergency and mishap response plans would be updated, no aspects of the proposed KC-46A MOB 3 mission at Westover ARB are expected to create new or unique ground safety issues. O&M procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission at Westover ARB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Westover ARB airfield safety conditions would still be similar to baseline conditions. As indicated in Section 3.4.3.2, the base Fire Department will continue to be party to mutual-aid support agreements with nearby communities. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

4.4.4 Soils and Water

4.4.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur on previously disturbed areas within the boundary of Westover ARB. As shown in Table 2-15, the disturbed area for the new construction projects proposed as part of the KC-46A MOB 3 mission would be less than 12 acres (new construction).

Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling.

For any projects that result in soil disturbance, the Government construction management entity would ensure that all construction activities are conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. The *Westover ARB Storm Water Pollution Prevention Plan*

(SWPPP) (Westover ARB 2015f) references the USEPA control measures that are generally used to reduce the potential for soil erosion and sediment transport offsite. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.4.4.2 Water Resources

Prior to construction activities, Westover ARB and the design or construction contractor would submit an NOI under the NPDES procedures as described in the USEPA Construction General Permit. Per the Construction General Permit, the construction contractor would prepare a site-specific SWPPP describing site-specific measures that would be implemented prior to construction. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

Less than 12 acres of impervious surface would be added to the existing 598 acres of impervious surface on the installation (Westover ARB 2015f). Although this additional impervious surface would increase sheet flow and stormwater runoff, the total impervious surface on base would increase by less than 1 percent. The increase in impervious surface would not result in long-term adverse impacts to water resources.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 *USC* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

In 2015, the base used approximately 76,000 gallons of aircraft deicing fluid. The MSGP has an upper effluent limit of 100,000 gallons of aircraft deicing fluid on an average annual basis before additional monitoring and reporting are required.

Aircraft deicing operations for the proposed MOB 3 mission would primarily occur on the East Ramp. The increase in flying operations resulting from implementation of the proposed MOB 3 mission at Westover ARB would have the potential to increase the use of aircraft deicing fluids, thereby potentially increasing the amount of deicing fluid in stormwater runoff. Primary recovery of spent deicing fluid would be conducted with a vacuum truck. Once recovered, the spent deicing fluid would be transferred to a holding tank for recycling or proper disposal. Remaining deicing fluid from the ramp would be primarily discharged through Outfall 1, where it is partially bioremediated in a submerged flow constructed wetland before discharging to Cooley Brook.

If implementation of the proposed MOB 3 mission at Westover ARB would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, quarterly benchmark water quality monitoring at Outfall 1 would be required to validate compliance the benchmark monitoring concentrations contained in Table 8.S-1 in Part 8, Sector S of the MSGP. The quarterly results would be reported to the USEPA. If the sample results exceed the benchmark levels for Biological Oxygen Demand (BOD) [30 milligrams per liter (mg/L)], Chemical Oxygen Demand (COD) (120 mg/L), Ammonia (2.14 mg/L) or pH (6-9), additional controls would require evaluation and possible implementation. Because the nature of the activity (aircraft deicing) is not changing, a change to the permit would not be required. Although increases in aircraft operations could increase the amount of deicing fluid utilized, long-term significant adverse impacts to water quality are not anticipated to result from deicing operations associated with the proposed KC-46A MOB 3 mission at Westover ARB.

4.4.4.3 Floodplains

Based on the results of the GIS analysis as described in Section 3.4.4.2.3 to identify the 100-year floodplain plus 3 feet elevation, no floodplains are near the 439 Airlift Wing (AW) ramp, where all of the construction, demolition and renovation is proposed to occur. Therefore, significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission at Westover ARB.

4.4.5 Biological Resources

4.4.5.1 Vegetation

Activities associated with the construction, demolition, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands. These areas are already disturbed for ongoing, routine maintenance and/or landscaping activities and are of low ecological value. Therefore, no impacts to vegetation are anticipated to result from implementation of the MOB 3 mission at Westover ARB.

4.4.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. The areas planned for development as part of the proposed MOB 3 mission are in previously disturbed areas of improved lands on Westover ARB and provide little wildlife habitat. Therefore, the proposed MOB 3 mission would not result in significant impacts to local wildlife populations.

Airfield operations are anticipated to increase at Westover ARB. Much of the area that would be subject to increased noise levels consists of developed or residential land use. Increased operations would increase the potential for bird/wildlife-aircraft strikes. However, continued adherence to the base's BASH Plan would minimize the risk (Westover ARB 2014b).

The combination of the C-5B conversion with implementation of the proposed MOB 3 mission would result in a decrease of off-base acres affected by noise associated with aircraft operations (see Section 4.4.1.1).

Noise resulting from the proposed construction would be localized, short-term and only during daylight hours. Wildlife in the areas proposed for construction and near the airfield is already exposed to aircraft noise under baseline conditions. Therefore, no impacts to wildlife are anticipated from the implementation of the proposed MOB 3 mission at Westover ARB.

4.4.5.3 Special-Status Species

No federally listed species or designated critical habitat occurs at Westover ARB. Therefore, no impacts to federally listed species are anticipated to result from implementation of the proposed MOB 3 mission at Westover ARB. The USFWS has concurred with this determination (see letter dated 30 June 2016, Volume II, Appendix A, Section A.6.4.2).

All of the projects would occur in developed or disturbed areas within the improved grounds on base. The proposed construction, demolition and renovation would not occur in any of the areas on base that provide habitat for special-status species. Therefore, no impacts to special-status species are anticipated.

4.4.5.4 Wetlands

Because no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed MOB 3 mission at Westover ARB.

4.4.6 Cultural Resources

Implementation of the proposed KC-46A MOB 3 mission at Westover ARB would include renovation/construction of six facilities: 2-bay hangar, flight simulators/squadron operations building, fuselage trainer, civil engineering grounds facility, relocated gas station, and expansion of the existing fitness center (Building 1700). Construction of the new facilities would require demolition of Hangar 7071 and Buildings 2426, 7045, and 7046. Renovation projects would occur along the parking ramp taxi lane, and to the interior of Hangars 7072 and 7073 and Buildings 5103, 5375, and 5377.

On 29 March 2016, pursuant to Section 106 (54 *USC*. 306108) of the NHPA, Westover ARB submitted a letter to the Massachusetts Historical Commission (MHC) regarding the proposed KC-46A MOB 3 mission at Westover ARB. Westover ARB requested concurrence from the MHC that no historic properties would be affected by the proposed undertaking (Volume II, Appendix A, Section A.5.4). On 28 April 2016, the MHC responded by letter and identified that the Westover ARB area (Historic District, MHC# CHI.AA) is included in the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth.

On 4 August 2016, Westover ARB submitted a response letter to the MHC identifying the APE, which includes the Historic District. This letter stated that the proposed undertaking includes the demolition of Hangar 7071 and Building 2426, contributing resources to the Historic District, and would therefore result in an adverse effect on the historic property. Pursuant to 36 *CFR* § 800.6(c), the letter also stated that the USAF was seeking concurrence from MHC on the adverse effect determination and would continue to consult with the MHC in order to avoid, minimize, or mitigate the potential adverse effects of the undertaking. In a response dated 26 August 2016, the MHC concurred with the USAF letter (see Volume II, Appendix A, Section A.5.4.1).

Although the proposed demolition, renovation, and new construction for the proposed MOB 3 beddown would occur in a limited area of the current Westover ARB boundaries, the undertaking has the potential to directly and indirectly affect the NRHP-eligible Historic District, including portions of the Historic District that may lie beyond the current installation boundary. Individual contributing resources that would be affected by the proposed undertaking, should it occur at Westover ARB, include Hangars 7071, 7072 and 7073, and Buildings 2426, 5103, 5375 and 1700. The remaining buildings and structures (including Buildings 7045, 7046, 5377, and the parking ramp) were constructed after the period of significance and are not contributing resources to the Historic District.

The USAF has determined that the proposed undertaking would have an adverse effect on historic properties, in particular Hangar 7071 (built in 1941) and Building 2426 (an avionics shop built in 1960), both contributing elements to the Historic District. The USAF initial site survey report for the potential beddown of the KC-46A MOB 3 aircraft at Westover ARB identified that the only three-bay hangars that could house the KC-46A are currently and will continue to be devoted to C-5 flying and Regional Isochronal (RISO) operations. The remaining five hangars at Westover ARB were considered not adequately sized and, due to deteriorating conditions, could not be renovated to house the KC-46A aircraft. Therefore, the beddown would require construction of a new two-bay hangar in place of Hangar 7071 and Building 2426.

Hangar 7071 is one of four similar hangars (7072, 7073, 7075) constructed in 1941 in the Art Moderne style. As part of the proposed undertaking, Hangars 7072 and 7073, and Buildings 5103 (a dormitory built in 1957) and 5375 (a base supply and equipment warehouse built in 1956), all contributing resources to the Historic District, would require interior renovation to accommodate the proposed KC-46A MOB 3 mission. If Westover ARB is selected for the MOB 3 mission, the USAF has agreed to complete the interior renovation of Hangars 7072 and 7073 and Buildings 5103 and 5375 per the Secretary of Interior's Standards for the Treatment of Historic Properties (Secretary of Interior [SOI] Standards, 36 *CFR* Part 68) as part of the proposed undertaking, thereby avoiding adverse effects to these contributing resources.

In addition to the construction of a new two-bay hangar, the proposed undertaking also entails the construction of new facilities and the expansion of Building 1700 (a gymnasium built in 1949). As the proposed new facilities would further the key USAF mission at Westover ARB, and the USAF proposes to design the facilities per SOI Standards, the new construction would have no adverse effect on historic properties. The proposed undertaking would also allow Building 1700 to continue to be used as a fitness center. Building 1700 has been substantially expanded since its original construction; therefore, all new additions constructed as part of this undertaking would be designed in accordance with the SOI Standards so as to not diminish the historic character of the building or the Historic District.

Should the proposed MOB 3 mission be located at Westover ARB, the USAF has agreed, in consultation with the MHC, to prepare Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) recordation of Hangar 7071 and Building 2426. Westover ARB has also agreed to continue consulting with the MHC in order to identify the boundaries of the Westover ARB Historic District and the contributing resources within it. In addition, the MHC has agreed to participate in the design review process for the associated new construction.

Although known archaeological sites and sensitive areas have been identified within the boundaries of Westover ARB, there is a low potential for intact archaeological resources to occur within the APE. The archaeological sites and sensitive areas are located beyond the APE for anticipated ground disturbance. Although there may have been prehistoric and historic occupation of the installation at one time, the landscape within the APE was significantly modified during the construction of the airfield. Because all ground-disturbing activities would occur in previously disturbed contexts, it is unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with 36 *CFR* § 800.13.

No Section 106 impacts to tribal resources or traditional cultural properties would result from implementation of the MOB 3 mission. As required by Sections 101(d)(6)(B) and 106 of the NHPA, implementing regulations at 36 *CFR* § 800.2(c)(2), EO 13175, DoDI 4710.02, and AFI 90-2002, Westover ARB initiated Section 106 government-to-government consultation with five tribes to identify traditional cultural properties. The consultation correspondence included an invitation to participate in the Section 106 and NEPA processes, and an invitation to consult directly with the Westover ARB Base Commander regarding any comments, concerns, or suggestions (Volume II, Appendix A, Section A.3, letter dated 1 April 2016).

The Stockbridge Munsee Band of Mohican Tribe responded on 9 May 2016 and indicated that no tribal resources would be affected and no further consultation would be required. The remaining four tribes were contacted via telephone on 2 May 2016. All four of the remaining tribes indicated no interest in government-to-government consultation and had no comments on the proposed KC-46A MOB 3 mission (see Table A-1 in Volume II, Appendix A, Section A.3). While the USAF values its relationship with all tribes and will continue to consult on other planning efforts or matters of known or potential interest to tribes, Section 106 consultation on the proposed KC-46A MOB 3 mission at Westover ARB is now complete.

4.4.7 Land Use

4.4.7.1 Physical Development

The physical development associated with the proposed KC-46A MOB 3 mission at Westover ARB would occur within the Flightline District, Historic Core District, and Mission Support District. The proposed physical development projects in the Flightline District would not change the existing land uses, which are airfield pavement and aircraft O&M. Likewise, the construction of the Flight Simulators/Squadron Operations facility and Fitness Center expansion in the Historic Core District would also not substantially change the existing land uses, which are categorized as administrative and community/commercial. Construction of the Civil Engineering Grounds Facility in the Mission Support District would occupy 7,503 square feet of open space.

Overall, the physical development proposed to support the proposed KC-46A MOB 3 mission at Westover ARB would not result in changes to the existing land uses on the base. Subsequent O&M activities associated with the MOB 3 mission would conform to current and future land uses on the base. The physical changes and daily activities on the ground would be confined to Westover ARB. Implementation of the proposed projects on Westover ARB would have no impacts to off-base land use.

4.4.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Westover ARB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No additional on- or off-base land would be exposed to noise levels greater than 65 dB L_{Adn} with implementation of the proposed MOB 3 mission at Westover ARB (Table 4-23). Noise generated by KC-46A aircraft associated with the proposed MOB 3 mission would not be louder than the baseline noise at Westover ARB. As described in Section 4.4.1.1, the C-5B model aircraft currently stationed at Westover ARB are being replaced with the quieter C-5M models. This conversion is expected to be completed in 2019. No land use impacts on or off base would result from implementation of the proposed KC-46A MOB 3 mission.

It is anticipated that Westover ARB would continue to incorporate AICUZ policies and guidelines into zoning ordinances and comprehensive plans of the cities of Chicopee and Springfield, and the Towns of Granby and South Hadley. The Town of Ludlow has successfully implemented an Aircraft Flight Overlay Zoning District that includes zoning restrictions in the Westover ARB APZs and CZs within its jurisdiction.

4.4.8 Infrastructure

Refer to Section 3.4.8 for a description of existing infrastructure system capacities and conditions at Westover ARB. Table 2-16 provides changes in population that would result from implementation of the proposed MOB 3 mission at Westover ARB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.4.8.1 Potable Water System

Based on the average, per person usage rate of 125 GPD (UFC 3-230-03), it is anticipated that the proposed MOB 3 population change would create an additional water use demand of 0.1 MGD (125 GPD x 1,055). This equates to an increase of 76 percent over the current demand of 0.13 MGD at Westover ARB. Use of the 125 GPD per person rate of is a conservative measure of water use, as those numbers reflect the average residential use which includes showering, laundry, and other non-drinking uses of water. This increase would represent less than 0.1 of 1 percent of the 200 MGD supplied to Westover ARB and surrounding communities by the Massachusetts Water Resources Authority and impacts would be less than significant.

4.4.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate the proposed increase in population would increase wastewater discharge from Westover ARB by 0.1 MGD (120 GPD x 1,055). This increase, combined with the existing daily discharge would not exceed the 15.5 MGD water capacity of the City of Chicopee’s system and impacts would be less than significant.

4.4.8.3 Stormwater System

The majority of this work would occur on previously disturbed areas. Table 2-17 identifies the projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 12 acres (the area for new construction), and impacts would be less than significant. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures.

During the short-term construction period for the proposed MOB 3 mission, the construction contractor would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management during construction. Additional stormwater requirements are described in Section 3.4.4.

4.4.8.4 Electrical System

The USEIA estimates that the average household in Massachusetts uses 0.615 MWh per month (USEIA 2014). Converting this rate to an hourly rate and assuming 411 new households (i.e. one new household for each new authorized personnel on base), the proposed increase in population would increase electrical use by 0.02 MW. In 2014, Westover ARB used an average of 2.3 MW. The increase in population associated with the proposed MOB 3 mission would result in a 0.01 percent increase in electric use at Westover ARB and impacts would be less than significant.

4.4.8.5 Natural Gas System

The USEIA estimates that the average person in Massachusetts uses 18.8 Mcf of natural gas per year (USEIA 2016). Using this rate, the proposed increase in population (1,055) would increase natural gas use by Westover ARB by 2.3 Mcf per hour or 20,148 Mcf per year. This a small fraction of the 128 MMcf used by the population of Westover ARB in 2014 and impacts would be less than significant.

4.4.8.6 Solid Waste Management

For the proposed MOB 3 mission, it is estimated that 14,350 tons of C&D debris would require management. The DoD has set a target diversion rate of 60 percent of C&D debris to be reused or recycled. Application of the 60 percent target diversion rate would result in 8,610 tons being reused or recycled and 5,740 tons being transported to the F&G Transfer Station near East Windsor, Connecticut, and transferred to landfills located outside the state. Additional personnel and dependents associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, “Waste Management.”

4.4.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Westover ARB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities, along with construction crews, would access the base via the James Street Gate or the Industrial Drive Gate. Construction-related traffic would comprise only a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with C&D activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the facility and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term or significant impacts on transportation infrastructure are anticipated.

Implementation of the proposed MOB 3 mission at Westover ARB would result in an increase of 411 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 20 percent increase in daily commuting traffic to and from the base. In addition to the increase in personnel-related traffic, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. The small increase in base mission personnel could increase congestion and queuing at the Main Gate during morning and evening rush hours. To minimize this, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gate to process security checks during peak hours. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.4.9 Hazardous Materials and Waste

4.4.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Westover ARB is not anticipated to add any new hazardous materials that exceed the base’s current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the addition of the KC-46A MOB 3 mission, but would be expanded to meet the increased use.

4.4.9.1.1 Aboveground and Underground Storage Tanks

The addition of 12 KC-46A aircraft at Westover ARB is expected to increase the maximum daily consumption of Jet-A. The increase in fuel consumption would be supported by the current infrastructure.

New and remodeled facilities would require the addition of ASTs for generators and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. The proposed MOB 3 mission would require the demolition of the AGE gas station (Buildings 7045 and 7046) to clear space for the construction of the new hangar. Three underground storage tanks (USTs) (7045-A, 7045-B, and 7045-C) are associated with these facilities and would be removed. The new AGE gas station would require new USTs and/or ASTs. Building 7071 would also require demolition to clear space for the new hangar. One OWS (OWS 7071) associated with Building 7071 would also be removed. The *Hazardous Material Emergency Planning and Response Plan* for Westover ARB would be amended to capture any changes in facility design, construction, operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products (Westover ARB 2011).

4.4.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Westover ARB. Any renovation, construction, or demolition project proposed at Westover ARB would be reviewed to determine if ACM is present. Building 2426 is known to contain ACM. Volume II, Appendix F, Table F-4, contains a list of the eight additional buildings proposed for modification and their potential to contain ACM. Additional testing would be conducted where no data exist. All testing and data collection would be conducted in accordance with the Asbestos Management Plan (Westover ARB 2013a). Any exposed friable asbestos would be removed in accordance with USAF policy and applicable health laws, regulations, and standards. Advanced written notification (Form BWP AQ 04 [ANF-001]) to the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Waste Prevention and the USEPA are required for all anticipated asbestos abatement activity, as required by 40 *CFR* 61.145 and Massachusetts Regulations 310 CMR 4.00, 310 CMR 7.00, 7.09, 7.15, and 453 CMR 6.00. (Westover ARB 2013a). The handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

All renovation, construction, or demolition projects proposed at Westover ARB would be reviewed to determine if LBP is present, and whether such materials would be disturbed in the performance of the work. Volume II, Appendix F, Table F-4, contains a list of the nine buildings that would be affected by demolition or renovation, the years of construction, and the potential for LBP. In accordance with the LBP Management Plan (Westover ARB 2013b), any required renovation or demolition activities (e.g., sanding, scraping, or other disturbances of the paint) that could generate lead dust would not be performed without prior LBP testing. All handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Westover ARB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.4.9.2 Hazardous Waste Management

Westover ARB would continue to be classified as an LQG and generate hazardous wastes during various O&M activities. Hazardous waste disposal procedures, including off-base disposal procedures, are adequate to handle changes in quantity and would remain the same. Hazardous waste anticipated to be generated by the proposed KC-46A MOB 3 mission would be similar to waste generated by the existing C-5 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. Operations involving hexavalent chromium, cadmium, and halon (i.e., an ODS) have been eliminated or minimized to the extent possible (Boeing 2013). Hazardous materials such as TCE have available alternates and would not be required for the KC-46A MOB 3 mission. No new hazardous materials would be added that exceed Westover ARB’s current hazardous waste processes.

4.4.9.3 Environmental Restoration Program

There are 21 ERP sites, two areas of concern, and two compliance restoration sites located at Westover ARB. Eighteen (18) of these sites have been closed. Proposed construction, demolition, and renovation projects associated with the proposed KC-46A MOB 3 mission at Westover ARB are on or adjacent to four ERP sites.

Implementation of the proposed MOB 3 mission would require the demolition of Buildings 2426 and 7071 to construct a 2-bay fuel cell, corrosion control, and maintenance hangar. This hangar, the fuselage trainer, and a new POV parking lot are located within ERP site Zone 1 (Sites SS-16 and SS-19). According to the Management Action Plan, the MassDEP approved a Response Action Outcome Statement for Zone 1, which is currently undergoing long-term monitoring (Westover ARB 2015g). There are nine groundwater monitoring wells (CEA-4, CEA-5, ECS-20, ECS-21, ECS-22, OBG-8, OBG-9, OBG-10, and OBG-42) within the proposed construction area that may require abandonment and replacement.

The proposed parking ramp taxi lane repair project on the East Ramp is near two ERP sites (parking locations E-2 and E-7) associated with a JP-8 release from a Defense Logistics Agency (DLA) pipeline. Three groundwater monitoring wells (IW-2, IW-3, and IW-4) within the proposed construction area could require abandonment and replacement.

The depth to groundwater is generally 19 to 24 feet bgs at Chicopee, Massachusetts (USGS 2016). These depths are below what would be required for excavation associated with the C&D activities proposed at Westover ARB; therefore, no impacts to groundwater associated with these sites are anticipated.

Prior to initiation of construction, the USAF would work closely with the MassDEP if any of the wells mentioned above would need to be replaced or abandoned. The USAF would coordinate with the AFCEC restoration office before any construction, demolition, or renovation project is initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with current EIAP processes, as specified in AFI 32-7061. Westover ARB would coordinate with the MassDEP prior to any construction activities on an active ERP site.

The USAF would ensure that modifications are coordinated with ongoing remediation or investigation activities at any ERP site. Adverse impacts to those ERP sites are not anticipated with implementation of the existing plans and standard policies. During C&D activities, there is the potential to encounter contaminated soil in areas associated with ERP sites. There is also the possibility that undocumented contaminated soils from historical fuel spills may be present. If encountered, storage/transport/disposal of contaminated soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required. Construction of utility corridors within previously disturbed areas would minimize impacts.

No significant impacts to ERP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near ERP sites.

4.4.10 Socioeconomics

4.4.10.1 Population

The current personnel at Westover ARB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-15. Implementation of the proposed MOB 3 mission would potentially add up to 396 full-time mission personnel (not including contractors) and 644 military and DoD civilian dependents to the ROI, resulting in a 0.17 percent increase in the total ROI population. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the MOB 3 mission would be from the local population and would not be migrating to the area.

4.4.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-15, implementation of the proposed MOB 3 mission at Westover ARB would increase the full-time work force assigned to Westover ARB by 411 total personnel (including contractors). Using the IMPLAN model, the direct effect of 411 full-time personnel at Westover ARB would have an estimated indirect and induced effect of approximately 100 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, retail, physician offices, individual and family services, nursing and community care services, and real estate. With a 2014 unemployment rate of 7.8 percent in Hampden County and 5.0 percent in Hampshire County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that $196.9 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Westover ARB. All MILCON expenditures would occur in 2017. The total expenditures could generate approximately 2,137 jobs, primarily within the construction industry or related industries, including retail stores (i.e., nonstore retailers, miscellaneous store, general merchandise), wholesale trade, and hospitals. Construction activities would occur during a 2-year period and it would be possible for a single worker to work on multiple projects. With a total labor force of 308,336 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of $196.9 million at Westover ARB would generate an estimated $41.5 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.4.10.3 Housing

Although no dormitories are currently located on Westover ARB, Building 5103 (Table 2-15) would be renovated to provide housing for first-term Airmen/single Airmen. Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 396 off-base housing units. Based on the number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.4.10.4 Education

As described in Section 2.5.4.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 386 dependents would be of school age and would enter any of the 24 public school districts in the ROI. The incoming students would represent a 0.5 percent increase of the current total enrollment. Based on the number of schools in the ROI, it is anticipated that the schools in the ROI would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.4.10.5 Public Services

Hampden County and Hampshire County represent a large community with police, fire, and other services. Implementation of the proposed MOB 3 mission would add approximately 1,040 USAF-related personnel and dependents, which represents a 0.17 percent increase of the ROI population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 1 percent]).

4.4.10.6 Base Services

Base services on Westover ARB are in good condition; however, several base services would require additional manpower and facilities to accommodate the incoming personnel associated with the proposed MOB 3 mission. No forms of childcare or youth programs are currently located on Westover ARB. However, several childcare and youth programs are available in surrounding communities in proximity to Westover ARB. It is anticipated to support the needs of incoming personnel. There is no military dining facility located on the installation and therefore, personnel would utilize off-base commercial dining facilities.

To accommodate the personnel increase that would occur with implementation of the proposed MOB 3 mission, extended operational hours for the fitness center could be required. Should operational hours be adjusted, additional FTE positions would be required at the fitness center. The USAF identified that up to one additional FTE position would also be needed to fully support the A&FR program. By meeting the additional manpower and facility requirements that have been identified, Westover ARB would be able to support the personnel increase that would occur with implementation of the proposed MOB 3 mission.

4.4.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and other sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes areas that are exposed to noise levels of 65 dB L_{Adn} or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.4.11 provides baseline conditions of the number of minority, low-income, youth, and elderly populations currently exposed to noise levels of 65 dB L_{Adn} or greater.

Aircraft-generated noise levels of 65 dB L_{Adn} or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise.

Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

Analysis of the proposed MOB 3 mission noise contours relative to the baseline contours at Westover ARB indicates that no people, on or off-base, would be exposed to any additional noise levels. As described in Section 3.4.11, an estimated 38 off-base residents are exposed to noise levels of 65 dB L_{Adn} or greater under baseline conditions at Westover ARB. The reduction in noise levels associated with the C-5 conversion would negate the increase in noise levels associated with the proposed KC-46A MOB 3 mission. The net effect of the two changes would result in a beneficial effect, because the estimated 38 off-base residents would no longer be exposed to noise levels of 65 dB L_{Adn} or greater. As a result, there would be no effect on minority or low-income populations. In addition, no youth or elderly populations would be exposed to increased noise.

4.5 NO ACTION ALTERNATIVE

Analysis of the No Action Alternative provides a benchmark, enabling decision makers to compare the magnitude of the environmental effects of the proposed action or alternatives. Section 1502.14(d) of NEPA requires an EIS to analyze the No Action Alternative. No action for this EIS means that the proposed KC-46A MOB 3 beddown would not occur at any base at this time. The No Action Alternative would not establish the KC-46A MOB 3 and associated aircraft.

The No Action Alternative has been carried forward in the EIS per Council on Environmental Quality (CEQ) regulations and as a baseline of existing impact continued into the future against which to compare impacts of the action alternatives.

Evaluation of the No Action Alternative compares the effects of implementing the KC-46A MOB 3 mission with the effects of the No Action Alternative at each base and for each resource area.

Under the No Action Alternative:

- There would be no change in based aircraft at Grissom ARB; operations at Grissom ARB would continue as described for baseline conditions. The 434 ARW would continue to operate the existing KC-135 aircraft and the personnel described under baseline conditions would remain unchanged.
- There would be no change in based aircraft at Seymour Johnson AFB and aircraft operations would continue as described for baseline conditions. The 916 ARW would continue to fly aerial refueling missions with the existing KC-135 aircraft. Noise levels greater than or equal to 80 dB L_{Adn} would continue to affect off-base residential areas posing some long-term risk of NIPTS for the affected population.
- There would be no change in based aircraft at Tinker AFB and aircraft operations would continue as described for baseline conditions. The 507 ARW would continue to fly air refueling missions with the existing KC-135 aircraft. The OC-ALC, AFSC, and other major units at the base would continue operating as described in baseline conditions.
- The C-5 mission would continue at Westover ARB; however, the model of C-5 aircraft would change. As part of a previously-scheduled program that is not connected to the proposed KC-46A MOB 3 beddown process, all Westover ARB-based C-5B aircraft are being replaced with C-5M aircraft. The conversion is scheduled to be completed by 2019, roughly coinciding with the beginning of the proposed KC-46A operations should Westover ARB be selected for the proposed MOB 3 mission. Therefore, while C-5B operations are a part of baseline conditions, noise level analysis of the proposed MOB 3 mission and No Action Alternative represents operations of based C-5M aircraft.

Impacts of implementation of the No Action Alternative on each resource area evaluated in this EIS are described below.

4.5.1 Acoustic Environment

Under the No Action Alternative at Grissom ARB, Seymour Johnson AFB, and Tinker AFB, existing flying operations would continue unchanged and construction associated with the KC-46A MOB 3 beddown would not occur. Noise levels would remain as they are under existing conditions, and there would be no new noise impacts.

Under the No Action Alternative at Westover ARB, implementation of the proposed KC-46A MOB 3 mission would not occur, but the separate action of converting the 439 AW fleet from

C-5B to C-5M aircraft would still take place. The conversion of the 439 AW fleet, scheduled to be completed in 2019, is a separate and independent action that is unrelated to the proposed KC-46A MOB 3 beddown. The C-5M is substantially quieter than the C-5B (see Table 4-22), and noise levels (dB L_{Adn}) near the base would decrease under the No Action Alternative (Figure 4-9).

The off-base area affected by noise levels greater than 65 dB L_{Adn} would decrease by 398 acres (86 percent decrease from 464 acres to 66 acres) (see Table 4-23). The number of on-base acres affected by noise levels greater than 65 dB L_{Adn} would decrease by 397 (35 percent decrease from 1,139 acres to 742 acres) (see Table 4-23). Noise levels (dB L_{Adn}) resulting from the No Action Alternative would be very similar to noise levels resulting from implementation of the proposed MOB 3 mission. The primary reason for this lack of substantive change with implementation of the proposed MOB 3 mission is that C-5 aircraft operations are louder and more frequent than the proposed KC-46A aircraft operations, even after conversion of C-5B to C-5M. The loudest and most frequent aircraft type is the most important factor in determining overall noise levels, as measured by the L_{Adn} metric. The KC-46A, in comparison to the C-5, would not significantly contribute to overall noise levels.

The estimated off-base population affected by noise levels greater than 65 dB L_{Adn} would decrease by 38 (from 38 to 0) (Table 4-24). Off-base areas exposed to noise levels greater than 65 dB L_{Adn} resulting from the No Action Alternative would be entirely non-residential. Because no people reside in areas where noise levels are greater than 80 dB L_{Adn}, either on or off base, the long-term risk of hearing loss is minimal. The same flightline building on Westover ARB affected by noise levels greater than 80 dB L_{Adn} from baseline conditions and the proposed MOB 3 mission would also be affected from the No Action Alternative. Hearing loss risk among people working in high-noise environments on Westover ARB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Westover ARB are presented in Table 4-25 and on Figure 4-9. After conversion of the C-5B to C-5M, and implementation of the proposed MOB 3 mission, noise levels at several representative locations surrounding Westover ARB would decrease 3 to 9 dB L_{Adn}.

Under the No Action Alternative, aircraft noise levels would decrease relative to baseline conditions. C-5 aircraft operations would continue to follow current time-patterns, and flights during acoustic night would continue to be rare. There would be no C&D activity or noise associated with the No Action Alternative.

4.5.2 Air Quality

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.2, 3.2.2, 3.3.2, and 3.4.2. No changes would occur. No construction emissions would occur and operational emissions would be identical to the current baseline conditions. At Westover ARB, the No Action Alternative would cause minor changes in air quality emissions. Impacts under the No Action Alternative would be minor.

4.5.3 Safety

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.3, 3.2.3, and 3.3.3. At Westover ARB, the No Action Alternative is not anticipated to significantly change safety as the number and types of operations would remain the same as those described under baseline conditions.

4.5.4 Soils and Water

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.4, 3.2.4, 3.3.4, and 3.4.4. None of the proposed KC-46A MOB 3 construction would occur, and no impacts to soil and water resources would occur.

4.5.5 Biological Resources

Under the No Action Alternative, baseline conditions at each of the four bases would remain as described in Sections 3.1.5, 3.2.5, 3.3.5, and 3.4.5. No vegetation or wildlife habitat would be disturbed as a result of not implementing the proposed KC-46A MOB 3 mission. No impacts on biological resources would be anticipated.

4.5.6 Cultural Resources

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.6, 3.2.6, 3.3.6, and 3.4.6. There would be no effect to cultural resources and/or historic properties.

4.5.7 Land Use

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.7, 3.2.7, 3.3.7, and 3.4.7. No changes would occur to planning noise contours surrounding the bases and no land use changes would occur within the base boundaries.

4.5.8 Infrastructure

Under the No Action Alternative, baseline conditions at each base would remain as described in the Sections 3.1.8, 3.2.8, 3.3.8, and 3.4.8. No new construction would occur and no new personnel would arrive or decrease at any of the bases. No impacts on the infrastructure system at any of the bases would occur.

4.5.9 Hazardous Materials and Waste

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.9, 3.2.9, 3.3.9, and 3.4.9. Each base would continue to use hazardous materials and dispose of hazardous waste as described for each base’s baseline conditions.

4.5.10 Socioeconomics

Under the No Action Alternative, baseline conditions would remain as described in Sections 3.1.10, 3.2.10, 3.3.10, and 3.4.10. No new personnel increases or decreases would occur at any of the bases and none of the bases would receive the benefits of a population increase. No construction would occur and therefore no construction related beneficial expenditures would occur. No impacts resulting from the use of hazardous materials or the generation of hazardous waste would occur.

4.5.11 Environmental Justice and other Sensitive Receptors

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB base would remain as described in Sections 3.1.11, 3.2.11, and 3.3.11.

Under the No Action Alternative at Westover ARB, the population affected would be zero. The C-5B to C-5M conversion, missions and programs would continue regardless of whether or not the proposed KC-46A MOB 3 mission would be implemented at Westover ARB. Therefore, disproportionate impacts to minority or low-income populations would not occur from the No Action Alternative at Westover ARB. In addition, implementation of the No Action Alternative would not expose youth or elderly populations to increased noise levels.

CHAPTER 5

CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Council on Environmental Quality (CEQ) regulations stipulate that the cumulative effects analysis in an Environmental Impact Statement (EIS) should consider the potential environmental consequences resulting from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 *Code of Federal Regulations [CFR]* 1508.7).

Actions that have a potential to interact with the proposed KC-46A Third Main Operating Base (MOB 3) mission at each of the four bases are included in this cumulative effects analysis. This approach enables decision makers to have the most current information available so that they can evaluate the range of environmental consequences that would result from the beddown of KC-46A aircraft, infrastructure, and personnel at these locations. Although known construction and upgrades are a part of the analysis contained in this document, potential future requirements of the proposed MOB 3 mission cannot be predicted. As those requirements become known, future National Environmental Policy Act (NEPA) analysis would be conducted, as required.

In this chapter, the U.S. Air Force (USAF) has identified past and present actions in the region of each of the four bases that have been selected as alternatives to host the proposed MOB 3 mission. In addition, this analysis also evaluated reasonably foreseeable future actions that are in the planning phase in the regions surrounding Grissom Air Reserve Base (ARB) in Indiana, Seymour Johnson Air Force Base (AFB) in North Carolina, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts. Although the use of an auxiliary airfield has been identified for use by KC-46A aircrews at Seymour Johnson AFB, no construction, ground disturbance, or other activities beyond flight operations are proposed for those locations; therefore, cumulative effects are not evaluated for the auxiliary airfields.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship with the proposed action (CEQ 1997). The scope of the analysis must consider other projects that coincide with the location and timetable of implementation of the proposed KC-46A MOB 3 beddown at each base. Cumulative effects can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be considered as actions connected in time or space (40 *CFR* 1508.25) (CEQ 1997) could include projects that affect areas on or near any of the four bases identified as alternatives. This EIS analysis addresses three questions to identify cumulative effects:

1. Does a relationship exist such that elements of the proposed action or alternatives might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the alternatives and another action could be expected to interact, would the alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the alternative is considered alone?

For the alternative under consideration to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant. Second, the proposed action must make a substantial contribution to that significant cumulative impact. Proposed actions of limited scope do not typically require as comprehensive an assessment of cumulative impacts as proposed actions that have significant environmental impacts over a large area (CEQ 2005).

In the sections below, the cumulative significance is based on the context, intensity and timing of the proposed KC-46A MOB 3 beddown, as discussed in Chapter 4, related to the past, present, and reasonably foreseeable actions. For each base, a summary of the cumulative effects is provided in a table, followed by a discussion of the resource areas that have potentially significant cumulative effects based on the above evaluation criteria.

5.1 GRISSOM AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed MOB 3 mission at Grissom ARB, as well as the incremental contribution of past, present, and reasonably foreseeable actions. Grissom ARB has been identified by the USAF as a reasonable alternative for the proposed MOB 3 mission.

Table 5-1 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed MOB 3 mission at Grissom ARB. Table 5-1 briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed MOB 3 mission at Grissom ARB. No other actions were identified during the data gathering and field survey phases at Grissom ARB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas (e.g., soils and water, biological resources, infrastructure, and hazardous materials and waste), the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-1. Past, Present, and Reasonably Foreseeable Actions at Grissom ARB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Top Five Military Construction (MILCON) Projects	Grissom ARB	Present, future	***Nose Dock 5 Shroud:*** Expand current facility into an aircraft hangar by making the following additions and alterations: extend metal building, concrete floor slab and foundations, truss and column steel frame, standing seam metal roof; add brick wainscot, high expansion foam fire suppression system, automatic aircraft doors, correct Occupational Safety and Health Administration (OSHA) deficiencies, and provide handicap access. ***Small Arms Range Upgrade:*** Demolish existing 15-point outdoor range. Retain weapons clearing room, storage room, rest rooms, offices, and target maintenance building if possible. Construct a 35-point indoor range and attach to any standing buildings. Install necessary environmental air quality equipment, bullet traps, and target retrieval equipment. Install parking spaces, sidewalks, access roads, storm drainage, grading, and landscaping. ***Visiting Quarters:*** Construct an additional phase to the Visiting Quarters Complex consisting of 50 rooms, housekeeping storage, laundry, lounge, vending area, and building storage. ***Petroleum Operations Facility:*** Construct a new, approximately 4,000 square foot, combined Petroleum Operations Facility and Laboratory. Work will include demolition of the existing facility once new construction is complete. ***Physical Fitness Center:*** Construct a new 30,306-square-foot fitness center. Demolish existing fitness center upon completion of construction.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Airfield Hydrant Upgrade	Defense Logistics Agency (DLA)	Spring 2016	The upgrade will replace the existing hydrant system with a new Type III system which includes a new primary feed line from the Tank Farm to the airfield and a new aboveground storage tank (AST) near the airfield. Most of the existing piping will be abandoned in place. Fuel outlets to support KC-135 aircraft will be constructed, along with new ramp tanks and an upgraded mechanical system.	Acoustic Environment, Air Quality, Safety, Infrastructure, Hazardous Materials and Waste, Socioeconomics

Table 5-1. Past, Present, and Reasonably Foreseeable Actions at Grissom ARB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions				
Miami County Economic Development Authority (MCEDA) industrial building	Development/ MCEDA	Present	The MCEDA is developing a 57,000-square-foot shell building at the Industrial Park at Grissom Aeroplex. The facility will offer space for prospective industrial/manufacturing companies. The shell building would be located south of Discount Tire. The building is designed to allow four additions, providing approximately 240,000 square feet of space.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials and Waste, Socioeconomics
Route 31 Improvements	County	Present	Project to improve Route 31 to interstate highway standards from Interstate (I)-465 in Indianapolis, Indiana, to South Bend, Indiana. Potential interchange locations on the Route 31 improvement, as well as other potential highway improvement projects, were discussed. The recently updated Miami County Comprehensive Plan recommends that the State Highway 218 intersection with Route 31 be developed into an interchange as part of the Route 31 improvements.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials and Waste, Socioeconomics
Hoosier Boulevard Repair	County	Present	This is an $80,000 project to resurface the road leading into Grissom Aeroplex, relocate underground lines, and round out a 90-degree curve in the road.	Acoustic Environment, Air Quality, Safety, Infrastructure, Socioeconomics

5.1.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-1) and the proposed MOB 3 mission at Grissom ARB. Table 5-2 provides a summary of the cumulative effects. As shown in Table 5-2, safety, cultural resources, land use, socioeconomics, and environmental justice and other sensitive receptors are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, and hazardous materials and waste.

Table 5-2. Summary of Cumulative Effects for Grissom ARB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	◘	◘	◘
Air Quality	◘	◘	◘
Safety	○	○	○
Soils and Water	◘	◘	◘
Biological Resources	◘	◘	◘
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	◘	◘	◘
Hazardous Materials and Waste	◘	◘	◘
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	○	◘	○

Key: ○ – not affected or beneficial impacts, ◘ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.1.2.1 Acoustic Environment

Construction and demolition (C&D) projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. Noise generated during C&D projects is localized and temporary, and construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes aircraft operations noise. Should multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

Noise generated by weapons firing in indoor small arms training ranges (see project description in Table 5-7, Top 5 MILCON Projects) is muffled by the exterior walls of the structure, whereas noise generated by weapons firing at outdoor ranges spreads with relatively little impedance. Therefore, the proposed indoor firing range would be less likely to generate noise levels of concern in adjacent areas than the existing outdoor firing range. While weapons noise is typically audible outside of indoor firing ranges, it does not typically occur at levels that have the potential to disrupt noise-sensitive activities (e.g., conversation). Although qualitatively different, weapons noise generated at the indoor firing range would be a part of the long-term acoustic environment together with KC-46A aircraft noise should the proposed MOB 3 mission occur at Grissom ARB. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Grissom ARB would not be significant.

5.1.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Grissom ARB would not be significant.

5.1.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the soil and water resources at Grissom ARB would not be significant.

5.1.2.4 Biological Resources

The additional C&D projects described in Table 5-1 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Grissom ARB would not be significant.

5.1.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Grissom ARB Installation Development Plan (IDP). The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Grissom ARB would not be significant.

5.1.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-1 are anticipated to be similar to the existing hazardous materials and waste currently being used at Grissom ARB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base’s capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Grissom ARB would not be significant.

5.1.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the proposed MOB 3 mission at Grissom ARB involve the consumption of material resources and energy resources. The use of these resources is considered permanent. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

For the proposed MOB 3 mission at Grissom ARB, most resource commitments would be neither irreversible nor irretrievable. Most impacts would short-term and temporary (e.g., air emissions from construction), or longer lasting but negligible (e.g., the construction of new homes to support proposed MOB 3 mission personnel increases on base or in the local communities). Those limited resources that could involve a possible irreversible or irretrievable commitment would be used in a beneficial manner.

Construction and renovation of base facilities and infrastructure would require the consumption of limited amounts of material typically associated with interior renovations (wiring, insulation, windows, and drywall) and exterior construction (concrete, steel, sand, mortar, brick, and asphalt). An undetermined amount of energy to conduct renovation, construction, and operation of these facilities would be expended and irreversibly lost, but energy would be used in an efficient and sustainable manner throughout the useful life cycle of the facilities.

Training operations would continue to involve the consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in the KC-46A aircraft and other aircraft while in flight. None of these activities are expected to significantly decrease the availability of minerals or petroleum resources. Personal vehicle use by the new personnel and those continuing to support the existing missions would consume fuel, oil, and lubricants. The amount of these materials used would increase slightly; however, this additional use is not expected to significantly affect the availability of the resources in the central Indiana region or the nation.

5.2 SEYMOUR JOHNSON AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.2.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-3 summarizes past, present, and reasonably foreseeable actions within the region that could interact with the implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed MOB 3 mission. No other actions were identified during the data gathering and field survey phases at Seymour Johnson AFB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas (e.g., soils and water, biological resources, infrastructure, and hazardous materials and waste), the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Seymour Johnson Installation Master Plan 2014	Seymour Johnson AFB	3-25 years	Includes projects recently completed, currently in execution, or funded. Majority of projects are MILCON funded. Top five MILCON projects currently at the installation include: ***Air Traffic Control Tower:*** Construct an aircraft operations building which includes Control Tower, Base Operations, In-flight Kitchen, Wing Safety, and Weather offices with all other support. Facilities provide command and control of all flight and ground operations around the installation. The control tower, Base Operations, In-flight Kitchen, Wing Safety, and Weather buildings are inadequately sized and configured for today's mission and high-tech equipment. Air traffic controllers do not have visual contact with all airfield surfaces due to facilities in the line of sight. Therefore, aircraft and ground personnel are at risk during aircraft movement. Access to the tower cab is narrow and unsafe. The control tower lacks space for required offices, operations cab, and simulator training for controllers. The Seymour Johnson AFB control tower/Radar Approach Control (RAPCON) records an annual aircraft traffic count of approximately 110,000 making it the second in Air Combat Command. These activities control 5,800 square miles of airspace. They provide radar services to 8 separate airports; assist and coordinate aircraft actions with 12 Federal Aviation Administration (FAA) Air Traffic Control Centers, Terminal Radar Approach Controls, and to control towers while managing the flow of aircraft in North Carolina's Eastern Region. ***Fitness Center (Lease and Sports Complex):*** The lease and sports complex will provide safe illuminated athletic fields for the City, Seymour Johnson AFB, and Wayne County residents. This proposal would be a Public-Public Public-Private (P4) Community Partnership initiative under the authority of 10 *United States Code (USC)* 2336. The City, as consideration for the lease of the property, proposes to construct an addition to the Seymour Johnson AFB Fitness Center. The addition would be 2,500 to 3,000 square feet and would provide needed space for group fitness and exercise equipment. Access to the Seymour Johnson AFB Fitness Center would continue to be for installation personnel only.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Seymour Johnson Installation Master Plan 2014 (Continued)	Seymour Johnson AFB (Continued)	3-25 years (Continued)	***Munitions Complex:*** Project constructs an armament shop, a munitions training and loading hangar, and improved GOV/privately owned vehicle (POV) transportation networks. Munitions loading training is currently accomplished at a significant distance from the F-15E apron (Building 4820) and needs to be relocated. Armament storage will be designed into this new hangar to store serviceable armament assets such as guns, rails, etc. The buildings being utilized currently for Armament, as well Weapons Load Training contain multiple safety hazards and concerns which would be mitigated by this new plan. The new plan would also call for a separate gun shop area (in the same location, but separate from the main building) to facilitate a jammed Gun or Ammunition Loading System that contains live rounds. New construction will route traffic on a new perimeter road. A small fighter ramp expansion is also included. Demolishes 2124, 2125, 2141, 2150, 2152, 2153 and 2154. ***Consolidated Mission Personnel Operations Facility:*** A consolidated facility to provide a central location for all common personnel functions, providing one stop service. The facility will be in a convenient geographical area consistent with the General Plan for Seymour Johnson AFB. The building will efficiently accommodate 11 separate but inter-related organizations. The facility will include space for Military and Civilian Personnel, Traffic Management, Finance, Military Equal Opportunity, Law Center, Mission Support, Support Group Headquarters, Family Support Center, Printing Office, and Audio Visual. A consolidated support center is greatly needed to improve operating procedures, reduce processing time, and improve effectiveness ***Mobility/War Readiness Material Storage/Aircraft Ramp:*** Construct a combined storage facility in the area in front of the Radar Approach Control and Control Tower.	

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Proposed Military Construction Project Seymour Johnson AFB Goldsboro, North Carolina	Seymour Johnson AFB	2016	Construct an expansion of the existing KC-135R parking apron at the Seymour Johnson AFB, Goldsboro, Wayne County, North Carolina. Project to improve the ability of the 916th Air Refueling Wing (ARW) to maneuver the KC-135R aircraft into and out of parking spaces on the existing KC-135R parking apron without having to manually push or pull the aircraft into the parking spaces. The KC-135R parking apron does not have an adequate number of taxi lanes to allow KC-135R aircraft to pull into and out of parking spaces along the two outermost parking rows. Without the construction of the expanded parking apron, the KC-135R would need to be manually pushed back into parking spaces, which requires approximately 800 labor hours per year.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Joint Land Use Study (JLUS)	Seymour Johnson AFB; local, state, Federal stakeholders	2016	The JLUS is a cooperative planning effort conducted as a joint venture between an active military installation, surrounding cities and counties, state and federal agencies, and other affected stakeholders. The Seymour Johnson AFB and Dare County Range JLUS is an 18-month study funded through a grant from the Department of Defense (DoD) Office of Economic Adjustment with contributions by the local sponsor, the State of North Carolina. The primary objective of a JLUS is to reduce potential conflicts between a military installation and surrounding areas while accommodating new growth and economic development, sustaining economic vitality, and protecting the general public's health and safety, without compromising the operational missions of the installation.	Acoustic Environment, Safety, Land Use, Infrastructure, Socioeconomics, Environmental Justice
State and Local Actions				
I-42 (U.S. Highway 70 [U.S. 70] Goldsboro Bypass)	North Carolina Department of Transportation	2016	Twenty mile bypass that extends from U.S. 70 just west of N.C. 581 in Wayne County to U.S. 70 just east of Promise Land Road in Lenoir County. The entire bypass project costs approximately $235 million. The project was completed in three sections, 3.9-mile central section opened in December 2011, the 5.9-mile western section opened in October 2015, and the 11.9-mile eastern section opened in May 2016. The bypass is part of plan to better connect North Carolinians to jobs, education, health care, and recreation opportunities and will provide greater access to destinations such as Seymour Johnson AFB, the state port in Morehead City, and the Global TransPark in Kinston.	

5.2.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-3) and the KC-46A beddown at Seymour Johnson AFB. Table 5-4 provides a summary of the cumulative effects. As shown in Table 5-4, safety, cultural resources, land use, and socioeconomics are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, hazardous materials and waste and environmental justice and other sensitive receptors.

Table 5-4. Summary of Cumulative Effects for Seymour Johnson AFB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	◘	◘	◘
Air Quality	◘	◘	◘
Safety	○	○	○
Soils and Water	◘	◘	◘
Biological Resources	◘	◘	◘
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	◘	◘	◘
Hazardous Materials and Waste	◘	◘	◘
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	◘	◘	◘

Key: ○ – not affected or beneficial impacts, ◘ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.2.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 beddown would take place near other ongoing and future C&D projects (e.g., projects identified in the 2014 Installation Master Plan) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Seymour Johnson AFB. C&D noise would be localized and temporary. Construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes elevated aircraft operations noise levels. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Seymour Johnson AFB would not be significant.

5.2.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Installation Master Plan) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Seymour Johnson AFB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Seymour Johnson AFB would not be significant.

5.2.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Installation Master Plan) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Seymour Johnson AFB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Seymour Johnson AFB would not be significant.

5.2.2.4 Biological Resources

The additional C&D projects described in Table 5-3 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Seymour Johnson AFB would not be significant.

5.2.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Installation Development Plan. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure, Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Seymour Johnson AFB would not be significant.

5.2.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-3 are anticipated to be similar to the existing hazardous materials and waste currently being used at Seymour Johnson AFB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base’s capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Seymour Johnson AFB would not be significant.

5.2.2.7 Environmental Justice and other Sensitive Receptors

Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would result in almost identical conditions as under baseline conditions. Noise from MILCON activities at Seymour Johnson AFB described in Table 5-3 would not be anticipated to extend off-base boundaries. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on environmental justice and other sensitive receptors at Seymour Johnson AFB would not be significant.

5.2.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the new mission at Seymour Johnson AFB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

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5.3 TINKER AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.3.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed KC-46A MOB 3 beddown at Tinker AFB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-5 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed KC-46A MOB 3 beddown at Tinker AFB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed KC-46A MOB 3 beddown at Tinker AFB. No other actions were identified during the data gathering and field survey phases at Tinker AFB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas, such as soils and water, biological resources, infrastructure, and hazardous materials and waste, the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Top Five MILCON Projects Next 5 Years	Tinker AFB	2017-2021	***2017 - KC 46A Depot System Integration Laboratory, MILCON:*** • Add External Storm Shelters at Child Development Center (CDC) West, Building 5510, Operations and Maintenance (O&M) • Add External Storm Shelters at CDC East, Building 3904, O&M • Correct Life Safety Code Deficiencies, Building 280, O&M • Repair By Replacement Heating, Ventilation and Air Conditioning System, Building 202, O&M ***2018 - E-3G Mission and Flight Simulator Training Facility, MILCON:*** • Refueler Vehicle Maintenance Shop, MILCON • KC 46A Mechanical Plant and Depot Site Support, MILCON • Depot Aircraft Corrosion Control Hangar, MILCON • Natural Gas Main Extension, MILCON ***2019 - KC 46A Depot Maintenance Hangars, MILCON:*** • Add 4 Hydrants to East Air Logistics Complex (ALC) Hydrant System, MILCON • E-3 Airborne Warning and Control System (AWACS) Fuels Maintenance Hangar, MILCON • Construct 552 Air Control Wing Headquarters Facility, MILCON • Add To Depot Ramp and Taxiway, MILCON ***2020 - Force/Asset Protection Land Acquisition, MILCON:*** • Repair Building 3001 W/Free Cooling Heat Exchangers, MILCON • Repair Building 9301 W/Free Cooling Heat Exchangers, MILCON • CDC, MILCON • Fully Contained, 25-Meter Small Arms Range, MILCON	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Top Five MILCON Projects Next 5 Years (Continued)	Tinker AFB (Continued)	2017-2021 (Continued)	***2021 - KC 46A Depot Maintenance and Corrosion Control Hangars PH3, MILCON:*** • General Purpose Warehouse, DLA, MILCON • Non-Organizational Parking Lot, Land Acquisition, MILCON • Construct New Transient Alert Facility, Building 240, MILCON • Construct New Installation Transport Network Communications Infrastructure South Tinker, MILCON	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics (Continued)
New Control Tower	Tinker AFB	Present	Construct a new 11-story Air Traffic Control (ATC) Tower to replace the current tower that is approximately 40 years old and does not meet FAA size standards for air control and training requirements. Construction will include reinforced concrete piers, control tower cab with tinted double glazing, elevator, flight command and administrative area, supervision and simulation training area as well as fire protection, utilities, back-up power, lighting protection, access road, and any other necessary support for a complete and useable facility. The new tower will be sited in relation to the two runways allowing personnel to conduct critical controller training and conduct operations in a high density environment.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
New Reserve AWACS Facility	Tinker AFB	Present	Construction of a multi-story, 32,000 square feet, consolidated squadron operations and Air Control Group facility. The facility will be located south of Arnold Street, approximately halfway between D Avenue and H Avenue, east of the Air Base Wing Headquarters building. The facility will provide space for flight crews and administrative support personnel for the AWACS Reserves at Tinker AFB.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
New KC-46A Maintenance Campus	Tinker AFB	2014-2028	KC-46A maintenance operations would be sited at the Burlington Northern Santa Fe Rail Yard located south of Tinker AFB. Although this property is off-base, it is just north of Building 9001 and is immediately adjacent to Tinker AFB property, within close proximity to the runway. Required facilities include 14 aircraft bays, taxiways, aircraft parking positions, aircraft fuel /defueling positions, aircraft run up positions, a 10-meter engine test cell, a kitting facility, a software integration lab, warehouse space and support facilities such as central chiller plant, fire pump house and personal vehicle parking areas. The proposed project will create a workload increase for Tinker AFB. During construction, an estimated 350 people would be required for the demolition and construction of the maintenance facilities. At full depot maintenance capabilities, an estimated additional 1,700 office and maintenance personnel would be required to maintain the KC-46A fleet, as well as continued maintenance on the KC-135 as it is being phased out. Select projects from this overall project are included in the top five MILCON projects listed above.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
New Truck Gate	Tinker AFB	Present	A truck inspection gate is located on SE 59th Street, north of the Burlington Northern Santa Fe alternative site. This gate serves to inspect commercial vehicles prior to base entry The truck inspection gate is being relocated to the west side of the Burlington Northern Santa Fe site along Air Depot Boulevard.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Replace Fuel Distribution Facilities	MILCON DLA	Present	This project includes the removal and replacement of the fiberglass fuel line from Facility 273 to Facility 995. Ten fuel hydrant outlets will be added and 13 will be replaced. The fuel storage tanks will be refurbished, and the Type II pump house will be replaced. Additionally, a Base Military Service Station will be constructed.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions				
Boeing Manufacturing Facility	Oklahoma City	Present	Boeing is currently adding on to an existing facility with an $80 million, 290,000 square foot expansion. This will be the third structure in the aerospace company's growing Oklahoma City campus and provide facilities for approximately 800 employees. The new building structure is scheduled to open in 2016 at the company's campus near the south gate of Tinker AFB and will house employees in engineering, research and development laboratories and support staff.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Northeast Oklahoma County Loop	Oklahoma Department of Transportation	3-5 years	One new stretch of turnpike, referred to as the Northeast Oklahoma County Loop, will require the construction of 21 miles of toll roads that will link I-40 and the Turner Turnpike (I-44) in the eastern part of the Oklahoma City metro area. The new turnpike is expected to link up with I-40 a few miles east of Tinker AFB and the Choctaw Road interchange and extend north to hook up with the Turner Turnpike near Luther. Designed to alleviate traffic congestion and reduce the drive time between Tulsa and the Oklahoma City metro area, the cost of that project is estimated at $300 million.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions (Continued)				
Traffic Interchange Improvements	Oklahoma Department of Transportation	Summer 2015	Recent improvements were made to the traffic interchanges in the areas of Interstate 40, SE 29 and Air Depot Boulevard, including improvements south to the Tinker Gate at Tinker AFB. Oklahoma Department of Transportation has begun making the improvements along I-40, which include strengthening the barrier wall at the curve in the area of SE 29. Additional construction plans along I-40 and Air Depot include: • Laying a high-friction pavement material along the curve, eastbound and westbound on I-40. • Adding roadway warning signs about the upcoming curve, eastbound and westbound. • Increasing traffic capacity of the I-40 eastbound and westbound exit ramps onto Air Depot by adding second lanes. • Adding traffic lights at the end of the westbound and eastbound exit ramps off I-40 onto Air Depot. • Adding a right-turn-only lane at the end of the eastbound exit ramp onto Air Depot south into Tinker AFB. • Adding a right-turn-only lane at the end of the westbound exit ramp onto Air Depot north into Midwest City. • Adding two new left-turn-only lanes, with signals, underneath the I-40 overpass: a new lane for northbound traffic and a new lane for southbound traffic servicing the entrance ramps onto I-40. • Widening of northbound and southbound lanes of Air Depot underneath the I-40 overpass, south of SE 29. • The existing lights at SE 29 and at Boeing Avenue and the new lights at the ramps will be coordinated to allow better traffic flow through the intersection and south under I-40. • Reconfiguring the SE 29 westbound median to add additional left-turn lane capacity for turning onto southbound Air Depot. • Adding a new eastbound traffic lane on SE 29, through the Air Depot intersection. • Creating a new right-turn-only lane south onto Air Depot off SE 29. • Constructing a new sidewalk from the Tinker Gate to Town Center Plaza.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

5.3.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-5) and the KC-46A beddown at Tinker AFB. Table 5-6 provides a summary of the cumulative effects. As shown in Table 5-6, safety, cultural resources, land use, and socioeconomics are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, hazardous materials and waste and environmental justice and other sensitive receptors.

Table 5-6. Summary of Cumulative Effects for Tinker AFB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	◘	◘	◘
Air Quality	◘	◘	◘
Safety	○	○	○
Soils and Water	◘	◘	◘
Biological Resources	◘	◘	◘
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	◘	◘	◘
Hazardous Materials and Waste	◘	◘	◘
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	◘	◘	◘

Key: ○ – not affected or beneficial impacts, ◘ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.3.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 beddown would take place near other ongoing and future C&D projects (e.g., New Control Tower) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Tinker AFB. C&D noise is localized and temporary. Construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes elevated aircraft operations noise levels. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

Noise generated during operations at the new KC-46A Maintenance Campus has been assessed for environmental impacts (USAF 2014c) and is included in baseline conditions for this EIS (see Section 3.3.1). KC-46A depot maintenance operations will take place in the context of an active installation currently supporting a multitude of similar operations. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Tinker AFB would not be significant.

5.3.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., New Control Tower, New KC-46A Maintenance Complex) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Tinker AFB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Tinker AFB would not be significant.

5.3.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., New Control Tower, New KC-46A Maintenance Complex) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Tinker AFB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Tinker AFB would not be significant.

5.3.2.4 Biological Resources

The additional C&D projects described in Table 5-5 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Tinker AFB would not be significant.

5.3.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Installation Master Plan. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Tinker AFB would not be significant.

5.3.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-5 are anticipated to be similar to the existing hazardous materials and waste currently being used at Tinker AFB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base’s capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous waste and materials at Tinker AFB would not be significant.

5.3.2.7 Environmental Justice and other Sensitive Receptors

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would result in almost identical conditions as under baseline conditions. Noise from MILCON activities at Tinker AFB described in Table 5-5 would not be anticipated to extend off-base boundaries. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on environmental justice and other sensitive receptors at Tinker AFB would not be significant.

5.3.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the proposed KC-46A MOB 3 beddown at Tinker AFB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

5.4 WESTOVER AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.4.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed MOB 3 beddown at Westover ARB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-7 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed MOB 3 beddown at Westover ARB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources potentially interact with the KC-46A beddown at Westover ARB. No other actions were identified during the data gathering and field survey phases at Westover ARB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas, such as soils and water, biological resources, infrastructure, and hazardous materials and waste, the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-7. Past, Present, and Reasonably Foreseeable Actions at Westover ARB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Fiscal Year 2015-2016 Installation Plan	Westover ARB	2015-2016	This list contains over 50 projects planned for 2015-2016 at Westover ARB. Projects include numerous facility renovations, utility repairs, runway concrete work, fence repairs, and other maintenance activities.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Top Five MILCON Projects	Westover ARB	2015-2020	***Indoor Small Arms Range:*** Construct a properly sized, configured and fully contained Indoor Small Arms Range at Westover ARB to provide adequate year round training to military personnel that require certification in the use of up to 45 caliber handguns, 12 gauge shotguns, and rifles up to 7.62 millimeters. ***Maintenance Facility Shops:*** Demolish Buildings 7071 and 2426, relocate the existing government vehicle fueling operation, and construct a properly sized and consolidated C-5 aircraft maintenance shop facility. Existing shops are located across multiple hangars and buildings not conducive for maintaining C-5 aircraft. Existing buildings are 1940s-era structures configured for obsolete aircraft are energy inefficient and require extensive repair. Construction of a new maintenance facility will consolidate all the shops into one building eliminating duplication of functions and allow the base to demolish approximately 100,000 square feet of 70-year-old facility space. ***Regional ISO Maintenance Hangar:*** Construct a properly sized and configured fully enclosed aircraft maintenance hangar and demolish Building 7072. The Regionalized ISO Inspection Program is performed in a hangar which cannot physically accommodate the tail section of the C-5. This exposes personnel to seasonal inclement weather delaying inspection/maintenance turn-around times. ***Overruns, Runway 15/33:*** Construct paved overruns to Runway 15/33 which is an existing Class B runway. The existing runway does not have paved overruns as required for an approved Class B runway. Assigned C-5 aircraft use this 7,100-foot runway during critical crosswind conditions. Runway is further restricted to Visual Flight Rules conditions only. Existing drainage structures and airfield lighting will need to be adjusted to accommodate the 1,000-foot overruns.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-7. Past, Present, and Reasonably Foreseeable Actions at Westover ARB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Top Five MILCON Projects (Continued)	Westover ARB (Continued)	2015-2020 (Continued)	***Addition to Fitness Center:*** 24,242 square feet addition to existing fitness center. Construction includes: foundations, structure, all utilities, lighting, landscaping, site improvements, fire alarm/suppression, communications, demolition of pavement, and all other necessary work. The new addition will include space for additional cardio and aerobics rooms, additional bathrooms and locker room space and an indoor running track. The project would incorporate applicable aspects of the Air Force Reserve Command (AFRC) Energy Policy.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics (Continued)
Manage Airfield Vegetation to Protect Flight Safety	Westover ARB	2015-Present	Westover ARB is altering vegetation management at the installation to comply with AFI 91-202. Compliance would include more frequent mowing of the grassland areas surrounding the airfield.	Air Quality, Safety, Soils and Water, Biological Resources, Socioeconomics
State and Local Actions				
Metro-Goldwyn-Mayer (MGM) Springfield	MGM	Present-2017	MGM Resorts International is constructing an approximately $800 million casino resort slated to open in fall 2017 in Downtown Springfield. This will be the first destination casino resort in Massachusetts. MGM Springfield estimates that the project will bring 3,000 permanent jobs and 2,000 construction jobs to Downtown Springfield. MGM has established a hiring goal of 35 percent of the workforce from the City of Springfield and 90 percent from a combination of Springfield and the region. The mixed-used development includes a hotel; 125,000 square feet of gaming space; about 55,000 square feet of retail and restaurant space that will accommodate 15 shops and restaurants; and a multi-level parking garage. Plans also envision a high-energy dining, retail and entertainment district with an eight-screen cinema, bowling alley and an outdoor stage. This will be developed by Davenport Properties of Boston, MA, in partnership with MGM on land now occupied by the South End Community Center and the Zanetti School.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Northern New England InterCity Rail Initiative	Massachusetts Department of Transportation and Vermont Agency of Transportation	Unknown	The Massachusetts Department of Transportation and the Vermont Agency of Transportation, in collaboration with the Connecticut Department of Transportation, are conducting a study to examine the opportunities and impacts of more frequent and higher speed intercity passenger rail service on two major rail corridors known as the Inland Route and the Boston to Montreal Route.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Aviation Research and Training Center at the Westover ARB	University of Massachusetts Amherst and M2C Aerospace, Inc.	2017	The University of Massachusetts Amherst and M2C Aerospace, Inc., of Milford, Massachusetts, are developing a new Aviation Research and Training Center at Westover ARB. The center is located at Westover ARB in space leased from USAF and staffed by UMass Amherst faculty and students and scientists from M2C. It will use a high-fidelity 360-degree air traffic control tower simulator that will be modified for three-dimensional views of a variety of operational environments. The aviation center is scheduled to open at the Westover location during the spring semester of 2017. Approximately 27,000 square feet will be renovated, about 7,000 of which will accommodate the simulator.	Safety, Infrastructure, Socioeconomics

5.4.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-7) and the proposed KC-46A MOB 3 beddown at Westover ARB. Table 5-8 provides a summary of the cumulative effects. As shown in Table 5-8, safety, cultural resources, land use, socioeconomics, and environmental justice and other sensitive receptors are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, and hazardous materials and waste.

Table 5-8. Summary of Cumulative Effects for Westover ARB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	◘	◘	◘
Air Quality	◘	◘	◘
Safety	○	○	○
Soils and Water	◘	◘	◘
Biological Resources	◘	◘	◘
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	◘	◘	◘
Hazardous Materials and Waste	◘	◘	◘
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	○	◘	○

Key: ○ – not affected or beneficial impacts, ◘ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.4.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top 5 MILCON Projects) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Westover ARB. C&D noise is localized and temporary and construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes aircraft operations noise. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

As discussed in section 4.4.1, the conversion of the Westover ARB-based C-5 fleet from C-5B aircraft to C-5M aircraft, when taken in combination with proposed MOB 3 mission aircraft operations, would result in reduction in A-weighted day-night average sound level (L_{Adn}) aircraft noise levels on and near the installation. The C-5 conversion is currently under way, and is scheduled for completion at approximately the same time that the proposed MOB 3 mission would begin operations.

Noise generated by weapons firing in indoor small arms training ranges (see project description in Table 5-7, Top 5 MILCON Projects) is muffled by the exterior walls of the structure. While weapons noise is typically audible outside of indoor firing ranges, it does not typically occur at levels that have the potential to disrupt activities. Weapons noise generated at the indoor firing range would be a part of the long-term acoustic environment similar to aircraft noise generated by KC-46A aircraft if the proposed MOB 3 mission were to occur at Westover ARB. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Westover ARB would not be significant.

5.4.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Westover ARB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Westover ARB would not be significant.

5.4.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Westover ARB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Westover ARB would not be significant.

5.4.2.4 Biological Resources

The additional C&D projects described in Table 5-7 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Westover ARB would not be significant.

5.4.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Westover ARB Installation Plan and other projects described in Table 5-7. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Westover ARB would not be significant.

5.4.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-7 are anticipated to be similar to the existing hazardous materials and waste currently being used at Westover ARB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base's capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Westover ARB would not be significant.

5.4.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the proposed KC-46A MOB 3 beddown at Westover ARB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

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40 *CFR* 112.20(f) – Certification of Applicability of Substantial Harm Criteria

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LIST OF PREPARERS

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LIST OF REPOSITORIES

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GRISSOM AIR RESERVE BASE (ARB) REPOSITORIES

- Peru Public Library, 102 East Main, Peru, IN 46970
- Kokomo-Howard County Public Library Main, 220 N. Union, Kokomo, IN 46901

SEYMOUR JOHNSON AIR FORCE BASE (AFB) REPOSITORIES

- Wayne County Public Library, 1001 E Ash St., Goldsboro, NC 27530
- Seymour Johnson AFB Library, 1520 Goodson St., Bldg. 3660, NC 27531

TINKER AFB REPOSITORIES

- Midwest City Public Library, 8143 E. Reno Ave., Midwest City, OK 73110-7589
- Del City Library, 4509 SE. 15th St., Del City, OK 73115
- Tinker Library, 6120 Arnold St., Bldg. 5702, Tinker AFB, OK 73145

WESTOVER ARB REPOSITORIES

- Chicopee Public Library, 449 Front St., Chicopee, MA 01013
- Ludlow Public Library, 24 Center St., Ludlow, MA 01056
- South Hadley Public Library, 2 Canal St., South Hadley, MA 01075

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GLOSSARY


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U.S. AIR FORCE
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Grissom ARB, IN
Seymour Johnson AFB, NC
Tinker AFB, OK
TINKER AIR FORCE BASE
UNITED STATES AIR FORCE
SEYMOUR JOHNSON AFB

GLOSSARY

24-Hour Exposure Level (L_{eq24}): The L_{eq24} metric is equivalent to L_{Adn} but does not add a decibel weighting factor to late-night noise events. The decibel weighting factor is relevant to estimating annoyance, but is not relevant to the physical mechanisms that can result in hearing impairment.

A-Weighted Day-to-Night Average Sound Level (L_{Adn}): A baseline day-to-night average sound level.

A-Weighted Maximum Sound Level (L_{Amax}): L_{Amax} is the highest sound level that occurs during a single aircraft overflight. For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level as the aircraft recedes into the distance. Federal Aviation Administration Order 1050.1E defines L_{Amax} as a single event metric that is the highest A-weighted sound level measured during an event.

Above Ground Level (AGL): Altitude expressed in feet measured above the ground surface.

Accident Potential Zone (APZ)**:** An area near a runway that is based on historical military accident and operations data and the application of a margin of a safety that represents those areas where an accident is most likely to occur. APZs are normally 3,000 feet wide and extend up to 15,000 feet from the end of the runway.

Acoustic Night: The period between 10 P.M. and 7 A.M. when 10 decibels is added to aircraft noise levels due to increased sensitivity to noise at night.

Asbestos-containing Material (ACM): Any material containing more than 1 percent asbestos.

Air Force Instruction (AFI): Instructions implementing U.S. laws and regulations, and providing policy for USAF personnel and activities.

Air Combat Command (ACC): The U.S. Air Force Command that operates combat aircraft assigned to bases within the contiguous 48 states, except those assigned to Air National Guard and the Air Force Reserve Command.

Air Installations Compatible Use Zones (AICUZ)**:** A land-use-planning program, used by the military, to protect the health, safety, and welfare of those living near military airfields while preserving the defense flying mission. AICUZ presents noise zones and accident potential zones for military airfields and recommendations for compatible land use.

Air Mobility Command (AMC): AMC, a major command with headquarters at Scott Air Force Base, Illinois. AMC provides America’s Global Reach. This rapid, flexible, and responsive air mobility promotes stability by keeping America’s capability and character highly visible.

Air Force Reserve Command (AFRC): AFRC, a major command with headquarters at Robins Air Force Base, Georgia. AFRC is the federally controlled Air Reserve Component of the U.S. Air Force.

Air Quality: The degree to which the ambient air is pollution-free, assessed by measuring a number of indicators of pollution.

Beddown: The provision of facilities and other necessary infrastructure to support a new mission or weapon system.

Bird/Wildlife-Aircraft Strike Hazard (BASH): A U.S. Air Force program to reduce the possibilities of bird or wildlife collisions with aircraft.

Clean Air Act (***CAA):*** This Act empowered the U.S. Environmental Protection Agency to establish standards for common pollutants that represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety to protect public health and safety.

Clean Water Act (***CWA):*** The primary federal law in the United States governing water pollution. The CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution, and ensuring that surface waters would meet standards necessary for human sports and recreation.

Clear Zone (CZ): An accident potential zone constituting the innermost portions of the runway approach.

Council on Environmental Quality (CEQ): The Council is within the Executive Office of the President and is composed of three members appointed by the President, subject to approval by the Senate. Members are to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs of the nation; and to formulate and recommend national policies to promote the improvement of environmental quality.

Day-Night Average Sound Level (DNL): DNL is a noise metric combining the levels and durations of noise events and the number of events over an extended time period. It is a cumulative average computed over a 24-hour period to represent total noise exposure. DNL also accounts for more intrusive nighttime noise, adding a 10 dB penalty for sounds after 10:00 P.M. and before 7:00 A.M. DNL is the Federal Aviation Administration's (FAA) primary noise metric. FAA Order 1050.1E defines DNL as the yearly day/night average sound level.

Decibel (dB): A sound measurement unit.

De Minimis Threshold: The minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas.

Endangered Species: The Endangered Species Act of 1973 defined the term "endangered species" to mean any species (including any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature) that is in danger of extinction throughout all or a significant portion of its range.

Environmental Justice: Pursuant to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, review must be made as to whether a federal program, policy, or action presents a disproportionately high and adverse human health or environmental effect on minority and/or low-income populations. Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, review must be made as to whether a federal program, policy, or action presents a risk to infants and children. Due to age-related physiological differences in types and levels of exposure, the evaluation of environmental impacts to children (youth under 18) is different from the evaluation of environmental impacts to adults (e.g., because children breathe more rapidly than adults and their bodies are not yet fully developed, they have different responses to environmental impacts).

Fiscal Year: U.S. Government accounting year beginning 1 October through 30 September.

Groundwater: Water held underground in the soil or in pores and crevices in rock.

Floodplain: An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.

Hazardous Material: Solids, liquids, or gases that can harm people, other living organisms, property, or the environment.

Hazardous Waste: Waste that poses substantial or potential threats to public health or the environment. In the United States, the treatment, storage and disposal of hazardous waste is regulated under the Resource Conservation and Recovery Act.

Integrated Noise Model (INM): The INM is the preferred model typically used for Federal Aviation Regulations Part 150 noise compatibility planning and for Federal Aviation Administration Order 1050 environmental assessments and environmental impact statements. INM is a computer model that evaluates aircraft noise impacts in the vicinity of airports. It is developed based on the algorithm and framework from SAE AIR 1845 standard, which used Noise-Power-Distance data to estimate noise accounting for specific operation mode, thrust setting, and source-receiver geometry, acoustic directivity and other environmental factors. The INM can output noise contours for an area or noise level at pre-selected locations. The noise output can be exposure-based, maximum-level-based, or time-based.

Joint Land Use Study (JLUS): A JLUS is a cooperative land use planning effort between military installations and surrounding communities that examines the positive and negative impacts that military installations have on surrounding communities, and vice versa.

Main Operating Base (MOB): A permanently manned, well-protected base with robust infrastructure. MOBs are characterized by command and control structures, enduring family support facilities, and strengthened force protection measures.

Mean Sea Level (MSL): Altitude expressed in feet measured above average sea level.

Military Operations Area (MOA): Airspace below 18,000 feet above mean sea level established to separate military activities from Instrument Flight Rule traffic and to identify where these activities are conducted for the benefit of pilots using Visual Flight Rule.

Mobile Sources: Includes cars and light trucks, heavy trucks and buses, nonroad engines, equipment, and vehicles.

National Ambient Air Quality Standards (NAAQS): NAAQS are established by the U.S. Environmental Protection Agency for criteria pollutants that represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect public health and safety.

National Environmental Policy Act (***NEPA):*** The National Environmental Policy Act of 1969 directs federal agencies to take environmental factors into consideration in their decisions.

National Historic Preservation Act (***NHPA):*** The National Historic Preservation Act of 1966, as amended, established a program for the preservation of historic properties throughout the United States.

National Register of Historic Places (NRHP): The NRHP is the Federal government's official list of districts, sites, buildings, structures, and objects deemed worthy of preservation.

NOISEMAP: *NOISEMAP* is a group of computer programs developed over a number of years by the U.S. Air Force for prediction of noise exposures in the vicinity of a military installation. NOISEMAP is the primary computer model used by the U.S. Department of Defense for evaluating military fixed-wing aircraft noise. It contains a suite of computer programs for prediction of noise exposure from aircraft flight, maintenance, and ground runup operations. NOISEMAP output includes noise contours, noise levels at preselected locations, and other supplemental metrics to assist users in analyzing impacts resulting from aircraft noise in the airfield environment.

Operation: An operation consists of a single activity such as a landing or a takeoff by one aircraft. Each time a single aircraft flies into a different airspace unit, one operation is counted. During a single sortie, an aircraft could fly in several airspace units and conduct a number of operations; therefore, the number of operations exceeds the number of sorties.

Power Setting: The power or thrust output of an engine in terms of kilonewtons thrust for turbojet and turbofan engines or shaft power in terms of kilowatts for turboprop engines.

Primary Aerospace Vehicles Authorized (PAA): PAA consists of the aircraft authorized and assigned to perform a U.S. Air Force wing's mission.

Prime Farmland: Prime farmlands are designations assigned by the U.S. Department of Agriculture. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used as cropland, pastureland, rangeland, forest land, or other land, but cannot be used as urban built-up land or water.

Region of Influence (ROI): The geographic scope of potential consequences in an area.

Scoping: A National Environmental Policy Act process of identifying the main issues of concern at an early stage in planning in order to discover any alternatives and aid in site selection.

Sortie: A sortie consists of a single military aircraft flight from the initial takeoff through the final landing and includes all activities that occur during that mission. For this EIS, the term sortie is used when referring to the quantity of aircraft operations from the airfield. A sortie can include more than one operation.

Sound Exposure Level (SEL): Sound Exposure Level (SEL) accounts for both the maximum sound level and the length of time a sound lasts. It provides a measure of the total sound exposure for an entire event. Federal Aviation Administration Order 1050.1E defines SEL as a single event metric that takes into account both the noise level and duration of the event and references to a standard duration of one second.

State Historic Preservation Office (SHPO): State department responsible for assigning protected status for cultural and historic resources.

Threatened Species: A species likely to become endangered within the foreseeable future throughout all, or a significant portion, of its range.

Traditional/Cultural Resource: Traditional and cultural resources are any prehistoric or historic district, site or building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes.

Wetland, Jurisdictional: A jurisdictional wetland is a wetland that meets all three U.S. Army Corps of Engineers' criterion for jurisdictional status: appropriate hydrologic regime, hydric soils, and facultative to obligate wetland plant communities under normal growing conditions.

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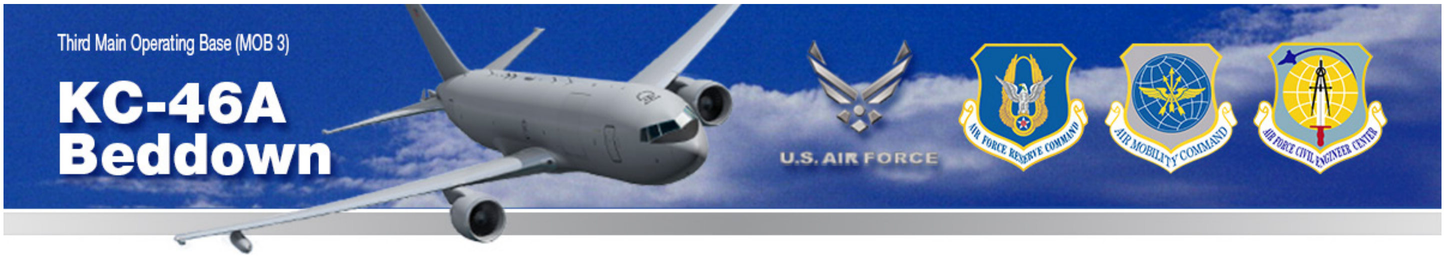

FINAL

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Prepared for:
Air Force Reserve Command
Air Force Civil Engineer Center
Air Mobility Command
United States Air Force

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April 2017

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ACM	asbestos-containing material
ACS	American Community Survey
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AGE	aerospace ground equipment
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
AMC	Air Mobility Command
AMSL	above mean sea level
APE	area of potential effect
APZ	accident potential zone
ARB	Air Reserve Base
ARW	Air Refueling Wing
AT/FP	Anti-Terrorism/Force Protection
BGEPA	Bald and Golden Eagle Protection Act
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CH_4	methane
CHABA	Committee on Hearing, Bioacoustics and Biomechanics
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	community of comparison
CONUS	continental United States
CWA	Clean Water Act
CZ	clear zone
dB	decibel(s)
dBA	A-weighted decibel
DNL	day-night average sound level
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FICAN	Federal Interagency Committee on Aircraft Noise
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FONPA	Finding of No Practicable Alternative
GHG	greenhouse gas

ACRONYMS AND ABBREVIATIONS (Continued)

GIS	geographic information system
GMV	government motor vehicle
GWP	global warming potential
HAP	hazardous air pollutant
Hz	hertz
ICRMP	Integrated Cultural Resources Management Plan
IDNR	Indiana Department of Natural Resources
IMPLAN	Impact Analysis for Planning
INRMP	Integrated Natural Resources Management Plan
L_{Adn}	A-weighted day-night average sound level
L_{Amax}	A-weighted maximum noise level
LAX	Los Angeles International Airport
LBP	lead-based paint
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Design
MBTA	Migratory Bird Treaty Act
MOB 3	Third Main Operating Base
NAAQS	National Ambient Air Quality Standards
NAIP	National Agriculture Imagery Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPTS	Noise-Induced Permanent Threshold Shift
NLR	noise level reduction
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
O&M	operations and maintenance
ODS	ozone depleting substance
OPTEMPO	operation tempo
PCB	polychlorinated biphenyl
PM_{10}	particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers in diameter
POV	privately owned vehicle
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTS	Permanent Threshold Shift
ROI	region of influence
SEL	sound exposure level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
TCP	traditional cultural property
TTS	Temporary Threshold Shift
UCLA	University of California, Los Angeles
UFC	Unified Facilities Criteria

ACRONYMS AND ABBREVIATIONS (Continued)

USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	*United States Code*
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

APPENDIX A

CORRESPONDENCE

APPENDIX A CORRESPONDENCE

A.1 NOTICE OF INTENT AND NEWSPAPER ADVERTISEMENT

A.1.1 Notice of Intent

15510 **Federal Register** / Vol. 81, No. 56 / Wednesday, March 23, 2016 / Notices

~~*Estimated Total Annual Burden Hours:* 3,652.~~

~~*Abstract:* Regulation I applies to all depository institutions lacking Federal deposit insurance. It requires the disclosure of certain insurance-related information in periodic statements, account records, locations where deposits are normally received, and advertising. This part also requires such depository institutions to obtain a written acknowledgment from depositors regarding the institution's lack of Federal deposit insurance. On December 16, 2011, the Bureau published an interim final rule (IFR) republishing Regulation I and making technical and conforming changes to reflect the transfer of authority and certain other changes made by the Dodd-Frank Act (76 FR 78126/RIN 3170–AA06). The IFR did not impose any new substantive obligations on persons subject to the existing regulations. As the Bureau added no new recordkeeping or reporting requirements, it adopted the PRA analysis from the original regulation. Upon further review, the Bureau has determined that the disclosures required by 12 CFR 1009.3 and 1009.4 and the signed acknowledgement required by § 1009.5 are subject to the PRA and require OMB approval thereunder. The Bureau has determined that it cannot reasonably comply with the standard approval timelines because the use of normal clearance procedures is reasonably likely to prevent the collection of information and result in public harm. *See* 5 CFR 1320.13(a)(2); 44 U.S.C. 3507(j).~~

~~Contemporaneously with this request for emergency processing, the Bureau is also initiating standard clearance procedures by allowing the public 60 days to comment on this collection of information. Accordingly, this request will also be resubmitted to OMB under standard clearance procedures.~~

~~Request for Comments: Comments are invited on: (a) Whether the collection of information is necessary for the proper performance of the functions of the Bureau, including whether the information will have practical utility; (b) The accuracy of the Bureau's estimate of the burden of the collection of information, including the validity of the methods and the assumptions used; (c) Ways to enhance the quality, utility, and clarity of the information to be collected; and (d) Ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology. Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval. All comments will become a matter of public record.~~

~~Dated: March 17, 2016.~~

~~**Darrin A. King,**~~

~~*Paperwork Reduction Act Officer, Bureau of Consumer Financial Protection.*~~

~~[FR Doc. 2016–06469 Filed 3–22–16; 8:45 am]~~

~~BILLING CODE 4810–AM–P~~

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for the KC–46A Third Main Operating Base (MOB 3) Beddown

AGENCY: Air Force Reserve Command, United States Air Force, DoD.

ACTION: Notice of intent.

SUMMARY: The United States Air Force (USAF) is issuing this notice to advise the public of the intent to prepare an Environmental Impact Statement (EIS) for the KC–46A Third Main Operating Base (MOB 3) Beddown. The EIS will assess the potential environmental consequences of various alternatives of the beddown of KC–46A tanker aircraft, associated infrastructure and personnel in support of the MOB 3 mission at existing installations where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

DATES: The USAF intends to hold scoping meetings from 5 p.m. to 8 p.m. in the following communities on the following dates:

1. Westover ARB—12 April 2016, at the Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020
2. Seymour Johnson AFB—14 April 2016, at the Herman Park Center, 701 East Ash St., Goldsboro, NC 27530
3. Grissom ARB—19 April 2016, at the Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
4. Tinker AFB—21 April 2016, at the Sheraton Midwest City Hotel and Reed Conference Center, 57050 Will Rodgers Rd., Midwest City, OK 73110

ADDRESSES: The project Web site (*www.kc-46a-beddown.com*) provides more information on the EIS and can be used to submit scoping comments. Scoping comments may also be submitted to Mr. Hamid Kamalpour, U.S. Air Force, AFCEC/CZN, 2261 Hughes Ave., Ste 155, Lackland AFB, Texas 78236–9853.

As a convenience for comments submitted by mail, a comment form is available for download on the Web site. Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the USAF has sufficient time to consider public input in the preparation of the Draft EIS, scoping comments should be submitted to the Web site or the address listed below by 25 April 2016.

SUPPLEMENTARY INFORMATION: The MOB 3 mission includes 12 KC–46A aircraft in one squadron. The KC–46A aircraft will replace the aging tanker fleet and would continue supporting the mission of providing worldwide refueling, cargo, and aeromedical evacuation support. The proposed basing alternatives for MOB 3 mission include: Seymour Johnson Air Force Base (AFB), Grissom Air Reserve Base (ARB), Tinker AFB, and Westover ARB. Along with the No Action Alternative, all four bases will be evaluated as alternatives in the EIS.

Scoping and Agency Coordination: To effectively define the full range of issues to be evaluated in the EIS, the USAF will determine the scope of the analysis by soliciting comments from interested local, state and federal elected officials and agencies, as well as interested members of the public and others. Implementation of the KC–46A MOB 3 mission at Tinker AFB in Oklahoma would have the potential to affect floodplains and/or wetlands. Consistent with the requirements and objectives of Executive Order (EO) 11990, "Protection of Wetlands," state and federal regulatory agencies with special expertise in wetlands and floodplains will be contacted to request comment. Consistent with EO 11988 and EO 11990, this NOI initiates early public review of the alternatives, including implementation of the KC–46A MOB 3 mission at Tinker AFB in Oklahoma which has the potential to affect wetlands and/or floodplains. Scoping meetings will be held in the local communities near the alternative basing locations. The scheduled dates, times, locations, and addresses for the scoping meetings will also be published in local media a minimum of 15 days prior to the scoping meetings.

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2016–06520 Filed 3–22–16; 8:45 am]

BILLING CODE 5001–10–P

A.1.2 General Newspaper Advertisement

U.S. AIR FORCE

The U.S. Air Force Invites You to Attend Public Scoping Meetings for the Proposed KC-46A Third Main Operating Base (MOB 3) EIS

Proposed Action and Alternatives

The U.S. Air Force (USAF) is proposing to establish the KC-46A Third Main Operating Base (MOB 3). The MOB 3 mission includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The purpose of the MOB 3 mission is to provide a fully capable, combat operational KC-46A aerial refueling squadron to accomplish aerial refueling and related missions.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC-46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft is located. Along with the No Action Alternative, all four bases will be evaluated as alternatives in the EIS.

The KC-46A aircraft will replace the aging tanker fleet. With more refueling capacity and enhanced capabilities, improved efficiency and increased capabilities for cargo and aeromedical evacuation, the KC-46A will provide aerial refueling support to the USAF, Navy, and Marine Corps, as well as allied nation coalition force aircraft.

Environmental Impact Statement (EIS)

Pursuant to the National Environmental Policy Act, the USAF will prepare an EIS, which will assess the potential environmental consequences of the KC-46A MOB 3 beddown. In addition to aircraft, the MOB 3 mission will include personnel, facilities to support aircraft operations, and pilot and operator requirements.

Public Scoping Meetings – Please Attend

Public scoping meetings are being held to inform the public about the proposed action and alternatives under consideration, and to “scope” important issues to evaluate in the EIS. The meetings will be arranged in a “come and go” open house format with no formal USAF presentation or opportunity for public testimony. Written comments will be accepted. **Your input is valuable and assists the USAF in making more informed decisions.**

Open House: Drop in anytime between 5-8 P.M.

- April 12, 2016, Westover ARB, Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020
- April 14, 2016, Seymour Johnson AFB, Herman Park Center, 901 East Ash St., Goldsboro, NC 27530
- April 19, 2016, Grissom ARB, Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
- April 21, 2016, Tinker AFB, Sheraton Midwest City Hotel and Reed Conference Center, 57050 Will Rodgers Rd., Midwest City, OK 73110

Public Comment

For more information or to submit written comments, please visit the project website at www.KC-46A-beddown.com or contact:

Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN, 2261 Hughes Ave, Ste 155, Lackland AFB, Texas 78236-9853.

The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Draft EIS, please submit comments by April 25, 2016!***

A.1.3 Tinker AFB Newspaper Advertisement

U.S. AIR FORCE

The U.S. Air Force Invites You to Attend Public Scoping Meetings for the Proposed KC-46A Third Main Operating Base (MOB 3) EIS

Proposed Action and Alternatives

The U.S. Air Force (USAF) is proposing to establish the KC-46A Third Main Operating Base (MOB 3). The MOB 3 mission includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The purpose of the MOB 3 mission is to provide a fully capable, combat operational KC-46A aerial refueling squadron to accomplish aerial refueling and related missions.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC-46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft is located. Along with the No Action Alternative, all four bases will be evaluated as alternatives in the EIS.

The KC-46A aircraft will replace the aging tanker fleet. With more refueling capacity and enhanced capabilities, improved efficiency and increased capabilities for cargo and aeromedical evacuation, the KC-46A will provide aerial refueling support to the USAF, Navy, and Marine Corps, as well as allied nation coalition force aircraft.

Environmental Impact Statement (EIS)

Pursuant to the National Environmental Policy Act, the USAF will prepare an EIS, which will assess the potential environmental consequences of the KC-46A MOB 3 beddown. In addition to aircraft, the MOB 3 mission will include personnel, facilities to support aircraft operations, and pilot and operator requirements. Implementation of the KC-46A MOB 3 mission at Tinker AFB in Oklahoma would potentially affect wetlands and/or floodplains and would therefore be subject to Executive Order (EO) 11988, “Floodplain Management”, and EO 11990, “Protection of Wetlands.” These public scoping meetings provide the opportunity for early public review of potential impacts to wetlands and floodplains.

Public Scoping Meetings – Please Attend

Public scoping meetings are being held to inform the public about the proposed action and alternatives under consideration, and to “scope” important issues to evaluate in the EIS. The meetings will be arranged in a “come and go” open house format with no formal USAF presentation or opportunity for public testimony. Written comments will be accepted. **Your input is valuable and assists the USAF in making more informed decisions.**

Open House: Drop in anytime between 5-8 P.M.

- April 12, 2016, Westover ARB, Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020
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- April 19, 2016, Grissom ARB, Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
- April 21, 2016, Tinker AFB, Sheraton Midwest City Hotel and Reed Conference Center, 57050 Will Rodgers Rd., Midwest City, OK 73110

Public Comment

For more information or to submit written comments, please visit the project website at www.KC-46A-beddown.com or contact:

Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN, 2261 Hughes Ave, Ste 155, Lackland AFB, Texas 78236-9853.

The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Draft EIS, please submit comments by April 25, 2016!***

A.1.4 List of Newspapers

Newspaper	Publication Date
The Republican (Westover ARB, MA)	Sunday, 27 March 2016
Goldsboro News-Argus (Seymour Johnson AFB, NC)	Sunday, 27 March 2016
The Free Press, Kinston, NC (Seymour Johnson AFB, NC)	Sunday, 27 March 2016
Kokomo Tribune (Grissom ARB, IN)	Sunday, 3 April 2016
Peru Tribune (Grissom ARB, IN)	Sunday, 3 April 2016
The Oklahoman (Tinker AFB, OK)	Sunday, 3 April 2016

A.2 AGENCY COORDINATION

A.2.1 Agency Coordination Letter

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

28 March 2016

Mr. J. Dale Clark
Air Force NEPA Division (AFCEC/CZN)
2261 Hughes Ave, Suite 155
Lackland AFB TX 78235-9853

Name/Title
(address being mailed to)
(address being mailed to)
(City, State Zip)

Dear {*Merged Name from list*}

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. The Air Force has identified Seymour Johnson Air Force Base (AFB) as the preferred alternative with Grissom Air Reserve Base (ARB), Tinker AFB, and Westover ARB as reasonable alternatives. All four bases and the No Action Alternative will be evaluated as alternatives in the EIS. Additional information on the beddown and EIS process is included in the attached Notice of Intent from the March 23, 2016, Federal Register.

The Air Force will host a public come and go open house scoping meeting in the local area near each of the bases proposed for this action (see attached scoping brochure). The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be analyzed in depth in the EIS. Public and agency comments provided to the Air Force during the scoping period will be considered in the preparation of the Draft EIS. Additional information can be found on the project website at www.kc-46A-beddown.com.

We request your participation and solicit scoping comments on this action. Please provide any comments by April 25, 2016, directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; 2261 Hughes Ave, Ste. 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely,

J. DALE CLARK, PE, GS-14, DAF
Chief, Air Force NEPA Division
Environmental Management Directorate

Attachments:
1. Notice of Intent
2. KC-46A MOB 3 EIS Brochure

15510 Federal Register / Vol. 81, No. 56 / Wednesday, March 23, 2016 / Notices

~~*Estimated Total Annual Burden Hours:* 3,652.~~

~~*Abstract:* Regulation I applies to all depository institutions lacking Federal deposit insurance. It requires the disclosure of certain insurance-related information in periodic statements, account records, locations where deposits are normally received, and advertising. This part also requires such depository institutions to obtain a written acknowledgment from depositors regarding the institution's lack of Federal deposit insurance. On December 16, 2011, the Bureau published an interim final rule (IFR) republishing Regulation I and making technical and conforming changes to reflect the transfer of authority and certain other changes made by the Dodd-Frank Act (76 FR 78126/RIN 3170–AA06). The IFR did not impose any new substantive obligations on persons subject to the existing regulations. As the Bureau added no new recordkeeping or reporting requirements, it adopted the PRA analysis from the original regulation. Upon further review, the Bureau has determined that the disclosures required by 12 CFR 1009.3 and 1009.4 and the signed acknowledgement required by § 1009.5 are subject to the PRA and require OMB approval thereunder. The Bureau has determined that it cannot reasonably comply with the standard approval timelines because the use of normal clearance procedures is reasonably likely to prevent the collection of information and result in public harm. See 5 CFR 1320.13(a)(2); 44 U.S.C. 3507(j).~~

~~Contemporaneously with this request for emergency processing, the Bureau is also initiating standard clearance procedures by allowing the public 60 days to comment on this collection of information. Accordingly, this request will also be resubmitted to OMB under standard clearance procedures.~~

~~*Request for Comments:* Comments are invited on: (a) Whether the collection of information is necessary for the proper performance of the functions of the Bureau, including whether the information will have practical utility; (b) The accuracy of the Bureau's estimate of the burden of the collection of information, including the validity of the methods and the assumptions used; (c) Ways to enhance the quality, utility, and clarity of the information to be collected; and (d) Ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology. Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval. All comments will become a matter of public record.~~

~~Dated: March 17, 2016.~~

~~**Darrin A. King,**~~

~~*Paperwork Reduction Act Officer, Bureau of Consumer Financial Protection.*~~

~~[FR Doc. 2016–06460 Filed 3–22–16; 8:45 am]~~

~~BILLING CODE 4810–AM–P~~

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for the KC–46A Third Main Operating Base (MOB 3) Beddown

AGENCY: Air Force Reserve Command, United States Air Force, DoD.

ACTION: Notice of intent.

SUMMARY: The United States Air Force (USAF) is issuing this notice to advise the public of the intent to prepare an Environmental Impact Statement (EIS) for the KC–46A Third Main Operating Base (MOB 3) Beddown. The EIS will assess the potential environmental consequences of various alternatives of the beddown of KC–46A tanker aircraft, associated infrastructure and personnel in support of the MOB 3 mission at existing installations where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

DATES: The USAF intends to hold scoping meetings from 5 p.m. to 8 p.m. in the following communities on the following dates:

1. Westover ARB—12 April 2016, at the Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020
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3. Grissom ARB—19 April 2016, at the Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
4. Tinker AFB—21 April 2016, at the Sheraton Midwest City Hotel and Reed Conference Center, 57050 Will Rodgers Rd., Midwest City, OK 73110

ADDRESSES: The project Web site (*www.kc-46a-beddown.com*) provides more information on the EIS and can be used to submit scoping comments. Scoping comments may also be submitted to Mr. Hamid Kamalpour, U.S. Air Force, AFCEC/CZN, 2261 Hughes Ave., Ste 155, Lackland AFB, Texas 78236–9853.

As a convenience for comments submitted by mail, a comment form is available for download on the Web site. Comments will be accepted at any time during the environmental impact analysis process. However, to ensure the USAF has sufficient time to consider public input in the preparation of the Draft EIS, scoping comments should be submitted to the Web site or the address listed below by 25 April 2016.

SUPPLEMENTARY INFORMATION: The MOB 3 mission includes 12 KC–46A aircraft in one squadron. The KC–46A aircraft will replace the aging tanker fleet and would continue supporting the mission of providing worldwide refueling, cargo, and aeromedical evacuation support. The proposed basing alternatives for MOB 3 mission include: Seymour Johnson Air Force Base (AFB), Grissom Air Reserve Base (ARB), Tinker AFB, and Westover ARB. Along with the No Action Alternative, all four bases will be evaluated as alternatives in the EIS.

Scoping and Agency Coordination: To effectively define the full range of issues to be evaluated in the EIS, the USAF will determine the scope of the analysis by soliciting comments from interested local, state and federal elected officials and agencies, as well as interested members of the public and others. Implementation of the KC–46A MOB 3 mission at Tinker AFB in Oklahoma would have the potential to affect floodplains and/or wetlands. Consistent with the requirements and objectives of Executive Order (EO) 11990, "Protection of Wetlands," state and federal regulatory agencies with special expertise in wetlands and floodplains will be contacted to request comment. Consistent with EO 11988 and EO 11990, this NOI initiates early public review of the alternatives, including implementation of the KC–46A MOB 3 mission at Tinker AFB in Oklahoma which has the potential to affect wetlands and/or floodplains. Scoping meetings will be held in the local communities near the alternative basing locations. The scheduled dates, times, locations, and addresses for the scoping meetings will also be published in local media a minimum of 15 days prior to the scoping meetings.

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2016–06520 Filed 3–22–16; 8:45 am]

BILLING CODE 5001–10–P

A.2.1 Agency Coordination Letter (Continued)

The U.S. Air Force (USAF) is preparing a Draft Environmental Impact Statement (EIS) to assess the potential environmental consequences of basing and operating the KC-46A tanker aircraft, associated infrastructure, and manpower to establish the KC-46A Third Main Operating Base (MOB 3) mission. In order to effectively define the full range of issues to be evaluated in the EIS, the USAF is holding public scoping meetings to determine the EIS scope (i.e., what will be covered and in what detail) by soliciting comments from interested state and federal agencies and interested members of the public.

The National Environmental Policy Act (NEPA)

The NEPA is our national mandate for making informed decisions while considering environmental impacts. When federal agencies propose projects having the potential to significantly impact the environment, NEPA requires the following process be undertaken as part of planning before final decisions are made:

- Evaluation and consideration of potential environmental consequences for projects that may significantly impact the environment, and
- Consideration of public and government agency comments.

Where the potential for significant environmental impacts exists, this evaluation is presented in an EIS, which:

- Identifies and describes the affected environment;
- Evaluates the potential environmental consequences from a range of reasonable alternatives; and
- Identifies environmental permits and specific mitigation measures that could avoid, minimize, or reduce potential environmental consequences.

The EIS Timeline

Opportunities for Public Involvement

Where We Are Now

Notice of Intent to conduct environmental analysis on KC-46A Third Main Operating Base (MOB 3) beddown published in *Federal Register*
March 2016

↓

Minimum 30-day Scoping Period
Spring 2016

↓

Preparation of Draft EIS
Summer 2016

↓

Notice of Availability of Draft EIS for public review published in *Federal Register*
Minimum 45-day Comment Period
September 2016

↓

Preparation of Final EIS
Winter 2017

↓

Notice of Availability of Final EIS published in *Federal Register* and 30-day EIS Waiting Period
March 2017

↓

Record of Decision (ROD)

Notice of Intent (NOI) and Scoping

The EIS begins with an NOI, which is published in the *Federal Register* to announce the USAF's intent to prepare an EIS on the KC-46A MOB 3 beddown proposed action and alternatives. The NOI is the beginning of the public scoping process, including community scoping meetings, to provide the public and government agencies and entities time to review the proposed action and alternatives.

1

Proposed Action: KC-46A MOB 3 Beddown

The KC-46A MOB 3 beddown EIS will evaluate the potential environmental consequences of the beddown of 12 KC-46A aircraft, associated facilities and infrastructure, and manpower at a single MOB 3 location.

The MOB 3 preferred alternative location is:

- Seymour Johnson Air Force Base (AFB), North Carolina

The MOB 3 reasonable alternative locations are:

- Grissom Air Reserve Base (ARB), Indiana
- Tinker AFB, Oklahoma
- Westover ARB, Massachusetts

Along with the No Action Alternative, all four alternatives are evaluated equally in the EIS.

The USAF is in the early stages of the EIS process, and no decision has been made as to the final MOB 3 beddown location.

U.S. Map of MOB 3 Alternative Bases

No Action Alternative

Under the No Action Alternative, beddown of the KC-46A MOB 3 mission would not occur at this time. A No Action Alternative will be evaluated at each proposed beddown location. Evaluation of the No Action Alternative provides a baseline for decision makers.

2

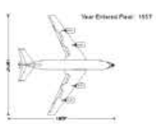
A.2.1 Agency Coordination Letter (Continued)

Purpose and Need: Tanker Modernization

The selected basing locations would need to accommodate training, flight operations, and maintenance support as necessary to support KC-46A pilots and operating personnel. Each KC-46A squadron requires personnel, facilities, and airspace to support aircraft operations and pilot and personnel training.

The purpose of the KC-46A MOB 3 beddown is to provide locations for training and flight operations. The KC-46A tankers are needed to support a high-threat, multi-role warfighting capability to Commanders worldwide. Trained pilots and personnel must be available to meet necessary KC-46A scheduled inventory replenishment dates as older tanker aircraft are withdrawn from the inventory.

Comparison of KC-135 and KC-46A Aircraft Performance Capabilities



Capability Area	KC-135	KC-46A
Primary Function	Aerial refueling and airlift with 200,000 lbs total fuel for refueling.	Aerial refueling and airlift with 212,000 lbs total fuel for refueling.
Boom Refueling	Manually controlled legacy system	Modernized KC-10 fly-by-wire system
Probe and Drogue Refueling	Permanent system does not exist - must be temporarily added	Permanent centerline probe and drogue system
Boom and Probe & Drogue Refueling on Same Mission	Not capable of both on same mission	Capable of using both refueling types on the same mission
Refueling of Two Aircraft at the Same Time	Limited to 20 tankers with the capability to attach wing pods and conduct multipoint refueling of two aircraft	All tankers have the capability to attach wing pods and conduct multipoint refueling
Cargo/Passenger/ Medical Patient Capacity	6 cargo pallets, 53 passengers, 44 medical patients	18 cargo pallets, 114 passengers, 54 medical patients
Defensive Systems	Does not possess sufficient systems	Protection from nuclear, infrared (heat seeking missiles), and biochemical threats
Night-time Refueling	Restricted in tactical missions	Able to refuel in tactical missions

Source: GAO presentation of USAF information; © Boeing Company (KC-46A photo).

Environmental Resources

The USAF understands the potential for the KC-46A MOB 3 beddown to affect environmental resources. As part of the EIS, the USAF will analyze potential environmental consequences associated with changes made to support KC-46A operations, including changes in personnel, construction of facilities, and the inclusion of KC-46A flight operation activities. The environmental resource areas listed to the right are currently under consideration in the KC-46A MOB 3 beddown EIS.

Please take this opportunity to:

- ☑ Learn about the project,
- ☑ Identify community-specific issues, and
- ☑ Make sure you are included on our mailing list.

Public Scoping Meetings

5:00 p.m. - 8:00 p.m.

April 12, 2016
Westover Air Reserve Base
Castle of Knights
1599 Memorial Drive
Chicopee, MA

April 14, 2016
Seymour Johnson Air Force Base
Herman Park Center
901 E. Ash Street
Goldsboro, NC

April 19, 2016
Grissom Air Reserve Base
Milestone Event Center
1458 N. Liberator Road
Peru, IN

April 21, 2016
Tinker Air Force Base
Sheraton Midwest City Hotel and
Reed Conference Center
57050 Will Rodgers Road
Midwest City, OK

Environmental Resource Areas include:

Aircraft Operations
- Noise
- Air Quality
- Safety
  - Flight Safety
  - Ground Safety

Natural Resources
- Geology and Soils
- Surface Water and Groundwater
- Wetlands and Floodplains
- Biological Resources

Cultural Resources
- Archaeological Resources
- Architectural Resources
- Traditional Resources

Human Resources
- Land Use
- Recreation
- Socioeconomics
- Environmental Justice and Protection of Children

Community Infrastructure
- Infrastructure (utilities and public services)
- Hazardous Materials and Waste
- Transportation

How to Submit Comments

Scan with Your Phone to Learn More about the KC-46A MOB 3 Beddown EIS.

Submit comments electronically at www.KC-46A-beddown.com

at a scoping meeting, or by mail before *April 25, 2016*, to:

Mr. Hamid Kamalpour
U.S. Air Force, AFCEC/CZN
2261 Hughes Ave, Ste. 155
Lackland AFB, TX 78236-9853

A.2.2 Agency Coordination Mailing List

A.2.2.1 Grissom ARB Agency Coordination Mailing List

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	Rune	Duke		AOPA	Washington	DC	20001
Mrs.	Susan	Hovermale	Conservation Specialist	Farm Service Agency	Indianapolis	IN	46278
Mr.	Barry	Cooper	Regional Administrator	Federal Aviation Administration, Great Lakes Regional Office	Des Plaines	IL	60018
Mr.	Robert	Kaplan	Regional Administrator	Ralph Metcalfe Federal building	Chicago	IL	60604
Mr.	Susan	Meadows	Asst. State Conservationist for Programs	Natural Resources Conservation Service	Indianapolis	IN	46278
Mr.	Scott	Pruitt	Field Supervisor	U.S. Fish and Wildlife Service	Bloomington	IN	47403-2121
Mr.	Jennifer	Boyle-Warner	Executive Director	Indiana Association of Soil and Water Conservation Districts	Indianapolis	IN	46202
Ms.	Brandye	Hendrickson	Commissioner	Indiana Department of Transportation	Indianapolis	IN	46204
Mr.	Duane	Embree	Executive Director	Indiana Office of Defense Development	Bloomington	IN	47404
Mr.	Jim	Schellinger	President	Indiana Economic Development Corporation	Indianapolis	IN	46204
Mr.	Bill	Konyha	Executive Director	Indiana Office of Community and Rural Affairs	Indianapolis	IN	46204
Ms.	Jennifer	Vandenberg	Community Liaison	Indiana Office of Community and Rural Affairs	Indianapolis	IN	46204
Mr.	Cameron F.	Clark	Director	Indiana Department of Natural Resources	Indianapolis	IN	46204
Mr.	Ted	McKinney	Director	Indiana State Department of Agriculture	Indianapolis	IN	46204
Mr.	Jason	Hill	Manager	Ducks Unlimited	Ann Arbor	MI	48108
Mr.	Andy	Kron	President	Indiana Farm Bureau	Indianapolis	IN	46202
Mr.	Robert	Suseland	Regional Biologist	Pheasants Forever	Lafayette	IN	47909
Ms.	Mary	McConnell	Director	The Nature Conservancy	Indianapolis	IN	46202
Mr.	Steven	Howell	Director	Indiana Department of Environmental Management (IDEM)	Indianapolis	IN	46204
Mr.	Kenneth	Westlake	NEPA Coordinator	US EPA Region V	Illinois	IL	60604
Mr.	Greg	Goodnight	Mayor of Kokomo	City of Kokomo	Kokomo	IN	46901
Ms.	Brenda	Brunnemer-Ott	City Clerk of Kokomo	City of Kokomo	Kokomo	IN	46901
Mr.	Gabriel	Greer	Mayor of Peru	City of Peru	Peru	IN	46970
Ms.	Trish	Soldi	Peru City Clerk/Treasurer	City of Peru	Peru	IN	46970
Mr.	Dennis	See	Zoning Administrator	City of Peru	Peru	IN	46970
Mr.	Dave	Kitchell	Mayor of City of Logansport	City of Logansport	Logansport	IN	46947
Ms.	Carol Sue	Hayworth	Logansport Clerk/Treasurer	City of Logansport	Logansport	IN	46947
Mr.	CJ	Crist	Town Council President	Town of Bunker Hill	Bunker Hill	IN	46914
Ms.	Rose	Jackson	Clerk Treasurer	Galveston Town Hall	Galveston	IN	46932
Ms.	Sandy	Chittum	President Chambers of Commerce	Miami County Chamber of Commerce	Peru	IN	46970
Mr.	Bill	Cuppy	Executive Director Chamber of Commerce	Logansport-Cass County Chamber of Commerce	Logansport	IN	46947
Mr.	Jim	Tidd	Director	Miami County Economic Development Authority	Peru	IN	46970
Ms.	Christy	Householder	Director	Cass County Economic Development Authority	Logansport	IN	46947
Mr.	Bill	Cuppy	Executive Director	Cass Logansport Economic Development Organization	Logansport	IN	46947

A.2.2.1 Grissom ARB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	John	Gilpin	President	Grissom Community Council	Wabash	IN	46992
Mr.	Timothy	Cox	Vice President	Grissom Community Council	Peru	IN	46970
Mr.	Jim	Price	Executive Director	Grissom Air Museum	Peru	IN	46970
Mr.	Patrick	Robinson	President	Walton Town Hall	Walton	IN	46994
Mr.	Josh	Francis	Commission Chairman	Miami County courthouse	Peru	IN	46970
Mr.	James L.	Sailors	Commission Chairman	Cass County	Logansport	IN	46947
Mr.	Arin	Shaver	AICP, Executive Director/Subdivision Administrator	Cass County Government Building	Logansport	IN	46947
Mr.	Steven	Ray	Executive Director	North Central Indiana Regional Planning Council	Peru	IN	46970
Mr.	Paul	Wyman	President	Howard County Administration Center	Kokomo	IN	46901
The Honorable	Mike	Pence	Governor	Indiana State House	Indianapolis	IN	46204
The Honorable	Sue	Ellspermann	Lt. Governor	Indiana State House	Indianapolis	IN	46204
The Honorable	James	Buck	Senate District 21	Indiana State House	Indianapolis	IN	46204
The Honorable	Randall	Head	Senate District 18	Indiana State House	Indianapolis	IN	46204
The Honorable	William	Friend	House District 23	Indiana State House	Indianapolis	IN	46204
The Honorable	Heath	VanNatter	House District 38	Indiana State House	Indianapolis	IN	46204
The Honorable	Dan	Coats	US Senator	U.S. Senate	Indianapolis	IN	46204
The Honorable	Joe	Donnelly	US Senator	U.S. Senate	Indianapolis	IN	46204
The Honorable	Jackie	Walorski	US Representative	U.S. House of Representatives	Mishawaka	IN	46544
The Honorable	Susan	Brooks	US Representative	U.S. House of Representatives	Carmel	IN	46032
The Honorable	Todd	Rokita	US Representative	U.S. House of Representatives	Danville	IN	46122
Ms.	Amy	Pate	Executive Vice President	REALTORS Association of Central Indiana	Kokomo	IN	46902
Mr.	Sean	White	General Manager	Montgomery Aviation, Inc.	Peru	IN	46970
Mr.	Chris	Renteria	General Manager	Dean Baldwin Painting	Peru	IN	46970
Mr.	Brandon	Smith	News Reporter	Indiana Public Broadcasting Stations	Indianapolis	IN	46805
Mr.	Jake	Robinson		Network Indiana	Indianapolis	IN	46204
				WEDJ-Radio	Indianapolis	IN	46202
Ms.	Michelle	Kiefer		WNDE-Radio	Indianapolis	IN	46220
Mr.	Jay	Michaels		WRWM-Radio	Indianapolis	IN	46220
Mr.	Bob	Richards		WLHK-Radio	Indianapolis	IN	46204

A.2.2.1 Grissom ARB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Ms.	Michelle	Johnson		WFYI-Radio	Indianapolis	IN	46202
Mr.	Chuck	Williams		WTLC-Radio	Indianapolis	IN	46202
Mr.	Jim	Ganley		WSQM-Radio	Indianapolis	IN	46250
Mr.	JR	Ammons		WZPL-Radio	Indianapolis	IN	46260
Mr.	Edward	Thurman		WBAT/WCJC/WMRI/WXXC-Radio	Marion	IN	46953
Mr.	Jack	Crummer		WIWU-Radio	Marion	IN	46953
Ms.	Camellia	Pflum		WZWZ-Radio	Kokomo	IN	46904
Mr.	Allan	James		WWKI-Radio	Kokomo	IN	46901
Mr.	Ken	Holtzinger		WSAL-Radio	Logansport	IN	46947
Mr.	Wade	Weaver		WJOT-Radio	Wabash	IN	46992
Ms.	Toni	Metzger		WKUZ-Radio	Wabash	IN	46992
Ms.	Shannon	Crouch		Kokomo Herald	Kokomo	IN	46901
Mr.	Pat	Munsey		Kokomo Perspective	Kokomo	IN	46901
Mr.	Jeff	Kovaleski		Kokomo Tribune	Kokomo	IN	46901
Ms.	Michelle	Dials		Cass County Info	Logansport	IN	46947
Ms.	Mitsy	Knisely		Pharos-Tribune	Logansport	IN	46947
Mr.	Tom	Davies	Editor	Associated Press	Indianapolis	IN	46204
Ms.	Linda	Kelsay		Chronicle-Tribune	Marion	IN	46952
Mr.	Greg	Andrews		Indianapolis Business Journal	Indianapolis	IN	46204
Ms.	Amanda	Heckert		Indianapolis Monthly	Indianapolis	IN	46204
Mr.	William	Mays		Indianapolis Recorder	Indianapolis	IN	46218
Ms.	Patricia	Miller		Indianapolis Star	Indianapolis	IN	46225
Ms.	Julie	Inskeep		Journal Gazette	Fort Wayne	IN	46802
Mr.	Ben	Quiggle		Peru Tribune	Peru	IN	46970
Mr.	Doug	Roorbach		News Herald	Marion	IN	46952
Mr.	Wayne	Rees		The Paper	Wabash	IN	46992
Mr.	Eric	Seaman		Wabash Plain Dealer	Wabash	IN	46992
Ms.	Tina	Cosby		WISH/WNDY-TV	Indianapolis	IN	46202
Mr.	Jimmy	Love		WRTV-TV	Indianapolis	IN	46202
Ms.	Julie	McQuoid		WTHR-TV	Indianapolis	IN	46204
Mr.	Brad	Norris		WXIN-TV	Indianapolis	IN	46278
Ms.	Maryann	Farnham		Peru Public Library	Peru	IN	46970
Ms.	Faith	Brautigam		Kokomo-Howard County Public Library Main	Kokomo	IN	46901
Ms.	Lori	Hugley		Kokomo Public Library-South	Kokomo	IN	46902
Mr.	Pat	Brubaker		Wabash Carnegie Public Library	Wabash	IN	46992
Mr.	David	Ivey		Logansport Public Library	Logansport	IN	46947

A.2.2.2 Seymour Johnson AFB Agency Coordination Mailing List

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
The Honorable	Louis	Pate	Deputy President Pro Tempore, Senator	North Carolina State Senate	Raleigh	NC	27601-2808
The Honorable	Jimmy	Dixon	Representative	North Carolina House of Representatives	Raleigh	NC	27603-5925
The Honorable	John	Bell, IV	Majority Whip, Representative	North Carolina House of Representatives	Raleigh	NC	27603-5925
The Honorable	Larry	Bell	Representative	North Carolina House of Representatives	Raleigh	NC	27603-5925
The Honorable	Pat	McCrory	Governor	North Carolina Governor	Raleigh	NC	27699-0301
The Honorable	Howard	Hunter	Senator	North Carolina House of Representatives	Raleigh	NC	27603-5925
Mr.	John	Hammond	Endangered Species Coordinator	U.S. Fish and Wildlife Service	Raleigh	NC	27636-3726
Mr.	Michael P.	Huerta	Administrator	U.S. Department of Transportation	Washington	DC	20591
Ms.	Heather	McTeer Toney	Regional Administrator	USEPA Region IV	Atlanta	GA	30303-3104
Mr.	Gordon	Myers	Executive Director	North Carolina Wildlife Resources Commission	Raleigh	NC	27699-1701
Ms.	Renee	Gledhill-Earley	DCR-Historic Preservation	North Carolina Department of Natural and Cultural Resources	Raleigh	NC	27699-4617
Mr.	Donald	van der Vaart	Secretary of Department of Environmental Quality	North Carolina Department of Environmental Quality	Raleigh	NC	27699-1601
Ms.	Crystal	Best		North Carolina State Environmental Review Clearinghouse	Raleigh	NC	27699-1301
Ms.	Sheila	Holman	Director	North Carolina Division of Air Quality	Raleigh	NC	27699-1641
Mr.	Braxton	Davis	Director	North Carolina Division of Coastal Management	Morehead City	NC	28557
Mr.	Bobby	Walston	Aviation Director	North Carolina Division of Aviation	Raleigh	NC	27699-1560
Secretary	Nick	Tennyson	Transportation Secretary	North Carolina Department of Transportation	Raleigh	NC	27699-1501
Mr.	Gregory	Richardson	Executive Director	North Carolina Commission of Indian Affairs	Raleigh	NC	27699-1317
The Honorable	Chuck	Allen	Mayor	City of Goldsboro	Goldsboro	NC	27533
Mr.	George	Wood	County Manager	Wayne County Manager	Goldsboro	NC	27533
Ms.	Ashley	Smith	Director	Wayne County Soil & Water Conservation	Goldsboro	NC	27530
Ms.	Kate	Daniels	President and Executive Director	Wayne County Chamber of Commerce	Goldsboro	NC	27533
Mr.	Davin	Madden	Director	Environmental Health Department	Goldsboro	NC	27530
Mr.	Chip	Crumpler	Planning Board	Wayne County Planning Department	Goldsboro	NC	27530

A.2.2.2 Seymour Johnson AFB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	James	Rowe	Planning Director	City of Goldsboro	Goldsboro	NC	27530
Mr.	Scott	Stevens	City Manager	City of Goldsboro	Goldsboro	NC	27530
Mr.	Joe	Daughtery	Chairman	Wayne County Board of Commissioners	Goldsboro	NC	27534
Ms.	Natasha	Francois	Reference Department Head	Wayne County Public Library	Goldsboro	NC	27530
Ms.	Kim	Webb	Librarian	Seymour Johnson AFB Library	Seymour Johnson AFB	NC	27531
Mr.	Dennis	Hill	Editor	Goldsboro News-Argus	Goldsboro	NC	27534
Mr.	Thomas	Vick	News Director	Goldsboro Daily News	Goldsboro	NC	27530
Mr.	Jared	Brumbaugh		Public Radio East - NPR	New Bern	NC	28562
Mr.	Bruce	Ferrell	Manager	WPTF - 680 AM	Raleigh	NC	27604
Mr.	Rick	Gall	News Director	WRAL-TV	Raleigh	NC	27605
Ms.	Andrea	Parquet-Taylor	News Director	WNCN-TV	Raleigh	NC	27609
Ms.	Michelle	Germano	News Director	WTVD-TV	Durham	NC	27701
Mr.	Gregory	Ruhl	Manager	Wayne Executive Jetport	Pikeville	NC	27863
The Honorable	Richard	Burr	Senator	U.S. Senate	Washington	DC	20510
The Honorable	Richard	Burr	Senator	U.S. Senate	Rocky Mount	NC	27804
The Honorable	Thom	Tillis	Senator	U.S. Senate	Washington	DC	20510
The Honorable	Thom	Tillis	Senator	U.S. Senate	Raleigh	NC	27601
The Honorable	G.K.	Butterfield	Congressman	U.S. House of Representatives	Washington	DC	20515
The Honorable	G.K.	Butterfield	Congressman	U.S. House of Representatives	Wilson	NC	27893
The Honorable	George	Holding	Congressman	U.S. House of Representatives	Washington	DC	20515
The Honorable	George	Holding	Congressman	U.S. House of Representatives	Fremont	NC	27830

A.2.2.3 Tinker AFB Agency Coordination Mailing List

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Ms.	Tamara	Francis-Fourkiller	THPO (Acting) Caddo Nation of Oklahoma	Caddo Nation of Oklahoma	Binger	OK	73009
Mr.	James	Floyd	Principal Chief Muscogee (Creek) Nation	Muscogee (Creek) Nation	Okmulgee	OK	74447
Dr.	Andrea	Hunter	THPO Osage Nation	Osage Nation	Pawhuska	OK	74056
Ms.	Natalie	Harjo	HPO Seminole Nation	Seminole Nation	Wewoka	OK	74884
Ms.	Terri	Parton	President Wichita & Affiliated Tribes	Wichita & Affiliated Tribes	Anadarko	OK	73005
Mr.	Ken	Collins	T&E Branch Chief	U.S. Fish and Wildlife Service	Tulsa	OK	74129-1428
Mr.	Kevin	Grant	State Director Oklahoma Wildlife Service	US Department of Agriculture	Oklahoma City	OK	73152
Mr.	Eddie	Streater	Regional Director	Bureau of Indian Affairs	Muskogee	OK	74401-6201
Mr.	Dan	Deerinwater	Regional Director	Bureau of Indian Affairs	Anadarko	OK	73005
Ms.	Rhonda	Smith	Chief Compliance Assurance and Enforcement Division	EPA Region VI	Dallas	TX	75202
Mr.	Ron	Curry	Regional Administrator	EPA Region VI	Dallas	TX	75202
Mr.	Gary	O'Neill	State Conservationist	US Department of Agriculture	Stillwater	Ok	74074-2655
Mr.	John	Hendrix	State Coordinator	US Fish and Wildlife Services	Tulsa	Ok	74129-1428
Mr.	Ross	Richardson		Federal Emergency Management Association (FEMA)	Denton	TX	76209
Ms.	Carolyn	Schultz		US Army Corps of Engineers, Tulsa District	Tulsa	OK	74128-4609
Ms.	Julie	Cunningham	Chief, Planning & Management Division	Oklahoma Water Resource Board	Oklahoma City	OK	73118
Ms.	Bob	Anthony	Chairman Oklahoma Corporation Commission	Oklahoma Corporation Commission	Oklahoma City	OK	73152-2000
Mr.	George	Geissler	State Forester	Oklahoma Department of Agriculture, Food and Forestry	Oklahoma City	OK	73105
Mr.	Richard	Hatcher	Director Oklahoma Department of Wildlife Conservation	Oklahoma Department of Wildlife Conservation	Oklahoma City	OK	73152
Dr.	Jeremy	Boak	Director Oklahoma Geological Survey	Oklahoma Geological Survey	Norman	OK	73019
Mr.	Jeff	Pearl	Environmental Programs Manager	Oklahoma Department of Transportation	Oklahoma City	OK	73105
Ms.	Jennifer	Wright		Oklahoma Department of Environmental Quality	Oklahoma City	OK	73101-1677
Ms.	Melvena	Heisch	Deputy SHPO	State Historic Preservation Office	Oklahoma City	OK	73105
Mr.	Eric	Pollard	Central Oklahoma Clean Cities Coordinator	Association of Central Oklahoma Governments	Oklahoma City	OK	73104-2405
Ms.	Kellie	Gilles	Planning Manager	Midwest City	Midwest City	OK	73110
Mr.	John	Johnson	Executive Director	Association of Central Oklahoma Governments (ACOG)	Oklahoma City	OK	73104-2405

A.2.2.3 Tinker AFB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	Eric	Wenger	Floodplain Administrator, Director, City Engineer	Oklahoma City	Oklahoma City	OK	73102
Ms.	Marsha	Slaughter	General Manager Oklahoma City Water Utilities Trust	City of Oklahoma City	Oklahoma City	OK	73102
Mr.	Mark	VanLandingham	Vice President Government Relations and Policy	Greater Oklahoma City Chamber of Commerce	Oklahoma City	OK	73102
Mr.	Pete	White	Councilman Ward Four	City of Oklahoma City	Oklahoma City	OK	73102
Mr.	Patrick	Menefee	Floodplain Administrator, City Engineer	City of Midwest City	Midwest City	OK	73110
Ms.	Monica	Cardin	Floodplain Administrator	City of Del City	Del City	OK	73115
Mr.	Erik	Brandt	Floodplain Administrator	Oklahoma County	Oklahoma City	OK	73102-3441
Mr.	William	Janacek	Co-Chair	Tinker Restoration Advisory Board	Midwest City	OK	73110
Mr.	Andy	McDaniels	Executive Director Oklahoma Wildlife Federation	Oklahoma Wildlife Federation	Oklahoma City	OK	73146
Mr.	Johnson	Bridgwater	Chapter Director Sierra Club	Sierra Club	Oklahoma City	OK	73103
Ms.	Susie	Beasley	Community Relations, Chair Executive Committee	Tinker Restoration Advisory Board	Choctaw	OK	73020
Mr.	Bill	Diffin	President	Audubon Society of Central Oklahoma	Oklahoma City	OK	73114
The Honorable	James	Inhofe	Senator	U.S. Senate	Washington	DC	20510-3603
The Honorable	James	Inhofe	Senator	U.S. Senate	Enid	OK	73701
The Honorable	James	Lankford	Senator	U.S. Senate	Washington	DC	20510
The Honorable	James	Lankford	Senator	U.S. Senate	Oklahoma City	OK	73102
The Honorable	Thomas	Cole	Congressman	U.S. House of Representatives	Washington	DC	20515
The Honorable	Thomas	Cole	Congressman	U.S. House of Representatives	Norman	OK	73069
The Honorable	Jack	Fry	Senator	Oklahoma State Senate	Oklahoma City	OK	73105
The Honorable	Charlie	Joyner	Representative	Oklahoma House of Representatives	Oklahoma City	OK	73105
The Honorable	Charlie	Joyner	Representative	Oklahoma House of Representatives	Midwest City	OK	73110
The Honorable	Mary	Fallin	Governor	Oklahoma Governor	Oklahoma City	OK	73105

A.2.2.3 Tinker AFB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
The Honorable	Brian	Linley Sr.	Mayor, City of Del City	City of Del City	Del City	OK	73115
Mr.	Brian	Maughanm	County Commissioner District Two	Oklahoma County	Oklahoma City	OK	73102-3441
The Honorable	Mick	Cornett	Mayor, City of Oklahoma City	City of Oklahoma City	Oklahoma City	OK	73102
The Honorable	Dee	Collins	Mayor, City of Midwest City	City of Midwest City	Midwest City	OK	73110
Ms.	Kelly	Dyer Fry	Editor of The Oklahoman & Vice President of News	The Oklahoman	Oklahoma City	OK	73125
Ms.	Natalie	Hughes	News Director	KFOR-TV	Oklahoma City	OK	73114
Ms.	Rebecca	Gaylord	News Director	KOCO-TV	Oklahoma City	OK	73131
Mr.	Rob	Krier	General Manager	KWTV-DT	Oklahoma City	OK	73111
Mr.	Adam	Pursch	News Director	KOKH-TV	Oklahoma City	OK	73111
Mr.	Tom	Travis	Director of Programming	KTOK	Oklahoma City	OK	73118
Mr.	Jack	Taylor	Program Director	KOKO	Oklahoma City	OK	73114
Mr.	Chris	Kennedy		Midwest City Public Library	Midwest City	OK	73110-7589
Mr.	David	Newyear		Del City Library	Del City	OK	73115
Mr.	Peter	Nardin	Reference Librarian	Tinker Library	Tinker AFB	OK	73145
Mr.	Mark	Kranenburg	Director	Will Rogers World Airport	Oklahoma City	OK	73159-0937

A.2.2.4 Westover ARB Agency Coordination Mailing List

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	Kevin	Walsh	Director	Massachusetts Department of Transportation	Boston	MA	02116
Ms.	Deirdre	Buckley	Director	Executive Office of Energy and Environmental Affairs (EEA)	Boston	MA	02114
Dr.	Jeffrey	DeCarlo	Administrator	Massachusetts Department of Transportation Aeronautics Division	East Boston	MA	02128-2909
Mr.	Matthew	Beaton	Secretary	Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs	Boston	MA	02114
Mr.	Leo	Roy	Commissioner	Department of Conservation and Recreation	Boston	MA	02114-2104
Mr.	Jack	Buckley	Administrator	Massachusetts Division of Fisheries and Wildlife	Westborough	MA	01581
Mr.	Steve	Hubbard		Chicopee Memorial State Park	Chicopee	MA	01020
Mr.	James	Reidy	Chairperson	City of Chicopee-Chicopee City Hall	Chicopee	MA	01013
Mr.	Lee	Pouliot	Administrator	City of Chicopee	Chicopee	MA	01013
Mr.	Jason	Martowski	Chairperson	Town of Ludlow	Ludlow	MA	01056

A.2.2.4 Westover ARB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Mr.	Douglas	Stefancik		Town of Ludlow	Ludlow	MA	01056
Mr.	Domenic	Sarno	Mayor	City of Springfield	Springfield	MA	01103
Mr.	Alex	Morse	Mayor	City of Holyoke	Holyoke	MA	01040
Mr.	Christopher	Martin	Town Administrator	Town of Granby	Granby	MA	01033
Mr.	Mike	Sullivan	Town Administrator	Town of South Hadley	South Hadley	MA	01075
The Honorable	Charlie	Baker	Governor	Massachusetts Governor Office	Springfield	MA	01103
The Honorable	Donald F.	Humason, Jr.		Massachusetts State Senate	Westfield	MA	01085
The Honorable	James T.	Welch		Massachusetts State Senate	Springfield	MA	01103
The Honorable	Eric P.	Lesser		Massachusetts State Senate	Boston	MA	02133
The Honorable	Stanley C.	Rosenberg		Massachusetts State Senate	Northampton	MA	01080
The Honorable	Michael J.	Finn		Massachusetts House of Representatives	West Springfield	MA	01089
The Honorable	John	Scibak		Massachusetts House of Representatives	Boston	MA	02133
The Honorable	Ellen	Story		Massachusetts House of Representatives	Boston	MA	02133
The Honorable	Thomas M.	Petrolati		Massachusetts House of Representatives	Ludlow	MA	01056
The Honorable	Joseph F.	Wagner		Massachusetts House of Representatives	Chicopee	MA	01013
The Honorable	Jose F.	Tosado		Massachusetts House of Representatives	Springfield	MA	01104-3000
The Honorable	Richard	Neal	Congressman	U.S. House of Representatives	Washington	DC	20515
The Honorable	James T.	McGovern	Congressman	U.S. House of Representatives	Washington	DC	20515
The Honorable	Elizabeth	Warren	Senator	U.S. Senate	Boston	MA	02203
The Honorable	Edward	Markey	Senator	U.S. Senate	Boston	MA	02203
Ms.	Wendi	Weber	Regional Director	United States Fish and Wildlife Service	Hadley	MA	01035-9589
Mr.	Maurice	Lourdes	Executive Director	Federal Aviation Administration	Washington	DC	20591
Mr.	Timothy W.	Brennan	Executive Director	Pioneer Valley Planning Commission	Springfield	MA	01104-3419

A.2.2.4 Westover ARB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Ms.	Gina	McCarthy	Regional Administrator	Environmental Protection Agency New England, Region 1	Boston	MA	02109-3912
Ms.	Mary T.	Walsh	Manager	Federal Aviation Administration New England Region	Burlington	MA	01803
Ms.	Eileen Drumm	Moore	President	Chicopee Chamber of Commerce	Chicopee	MA	01013
Mr.	Jeffrey	Ciuffreda	President	Affiliated Chambers of Commerce of Greater Springfield, Inc.	Springfield	MA	01103-1149
Mr.	Michael W.	Bolton	Director of Civil Aviation	Westover Metropolitan Airport	Chicopee	MA	01022
Mr.	Rick	Sullivan	President and CEO	Economic Development Council	Springfield	MA	01103
Mr.	Brian P.	Barnes	Airport Manager	Westfield-Barnes Airport	Westfield	MA	01085-5331
Ms.	Marie	Laflamme	Director	Westover Metropolitan Development Corporation	Chicopee	MA	01022
Ms.	Kathy	Brown	President	East Springfield Neighborhood Council	Springfield	MA	01104
Mr.	Gary	Clayton	President	Mass Audubon	Lincoln	MA	01773
Mr.	Eric	Stiles	President	New Jersey Audubon Society Headquarters	Bernardsville	NJ	07924
Mr.	Scott	Surner	President	Hampshire Bird Club	Amherst	MA	01004-0716
Ms.	Linda	Ferraresso	Director	Brookline Bird Club	Watertown	MA	02472
Ms.	Jaana	Cutson	President	Hitchcock Center for the Environment	Amherst	MA	01002
Mr.	Dave	Gallup	President	Springfield Naturalists' Club	Springfield	MA	01103
Ms.	Aimee	Henderson	Editor	The Sentinel	Palmer	MA	01069
Mr.	Larry	Parnass	Editor	The Daily Hampshire Gazette	Northampton	MA	01061
Mr.	George	Arwady	Publisher & CEO	The Republican	Springfield	MA	01103
Mr.	Michael	Gorski	Director	Massachusetts Department of Environmental Protection	Springfield	MA	01103
Mr.	William	Galvin	Secretary	Massachusetts Historical Commission (SHPO)	Boston	MA	02125
Mr.	Kevin	Kennedy	Chief Development Officer	City of Springfield	Springfield	MA	01104
Mr.	Marcos A	Marrero	Director	City of Holyoke	Holyoke	MA	01040
Ms.	Cathy	Leonard	Town Administrator's Secretary	Town of Granby	Granby	MA	01033
Mr.	Richard	Harris	Town Planner	Town of South Hadley	South Hadley	MA	01075
Mr.	William	Jebb	Chief	City of Chicopee	Chicopee	MA	01020
Mr.	Paul	Madera	Chief	Town of Ludlow	Ludlow	MA	01056
Mr.	John	Barbieri	Chief	City of Springfield	Springfield	MA	01105
Mr.	James M.	Neiswanger	Commissioner	City of Holyoke	Holyoke	MA	01040
Mr.	Alan	Wishart	Chief	Town of Granby	Granby	MA	01033
Mr.	David	LaBrie	Chief	Town of South Hadley	South Hadley	MA	01075
Ms.	Shannon	Bliven	Chief	East of the River 5	East Longmeadow	MA	01028

A.2.2.4 Westover ARB Agency Coordination Mailing List (Continued)

Salutation	First Name	Last Name	Title	Organization	City	State	Zip
Ms.	Kathleen	Anderson	Director	City of Holyoke	Holyoke	MA	01040-6504
Mr.	Dale	Johnson	President	Town of Granby and South Handley	South Hadley	MA	01075
Mr.	Glenn X.	Joslyn	Director	City of Chicopee	Chicopee	MA	01020
Mr.	Mark	Babineau	Chief	Town of Ludlow	Ludlow	MA	01056-0382
Mr.	Robert	Hassett	Director	City of Springfield	Springfield	MA	01104
Mr.	Stephen	Riffenburg	Chairman	City of Holyoke	Holyoke	MA	01040
Mr.	Russell	Anderson	Chief	Town of Granby	Granby	MA	01033
Ms.	Sharon	Hart	Director	Town of South Hadley	South Hadley	MA	01075
Mr.	Michael	Ashe Jr.	Sheriff	Hampden County	Ludlow	MA	01056
Ms.	Laura	Gentile		Hampden County	Springfield	MA	01102
Ms.	Emily L.	Partyka	Director	Chicopee Public Library	Chicopee	MA	01013
Ms.	Judy	Kelly	Director	Ludlow Public Library	Ludlow	MA	01056
Ms.	Molly	Fogarty	Director	Springfield City Library	Springfield	MA	01103
Mr.	Joseph	Rodio	Director	South Hadley Public Library	South Hadley	MA	01075
Ms.	Sharon	Sharry	Director	Amherst Public Library	Amherst	MA	01002
Ms.	Jennifer	Crosby	Director	Granby Public Library	Granby	MA	01033
Ms.	Sheila	McCormick	Director	Belchertown Public Library	Belchertown	MA	01007
Ms.	Maria G.	Pagan	Director	Holyoke Public Library	Holyoke	MA	01040
Mr.	Rune	Duke		AOPA	Washington	DC	20001

A.2.3 Grissom ARB Agency Coordination Responses

Office of COMMUNITY & RURAL AFFAIRS
OCRA

April 11, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Ave, Ste. 155
Lackland AFB, Texas 78236-9853

Re: EIS Third Main Operating Base (MOB 3) of the KC – 46A tanker aircraft Grissom Air Reserve Base (ARB)

Dear Mr. Kamalpour,

The Indiana Office of Community and Rural Affairs (OCRA) works with Indiana Communities to build relevant and economically thriving places where people want to live, work and grow. Therefore, on behalf of the State of Indiana we assist rural communities to develop and implement appropriate community and economic development plans.

OCRA has a substantial history of working with local elected officials, community and economic development officials, and the community at large to support development at and around Grissom Air Reserve Base. It is a substantial regional asset impacting no less than five counties. We believe that this project has great potential to impact the region in a very meaningful way. We established metrics by which we assist Indiana rural counties and regions to bench mark the relative success of community and economic development projects. The metrics include growing Assessed Value, Growing Population, Increasing Per Capita Income, Increasing Educational Attainment Rates, and Increased K-12 Public School Enrollment. We believe that this project has the potential to advance each of these metrics and the community as a whole.

OCRA will continue to support this project with grants when appropriate, with technical assistance, and to assist the community as it further aligns its vision with this and other assets. We encourage you to grant every consideration to Grissom Air Reserve Base for this project knowing that our office and operations will be on hand to support the community's efforts in every way possible.

Sincerely,

William S. Konyha
Executive Director

One North Capitol, Suite 600 - Indianapolis, IN 46204 - 800.824.2476 - 317.233.3597 (fax)
www.ocra.IN.gov

Subject: FW: KC-46A MOB 3 Environmental Impact Statement

-----Original Message-----
From: Kaiser, Jason [mailto:JASONKAISER@indot.IN.gov]
Sent: Thursday, March 31, 2016 3:13 PM
To: KAMALPOUR, HAMID GS-13 USAF HAF AFCEC/CZN <hamid.kamalpour@us.af.mil>
Subject: KC-46A MOB 3 Environmental Impact Statement

Hamid Kamalpour,

The Indiana Department of Transportation Commissioner (Brandye Hendrickson) has received coordination associated with the beddown of the MOB 3 of the KC-46A tanker aircraft and its possible location at Grissom ARB. Please advise as to whether the US Air Force believes any impacts to or improvements to the Indiana Department of Transportation's facilities would be required by this potential project.

Respectfully,

Jason Kaiser P.E.

Technical Services Director

5333 Hatfield Road

Fort Wayne, IN 46808

Office: (260) 969-8229

Email: jasonkaiser@indot.in.gov <mailto:jasonkaiser@indot.in.gov>

<https://www.facebook.com/INDOTNortheast>
<https://twitter.com/indotnortheast>
<http://www.youtube.com/user/IndianaDOT> <http://www.in.gov/indot/2341.htm>
<http://www.in.gov/>

<http://www.in.gov/indot/>

1

A.2.4 Seymour Johnson AFB Agency Coordination Responses

NC
State Environmental
Review Clearinghouse
ADMINISTRATION

Kathryn Johnston
Secretary

William W. Peaslee
General Counsel

April 22, 2016

Mr. Hamid Kamalpour
Department of the Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland AFB, TX 78236-9853

Re: SCH File # 16-E-0000-0296; SCOPING; US Air Force is preparing a Draft EIS to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base of the KC-46A tanker aircraft.

Dear Mr. Kamalpour:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are comments made by the agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Crystal Best

Crystal Best
State Environmental Review Clearinghouse

Attachments
cc: Region P

Nothing Compares
State of North Carolina | Administration
116 West Jones St. | 1301 Mail Service Center | Raleigh, NC 27699-1301
state.clearinghouse@doa.nc.gov | 919 807 2419 T

NC
Environmental
Quality

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MEMORANDUM

To: Crystal Best
State Clearinghouse Coordinator
Department of Administration

From: Lyn Hardison
Division of Environmental Assistance and Customer Service
Environmental Assistance and Project Review Coordinator

RE: 16-0296
Scoping – US Air Force is preparing a Draft EIS to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base of the KC-46A tanker aircraft
Wayne County

Date: April 21, 2016

The Department of Environmental Quality has reviewed the proposal for the referenced project. Based on the information provided, several of our agencies have identified permits that may be required and offered some guidance. The comments are attached for the applicant's review.

The Department's agencies will continue to be available to assist the applicant through the environmental review processes.

Thank you for the opportunity to respond.

Attachment

Nothing Compares
State of North Carolina | Environmental Quality
943 Washington Square Mall | Washington, North Carolina 27889
252-946-6481

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

State of North Carolina
Department of Environment and Natural Resources
INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Reviewing Office: Washington

Project Number 16-0296 Due Date: 4/18/2016
County Wayne

After review of this project it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual	30 days (90 days)
☐	NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later	90-120 days (N/A)
☐	Water Use Permit	Pre-application technical conference usually necessary	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100 thru 2Q.0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q.0113)	90 days
☐	Permit to construct & operate Transportation Facility as per 15A NCAC (2D.0800, 2Q.0601	Application must be submitted at least 90 days prior to construction or modification of the source.	90 days
☒	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
☒	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5950		
☐	Complex Source Permit required under 15 A NCAC 2D.0800		
☒	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) At least 30 days before beginning activity. A fee of $65 for the first acre or any part of an acre. An express review option is available with additional fees		20 days (30 days)
☐	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		(30 days)
☐	Mining Permit	On-site inspection usual. Surety bond filed with ENR Bond amount varies with type mine and number of acres of affected land. Any are mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	North Carolina Burning permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days	1 day (N/A)
☐	Special Ground Clearance Burning Permit - 22 counties in coastal N.C. with organic soils	On-site inspection by N.C. Division Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
☐	Oil Refining Facilities	N/A	90-120 days (N/A)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction, certify construction is according to ENR approved plans. May also require permit under mosquito control program. And a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of $200.00 must accompany the application. An additional processing fee based on a percentage or the total project cost will be required upon completion.	30 days (60 days)

February 11, 2015

County Wayne

Project Number: 16-0296 Due Date: 4/18/2016

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with ENR running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to ENR rules and regulations.	10 days N/A
☐	Geophysical Exploration Permit	Application filed with ENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
☐	State Lakes Construction Permit	Application fee based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property.	15-20 days N/A
☐	401 Water Quality Certification	N/A	60 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	55 days (150 days)
☐	CAMA Permit for MINOR development	$50.00 fee must accompany application	22 days (25 days)
☐	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687 Raleigh, NC 27611		
☒	Abandonment of any wells, if required must be in accordance with Title 15A, Subchapter 2C.0100		
☐	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☒	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
☐	Catawba, Jordan Lake, Randalman, Tar Pamlico or Neuse Riparian Buffer Rules required.		
☐	Plans and specifications for the construction, expansion, or alteration of a public water system must be approved by the Division of Water Resources/Public Water Supply Section prior to the award of a contract or the initiation of construction as per 15A NCAC 18C .0300 et. seq. Plans and specifications should be submitted to 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. All public water supply systems must comply with state and federal drinking water monitoring requirements. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days
☐	If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Water Resources/Public Water Supply Section at 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days

Other comments (attach additional pages as necessary, being certain to cite comment authority)

Division	Initials	No comment	Comments	Date Review
DAQ	RMB	☒	No comment	4/18/16
DWR-WQROS (Aquifer & Surface)	DRS	☒ ☐		4/19/16 / /
DWR-PWS	DEL	☒		4/15/16
DEMLR (LQ & SW)	SD	☐	Erosion & Sed. Control permit needed. Stormwater permit administered through the SJAFB woth DEMLR oversight.	4/18/16
DWM - UST	JSB	☐	Please see attached comments	4/14/16

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☐ **Asheville Regional Office**
2090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

☐ **Mooresville Regional Office**
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

☐ **Wilmington Regional Office**
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☐ **Fayetteville Regional Office**
225 North Green Street, Suite 714
Fayetteville, NC 28301-5043
(910) 433-3300

☐ **Raleigh Regional Office**
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200

☐ **Winston-Salem Regional Office**
450 West Hanes Mill Road, Suite 300
Winston-Salem, NC 27105
(336) 771-9800

☒ **Washington Regional Office**
943 Washington Square Mall
Washington, NC 27889
(252) 946-6481

February 11, 2015

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

Waste Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MICHAEL E. SCOTT
Acting Director

MEMORANDUM

TO: Michael Scott, Acting Division Director through Sharon Brinkley

FROM: Drew Hammonds, Eastern District Supervisor - Solid Waste Section

DATE: April 15, 2016

SUBJECT: Review: Project #16-0296 – Wayne County (Department of the Air Force)

The Division of Waste Management, Solid Waste Section (Section) has reviewed the assessment documents for the proposed establishment of the KC-46A Third Main Operating Base (MOB 3) Beddown, which includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a U.S. Air Force (USAF) installation within the continental United States (CONUS) where Air Force Reserve Command (AFRC) leads a Mobility Air Force Mission. The preferred alternative location is Seymour Johnson Air Force Base (AFB), North Carolina. The Section has seen no adverse impact on the surrounding community and likewise knows of no situations in the community, which would affect this project.

During construction, USAF and/or its contractors should make every feasible effort to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in the development of this project where suitable. Any waste generated by this project that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility permitted by the Division. The Section strongly recommends that the owner require all contractors to provide proof of proper disposal for all waste generated.

Facilities are listed on the Division of Waste Management, Solid Waste Section portal site at: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/solid-waste-management-annual-reports/solid-waste-permitted-facility-list

Questions regarding solid waste management should be directed to Mr. Wes Hare, Environmental Senior Specialist, Solid Waste Section, at (910) 7967405.

cc: Wes Hare, Environmental Senior Specialist
Jessica Montie, Compliance Officer

State of North Carolina Environmental Quality | Waste Management
Winston-Salem Regional Office | 450 W. Hanes Mill Road, Suite 300 | Winston-Salem, NC 27105
336 776 9800

Waste Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MICHAEL SCOTT
Acting Director

Date: April 12, 2016

To: Michael Scott, Acting Director
Division of Waste Management

Through: Dave Lown, Head
Federal Remediation Branch

From: Melanie Bartlett, Federal Remediation Branch

Subject: NEPA Project #16-0296, Draft EIS to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base of the KC 46A tanker aircraft, Wayne County, North Carolina

The above-mentioned project covers Seymour Johnson Air Force Base. No specific addresses were included in the project. For individual construction projects with specific addresses, nearby regulated sites may be viewed via maps found at https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/waste-management-gis-maps. Information included on these various maps are Site Name and/or Site ID.

If regulated sites are present in the area of a specific address or construction project, additional information for the sites can be accessed by following the "Access Online Files" link on the Superfund Section website: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/e-documents. The sites may be searched by Site ID or Site Name. If you have any questions, please contact me at (919) 707-8373 or via email at melanie.bartlett@ncdenr.gov.

State of North Carolina | Environmental Quality | Waste Management
1646 Mail Service Center | 217 West Jones Street | Raleigh, NC 27699-1646
919 707 8200 Telephone

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

NC Waste Management ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MICHAEL SCOTT
Acting Director

TO: Lyn Hardison, Environmental Coordinator

FROM: Scott Bullock, Regional UST Supervisor

COPY: Robert Davies, Corrective Action Branch Head

COPY: Sharon Brinkley, Administrative Secretary

DATE: April 14, 2016

RE: Environmental Review – Project Number 16-0296– Scoping – US Air Force at Seymour Johnson AFB in Goldsboro, NC is preparing a Draft EIS to assess the potential environmental consequences associated with the bed-down of the Third Main Operating Base for the KC46A tanker aircraft.

I searched the Petroleum Underground Storage Tank (UST) and Non-UST Databases and those databases indicated multiple petroleum releases at Seymour Johnson AFB. I reviewed the above proposal and determined that this project should not have any adverse impact upon groundwater. The following comments are pertinent to my review:

1. The Washington Regional Office (WaRO) UST Section recommends removal of any abandoned or out-of-use petroleum USTs or petroleum above ground storage tanks (ASTs) within the project area. The UST Section should be contacted regarding use of any proposed or on-site petroleum USTs or ASTs. We may be reached at (252) 946-6481.
2. Any petroleum USTs or ASTs must be installed and maintained in accordance with applicable local, state, and federal regulations. For additional information on petroleum ASTs it is advisable that the North Carolina Department of Insurance at (919) 661-5880 ext. 239, USEPA (404) 562-8761, local fire department, and Local Building Inspectors be contacted.
3. Any petroleum spills must be contained and the area of impact must be properly restored. Petroleum spills of significant quantity must be reported to the North Carolina Department of Environment & Natural Resources – Division of Waste Management Underground Storage Tank Section in the Washington Regional Office at (252) 946-6481.
4. Any soils excavated during demolition or construction that show evidence of petroleum contamination, such as stained soil, odors, or free product must be reported immediately to the local Fire Marshall to determine whether explosive or inhalation hazards exist. Also, notify the UST Section of the Washington Regional Office at (252) 946-6481. Petroleum contaminated soils must be handled in accordance with all applicable regulations.
5. Any questions or concerns regarding spills from petroleum USTs, ASTs, or vehicles should be directed to the UST Section at (252) 946-6481.

If you have any questions or need additional information, please contact me at 252-948-3906.

State of North Carolina | Environmental Quality | Waste Management
UST Section Central Office | 1646 Mail Service Center | Raleigh, NC 27699-1646 | (919) 707-8171

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

Natusha Earle

COUNTY: WAYNE

G07: MILITARY ACTIVITES (TRAINING, FLIGHT ROUTES, BASE EXPANSIONS

STATE NUMBER: 16-E-0000-0296
DATE RECEIVED: 04/01/2016
AGENCY RESPONSE: 04/18/2016
REVIEW CLOSED: 04/21/2016

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

APR 2016 RECEIVED

REVIEW DISTRIBUTION

DEPT OF ENVIR. QUALITY - COASTAL MG
DEPT OF ENVIRONMENTAL QUALITY
DEPT OF NATURAL & CULTURAL RESOURCE
DEPT OF TRANSPORTATION
DNCR - DIV OF PARKS AND RECREATION
DPS - DIV OF EMERGENCY MANAGEMENT
EASTERN CAROLINA COUNCIL

PROJECT INFORMATION

APPLICANT: Department of the Air Force
TYPE: National Environmental Policy Act Scoping

DESC: US Air Force is preparing a Draft EIS to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base of the KC-46A tanker aircraft. - View documents at www.kc-46A-beddown.com

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☑ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: Natasha Earle-Young DATE: 4/18/2016

APR 2016 RECEIVED Secretary's Office DOA

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

APR 06 2016

COUNTY: WAYNE

G07: MILITARY ACTIVITIES (TRAINING, FLIGHT ROUTES, BASE EXPANSIONS

STATE NUMBER: 16-E-0000-0296
DATE RECEIVED: 04/01/2016
AGENCY RESPONSE: 04/18/2016
REVIEW CLOSED: 04/21/2016

MS PAULA CUTTS
CLEARINGHOUSE COORDINATOR
DPS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
MSC # 4218
RALEIGH NC

REVIEW DISTRIBUTION

DEPT OF ENVIR. QUALITY - COASTAL MG
DEPT OF ENVIRONMENTAL QUALITY
DEPT OF NATURAL & CULTURAL RESOURCE
DEPT OF TRANSPORTATION
DNCR - DIV OF PARKS AND RECREATION
DPS - DIV OF EMERGENCY MANAGEMENT
EASTERN CAROLINA COUNCIL

APR 2016 RECEIVED

PROJECT INFORMATION

APPLICANT: Department of the Air Force
TYPE: National Environmental Policy Act Scoping

DESC: US Air Force is preparing a Draft EIS to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base of the KC-46A tanker aircraft. - View documents at www.kc-46A-beddown.com

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: [signature] DATE: 4/8/16

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary of Environmental Quality

April 25, 2016

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
Lackland AFB, TX 78236-9853

Dear Mr. Kamalpour,

As the most military-friendly state in the nation, North Carolina is pleased to learn that the U.S. Air Force is considering Seymour Johnson Air Force Base (AFB) as the preferred location for the KC-46A tanker aircraft. The N.C. Department of Environmental Quality appreciates the opportunity to provide its comments on the Notice of Intent to prepare an Environmental Impact Statement (EIS) to assess the potential environmental consequences.

Seymour Johnson AFB has consistently demonstrated its commitment to conserving and protecting North Carolina's natural resources. In addition to its strong environmental stewardship, there are many advantages to basing and operating the KC-46A tanker aircraft in our state. North Carolina has laws in place to protect military aircraft from tall structures, including a permitting process for wind energy facilities that could conflict with military activities.

Applicants are required to conduct a preliminary evaluation to ensure that proposed wind turbines will not pose serious risk to military air navigation routes, air traffic control areas, military training routes, special-use air space, radar, or other potentially affected military operations. These safeguards protect military pilots, our environment, and the safety of our citizens.

I am available to answer any questions you may have, and I look forward to working with you throughout the selection process. Please do not hesitate to contact me at (919) 707-8622 or donald.vandervaart@ncdenr.gov.

Sincerely,

Van der Vaart

Donald R. van der Vaart
Secretary, N.C. Department of Environmental Quality

cc: Cornell Wilson, Secretary, N.C. Department of Military and Veterans Affairs
Nick Tennyson, Secretary, N.C. Department of Transportation

State of North Carolina | Environmental Quality
1601 Mail Service Center | Raleigh, NC 27699-1601
919-707-8600

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

Subject: Scoping comments on behalf of NC Division of Coastal Management

-----Original Message-----
From: Spears, Courtney [mailto:courtney.spears@ncdenr.gov]
Sent: Tuesday, April 12, 2016 10:30 AM
To: KAMALPOUR, HAMID GS-13 USAF HAF AFCEC/CZN <hamid.kamalpour@us.af.mil>
Subject: Scoping comments on behalf of NC Division of Coastal Management

Good morning,

After review of the draft EIS scoping documents, it has been determined that a Federal Consistency Determination may be needed. Please submit any documents or questions for Consistency directly to our Federal Consistency Coordinator, Daniel Govoni. He can be reached by email at Daniel.govoni@ncdenr.gov <mailto:Daniel.govoni@ncdenr.gov> , or by phone at
252-808-2808 ext 233.

Thank you,

Courtney Spears

Assistant Major Permits Coordinator

Division of Coastal Management

Department of Environmental Quality

252 808 2808 office

courtney.spears@ncdenr.gov

400 Commerce Avenue

Morehead City, NC 28557

NC
Environmental Quality

PAT McCRORY
Governor

DONALD R. VAN DER VAART
Secretary

May 4, 2016

Mr. Dennis G. Goodson, P.E.
Deputy Base Civil Engineer
1095 Peterson Avenue
Seymour Johnson Air Force Base, NC 27531

SUBJECT: **CD16-020** Negative Determination concurrence for the project at Seymour Johnson Air Force Base, Wayne County, North Carolina (DCM#20160018)

Dear Mr. Goodson:

We received your negative determination on May 3, 2016, concerning the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft at Seymour Johnson Air Force Base, Wayne, North Carolina.

North Carolina's coastal zone management program consists of, but is not limited to, the Coastal Area Management Act, the State's Dredge and Fill Law, Chapter 7 of Title 15A of North Carolina's Administrative Code, and the land use plan of the County and/or local municipality in which the proposed project is located. It is the objective of the Division of Coastal Management (DCM) to manage the State's coastal resources to ensure that proposed Federal activities would be compatible with safeguarding and perpetuating the biological, social, economic, and aesthetic values of the State's coastal waters.

DCM concurs with the decision made by the United States Air Force that a Federal Consistency Determination is not necessary. Should the proposed action be modified, a revised consistency determination could be necessary. This might take the form of either a supplemental consistency determination pursuant to 15 CFR 930.46, or a new consistency determination pursuant to 15 CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered by the proposed development, a supplemental consistency certification may be required. If you have any questions, please contact Courtney Spears at 252-808-2808 x215. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Daniel Govoni
Policy Analyst

Nothing Compares

State of North Carolina | Environmental Quality
217 West Jones Street | 1601 Mail Service Center | Raleigh, North Carolina 27699-1601
919 707 8600

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

WAYNE COUNTY
COUNTY MANAGER
GEORGE A. WOOD

WAYNECOUNTY
NORTH CAROLINA
Phone: (919) 731-1435
Fax (919) 731-1446

March 31, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland AFB, TX 78236-9853

Comments for the Environmental Impact Statement for the Basing of KC-46A tanker aircraft at Seymour Johnson AFB, Goldsboro, NC

Dear Mr. Kamalpour:

I am in receipt of the Air Force's March 28th letter inviting my participation in your environmental scoping process for the above referenced project. Since Seymour Johnson AFB already is home to 16 KC-135 aircraft in the 916th Air Refueling Wing, and the intent is to replace them with the KC-46A aircraft, Wayne County does not believe there will be any negative environmental impact compared to the current situation. The base already has the basic infrastructure, and any additional construction necessary would not be detrimental to the environment. We already house comparable personnel and operations.

The people of Wayne County are used to the daily training exercises conducted both by the 916th Air Refueling Wing and the 4th Fighter Wing's 95 F-15E aircraft. I see no reason to believe that upgrading to the KC-46A aircraft will cause any concern about noise.

Wayne County is proud to host both the 916th and the 4th Fighter Wing, and we are totally supportive of this upgrade to the KC-46A aircraft. We are fully prepared to partner with the US Air Force to make this a seamless transition.

If you need anything further from my office, please do not hesitate to contact me.

Sincerely,

George A. Wood

George A. Wood
County Manager

Cc: Board of Commissioners
Col. Mark Slocum, Base Commander
Mr. Stu Cox, SJAFB

THE GOOD LIFE. GROWN HERE.

PO BOX 227
GOLDSBORO, NC 27533

WAYNE COUNTY
BOARD OF COMMISSIONERS

WAYNECOUNTY
NORTH CAROLINA
Phone: (919) 731-1435
Fax (919) 731-1446

March 31, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland AFB, TX 78236-9853

RE: Comments for the Environmental Impact Statement for the Basing of KC-46A Tanker Aircraft at Seymour Johnson Air Force Base, Goldsboro, North Carolina

Dear Mr. Kamalpour:

Seymour Johnson Air Force Base is presently home to 16 KC-135 aircraft in the 916th Air Refueling Wing. Wayne County does not believe replacing them with the KC-46A aircraft will cause any negative environmental impact to our present situation. Seymour Johnson Air Force Base has the appropriate infrastructure, personnel and operations to handle this transition.

Wayne County citizens are accustomed to the training exercises conducted both by the 916th Air Refueling Wing and the 4th Fighter Wing's 95 F-15E aircraft. I do not believe upgrading to the KC-46A aircraft will create any concern regarding noise.

Wayne County is extremely proud to be the home of Seymour Johnson Air Force Base and will support the upgrade to the KC-46A aircraft. We will continue to partner with the United States Air Force to make this transition.

Please feel free to call me on my cell at 919-273-6064 with any additional questions.

Sincerely,

Joe C. Daughtery

Joe C. Daughtery, Chairman
Wayne County Board of Commissioners

CC: Wayne County Board of Commissioners
Col. Mark Slocum, Base Commander
Mr. Stu Cox, SJAFB

THE GOOD LIFE. GROWN HERE.

PO BOX 227
GOLDSBORO, NC 27533

A.2.4 Seymour Johnson AFB Agency Coordination Responses (Continued)

GOLDSBORO
BE MORE DO MORE SEYMOUR
North Carolina

April 18, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland AFB, TX 78236-9853

Re: Comments for Environmental Impact Statement for the Basing of KC-46A Tanker Aircraft at Seymour Johnston AFB, Goldsboro, NC

Dear Mr. Kamalpour,

Many community members and City staff participated in the open house scoping meeting for the above referenced project held on April 14, 2016 in Goldsboro, North Carolina. Seymour Johnson AFB is currently home to 16 KC-135 aircraft in the 916th Air Refueling Wing. Since the intent is to replace the existing KC-135 aircraft with the KC-46A aircraft, the City of Goldsboro does not believe there would be any negative environmental impact compared to the current situation. Seymour Johnson AFB already has the basic infrastructure and if any additional construction is necessary, I do not feel it would be detrimental to the environment.

The citizens of Goldsboro are accustomed to the daily training exercises conducted by both the 916th Air Refueling Wing and the 4th Fighter Wing's 95 F-15E aircrafts. I see no reason to believe the upgrade to the KC-46A aircraft would cause any concern about noise.

The City of Goldsboro is proud to be home to both the 916th and the 4th Fighter Wing. We are totally supportive of the upgrade to the KC-46A aircraft and are fully prepared to partner with the United States Air Force to make this a seamless transition.

If you need anything further, please do not hesitate to contact me at 919-580-4330.

Sincerely,

Chuck Allen, Mayor

cc: Goldsboro City Council
Col. Mark Slocum, Commander, 4th Fighter Wing
Col. Craig Shenkenberg, Commander, 916th ARW

www.goldsboronc.gov

A.2.5 Tinker AFB Agency Coordination Responses

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

April 8, 2016

Mr. J. Dale Clark
Department of the Air Force
2261 Hughes Ave, Suite 155
Lackland AFB, TX 78235-9853

Re: ENVIRONMENTAL REVIEW
Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft

Dear Mr. Clark,

In response to your request, we have completed an environmental review of air, land and water records for the above- referenced project. Attached is a list of environmental recommendations that you should consider as you complete your project.

If you have any questions or need clarification, please contact me at 405.702.7111, jon.roberts@deq.ok.gov

Sincerely,

Jon A. Roberts, Senior Manager
Office of External Affairs
Enclosure

707 NORTH ROBINSON, P.O. BOX 1677, OKLAHOMA CITY, OKLAHOMA 73101-1677
printed on recycled paper with soy ink

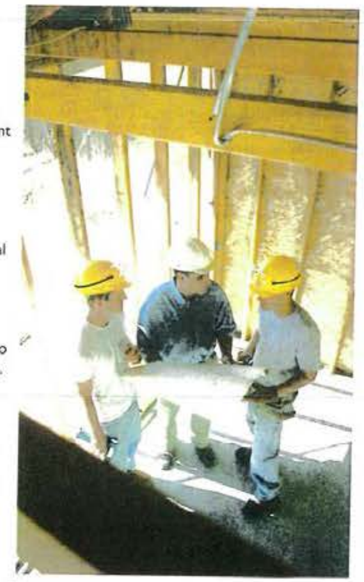
October 2010

AIR, LAND & WATER

Recommendations for General Construction/Improvement Projects

During the environmental review process for general construction/improvement projects, the following recommendations are offered to assist in ensuring environmental compliance throughout the project.

- Any project which includes the removal or installation of water and/or sewer lines shall conform to all relevant local and/or state plumbing codes.
- Any project which includes the removal of paint shall conform to all relevant lead-based paint regulations.
- Any project which includes the handling and/or removal of asbestos shall conform to all relevant asbestos regulations.
- During any construction, demolition, and/or rehabilitation reasonable precautions should be taken to protect air quality by minimizing fugitive dust emissions.
- If construction, demolition, and/or rehabilitation will disturb more than one acre of land, a determination should be made as to whether an Oklahoma Pollutant Discharge Elimination System (OPDES) permit for storm water is required during the construction phase.
- Any solid or hazardous waste from the site shall be recycled and/or disposed of in accordance with all relevant solid waste and/or RCRA regulations.



This publication is issued by the Oklahoma Department of Environmental Quality authorized by Steven A. Thompson, Executive Director. Copies have been prepared at a cost of $0.0535 each. Copies have been deposited with the publications clearinghouse of the Oklahoma Department of Libraries. (\fact sheets\sels\GenConstructionImprovement) 3/2012

A.2.5 Tinker AFB Agency Coordination Responses (Continued)

J. D. STRONG
EXECUTIVE DIRECTOR

MARY FALLIN
GOVERNOR

STATE OF OKLAHOMA
WATER RESOURCES BOARD
www.owrb.ok.gov

OKLAHOMA WATER RESOURCES BOARD
Planning & Management Division
Oklahoma City, OK

PUBLIC NOTICE REVIEW

___ We have no comments to offer. _X_ We offer the following comments.

WE RECOMMEND THAT YOU CONTACT THE LOCAL FLOODPLAIN ADMINISTRATOR FOR POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT. THE OWRB WEB SITE, www.owrb.ok.gov, contains a directory of floodplain administrators and is located under forms/floodplain management/floodplain administrators, listed alphabetically by name of community. **If this development would fall on STATE OWNED or operated property, a floodplain development permit is required from OWRB.** The Chapter 55 Rules and permit application for this requirement can be found on the OWRB web site listed above. If this project is proposed in a non-participating community, try to ensure that this project is completed so that it is reasonably safe from flooding and so that it does not flood adjacent property if at all possible.

Reviewer: Cathy Poage, CFM **Date:** 05/31/2016

Project Name: Proposed Beddown of the Third Main Operating Base (MOB 3) of the KC-46A Tanker Aircraft, Possible Alternative Location at Tinker AFB, Oklahoma County, OK

FIRM Name: USAF, NEPA Division, Lackland AFB, J Dale Clark, PE
CC: Eric Wenger, FPA, Oklahoma City
Erik Brandt, CFM, FPA, Oklahoma County

* Oklahoma City and Oklahoma County both participate in the NFIP and have floodplain development permitting systems. Please see above paragraph.

OWRB
the water agency

3800 N. CLASSEN BOULEVARD • OKLAHOMA CITY, OKLAHOMA 73118
TELEPHONE (405) 530-8800 • FAX (405) 530-8900

WATER FOR 2060

A.2.6 Westover ARB Agency Coordination Responses

THE CITY OF SPRINGFIELD, MASSACHUSETTS

MAYOR DOMENIC J. SARNO

HOME OF THE BASKETBALL HALL OF FAME

April 12, 2016

Mr. J. Dale Clark
Chief, Air Force NEPA Division (AFCEC/CZN)
2261 Hughes Ave, Suite 155
Lackland AFB TX 78235-9853

Dear Chief Clark,

I hope this letter finds you well. The City of Springfield, MA is in receipt of your notification letter dated March 28th, 2016. We would like to offer our full support to Westover Air Reserve Base and the City of Chicopee in consideration of the relocation of the KC-46A Third Main Operating Base.

We understand that you are currently in the environmental assessment phase of this project and that Westover is currently one of several reasonable alternatives. The Westover facility is not only key to the security of the United States but provides immeasurable benefits to our region as a whole. The base provides essential employment opportunities to several thousand of our local residents and servicemen and women, and has long been part of the fabric of our region. The very same people live in our City, patronize our businesses and spur economic development all along the Pioneer Valley.

As we have long valued the importance of the C5 wing that currently operates from the base, we welcome the potential for a new wave of aircraft serving our military. The City would have no objections to the proposed beddown and any concerns about noise or safety have long been demonstrated by our service members at Westover to be minimal in nature. Should you have any questions or wish to discuss the future of the base and our region as a whole, please feel to reach out to my office at any time.

Thank you for your consideration and best wishes as you pursue this very important project.

Respectfully,

Mayor Domenic J. Sarno

City of Springfield • 36 Court Street • Springfield, MA 01103-1687 • (413) 787-6100

A.2.7 General Comments

+U. S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX 76209-3698

FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION VI
MITIGATION DIVISION

NOTICE REVIEW/ENVIRONMENTAL CONSULTATION

☐ We have no comments to offer. ☒ We offer the following comments:

WE WOULD REQUEST THAT THE COMMUNITIES' FLOODPLAIN ADMINISTRATORS BE CONTACTED FOR THE REVIEW AND POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT. IF FEDERALLY FUNDED, WE WOULD REQUEST PROJECT TO BE IN COMPLIANCE WITH EO11988 & EO 11990.

REVIEWER:

Mayra G. Diaz
Floodplain Management and Insurance Branch
Mitigation Division
(940) 898-5541

DATE: March 30, 2016

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

RECEIVED
2016 MAR 29 A 2:44

28 March 2016

Mr. J. Dale Clark
Air Force NEPA Division (AFCEC/CZN)
2261 Hughes Ave, Suite 155
Lackland AFB TX 78235-9853

Mr. Ross Richardson
Federal Emergency Management Association (FEMA)
Mitigation Division
800 North Loop 288
Denton, TX 76209

Dear Mr. Richardson,

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. The Air Force has identified Seymour Johnson Air Force Base (AFB) as the preferred alternative with Grissom Air Reserve Base (ARB), Tinker AFB, and Westover ARB as reasonable alternatives. All four bases and the No Action Alternative will be evaluated as alternatives in the EIS. Additional information on the beddown and EIS process is included in the attached Notice of Intent from the March 23, 2016, Federal Register.

The Air Force will host a public come and go open house scoping meeting in the local area near each of the bases proposed for this action (see attached scoping brochure). The purpose of the meetings and the scoping period is to solicit comments on the scope of environmental issues to be analyzed in depth in the EIS. Public and agency comments provided to the Air Force during the scoping period will be considered in the preparation of the Draft EIS. Additional information can be found on the project website at www.kc-46A-beddown.com.

We request your participation and solicit scoping comments on this action. Please provide any comments by April 25, 2016, directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; 2261 Hughes Ave, Ste. 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely,

J. DALE CLARK, PE, GS-14, DAF
Chief, Air Force NEPA Division
Environmental Management Directorate

Attachments:
1. Notice of Intent
2. KC-46A MOB 3 EIS Brochure

A.2.7 General Comments (Continued)

U.S. Department of Transportation
Federal Aviation Administration

Mission Support Services
800 Independence Avenue, SW
Washington, DC 20591

APR 2 5 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland AFB, TX 78236

Dear Mr. Kamalpour:

Thank you for the March 28, 2016, letter from Mr. J. Dale Clark concerning the Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB) of the KC-46A tanker aircraft.

The Federal Aviation Administration (FAA) has reviewed your letter and appreciates the opportunity to participate in the EIS scoping process. Currently, we do not have any comments involving the identified preferred and reasonable alternative beddown locations. The FAA can provide assistance if at any time the United States Air Force (USAF) identifies any special use airspace changes resulting from this action or the USAF needs the FAA's specific expertise regarding aviation.

Thank you for your consideration of the FAA in this matter.

Sincerely,

Jodi S. McCarthy
for Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Operations

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAY 0 2 2016

REPLY TO THE ATTENTION OF:
E-19J

Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Avenue, Suite 155
Lackland Air Force Base, Texas 78236-9853

Re: Project Scoping for KC-46A Aircraft Beddown at Seymour Johnson Air Force Base, Goldsboro, Wayne County, North Carolina

Dear Mr. Kamalpour:

EPA has reviewed the scoping document for the referenced project, dated March 28 2016, which was prepared by the United States Air Force (USAF), pursuant to our authorities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The proposed project involves the beddown of the Third Main Operating Base of the KC-46A aircraft at Seymour Johnson Air Force Base (AFB). Seymour Johnson AFB is the preferred location (the preferred alternative), however, USAF has proposed alternate beddown locations at Grissom Air Reserve Base (ARB), Indiana; Tinker AFB, Oklahoma; and Westover ARB, Massachusetts.

We have some general recommendations that we believe will assist the development of the draft environmental impact statement (DEIS), including comments on water quality, green infrastructure, climate change and greenhouse gas emissions, demolition of buildings, erosion control, and consultation records, as stated below.

Water Quality
The DEIS should describe how the proposed action may affect Clean Water Act (CWA) Section 303(d) listed water bodies and their listing status as impaired. We recommend that this section of the document discuss current impairments, and how the proposed action may affect, either positively or detrimentally, the impairment. A list of nearby impaired streams can be found at: https://iaspub.epa.gov/tmdl/attains_index.home.

Green Infrastructure
In compliance with Section 438 of the Energy Independence and Security Act, and also guidelines from Leadership in Energy and Environmental Design (LEED), we recommend USAF consider using energy-efficient design and building materials when constructing new

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A.2.7 General Comments (Continued)

infrastructure. As a measure to reduce or eliminate the need for traditional stormwater management infrastructure, we strongly encourage use of "green" stormwater management features, such as permeable pavement and bioretention, which are listed in the attachment *NEPA Stormwater Green Sheet.*

Climate Change and Greenhouse Gas Emissions
. EPA recommends the following be completed and information added to the DEIS:

- Include a summary discussion of climate change and reasonably foreseeable climate change impacts relevant to the project, based on U.S. Global Change Research Program[1] assessments, to assist with identification of potential project impacts that may be exacerbated by climate change and to inform consideration of measures to adapt to climate change impacts. This will assist in identifying resilience-related changes to the tentatively selected plan that should be evaluated and considered as part of the proposed project.
- Estimate the greenhouse gas (GHG) emissions associated with all project alternatives. Example tools for estimating and quantifying GHG emissions can be found on CEQ's NEPA.gov website[4]. For actions that are likely to have less than 25,000 metric tons of carbon dioxide (CO_2) emissions/year, providing a qualitative estimate is acceptable, unless quantification is easily accomplished. The estimated GHG emissions can serve as a reasonable proxy for climate change impacts when comparing the proposal and alternatives. In disclosing the potential impacts of the proposal and reasonable alternatives, consideration should be given to whether and to what extent the impacts may be exacerbated by expected climate change in the project area, as discussed in the "affected environment" sections.
- Describe measures to reduce GHG emissions associated with the proposed project, including reasonable alternatives or other practicable mitigation opportunities, and disclose the estimated GHG reductions associated with such measures. Any commitments to implement reasonable mitigation measures that will reduce or eliminate project-related GHG emissions should be committed to in the project Record of Decision (ROD).
- Include a discussion on adaptation and, as appropriate, consider practicable changes to the alternatives to make them more resilient to anticipated climate change. A list of practicable mitigation options is included in the attachment *Diesel Emission Reduction Checklist.*

Demolition of Buildings
For demolition projects, we recommend pavement (asphalt, concrete, or cement) and other structural materials be reclaimed for reuse, or recycled to the maximum extent possible.

Consultation Records
EPA recommends attaching consultation documents with the DEIS regarding historic resources, and Federal and state threatened and endangered species for each location.

[2] https://ceq.doe.gov/initiatives/nepa/ghg-guidance
[3] http://www.globalchange.gov/
[4] https://ceq.doe.gov/current_developments/GHG_accounting_methods_7Jan2015.html

Agency Coordination
Thank you for coordinating with EPA's Chicago Office (Region 5), which covers Indiana. We request USAF also coordinate with the following EPA offices for this project, since multiple bases in multiple states are under consideration by the Air Force:

Tim Timmermann
Office of Environmental Review
U.S. Environmental Protection Agency Region 1
5 Post Office Square, Suite 100
Mail Code ORA 17-1
Boston, Massachusetts 02109-3912
(This office covers Massachusetts)

Chris Militscher
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency Region 4
61 Forsyth Street SW
Atlanta, Georgia 30303-8960
(This office covers North Carolina)

Michael Jansky
Office of Planning and Coordination
U.S. Environmental Protection Agency Region 6
1445 Ross Avenue
Dallas, Texas 75202-2750
(This office covers Oklahoma)

We are available to discuss these comments on the scoping document at your convenience. Please feel free to contact Mike Sedlacek of my staff at 312-886-1765, or by email at sedlacek.michael@epa.gov.

Sincerely,

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

Encl: NEPA Stormwater Green Sheet
Diesel Emission Reduction Checklist

A.2.7 General Comments (Continued)

NEPA Stormwater Green Sheet

The Stormwater/Wastewater section of NEPA documents should (at a minimum) address the following:

- ✓ How will wastewater from the facility be managed? Is there a new or increased discharge of pollutants to a sensitive water body (e.g., a high quality water body, or a water body that is already impaired)?
- ✓ How will stormwater runoff from the building, parking lot, and other impervious surfaces be managed?
  - ✓ In most cases if more than one acre of land will be disturbed the project owner/operator will need to obtain NPDES permit coverage for stormwater runoff during the construction phase.
  - ✓ Most Region 5 States have general permits for stormwater runoff from construction sites, and most sites quality for coverage under the general permit.
  - ✓ The permit will require minimizing erosion and minimizing releases of sediment. If the site is immediately adjacent to a water body there should be a buffer area between the construction activity and the water body.
  - ✓ Post-construction requirements vary by jurisdiction. At this time there is no quantified Federal performance standard for runoff from the new impervious areas that will be created. Some States, e.g., WI, have a performance standard. Also, many municipalities have release rate requirements for stormwater. These rate restrictions are intended to keep the sewer systems from being overloaded from too much flow coming in all at once. Local release rate are the reason detention basins are put in place at new development sites.
  - ✓ If the project involves construction of a Federal building/structure, the provisions of the Energy Independence and Security Act of 2007 likely will be applicable. Title IV of the Act ("Energy Savings in Building and Industry"), Subtitle C "(High Performance Federal Buildings") establishes this requirement:

SEC. 438. STORMWATER RUNOFF REQUIREMENTS FOR FEDERAL DEVELOPMENT PROJECTS The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.

This provision for many projects can be quite significant. This language requires Federal sites to achieve/maintain the predevelopment hydrology to the "maximum extent technically feasible". For many sites what this will mean is practices must be put in place to store/soak in the first 1 to 1.5 inches of rain that falls in a large rain event (rather than having that water run off). Sites will need to include practices such as rain gardens and permeable pavement in order to do this.

4

U.S. Environmental Protection Agency

Diesel Emission Reduction Checklist

- Use low-sulfur diesel fuel (15 ppm sulfur maximum) in construction vehicles and equipment.
- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, reducing the fume concentration to which personnel are exposed.
- Use catalytic converters to reduce carbon monoxide, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels.
- Use enclosed, climate-controlled cabs pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Regularly maintain diesel engines, which is essential to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance. For example, blue/black smoke indicates that an engine requires servicing or tuning.
- Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel-equipment operators to perform routine inspection, and maintaining filtration devices.
- Repower older vehicles and/or equipment with diesel- or alternatively-fueled engines certified to meet newer, more stringent emissions standards. Purchase new vehicles that are equipped with the most advanced emission control systems available.
- Use electric starting aids such as block heaters with older vehicles to warm the engine reduces diesel emissions.
- Use respirators, which are only an interim measure to control exposure to diesel emissions. In most cases, an N95 respirator is adequate. Workers must be trained and fit-tested before they wear respirators. Depending on work being conducted, and if oil is present, concentrations of particulates present will determine the efficiency and type of mask and respirator. Personnel familiar with the selection, care, and use of respirators must perform the fit testing. Respirators must bear a NIOSH approval number.
- Per Executive Order 13045 on Children's Health[2], EPA recommends operators and workers pay particular attention to worksite proximity to places where children live, learn, and play, such as homes, schools, daycare centers, and playgrounds. Diesel emission reduction measures should be strictly implemented near these locations in order to be protective of children's health.

[2] Children may be more highly exposed to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Also, children's normal activities, such as putting their hands in their mouths or playing on the ground, can result in higher exposures to contaminants as compared with adults. Children may be more vulnerable to the toxic effects of contaminants because their bodies and systems are not fully developed and their growing organs are more easily harmed. EPA views childhood as a sequence of life stages, from conception through fetal development, infancy, and adolescence.

5

A.3 TRIBAL CORRESPONDENCE

To support this EIS, the USAF consulted on a government-to-government basis with potentially affected tribes in the Region of Influence (ROI) for each base associated with the proposed KC-46A MOB 3 beddown. The ROI includes each installation and the area surrounding the base. The table following provides a summarized list of USAF communication with tribes. All tribes listed in Table A-1, except those affiliated with Seymour Johnson AFB, received a letter notifying the tribe of the project, as well as requesting consultation under Section 106 of the NHPA. Several tribes responded to consultation requests or coordination letters, and a brief summary of the responses is included in Table A-1.

Follow-up correspondence was conducted for tribes that did not respond to initial consultation and coordination efforts. This additional outreach may have included additional telephone, e-mail, or letter correspondence. Unless requested otherwise, all of the tribes were notified via postcard of the availability of the Draft EIS.

Table A-1. Tribal Consultation

Tribe	Summary Response	Initial Notification and Section 106 Letter	Follow-Up Correspondence (email/phone calls)
Grissom ARB			
Citizen Potawatomi Nation	Received on 19 April 2016. No traditional religious or cultural properties or other interests that may be affected.	28 March 2016	Not applicable. No follow-up necessary.
Forest County Potawatomi	No Response.	28 March 2016	Email to Chairman Frank on 18 May 2016.[a]
Hannahville Indian Community	No Response.	28 March 2016	Email to Chairperson Meshigaud on 18 May 2016.[a]
Kickapoo Tribe in Kansas	No Response.	28 March 2016	Email to Chairman Randall on 18 May 2016.[a]
Kickapoo Tribe of Oklahoma	No Response.	28 March 2016	Email to Kent Collier on 18 May 2016.[a]
Miami Tribe of Oklahoma	Received on 19 April 2016. No objections to the project. Requests archaeological surveys if performed and compliance with NAGPRA.	28 March 2016	Not applicable. No follow-up necessary.
Peoria Tribe of Indians of Oklahoma	No Response.	28 March 2016	Email to Chief Froman on 18 May 2016.[a]
Pokagon Band of Potawatomi Indians	Email from Jason Wesaw on 18 May 2016 requesting additional information.	28 March 2016	Email to Marcus Winchester on 18 May 2016. Email also sent to Jason Wesaw on 18 May 2016.[a]
Peoria Band of Potawatomi Nation	No Response.	28 March 2016	Email to Chairperson Onnen on 18 May 2016.[a]
Osage Nation	Email from Jackie Rodgers on 20 May 2016 referring to letter dated 20 May 2016 stating no concerns. See same letter received for Tinker AFB from the Osage Nation.	28 March 2016	Phone call on 20 May 2016.[a]
Seymour Johnson AFB			
Eastern Band of Cherokee Indians (EBCI)	Previous correspondence indicates this tribe has no interest in the area around Seymour Johnson AFB.	See email dated 17 April 2014.	Not applicable. No follow-up necessary.

Table A-1. Tribal Consultation (Continued)

Tribe	Summary Response	Initial Notification and Section 106 Letter	Follow-Up Correspondence (email/phone calls)
Tinker AFB			
Muscogee (Creek) Nation	No Response.	28 March 2016	Phone call on 3 May 2016, 20 May 2016.[a]
Osage Nation	Letter dated 20 May 2016 from the Osage Nation THPO stating no concerns; however, if something is discovered during construction, they want to be notified.	28 March 2016	Phone call on 3 May 2016, 20 May 2016.[a]
The Caddo Nation	No Response.	28 March 2016	Phone call on 3 May 2016, 20 May 2016.[a]
Seminole Nation of Oklahoma	Col Stephanie Wilson met with Chief Harjo on 5 August 2016. Although Chief Harjo was interested in small business opportunities for the Seminole Nation of Oklahoma, he had no comments or concerns specific to the proposed KC-46A MOB 3 mission.	28 March 2016	Phone call on 3 May 2016; 5 August 2016.[a]
Wichita and Affiliated Tribes	No Response.	28 March 2016	Phone call on 3 May 2016, 20 May 2016.[a]
Westover ARB			
Narragansett Indian Tribe of Rhode Island	Expressed no interest in G2G consultation, and had no comments regarding proposed KC-46A MOB 3 beddown.	1 April 2016	Phone call on 2 May 2016.[a]
Mashpee Wampanoag Indian Tribal Council	Expressed no interest in G2G consultation, and had no comments regarding proposed KC-46A MOB 3 beddown.	1 April 2016	Phone call on 2 May 2016.[a]
Wampanoag Tribe of Gay Head (Aquinnah) of Massachusetts	Expressed no interest in G2G consultation, and had no comments regarding proposed KC-46A MOB 3 beddown.	1 April 2016	Phone call on 2 May 2016.[a]
Mashantucket Pequot Tribe	Expressed no interest in G2G consultation, and had no comments regarding proposed KC-46A MOB 3 beddown.	1 April 2016	Phone call on 2 May 2012.[a]
Stockbridge Munsee Band of Mohican Tribe	THPO submitted Section106 response form on 9 May 2016. Expressed no interest in G2G consultation, and had no comments regarding proposed KC-46A MOB 3 beddown.	1 April 2016	Phone call on 2 May 2016, and email on 9 May 2016.[a]

[a] No further response was received, and consultation was deemed complete.

A.3.1 Tribal Consultation and Notification Letters

A.3.1.1 Grissom ARB Tribal Consultation and Notification Letter (Example)

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

28 March 2016

Colonel Douglas J. Schwartz, USAFR
Commander
434th Air Refueling Wing
7207 South Grissom Street
Grissom Air Reserve Base, Indiana 46971-1609

Chairman Lester Randall
Kickapoo Tribe in Kansas
1107 Goldfinch Road
Horton, Kansas 66439

Dear Chairman Randall

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Kickapoo Tribe in Kansas may have an interest; and to invite the Kickapoo Tribe in Kansas to participate in government-to-government consultation with Grissom ARB pursuant to Section 106 of the National Historic Preservation Act. [1]

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base (MOB 3). This EIS will, as required by law and regulations, [2] consider the potential impacts resulting from basing 12 KC-46A aircraft (and related construction, demolition, and renovation of facilities) at a USAF installation within the continental United States (CONUS) operated by the Air Force Reserve Command (AFRC). The USAF has identified Seymour Johnson Air Force Base (AFB) as the preferred alternative. Grissom Air Reserve Base (ARB), Tinker AFB, Westover ARB, and the No Action Alternative will be evaluated as alternatives.

If Grissom ARB is selected for the KC-46A MOB 3 mission, 12 KC-46A aircraft would replace the existing 16 KC-135 aircraft. The KC-46A would operate in existing airspace and the types of flight operations would be similar to existing KC-135 operations. The KC-46A would use existing KC-135 air refueling tracks and fuel jettison areas, if necessary. The elevation of the current air refueling tracks for the KC-135 vary but are generally at elevations of 14,000 to 24,000 feet above ground level. Preliminary analysis indicates that noise levels from these operations would be similar to noise levels associated with the current KC-135 mission. Therefore, the area of potential effect (APE) for this action will be limited to the areas of construction, demolition, and renovation on Grissom ARB. Additional information can be found on the project website at www.kc-46A-beddown.com.

Please let me know whether the Kickapoo Tribe in Kansas desires to participate in the development of this NEPA analysis, or to engage in government-to-government consultation. Grissom ARB does not know of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of which we may be unaware, particularly those that may be affected by this proposal.

My staff will be contacting your office by telephone to discuss the KC-46A MOB 3 project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Jeff Woodring, Grissom ARB, Chief Environmental Flight, jeffrey.woodring@us.af.mil, (765) 688-4561. For matters related to government-to-government consultation, you may contact me directly at (765) 688-4340.

Please take this opportunity to complete attachment 4, which can be filled out to identify the Tribe's interest in consulting about the proposal and to facilitate further communication on the matter. Upon completion, please return attachment 4 to us in the stamped and self-addressed envelope. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

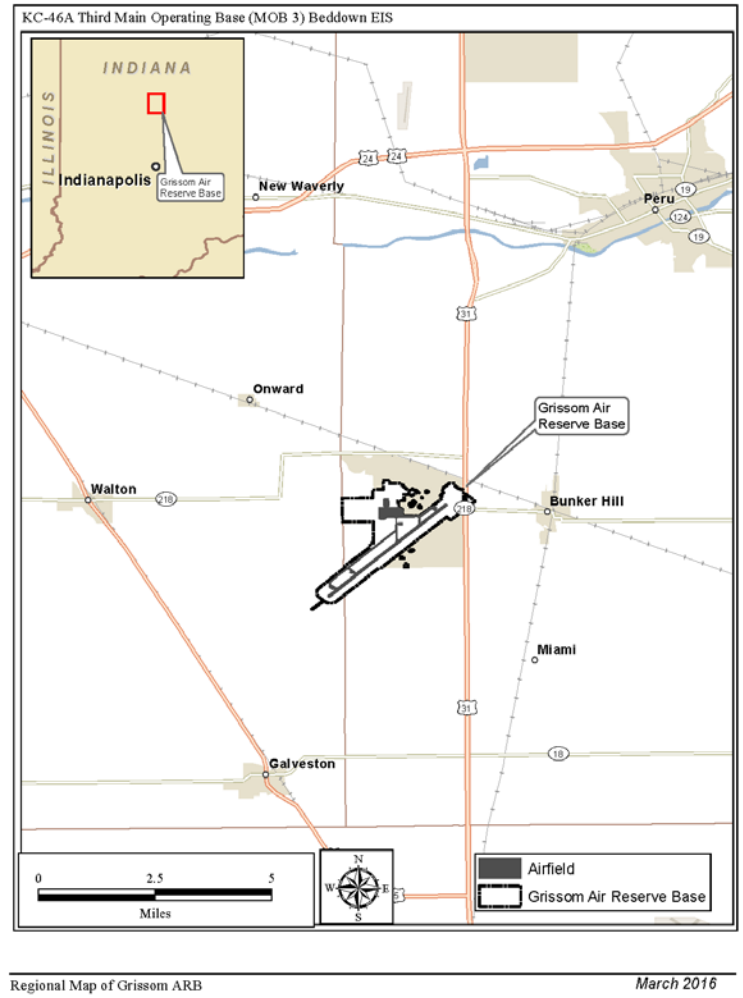
DOUGLAS J. SCHWARTZ, Colonel, USAFR
Commander

5 Attachments
1. KC-46A MOB 3 EIS Scoping Brochure
2. Regional Location Map Grissom ARB
3. APE Grissom ARB
4. Response Endorsement and Preferences Form
5. Stamped, addressed return envelope

[1] 54 U.S.C. § 306108, as implemented by 36 CFR Part 800.
[2] National Environmental Policy Act (NEPA) of 1969 [42USC 4321 *et seq.*]; Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA 40 CFR Parts 1500-1508; and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process* (32 CFR Part 989).

A.3.1.1 Grissom ARB Tribal Consultation and Notification Letter (Example) (Continued)

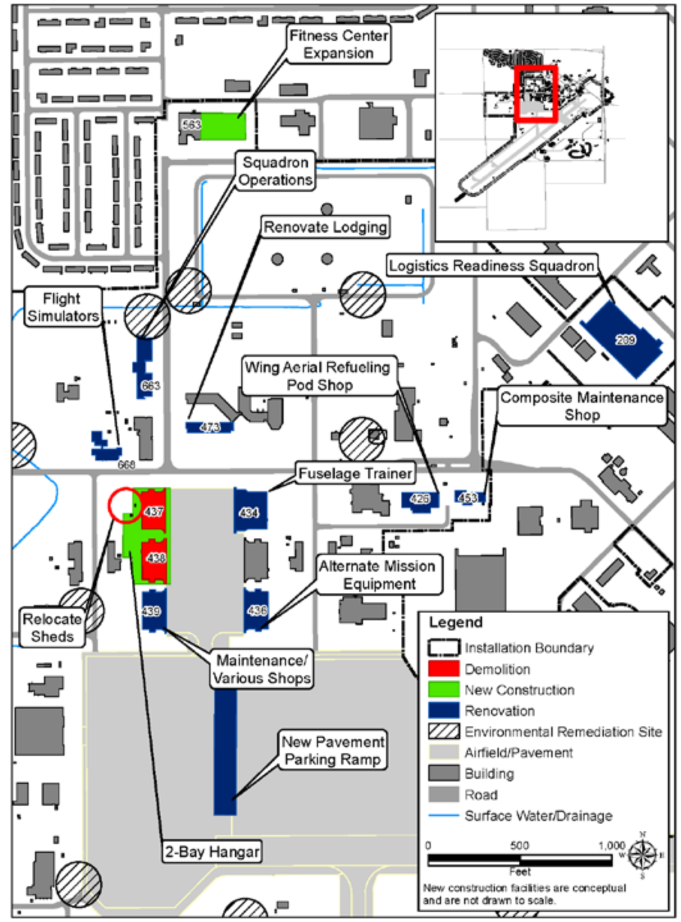
ATTACHMENT 2. REGIONAL LOCATION MAP GRISSOM ARB



A.3.1.1 Grissom ARB Tribal Consultation and Notification Letter (Example) (Continued)

ATTACHMENT 3. AREA OF POTENTIAL EFFECT GRISSOM ARB

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



The APE for this project is proposed as the construction footprints for the facilities shown above.

Facilities and Infrastructure Projects for the KC-46A MOB 3 at Grissom ARB *March 2016*

A.3.1.1 Grissom ARB Tribal Consultation and Notification Letter (Example) (Continued)

ATTACHMENT 4. RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR GRISSOM ARB

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR GRISSOM ARB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to jeffrey.woodring@us.af.mil:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

_____ Meeting with the Air Force at a tribal facility.

_____ Communicating with the Air Force by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

______________________________ Telephone: ______________
Printed Name and Title

Please print email address: ________________________

Signed: ______________________________ Date: ______________

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:

Please mail response in provided postpaid envelope to:

Colonel Douglas J. Schwartz
KC-46A MOB 3 EIS
Grissom Air Reserve Base
7207 South Grissom Street
Grissom ARB, IN 46971-1609
Or e-mail: jeffrey.woodring@us.af.mil

A.3.1.2 Seymour Johnson AFB Tribal Consultation and Notification Letter (Example)

The Eastern Band of the Cherokee Indians has indicated that they have no interests in projects in Wayne County, North Carolina (see letter below).

From: CHASTAIN, WILLIAM D GS-12 USAF ACC 4 CES/CEIE
To: PESENTI, CATHRYN M GS-11 USAF ACC 4 CES/CEIEA
Subject: FW: EBCI North Carolina counties of interest
Date: Thursday, April 17, 2014 10:25:57 AM
Attachments: THPO Counties.docx

FYI

W. Dean Chastain, P.E.
Environmental Element Chief
4 CES/CEIE
DSN 722- 5168/COMM (919) 722-5168

-----Original Message-----
From: Yolanda Saunooke [mailto:yolasaun@nc-cherokee.com]
Sent: Thursday, April 10, 2014 8:14 AM
To: CHASTAIN, WILLIAM D GS-12 USAF ACC 4 CES/CEIE
Subject: RE: EBCI North Carolina counties of interest

Here you go. Have a good day.

-----Original Message-----
From: CHASTAIN, WILLIAM D GS-12 USAF ACC 4 CES/CEIE [mailto:william.chastain@us.af.mil]
Sent: Wednesday, April 09, 2014 11:39 AM
To: Yolanda Saunooke
Subject: EBCI North Carolina counties of interest

Ms. Saunooke,
Thank you for returning my call, and confirming that EBCI does not have interests in Dare County, NC. If you could provide a list of other North Carolina counties or areas that the EBCI does or does not have interests in, it would be greatly appreciated.

Again, thank you
W. Dean Chastain, P.E.
Environmental Element Leader
4 CES/CEIE
DSN 722- 5168/COMM (919) 722-5168

State and County Summary
Of the Cherokee Indians Traditional Aboriginal Territory

Based on the Map of the Former Territorial Limits of the Cherokee Nation of Indians Exhibiting the Boundaries of the Various Cessions of Land Made by Them to the Colonies and the United States by Treaty Stipulations, From the Beginning of Their Relations with the White to the Date of Their Removal West of the Mississippi River (Royce 1884)

ALABAMA	GEORGIA	NORTH CAROLINA	SOUTH CAROLINA	VIRGINIA	WEST VIRGINIA
Blount	Banks	Alleghany	Abbeville	Bland	Boone
Cherokee	Barrow	Ashe	Aiken	Buchanan	Cabell
Colbert	Bartow	Avery	Anderson	Carroll	Fayette
Cullman	Catoosa	Buncombe	Calhoun	Dickenson	Kanawha
De Kalb	Chattooga	Burke	Cherokee	Floyd	Lincoln
Etowah	Cherokee	Caldwell	Chester	Giles	Logan
Franklin	Clarke	Catawba	Edgefield	Grayson	Mason
Jackson	Cobb	Cherokee	Fairfield	Lee	McDowell
Lauderdale	Dade	Clay	Greenwood	Montgomery	Mercer
Lawrence	Dawson	Cleveland	Greenville	Pulaski	Mingo
Limestone	Elbert	Gaston	Kershaw	Russell	Monroe
Madison	Fannin	Graham	Lancaster	Scott	Putnam
Marion	Floyd	Haywood	Laurens	Smyth	Raleigh
Marshall	Forsyth	Henderson	Lexington	Tazewell	Summers
Morgan	Franklin	Jackson	McCormick	Washington	Wayne
St. Clair	Gilmer	Lincoln	Newberry	Wise	Wyoming
Winston	Gordon	Macon	Oconee	Wythe	
	Gwinnett	Madison	Orangeburg		
	Habersham	McDowell	Pickens		
	Hall	Mitchell	Richland		
	Hart	Polk	Saluda		
	Jackson	Rutherford	Spartanburg		
	Lumpkin	Swain	Union		
	Madison	Transylvania	York		
	Murray	Watauga			
	Oconee	Wilkes			
	Oglethorpe	Yancey			
	Paulding				
	Pickens				
	Polk				
	Rabun				
	Stephens				
	Towns				
	Union				
	Walker				
	White				
	Whitfield				

A.3.1.2 Seymour Johnson AFB Tribal Consultation and Notification Letter (Example) (Continued)

State and County Summary
Of the Cherokee Indians Traditional Aboriginal Territory

Based on the Map of the Former Territorial Limits of the Cherokee Nation of Indians Exhibiting the Boundaries of the Various Cessions of Land Made by Them to the Colonies and the United States by Treaty Stipulations, From the Beginning of Their Relations with the White to the Date of Their Removal West of the Mississippi River (Royce 1884)

Kentucky	Kentucky cont'd	Kentucky cont'd	Tennessee	Tennessee cont'd
Adair	Grayson	Mercer	Anderson	Lewis
Allen	Green	Metcalfe	Bedford	Loudon
Anderson	Greenup	Monroe	Bledsoe	Macon
Barren	Hancock	Montgomery	Blount	Marion
Bath	Hardin	Morgan	Bradley	Marshall
Bell	Harlan	Muhlenburg	Campbell	Maury
Boone	Harrison	Nelson	Cannon	McMinn
Bourbon	Hart	Nicholas	Carter	Meigs
Boyd	Henderson	Ohio	Cheatham	Monroe
Boyle	Henry	Oldham	Claiborne	Moore
Bracken	Hopkins	Owen	Clay	Morgan
Breathitt	Jackson	Owsley	Cocke	Montgomery
Breckinridge	Jefferson	Pendleton	Coffee	Overton
Bullitt	Jessamine	Perry	Cumberland	Perry
Butler	Johnson	Pike	Davidson	Pickett
Caldwell	Kenton	Powell	DeKalb	Polk
Campbell	Knott	Pulaski	Dickson	Putnam
Carroll	Knox	Robertson	Fentress	Rhea
Carter	Larue	Rockcastle	Franklin	Roane
Casey	Laurel	Rowan	Giles	Robertson
Christian	Lawrence	Russell	Grainger	Rutherford
Clark	Lee	Scott	Greene	Scott
Clay	Leslie	Shelby	Grundy	Sequatchie
Clinton	Letcher	Simpson	Hamblen	Sevier
Crittenden	Lewis	Spencer	Hamilton	Smith
Cumberland	Lincoln	Taylor	Hancock	Stewart
Daviess	Livingston	Todd	Hardin	Sullivan
Edmonson	Logan	Trigg	Hawkins	Sumner
Elliot	Lyon	Trimble	Hickman	Trousdale
Estill	McCreary	Union	Houston	Unicoi
Fayette	McLean	Warren	Humphreys	Union
Fleming	Madison	Washington	Jackson	Van Buren
Floyd	Magoffin	Wayne	Jefferson	Warren
Franklin	Marion	Webster	Johnson	Washington
Gallatin	Martin	Whitley	Knox	Wayne
Garrard	Mason	Wolfe	Lawrence	White
Grant	Meade	Woodford	Lincoln	Williamson
	Menifee			Wilson

A.3.1.3 Tinker AFB Tribal Consultation and Notification Letter (Example)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

MAR 2 8 2016

MEMORANDUM FOR PRESIDENT TERRY PARTON
WICHITA AND AFFILIATED TRIBES
1 ¼ MILES NORTH ON HIGHWAY 281
ANADARKO OKLAHOMA 73005

FROM: 72 ABW/CC
7460 Arnold Street, Suite 234
Tinker AFB OK 73145

SUBJECT: Introduction of the KC-46A MOB 3 Environmental Impact Statement and Section 106 Consultation Invitation for Tinker Air Force Base

1. The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Wichita and Affiliated Tribes of Oklahoma may have an interest; and to invite the Wichita and Affiliated Tribes of Oklahoma to participate in government-to-government consultation with Tinker AFB pursuant to Section 106 of the National Historic Preservation Act. [1]

2. The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base (MOB 3). This EIS will, as required by law and regulations, [2] consider the potential impacts resulting from basing 12 KC-46A aircraft (and related construction, demolition, and renovation of facilities) at a USAF installation within the continental United States (CONUS) operated by the Air Force Reserve Command (AFRC). The USAF has identified Seymour Johnson Air Force Base (AFB) as the preferred alternative. Grissom Air Reserve Base (ARB), Tinker AFB, Westover ARB, and the No Action Alternative will be evaluated as alternatives.

3. If Tinker AFB is selected for the KC-46A MOB 3 mission, 12 KC-46A aircraft would replace the existing 8 KC-135 aircraft. The KC-46A would operate in existing airspace and the types of flight operations would be similar to existing KC-135 operations. The KC-46A would use existing KC-135 air refueling tracks and fuel jettison areas, if necessary. The elevation of the current air refueling tracks for the KC-135 vary but are generally at elevations of 14,000 to 24,000 feet above ground level. Preliminary analysis indicates that noise levels from these operations would be similar to noise levels associated with the current KC-135 mission. Therefore, the area of potential effect (APE) for this action will be limited to the areas of construction, demolition, and renovation on Tinker AFB. Additional information can be found on the project website at www.kc-46A-beddown.com.

4. Please let me know whether the Wichita and Affiliated Tribes of Oklahoma desire to participate in the development of this NEPA analysis, or to engage in government-to-government consultation. Tinker AFB does not know of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of which we may be unaware, particularly those that may be affected by this proposal.

5. My staff will be contacting your office by telephone to discuss the KC-46A MOB 3 project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tim Taylor, Tinker AFB, Cultural Resources Manager, timothy.taylor.5@us.af.mil, at (405) 734-4579. For matters related to government-to-government consultation, you may contact me directly at (405) 734-2101.

6. Please take this opportunity to complete attachment 4, which can be filled out to identify the Tribe's interest in consulting about the proposal and to facilitate further communication on the matter. Upon completion, please return attachment 4 to us in the stamped and self-addressed envelope. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

Stephanie

STEPHANIE P. WILSON, Colonel, USAF
Commander

5 Attachments:
1. KC-46A MOB 3 EIS Scoping Brochure
2. Regional Location Map Tinker AFB
3. APE Tinker AFB
4. Response Endorsement and Preferences Form
5. Stamped, addressed return envelope

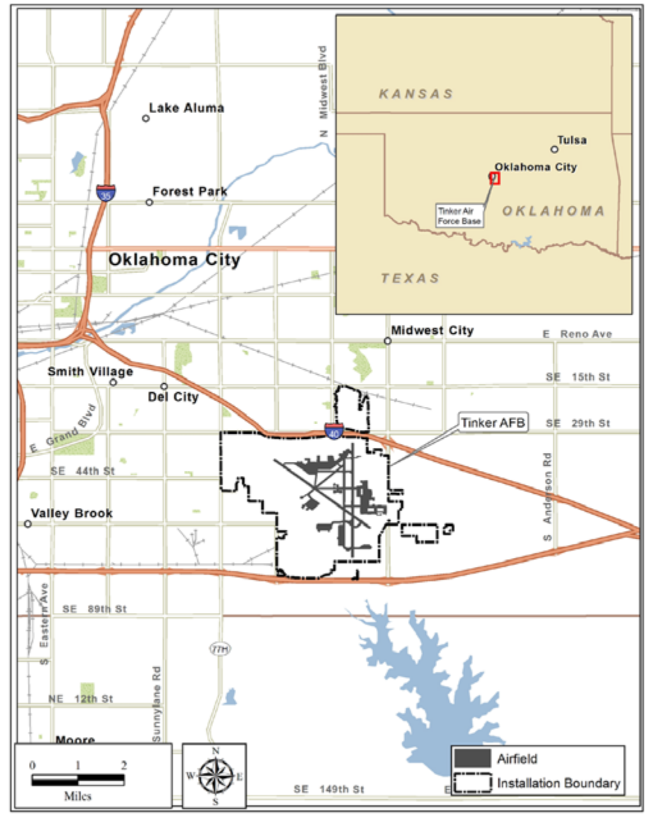
[1] 54 U.S.C. § 306108, as implemented by 36 CFR Part 800.
[2] National Environmental Policy Act (NEPA) of 1969 [42USC 4321 *et seq.*]; Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA 40 CFR Parts 1500-1508; and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process* (32 CFR Part 989),

A.3.1.3 Tinker AFB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
72D Air Base Wing (AFMC)
Tinker Air Force Base Oklahoma

ATTACHMENT 2. REGIONAL LOCATION MAP TINKER AFB

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



Regional Location of Tinker AFB, Oklahoma

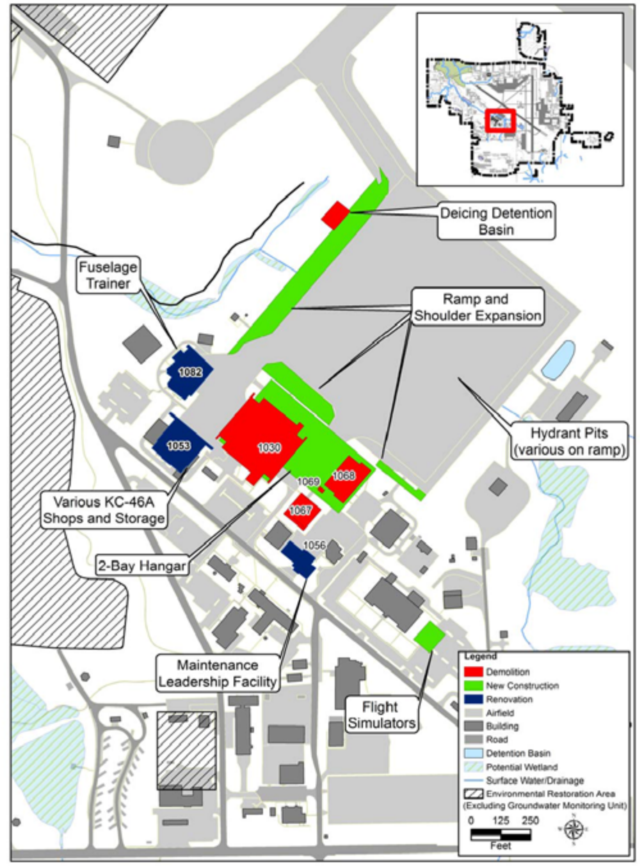
March 2016

A.3.1.3 Tinker AFB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
72D Air Base Wing (AFMC)
Tinker Air Force Base Oklahoma

ATTACHMENT 3. AREA OF POTENTIAL EFFECT TINKER AFB

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



The APE for this project is proposed as the construction footprints for the facilities shown above.

Facilities and Infrastructure Projects for the KC 46A MOB 3 at Tinker AFB *March 2016*

A.3.1.3 Tinker AFB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
72D Air Base Wing (AFMC)
Tinker Air Force Base Oklahoma

ATTACHMENT 4. RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR TINKER AFB

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR TINKER AFB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to timothy.taylor.5@us.af.mil:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

Meeting with the Air Force at a tribal facility.

Communicating with the Air Force by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

______________________________ Telephone: ______________
Printed Name and Title

Please print email address:

Signed: ______________________________ Date: ______________

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:

Please mail response in provided postpaid envelope to:

Colonel Stephanie Wilson
KC-46A MOB 3 EIS
Tinker Air Force Base
7535 5th Street
Tinker AFB Oklahoma 73145-9100

Or, e-mail to: timothy.taylor.5@us.af.mil

A.3.1.4 Westover ARB Tribal Consultation and Notification Letter (Example)

DEPARTMENT OF THE AIR FORCE
439TH AIRLIFT WING (AFRC)

April 1, 2016

Colonel Jay D. Jensen
Commander, 439th Airlift Wing
975 Patriot Avenue
Westover ARB, MA 01022

Mr. Rodney A. Butler, Tribal Council Chairman
Mashantucket Pequot Tribal Nation
2 Matts Path
PO Box 3060
Mashantucket, CT 06338-3060

Dear Mr. Butler,

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Mashantucket Pequot Tribal Nation may have an interest; and to invite the Mashantucket Pequot Tribal Nation to participate in government-to-government consultation with Westover ARB pursuant to Section 106 of the National Historic Preservation Act[1].

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base (MOB 3). This EIS will, as required by law and regulations[2], consider the potential impacts resulting from basing 12 KC-46A aircraft (and related construction, demolition, and renovation of facilities) at a USAF installation within the continental United States (CONUS) operated by the Air Force Reserve Command (AFRC). The USAF has identified Seymour Johnson Air Force Base (AFB) as the preferred alternative. Grissom Air Reserve Base (ARB), Tinker AFB, Westover ARB, and the No Action Alternative will be evaluated as alternatives.

If Westover ARB is selected for the KC-46A MOB 3 mission, 12 KC-46A aircraft would be based at Westover ARB. The KC-46A would operate in existing airspace and the types of flight operations would be similar to existing C-5 operations. The KC-46A would use existing KC-135 air refueling tracks and fuel jettison areas, if necessary. The elevation of the current air refueling tracks for the KC-135 vary but are generally at elevations of 14,000 to 24,000 feet above ground level. Preliminary analysis indicates that noise levels from these operations would be similar to noise levels associated with the current C-5 mission. Therefore, the area of potential effect (APE) for this action will be limited to the areas of construction, demolition, and renovation on Westover ARB. Additional information can be found on the project website at www.kc-46A-beddown.com.

Please let me know whether the Mashantucket Pequot Tribal Nation desires to participate in the development of this NEPA analysis, or to engage in government-to-government consultation. Westover ARB does not know of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of which we may be unaware, particularly those that may be affected by this proposal.

My staff will be contacting your office by telephone to discuss the KC-46A MOB 3 project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Jack Moriarty, Westover ARB Environmental Manager, (413) 557-2434, john.moriarty.1@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at (413) 557-3588.

Please take this opportunity to complete attachment 4, which can be filled out to identify the Tribe's interest in consulting about the proposal and to facilitate further communication on the matter. Upon completion, please return attachment 4 to us in the stamped and self-addressed envelope. I look forward to receiving any input you may have regarding this endeavor.

Sincerely,

JAY D. JENSEN, Colonel, USAFR
Commander

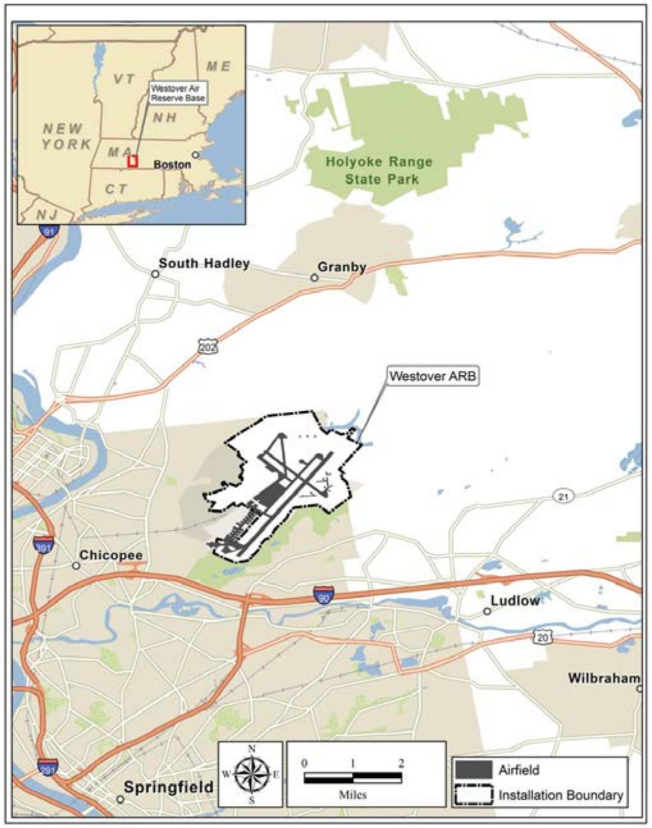
5 Attachments:
1. KC-46A MOB 3 EIS Scoping Brochure
2. Regional Location Map Westover ARB
3. APE Westover ARB
4. Response Endorsement and Preferences Form
5. Stamped, addressed return envelope

[1] 54 U.S.C. § 306108, as implemented by 36 CFR Part 800.
[2] National Environmental Policy Act (NEPA) of 1969 [42USC 4321 *et seq.*], Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA 40 CFR Parts 1500-1508; and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process* (32 CFR Part 989)

A.3.1.4 Westover ARB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 2. REGIONAL LOCATION MAP WESTOVER ARB



Regional Map of Westover ARB, Massachusetts

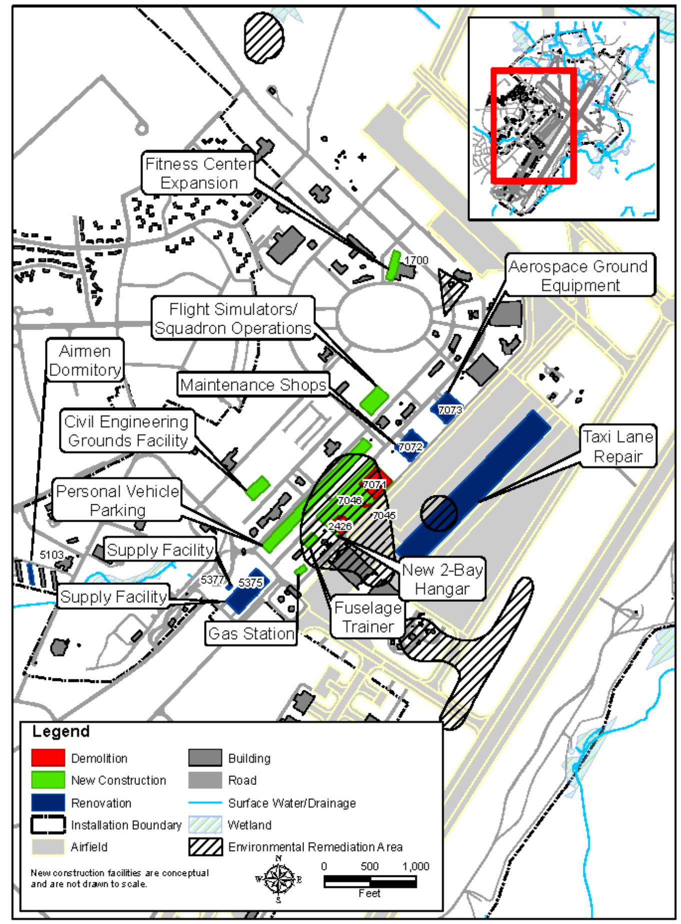
March 2016

A.3.1.4 Westover ARB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 3. AREA OF POTENTIAL EFFECT WESTOVER ARB

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



The APE for this project is proposed as the construction footprints for the facilities shown above.

Facilities and Infrastructure Projects for the KC 46A MOB 3 at Westover ARB *March 2016*

A.3.1.4 Westover ARB Tribal Consultation and Notification Letter (Example) (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 4. RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR WESTOVER ARB

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR WESTOVER ARB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to john.moriarty.1@us.af.mil:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

_____ Meeting with the Air Force at a tribal facility.

_____ Communicating with the Air Force by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

________________________________ Telephone: ______________
Printed Name and Title

Please print email address: ______________________

Signed: ______________________________ Date: ______________

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:

____

____

____

____

____

Please mail response in provided postpaid envelope to:

Brig. General Al Lupenski
KC-46A MOB 3 EIS
Westover Air Reserve Base
250 Patriot Avenue
Westover ARB, MA 01022
Or, e-mail to: john.moriarty.1@us.af.mil

A.3.2 Tribal Consultation and Notification Mailing Lists

A.3.2.1 Grissom ARB Tribal Consultation and Notification Mailing List

Salutation	First Name	Last Name	Tribe	City	State	Zip
Chairman	John “Rocky”	Barrett	Citizen Potawatomi Nation	Shawnee	Oklahoma	74801
Chairman	Harold “Gus”	Frank	Forest County Potawatomi	Crandon	Wisconsin	54520
Chairperson	Kenneth	Meshigaud	Hannahville Indian Community	Wilson	Michigan	49896
Chairman	Lester	Randall	Kickapoo Tribe in Kansas	Horton	Kansas	66439
Chairman	David	Pacheco, Jr.	Kickapoo Tribe of Oklahoma	McLoud	Oklahoma	74851
Chief	Douglas G.	Lankford	Miami Tribe of Oklahoma	Miami	Oklahoma	74354
Chief	John P.	Froman	Peoria Tribe of Indians of Oklahoma	Miami	Oklahoma	74354
Chairman	John	Warren	Pokagon Band of Potawatomi Indians	Dowagiac	Michigan	49047
Chairperson	Liana	Onnen	Prairie Band of Potawatomi Nation	Mayetta	Kansas	66509
Principal Chief	Geoffrey	Standing Bear	Osage Nation	Pawhuska	Oklahoma	74056

A.3.2.2 Seymour Johnson AFB Tribal Consultation and Notification Mailing List

The Eastern Band of the Cherokee Indians has indicated that they have no interests in projects in Wayne County, North Carolina (see section A.3.1.2).

A.3.2.3 Tinker AFB Tribal Consultation and Notification Mailing List

Salutation	First Name	Last Name	Tribe	City	State	Zip
President	Terry	Parton	Wichita and Affiliated Tribes	Anadarko	Oklahoma	73005
Attn	Emman	Spain	Muscogee (Creek) Nation	Okmulgee	Oklahoma	74447
Dr.	Andrea A.	Hunter	The Osage Nation	Pawhuska	Oklahoma	74056
Chief	Leonard M.	Harjo	Seminole Nation of Oklahoma	Wewoka	Oklahoma	74884
Chairman	Tamara	Francis-Fourkiller	The Caddo Nation	Binger	Oklahoma	73009

A.3.2.4 Westover ARB Tribal Consultation and Notification Mailing List

Salutation	First Name	Last Name	Tribe	City	State	Zip
Chairman	Rodney A.	Butler	Mashantucket Pequot Tribal Nation	Mashantucket	Connecticut	06338-3060
Chief		Silent Drum	Mashpee Wampanoag Tribe	Mashpee	Massachusetts	02649
Chief	Sachem Matthew	Thomas	Narragansett Indian Tribe of Rhode Island			
President	Shannon	Holsey	Stockbridge-Munsee Band of Mohican Tribe	Bowler	Wisconsin	54416
Chief	F. Ryan	Malonson	Wampanoag Tribe of Gay Head	Aquinnah	Massachusetts	02535-1546

A.3.3 Tribal Consultation and Notification Responses

A.3.3.1 Grissom ARB Tribal Consultation and Notification Responses

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR GRISSOM ARB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to jeffrey.woodring@us.af.mil:

_X_ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

_____ Meeting with the Air Force at a tribal facility.

_____ Communicating with the Air Force by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

____________________ Telephone: __________

Printed Name and Title

Please print email address: andrew.gourd@potawatomi.org

Signed: Andrew [signature] Date: 4-1-16

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:
CPN has historic ties to the geographic region described in your letter dated 3-28-16. At this time we know of no sites related to CPN history that will fall in the API. However we note former Kickapoo, Delaware and Miami Villages in the general vicinity and defer opinions to those who are descendants of those Nations. Thank you for your time.

Please mail response in provided postpaid envelope to:

Colonel Douglas J. Schwartz
KC-46A MOB 3 EIS
Grissom Air Reserve Base
7207 South Grissom Street
Grissom ARB, IN 46971-1609
Or e-mail: jeffrey.woodring@us.af.mil

WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV

From:	Diane Hunter <dhunter@miamination.com>
Sent:	Tuesday, April 19, 2016 10:38 AM
To:	WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV
Subject:	Grissom ARB consultation
Attachments:	IN Grissom ARB consultation response.pdf

Dear Mr. Woodring:

Aya, kikwehsitoole. My name is Diane Hunter, and I am the Acting Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Tribe's point of contact for all Section 106 issues.

The Miami Tribe accepts the invitation to serve as a consulting party to the above-mentioned project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for consultation. I have attached your consultation response form to this email.

The Miami Tribe offers no objection to the proposed project at this time, as we are not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the project site. However, as this site is within the aboriginal homelands of the Miami Tribe and due to the site's location near an existing historically important site, we request a copy of all archaeological surveys performed as the project moves forward. Please mail all documentation to the address listed below or email to dhunter@miamination.com <mailto:dhunter@miamination.com> .

If any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966, by email atdhunter@miamination.com <mailto:dhunter@miamination.com> , or by mail at the address listed below.

Sincerely,

Diane Hunter
Acting Tribal Historic Preservation Officer Miami Tribe of Oklahoma P.O. Box 1326 Miami, OK 74355
dhunter@miamination.com <mailto:dhunter@miamination.com>
918-541-8966

A.3.3.1 Grissom ARB Tribal Consultation and Notification Responses (Continued)

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR GRISSOM ARB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to jeffrey.woodring@us.af.mil:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

✓ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

_____ Meeting with the Air Force at a tribal facility.

_____ Communicating with the Air Force by scheduled teleconference.

✓ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

Diane Hunter, Tribal Historic Preservation Officer Telephone: 918-541-8966
Printed Name and Title

Please print email address: dhunter@miamination.com

Signed: Diane Hunter Date: 4-19-2016

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:
See email to which this is attached.

Please mail response in provided postpaid envelope to:

Colonel Douglas J. Schwartz
KC-46A MOB 3 EIS
Grissom Air Reserve Base
7207 South Grissom Street
Grissom ARB, IN 46971-1609
Or e-mail: jeffrey.woodring@us.af.mil

-----Original Message-----
From: Jason S. Wesaw - THPO [mailto:Jason.Wesaw@pokagonband-nsn.gov]
Sent: Wednesday, May 18, 2016 12:33 PM
To: WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV
<jeffrey.woodring@us.af.mil>
Subject: Pokagon THPO

Hi Jeffrey,

As of April 4, 2016 I assumed the position of Tribal Historic Preservation Officer from Marcus Winchester. I'm happy to assist in every way possible. I am not familiar with this consultation, but have a backlog of requests that I am working through since starting. So, I just may not have come across this paperwork or email thread yet. If there is anything you can provide me at your convenience to assist with this request, I would appreciate it. Feel free to contact me directly with any additional questions or concerns.

Thank you,

Jason S Wesaw
Tribal Historic Preservation Officer
(269) 462-4316 desk | (269) 783-9041 mobile
Pokegnek Bodewadmik
Pokagon Band of Potawatomi
www.PokagonBand-nsn.gov <http://www.pokagonband-nsn.gov/>

A.3.3.1 Grissom ARB Tribal Consultation and Notification Responses (Continued)

Subject: FW: Section 106 Consultation for KC-46A MOB3

-----Original Message-----
From: Andrea Hunter [mailto:ahunter@osagenation-nsn.gov]
Sent: Friday, May 20, 2016 9:40 AM
To: WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV <jeffrey.woodring@us.af.mil>
Subject: RE: Section 106 Consultation for KC-46A MOB3

Mr. Woodring,
Yes, the Osage Nation is going to participate in the consultation process for the beddown of the KC-46A tanker at a Third Main Operating Base (MOB3), Grissom Air Reserve Base. We will locate the notification documentation sent and provide a response.

Thank you,

Dr. Andrea A. Hunter
Director/THPO
Osage Nation Historic Preservation Office
627 Grandview Avenue
Pawhuska, OK 74056

Office Phone: (918) 287-5328
Office Fax: (918) 287-5376

-----Original Message-----
From: WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV [mailto:jeffrey.woodring@us.af.mil]
Sent: Wednesday, May 18, 2016 11:53 AM
To: Andrea Hunter
Subject: Section 106 Consultation for KC-46A MOB3

Dr. Hunter

I'm following up on the 28 Mar 2016 letter from my Commander concerning the government-to-government consultation process for Section 106 of the National Historic Preservation Act. His letter invited The Osage Nation to participate in the consultation process concerning the beddown of the KC-46A tanker at a Third Main Operating Base (MOB3). Grissom Air Reserve Base is one of the four potential locations.

As of this date, we have not received a response from The Osage Nation and I am wondering if you intend to participate in the government-to-government consultation process for this action.

Thank you
Jeffrey A. Woodring, GS-12, P.E.
Chief, Environmental Flight
434 MSG/CEV
7104 S. Warthog Street
Grissom ARB, IN 46971-1632

DSN 388-4561 Comm 765-688-4561
Fax DSN 388-4541 Comm 765-688-4541

1

Subject: FW: KC-46A Tanker Aircraft EIS
Attachments: 1516-1808OK-4 Grissom No Properties.pdf

-----Original Message-----
From: Jacqueline Rodgers [mailto:jrodgers@osagenation-nsn.gov]
Sent: Friday, May 20, 2016 5:41 PM
To: WOODRING, JEFFREY A GS-12 USAF AFRC 434 MSG/CEV <jeffrey.woodring@us.af.mil>
Subject: KC-46A Tanker Aircraft EIS

Dear Mr. Woodring,

Please find attached our office's response to the project titled EIS to assess beddown of KC-46A tanker aircraft at a third main operating base. I have also mailed a hard copy for your files.

Thank you for consulting with the Osage Nation on this project.

Sincerely,

Jackie Rodgers
Archaeologist, RPA

Osage Nation Historic Preservation Office

627 Grandview Avenue, Pawhuska, OK 74056

Office: 918-287-5494

jrodgers@osagenation-nsn.gov <mailto:jrodgers@osagenation-nsn.gov>

1

A.3.3.1 Grissom ARB Tribal Consultation and Notification Responses (Continued)

SEAL OF OSAGE NATION ®

TRIBAL HISTORIC PRESERVATION OFFICE

Date: **May 20, 2016** **File: 1516-1808OK-4**

RE: **DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmential consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma**

Department Of The Air Force
Douglas J Schwartz
7207 South Grissom
Grissom Air Reserve Base, Indiana 46971-1606

Dear Mr. Grissom,

The Osage Nation Historic Preservation Office has evaluated your submission regarding the proposed DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmental consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma and determined that the proposed project **most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation.** For direct effect, the finding of this NHPA Section 106 review is a determination of **"No Properties"** eligible or potentially eligible for the National Register of Historic Places.

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the Department of Defense fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed project referenced as DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmental consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma .**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

John Fox for: Andrea A. Hunter
Andrea A. Hunter, Ph.D.
Director, Tribal Historic Preservation Officer

Jackie Rodgers
Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376

A.3.3.2 Seymour Johnson AFB Tribal Consultation and Notification Responses

The Eastern Band of the Cherokee Indians has indicated that they have no interests in projects in Wayne County, North Carolina (see Section A.3.1.2).

A.3.3.3 Tinker AFB Tribal Consultation and Notification Responses

SEAL OF OSAGE NATION ®

TRIBAL HISTORIC PRESERVATION OFFICE

Date: May 20, 2016 **File: 1516-1808OK-4**

RE: DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmential consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma

Department Of The Air Force
Tim Taylor
7460 Arnold Street, Suite 234
Tinker AFB, OK 73145

Dear Mr. Taylor,

The Osage Nation Historic Preservation Office has evaluated your submission regarding the proposed DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmential consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma and determined that the proposed project **most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation.** For direct effect, the finding of this NHPA Section 106 review is a determination of **"No Properties"** eligible or potentially eligible for the National Register of Historic Places.

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the Department of Defense fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed project referenced as DoD, Department of the Air Force, Environmental Impact Statement to asses the potential environmential consequences associated with the beddown of KC-46A tanker aircraft at a Third Main Operating Base, Tinker Air Force Base, Oklahoma .**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

for: Andrea A. Hunter

Andrea A. Hunter, Ph.D.
Director, Tribal Historic Preservation Officer

Jackie Rodgers
Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376

A.3.3.4 Westover ARB Tribal Consultation and Notification Responses

SECTION 106 CONSULTATION RESPONSE ENDORSEMENT AND PREFERENCES FORM FOR WESTOVER ARB

Project Name: KC-46A Third Main Operating Base Beddown Environmental Impact Statement (KC-46A MOB 3 EIS)

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments. You may also respond via e-mail to john.moriarty.1@us.af.mil:

X We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

____ Meeting with the Air Force at a tribal facility.

____ Communicating with the Air Force by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name and Title of designated contact for this proposed project:

Bonney Hartley, THPO, Stockbridge Munsee Mohican Tribe — Telephone: 518-244-3164

Printed Name and Title

Please print email address: bonney.hartley@mohican-nsn.gov

Signed: B Hartley Date: 5/9/16

Please explain your reason for interest in the KC-46A MOB 3 EIS's Potential Effects on Cultural Resources:

Please mail response in provided postpaid envelope to:

Colonel Jay D. Jensen
KC-46A MOB 3 EIS
Westover Air Reserve Base
250 Patriot Avenue
Westover ARB, MA 01022
Or, e-mail to: john.moriarty.1@us.af.mil

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 MAY 2016

MEMORANDUM FOR THE RECORD

FROM: Westover ARB, 439 MSG/CEV

SUBJECT: Documentation of Tribal outreach as part of KC-46A EIAP and G2G consultation effort – Stockbridge-Munsee Band of Mohicans

1. In accordance with AFI 90-2002 *Interactions with Federally Recognized Tribes,* and the Air Force Environmental Impact Analysis Process (EIAP), correspondence was submitted to all known federally recognized tribes in the geographic area of operations for Westover Air Reserve Base inviting government-to-government consultation and solicitation of comments regarding the proposed beddown of KC-46A aircraft.

2. A phone call was placed to the office of Shannon Holsey, Tribal President of the Stockbridge-Munsee Band of Mohicans on May 2, 2016. I spoke with Ms. Cheri Bruegl of the tribal Public Relations Council. Ms. Bruegl informed me that I must contact the Historic Preservation Officer, Ms. Bonney Hartley, in the New York regional office. An email was sent to Ms. Hartley on May 9, 2012. A response was received on May 9, 2012 from Ms. Hartley indicating the tribe had no interest in G2G consultation and had no comments regarding the proposed KC-46A beddown at Westover ARB. Ms. Hartley also emailed a completed "Section 106 Consultation Response Endorsement and Preferences Form", indicating no tribal impacts are anticipated from the proposed KC-46A beddown.

Anthony Zaharias
Natural & Cultural Resources Manager
439 MSG/CEV
240 Patriot Ave, Box 35
Westover ARB, MA 01022
PH: 413-557-2436

A.3.3.4 Westover ARB Tribal Consultation and Notification Responses (Continued)

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 MAY 2016

MEMORANDUM FOR THE RECORD

FROM: Westover ARB, 439 MSG/CEV

SUBJECT: Documentation of Tribal outreach as part of KC-46A EIAP and G2G consultation effort – Mashantucket Pequot Tribal Nation

1. In accordance with AFI 90-2002 *Interactions with Federally Recognized Tribes,* and the Air Force Environmental Impact Analysis Process (EIAP), correspondence was submitted to all known federally recognized tribes in the geographic area of operations for Westover Air Reserve Base inviting government-to-government (G2G) consultation and solicitation of comments regarding the proposed beddown of KC-46A aircraft.

2. A phone call was placed to the office of the Mashantucket Pequot Tribal Nation Council Chairman, Mr. Rodney Butler, on May 2, 2016. I spoke with the Executive Assistant to Mr. Butler who referred me to the tribal Regulatory Affairs office. Mr. Daniel Menihan, the Chair of the Historical and Cultural Preservation office, indicated the tribe had no interest in G2G consultation and had no comments regarding the proposed KC-46A beddown at Westover ARB.

Anthony Zaharias
Natural & Cultural Resources Manager
439 MSG/CEV
240 Patriot Ave, Box 35
Westover ARB, MA 01022
PH: 413-557-2436

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 MAY 2016

MEMORANDUM FOR THE RECORD

FROM: Westover ARB, 439 MSG/CEV

SUBJECT: Documentation of Tribal outreach as part of KC-46A EIAP and G2G consultation effort – Mashpee Wampanoag Tribe

1. In accordance with AFI 90-2002 *Interactions with Federally Recognized Tribes,* and the Air Force Environmental Impact Analysis Process (EIAP), correspondence was submitted to all known federally recognized tribes in the geographic area of operations for Westover Air Reserve Base inviting government-to-government consultation (G2G) and solicitation of comments regarding the proposed beddown of KC-46A aircraft.

2. A phone call was placed to the office of the Mashpee Wampanoag tribal Chief Silent Drum (Vernon Lopez) on May 2, 2016. There was no answer at the phone number provided for Mr. Lopez. I spoke with Casey Thornbrugh, the Director of Natural Resources, who indicated the tribe had no interest in G2G consultation and had no comments regarding the proposed KC-46A beddown at Westover ARB.

Anthony Zaharias
Natural & Cultural Resources Manager
439 MSG/CEV
240 Patriot Ave, Box 35
Westover ARB, MA 01022
PH: 413-557-2436

A.3.3.4 Westover ARB Tribal Consultation and Notification Responses (Continued)

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 MAY 2016

MEMORANDUM FOR THE RECORD

FROM: Westover ARB, 439 MSG/CEV

SUBJECT: Documentation of Tribal outreach as part of KC-46A EIAP and G2G consultation effort – Narragansett Indian Tribe of Rhode Island

1. In accordance with AFI 90-2002 *Interactions with Federally Recognized Tribes,* and the Air Force Environmental Impact Analysis Process (EIAP), correspondence was submitted to all known federally recognized tribes in the geographic area of operations for Westover Air Reserve Base inviting government-to-government (G2G) consultation and solicitation of comments regarding the proposed beddown of KC-46A aircraft.

2. A phone call was placed to the office of Narragansett Indian tribal Chief Sachem on May 2, 2016. I spoke with Tamara Calhoun, Executive Assistant to Chief Sachem. Ms. Calhoun told me I must speak with Mr. John Brown, the Tribal Historic Preservation Officer. Mr. Brown indicated the tribe had no interest in G2G consultation and had no comments regarding the proposed KC-46A beddown at Westover ARB.

Anthony Zaharias
Natural & Cultural Resources Manager
439 MSG/CEV
240 Patriot Ave, Box 35
Westover ARB, MA 01022
PH: 413-557-2436

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 MAY 2016

MEMORANDUM FOR THE RECORD

FROM: Westover ARB, 439 MSG/CEV

SUBJECT: Documentation of Tribal outreach as part of KC-46A EIAP and G2G consultation effort – Wampanoag Tribe of Gay Head

1. In accordance with AFI 90-2002 *Interactions with Federally Recognized Tribes,* and the Air Force Environmental Impact Analysis Process (EIAP), correspondence was submitted to all known federally recognized tribes in the geographic area of operations for Westover Air Reserve Base inviting government-to-government (G2G) consultation and solicitation of comments regarding the proposed beddown of KC-46A aircraft.

2. A phone call was placed to the office of F. Ryan Malonson, Chief of the Wampanoag Tribe of Gay Head, on May 2, 2016. The Executive Assistant to Mr. Malonson referred me to the Tribal Historic Preservation Officer, Ms. Bettina Washington, who indicated the tribe had no interest in G2G consultation and had no comments regarding the proposed KC-46A beddown at Westover ARB.

Anthony Zaharias
Natural & Cultural Resources Manager
439 MSG/CEV
240 Patriot Ave, Box 35
Westover ARB, MA 01022
PH: 413-557-2436

A.4 NATIONAL HISTORIC PRESERVATION ACT (NHPA) PREVIOUS CULTURAL RESOURCE CONSULTATION

A.4.1 Grissom ARB NHPA Previous Section 106 SHPO Consultation Letter

DNR Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Historic Preservation & Archaeology•402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646•Fax 317-232-0693 · dhpa@dnr.IN.gov

HISTORIC PRESERVATION AND ARCHAEOLOGY

July 25, 2012

31 Jul 2012 CSV 31 Jul 12 copy 31 Jul 12

David A. Hughes, P.E.
Department of the Air Force
Air Force Reserve Command
434 MSG/CEV
7104 South Warthog Street
Grissom ARB, IN 46971-1632

Federal Agency: Department of the Air Force

Re: Request for SHPO concurrence regarding Grissom historic and cultural resources inventory (DHPA #13604)

Dear Mr. Hughes:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated June 20, 2012 and received on June 25, 2012 for the above indicated project in Grissom Air Reserve Base, Miami County, Indiana.

Thank you for your recent submission. Based on the results of the previously conducted cultural resource surveys and the current information provided to our office, we see no reason to disagree with the Department of the Air Force's assessment that there are no sites listed in or eligible for inclusion in the National Register of Historic Places within Grissom ARB.

If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations.

A copy of the revised 36 C.F.R. Part 800 that went into effect on August 5, 2004 may be found on the Internet at www.achp.gov for your reference. If you have questions about archaeological issues please contact Cathy Draeger-Williams at (317) 234-3791 or cdraeger-williams@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #13604.

Very truly yours,

James A. Glass, Ph.D.
Deputy State Historic Preservation Officer

JAG:CWS:CDW:cdw

www.DNR.IN.gov

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A.4.2 Seymour Johnson AFB Previous Section 106 Consultation Letter

File 8-7 BR4
LEL
ORIG IN '57 FILE
Deb
filed 35M

NORTH CAROLINA DEPARTMENT OF CULTURAL RESOURCES

Raleigh, North Carolina 27611

Division of Archives and History
Larry E. Tise, Director

October 9, 1978

Robert S. Dobbins, Lt. Col., USAF
Base Civil Engineer
Department of the Air Force
4th Civil Engineering Squadron (TAC)
Seymour Johnson Air Force Base, N.C. 27531

Re: Seymour Johnson Air Force Base, Wayne County

Dear Lt. Col. Dobbins:

We have reviewed the additional information forwarded by your office concerning an archeological investigation of Seymour Johnson Air Force Base in Wayne County, and would like to comment.

From information concerning the present and past use and ground disturbing activities that have taken place on the air base, it is likely that any archeological resources which may have been present on the property have been destroyed or sufficiently damaged to the extent that their potential significance has been destroyed. This conclusion was confirmed by an on-site inspection by a member of our staff on October 4, 1978.

The recorded archeological site (31 Wy 9) has also deteriorated to the point that it has lost any potential for inclusion in the National Register of Historic Places. This site was also visited on the 4th and found to have been eroded and disturbed so as to have become practically unrecognizable. We therefore recommend that no further archeological investigation be conducted on the air force base property.

We wish to thank you for your courtesty shown to our staff during the visit and for your cooperation and concern in this matter. If you have any questions concerning the above, please contact Ms. F. Langdon Edmunds, Environmental Review Coordinator, at 919/733-4763.

Sincerely,

Larry E. Tise

Larry E. Tise
State Historic Preservation Officer

LET:slw

Sara W. [illegible]
Secretary
[illegible]
Governor

A.4.3 Tinker AFB NHPA Previous Section 106 Consultation Letter

No previous correspondence was received.

A.4.4 Westover ARB NHPA Previous Section 106 Consultation Letter

No previous correspondence was received.

A.5 NATIONAL HISTORIC PRESERVATION ACT (NHPA) SECTION 106 STATE HISTORIC PRESERVATION OFFICE (SHPO) CONSULTATION

A.5.1 Grissom ARB NHPA Section 106 SHPO Consultation Letter

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

11 Mar 2016

Mr. David A. Hughes, P.E.
Base Civil Engineer
7104 S. Warthog Street
Grissom ARB, IN 46971-1632

Dr. James A. Glass
Deputy State Historic Preservation Officer
Division of Historic Preservation and Archaeology
402 W. Washington Street, W274
Indianapolis, IN 46204-2739

Subject: Section 106 Consultation on Proposed Air Force Beddown of the Third Main Operating Base of the KC-46A Tanker aircraft at Grissom Air Reserve Base

Dear Dr. Glass

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Grissom Air Reserve Base (ARB) is proposed as a reasonable alternative for the MOB 3 mission, along with Westover ARB, MA, and Tinker Air Force Base (AFB), OK. Seymour Johnson AFB, NC has been identified as the Preferred Alternative for this mission.

The proposed MOB 3 project would base 12 KC-46A aircraft at one of the four installations. Basing the aircraft at Grissom ARB would require the construction, demolition and renovation of facilities to accommodate the new personnel and aircraft associated with the mission. The attached Table 1 and project map identify specific facilities that are included as part of this project.

Pursuant to 54 U.S.C. § 306108 (commonly referred to as Section 106 of the National Historic Preservation Act) and 36 CFR 800, the Air Force, requests to enter into Section 106 consultation regarding the proposed undertaking. Grissom ARB has defined the Area of Potential Effects (APE) as the viewshed for historic facilities and areas of ground disturbance associated with construction, demolition and renovation on Grissom ARB (See attached Table 1). Based on the facts that the facilities identified in Table 1 are not eligible for the National Register of Historic Places and that all of the areas proposed for construction, demolition and renovation on Grissom ARB are heavily disturbed and in areas where the Integrated Cultural Resources Management Plan (ICRMP) indicates a lack of archaeological sites, Grissom ARB has determined that there are no historic properties affected within the APE.

Grissom ARB requests concurrence on both the APE for this project and this finding of no effect on historic properties.

In addition to the construction, demolition and renovation of facilities, aircraft operations would be conducted by the KC-46A aircraft. Aircraft activity near Grissom ARB would consist of aircraft operations similar to the existing KC-135 mission. The existing operations include take offs, landings, and flying patterns in the local airspace at Grissom ARB. Refueling operations would be conducted at altitudes above 14,000 feet above the ground surface. Preliminary analysis indicates that noise levels from these operations would be less than or similar to noise levels associated with the existing KC-135 mission at Grissom ARB.

In 2012 Grissom ARB submitted a determination package of its potentially historic and cultural resources to your office. Based on the information contained in the determination package, Grissom ARB determined and the Indiana SHPO confirmed that there were no sites listed in or eligible for inclusion in the National Register of Historic Places at Grissom ARB. The concurrence letter is included for reference. Based on the lack of historic and cultural resources, Grissom ARB has determined that this project has no potential to cause effects to cultural resources at Grissom ARB.

The following documentation, as detailed in Section 800.11(d), is included for your review:

- A description of the KC-46A project (see above)
- A summary of the efforts made to identify historic properties in the project's APE, including, as appropriate, efforts to seek information pursuant to Section 800.4(b), identification of historic properties (See Attached Table 1).
- 2012 Letter from the Indiana SHPO confirming that there are no sites listed in or eligible for inclusion in the National Register of Historic Places at Grissom ARB.

Please review the material enclosed and contact Mr. Jeff Woodring, Chief Environmental Engineer, at (765) 688-4541 if you have any questions. If we do not hear from you within 30 days after you receive this letter, we will assume that you concur with the finding of no historic properties affected determination. We then will proceed with the NEPA process, subject to the provisions of 36 CFR 800.13 for treating historic properties inadvertently discovered during an undertaking.

Sincerely

DAVID A. HUGHES, GS-13, P.E.
Base Civil Engineer

3 Attachments:
1. Table 1. Facilities and Infrastructure Development Table for Grissom ARB
2. Grissom ARB Project Map
3. 2012 Letter from the Indiana SHPO

A.5.1 Grissom ARB NHPA Section 106 SHPO Consultation Letter (Continued)

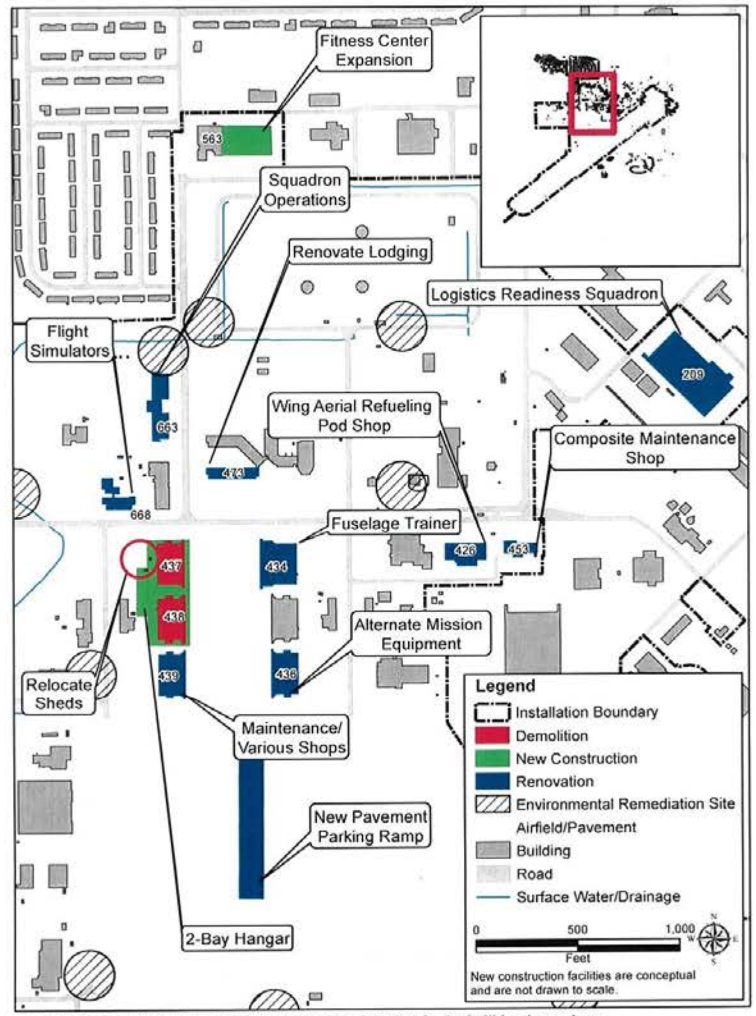
Table 1. Facilities and Infrastructure Projects for the KC-46A MOB 3 Beddown at Grissom ARB

Project	Status	Year Constructed
Demolition		
Building 437 (Hangar 5)	Not Eligible*	1959
Building 438 (Hangar 3)	Not Eligible*	1959
Renovation		
Building 209, Logistics Readiness Squadron (Internal fencing and vault)	Not Eligible*	1956
Building 426, Wing Air Refueling Pod (WARP) storage and maintenance	Not Eligible*	1960
Building 434, (Hangar 6) FuT	Not Eligible*	1959
Building 436, (Hangar 2) AME	Not Eligible*	2009
Building 439, (Hangar 1) Maintenance/Various Shops	Not Eligible*	1959
Building 453, Composite Maintenance Shop	Not Eligible*	1988
Building 473, Renovate Lodging (convert rooms into first-term Airmen/Single Airman Quarters)	Not Eligible*	2004
Building 663, Squadron Operations	Not Eligible*	1988
Building 668, Flight Simulators (WST/BOT)	Not Eligible*	1959
Relocation of two portable sheds (PB-56 and unnamed)	Not Eligible*	Unknown
New pavement parking ramp	Not Eligible*	Unknown
New Construction or Building Addition		
2-Bay Hangar	NA	NA
Building 563, Fitness Center	Not Eligible*	1977

Notes:

* *Not Eligible based on addendum to the 2011 Determination of Eligibility*

** *Not Eligible based on the recent construction dates and the lack of significant cultural context*



The APE for this project is proposed as the construction footprints for the facilities shown above.

Facilities and Infrastructure Projects for the KC 46A MOB 3 at Grissom ARB *March 2016*

ARCH I

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A.5.1 Grissom ARB NHPA Section 106 SHPO Consultation Letter (Continued)

DNR Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Historic Preservation & Archaeology • 402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646 • Fax 317-232-0693 · dhpa@dnr.IN.gov

HISTORIC PRESERVATION AND ARCHAEOLOGY

July 25, 2012

David A. Hughes, P.E.
Department of the Air Force
Air Force Reserve Command
434 MSG/CEV
7104 South Warthog Street
Grissom ARB, IN 46971-1632

Federal Agency: Department of the Air Force

Re: Request for SHPO concurrence regarding Grissom historic and cultural resources inventory (DHPA #13604)

Dear Mr. Hughes:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated June 20, 2012 and received on June 25, 2012 for the above indicated project in Grissom Air Reserve Base, Miami County, Indiana.

Thank you for your recent submission. Based on the results of the previously conducted cultural resource surveys and the current information provided to our office, we see no reason to disagree with the Department of the Air Force's assessment that there are no sites listed in or eligible for inclusion in the National Register of Historic Places within Grissom ARB.

If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations.

A copy of the revised 36 C.F.R. Part 800 that went into effect on August 5, 2004 may be found on the Internet at www.achp.gov for your reference. If you have questions about archaeological issues please contact Cathy Draeger-Williams at (317) 234-3791 or cdraeger-williams@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #13604.

Very truly yours,

James A. Glass, Ph.D.
Deputy State Historic Preservation Officer

JAG:CWS:CDW:cdw

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ATCH 3

A.5.1.1 Grissom ARB NHPA Section 106 SHPO Consultation Response

Michael R. Pence, Governor
Cameron F. Clark, Director

DNR Indiana Department of Natural Resources

Division of Historic Preservation & Archaeology•402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646•Fax 317-232-0693 · dhpa@dnr.IN.gov

HISTORIC PRESERVATION AND ARCHAEOLOGY

April 18, 2016

David A. Hughes
Base Civil Engineer
7104 S. Warthog Street
Grissom ARB, IN 46971-1632

Federal Agency: U.S. Department of the Air Force

Re: Project information and the Department of the Air Force's finding of "no historic properties affected" regarding demolition, construction and renovation on Grissom Air Reserve Base for the proposed Air Force Beddown of the Third Main Operating Base of the KC-46A tanker aircraft (DHPA #18989)

Dear Mr. Hughes:

Pursuant to Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated March 11, 2016 and received on March 17, 2016, for the above indicated project in Grissom Air Reserve Base, Miami County, Indiana.

We concur with the Department of the Air Force's March 11, 2016 finding that there are no historic buildings, structures, districts, objects, or archaeological resources within the area of potential effects that will be affected by the above indicated project.

If any prehistoric or historic archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations, including but not limited to 36 C.F.R. 800.

If you have questions about archaeological issues please contact Cathy Draeger-Williams at (317) 234-3791 or cdraeger-williams@dnr.IN.gov. If you have questions about buildings or structures please contact Ashley Thomas at (317) 234-7034 or asthomas@dnr.IN.gov.

Very truly yours,

Chad W. Slider

Mitchell K. Zoll
Deputy State Historic Preservation Officer

MKZ:ADT:CDW:cdw

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A.5.2 Seymour Johnson AFB NHPA Section 106 SHPO Consultation Letter

Subject: RE: SHPO emailFW: Determination of Eligibility for Listing Seven Bldgs at SJAFB

----Original Message-----
From: CHASTAIN, WILLIAM D GS-12 USAF ACC 4 CES/CEIE
Sent: Wednesday, March 09, 2016 2:04 PM
To: 'renee.gledhill-earley@ncdenr.gov'; 'renee.shearin@ncdcr.gov'
Cc: 'wchastain@nc.rr.com'
Subject: Determination of Eligibility for Listing Seven Bldgs at SJAFB

Dear Ms. Gledhill-Earley and Ms. Shearin,

We request your assistance regarding the determination of eligibility for listing in the National Register of Historic Places (NRHP) for seven buildings at Seymour Johnson Air Force Base (SJAFB). The eligibility determination is necessary because of a proposed new mission at SJAFB that would impact the seven buildings and the required completion of an Environmental Impact Statement (EIS) prior to that mission.

Attachment 1 of this email is our evaluation of the buildings based on guidance provided in The National Register Bulletin - How to Apply the National Register Criteria for Evaluation.

Other attachments (18 total) are referred to within Attachment 1.

If you have any questions, or require any further information please let me know.

Respectfully,

W. Dean Chastain, P.E.

Environmental Element Chief

4 CES/CEIE

1095 Peterson Ave

SJAFB, NC 27531

DSN 722-5168, Comm (919) 722-5168

A.5.2.1 Seymour Johnson AFB NHPA Section 106 SHPO Consultation Response

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

March 24, 2016

W. Dean Chastain
4 CES/CEIE
1095 Peterson Avenue
SJAFB, NC 27531

william.chastain@us.af.mil

Re: Determination of Eligibility for 7 Buildings, Seymour Johnson Air Force Base, Wayne County, ER 16-0461

Dear Mr. Chastain:

Thank you for your email of March 9, 2016, concerning the above-referenced undertaking. We have reviewed the materials submitted and offer the following comments.

The *NRHP Evaluation of Seven Buildings at Seymour Johnson AFB (SJAFB) Using the National Register Bulletin: "How to apply the National Register Criteria for Evaluation"* seemed to rely heavily upon the NRHP evaluation of Buildings 5015, 2130 and 4828 report our office reviewed in July 2015. While the 2015 report offered thorough documentation, including historic and current photographs of the properties in question, the 2016 report does not include photographs of the properties under evaluation. Without photographs demonstrating the current condition of the properties, it is difficult to properly evaluate their integrity.

It appears the properties were evaluated based on their associations with Cold War missions and activities, which are classified as "temporal." Does this mean the properties lack a direct relationship to significant Cold War events? Prior to offering further comments, we request the following information:

- Photographs demonstrating the current condition of the properties being evaluated for listing in the NRHP
- A clearer explanation of why the properties are considered "not eligible" for listing in the NRHP. What is meant by "temporal" and are the buildings only being evaluated for their association with the Cold War?

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address:** 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax:** (919) 807-6570/807-6599

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

A.5.2.1 Seymour Johnson AFB NHPA Section 106 SHPO Consultation Response (Continued)

DEPARTMENT OF THE AIR FORCE
4TH FIGHTER WING (ACC)
SEYMOUR JOHNSON AIR FORCE BASE NC

12 May 2016

Dennis G. Goodson, P.E.
Deputy Base Civil Engineer
1095 Peterson Ave
Seymour Johnson AFB NC 27531

Renee Gledhill-Earley
Environmental Review Coordinator
NC State Historic Preservation Office
4617 Mail Service Center
Raleigh NC 27699-4617

Dear Ms. Gledhill-Earley

Please find attached the information requested in your letter dated 24 March 2016 concerning Tracking Number **ER-16-0461**, Determination of Eligibility for 7 Buildings, Seymour Johnson Air Force Base, Wayne County.

Per your request, photographs of the buildings have been included. Also, the eligibility statements have been revised; the reference to "temporal" has been removed and replaced by more specific language.

To summarize, Seymour Johnson AFB has evaluated these 7 buildings and determined that none of these buildings are eligible for listing on the National Register of Historic Places. We request your concurrence on this determination.

Thank you very much for your time. If you have any questions or need additional information, please contact Mr. Dean Chastain at 722-5168 or william.chastain@us.af.mil.

Sincerely

Dean M Goodson
DENNIS G. GOODSON, P.E.

Attachment:
Supplemental Information Package for NC SHPO Tracking Number ER 16-0461

cc: Hamid Kamalpour, AFCEC/CZN

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

June 14, 2016

Dennis G. Goodson
Department of the Air Force
4th Fighter Wing (ACC)
Seymour Johnson Air Force Base NC

dennis.goodson@us.af.mil

Re: Determination of Eligibility for 7 Buildings, Seymour Johnson Air Force Base, Wayne County, ER 16-0461

Dear Mr. Goodson:

Thank you for your letter of May 12, 2016, regarding the above-referenced undertaking. We have reviewed the materials submitted and offer the following comments.

The *Supplemental Information Package for NC SHPO Tracking Number: ER 16-0461 Determination of Eligibility for 7 Buildings, Seymour Johnson Air Force Base, Wayne County* appears to be complete and we concur with the determination that none of the seven properties in question are eligible for listing in the National Register of Historic Places.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley
for Ramona M. Bartos

cc: Dean Chastain, william.chastain@us.af.mil
Cathryn Penseti, cathryn.pesenti@us.af.mil

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address:** 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax:** (919) 807-6570/807-6599

A.5.2.1 Seymour Johnson AFB NHPA Section 106 SHPO Consultation Response (Continued)

DEPARTMENT OF THE AIR FORCE
4TH FIGHTER WING (ACC)
SEYMOUR JOHNSON AIR FORCE BASE NC

8 February 2017

Mr. Dennis G. Goodson, P.E.
Deputy Base Engineer
1095 Peterson Ave
Seymour Johnson AFB NC 27531

Ms. Renee Gledhill-Earley
Environmental Review Coordinator
NC State Historic Preservation Office
4617 Mail Service Center
Raleigh NC 27699-4617

RE: No Historic Properties Affected Determination for KC-46A Main Operating Base (MOB 3) Beddown

Dear Ms. Gledhill-Earley

As you are aware, the Air Force is nearing completion of its Environmental impact Statement for the KC-46A Main Operating Base (MOB 3) Beddown. Seymour Johnson AFB (SJAFB) is the preferred location for that action. Last year, SJAFB determined that the seven buildings which would be adversely affected are not eligible for the National Register. Supporting 36 CFR § 800.11(d) documentation was provided at that time. The NC State Historic Preservation Office concurred with SJAFB's determination by letter dated 14 June 2016, "*Determination of Eligibility for 7 Buildings, Seymour Johnson Air Force Base (AFB), Wayne County,*" Tracking Number ER-16-0461.

The purpose of this letter is to notify you that in accordance with 36 CFR § 800.4(d)(1), SJAFB finds that no historic properties will be affected by the KC-46A Main Operating Base (MOB 3) Beddown because no historic properties are present. Please let me know at your earliest convenience, but no later than 30 days from receipt of this letter, if you disagree with this finding.

Thank you very much for your time. If you have any questions, please contact Mr. Dean Chastain at 722-5168 or william.chastain@us.af.mil.

Sincerely

DENNIS G. GOODSON, P.E.

cc: Hamid Kamalpour, AFCEC/CZN

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

February 21, 2017

Dennis G. Goodson
Department of the Air Force
4th Fighter Wind (ACC)
Seymour Johnson Air Force Base
Attn: Dean Chastain

william.chastain@us.af.mil

Re: KC-46A Main Operating Base (MOB 3) Beddown, Seymour Johnson AFB, Wayne County, ER 16-0461

Dear Mr. Goodson:

Thank you for your letter of February 8, 2017, concerning the above-referenced undertaking. We have reviewed your determination that no historic properties will be affected by the proposed undertaking due to none being located within the Area of Potential Effects. We concur with your finding. Your finding concludes the Section 106 review process and compliance with the National Historic Preservation Act.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address**: 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax**: (919) 807-6570/807-6599

A.5.3 Tinker AFB NHPA Section 106 SHPO Consultation Letter

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 72D AIR BASE WING (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

17 March 2016

Colonel Stephanie P. Wilson
Commander
7460 Arnold Street
Tinker AFB, OK 73145

Melvena Heisch, Deputy State Historic Preservation Officer
Oklahoma State Historic Preservation Office
800 Nazih Zuhdi Drive
Oklahoma City, OK 73105-7917

Dear Ms. Heisch,

Attached for your review and comment is the Draft Description of Proposed Action and Alternatives (DOPAA) for the KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS), attachment 1, and the Draft Notice of Intent (NOI), attachment 2. The overall purpose of the project is to establish a KC-46A Third Main Operating Base (MOB 3). The MOB 3 mission includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The purpose of the MOB 3 mission is to provide a fully capable, combat operational KC-46A 14 aerial refueling squadron to accomplish aerial refueling and related missions.

The EIS is considering four alternatives; the Strategic Basing Process resulted in the identification of Seymour Johnson AFB in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission.

In April 2006, the USAF completed an Analysis of Alternatives to determine the most appropriate strategy to recapitalize the existing KC-135 aircraft fleet. Based on this analysis, the USAF concluded that a commercial derivative replacement tanker would result in the best value.

At Tinker Air Force Base the beddown would occur at the 507th Air Refueling Wing Complex, attachment 4. Currently there have been no eligible historic buildings identified in this area. The closest eligible historic building is approximately a mile from the complex, Building 230. There are no eligible archeological sites in the area. The nearest eligible archeological site is approximately 1.3 miles away. Also a regional location map is attached, attachment 3.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation in the process, and solicit any comments or concerns you may have on the Draft DOPAA. Comments may be submitted no later than 30 days from receipt of this letter and should be provided to Mr. Tim Taylor, 72 ABW/CEIEC, by telephone at (405) 734-4579, or by email to timothy.taylor.5@us.af.mil .

Sincerely

STEPHANIE P. WILSON, Colonel, USAF

Attachment:
1. Draft DOPAA
2. NOI
3. Regional Location Map
4. Area of Potential Effect

A.5.3.1 Tinker AFB NHPA Section 106 SHPO Consultation Response

Oklahoma Historical Society *Founded May 27, 1893*
State Historic Preservation Office
Oklahoma History Center • 800 Nazih Zuhdi Drive • Oklahoma City, OK 73105-7917
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

April 6, 2016

Mr. Tim Taylor
72 ABW/CEIEC
7535 5th Street
Tinker AFB, OK 73145

RE: File #1167-16; Tinker AFB KC-46A Third Main Operating Base Beddown Project

Dear Mr. Taylor:

We have received and reviewed the documentation submitted on the referenced project in Oklahoma County. Additionally, we have examined the information contained in the Oklahoma Landmarks Inventory (OLI) files and other materials on historic resources available in our office. We find that there are no known historic properties affected within the referenced project's area of potential effect.

In addition to our review, you must contact the Oklahoma Archeological Survey (OAS), 111 E. Chesapeake, #102, Norman OK 73019-5111 (#405/325-7211, FAX #405/325-7604), to obtain a determination about the presence of prehistoric resources that may be eligible for the National Register of Historic Places. Should the OAS conclude that there are no prehistoric archaeological sites or other types of "historic properties," as defined in 36 CFR Part 800.16(l), which are eligible for inclusion in the National Register of Historic Places within the project area and that such sites are unlikely to occur, we concur with that opinion.

The OAS may conclude that an on-site investigation of all or part of the project impact area is necessary to determine the presence of archaeological resources. In the event that such an investigation reveals the presence of prehistoric archaeological sites, we will defer to the judgment of the OAS concerning whether or not any of the resources should be considered "historic properties" under the Section 106 review process. If sites dating from the historic period are identified during the survey or are encountered during implementation of the project, additional assessments by the State Historic Preservation Office will be necessary.

Should further correspondence pertaining to this project be necessary, please reference the above underlined file number. If you have any questions, please contact Catharine M. Wood, Historical Archaeologist, at 405/521-6381. Thank you.

Sincerely,

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:pm

Oklahoma Archeological Survey
THE UNIVERSITY OF OKLAHOMA

May 19, 2016

Trudi Logan
Department of the Air Force
Environmental Section
72 Air Base Wing
7535 5th Street
Tinker Air Force Base, Oklahoma 73145-9100

RE: Proposed ramp expansion of the 507th ARW as part of the KC 46A MOB 3 Project. Legal Description: NE ¼ SW ¼ NW ¼ SE ¼ Section 22 T11N R2W, Oklahoma County, Oklahoma.

Dear Ms. Logan:

The Community Assistance Program staff of the Oklahoma Archeological Survey has reviewed the above referenced project in order to identify areas that may potentially contain prehistoric or historic archeological materials (historic properties). The location of your project has been crosschecked with the state site files containing approximately 23,000 archaeological sites, which are currently recorded for the state of Oklahoma. **No sites are listed in your project area, but based on the topographic and hydrologic setting of your project, archeological materials are likely to be encountered. An archaeological field inspection is considered necessary prior to project construction in order to identify significant archaeological resources that may exist in the project area.** Please contact this office at (405) 325-7211 if you require additional information on this project.

This environmental review and evaluation is performed in order to locate, record, and preserve Oklahoma's prehistoric and historic cultural heritage in cooperation with the State Historic Preservation Office, Oklahoma Historical Society, and you must also have a letter from that office to document your consultation pursuant to Section 106 of the National Historic Preservation Act. In addition to our review comments, under 36CFR Part 800.3 you are reminded of your responsibility to consult with the appropriate Native American tribe/groups to identify any concerns they may have pertaining to this undertaking and potential impacts to properties of traditional and/or ceremonial value. Thank you for your cooperation.

Sincerely,

J. Matthew Oliver
Staff Archaeologist

Kary Stackelbeck
State Archaeologist

:ls

Cc: SHPO

111 E. Chesapeake, Room 102, Norman, Oklahoma 73019-5111 PHONE: (405) 325-7211 FAX: (405) 325-7604
A UNIT OF ARTS AND SCIENCES SERVING THE PEOPLE OF OKLAHOMA

A.5.4 Westover ARB NHPA Section 106 SHPO Consultation Letter

DEPARTMENT OF THE AIR FORCE
439TH MISSION SUPPORT GROUP (AFRC)

29 March 2016

Mr. Wayne M. Williams, CFM
Base Civil Egineer
250 Patriot Avenue
Westover ARB, MA 01022

Mr. Ryan T. Maciej
Preservation Planner
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

Dear Mr. Maciej,

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Westover Air Reserve Base (ARB) is proposed as a reasonable alternative for the MOB 3 mission, along with Grissom ARB, IN; and Tinker Air Force Base (AFB), OK. Seymour Johnson AFB, NC has been identified as the Preferred Alternative for this mission.

The proposed MOB 3 project would base 12 KC-46A aircraft at one of the four installations. Basing the aircraft at Westover ARB would require the construction and renovation of facilities to accommodate the new personnel and aircraft associated with the mission. The attached table and project map identifies specific facilities that are included as part of this project.

In compliance with the National Historic Preservation Act (NHPA) and 36 CFR 800, Westover ARB, hereby enters into Section 106 consultation regarding the proposed undertaking. Westover ARB also requests concurrence with the Area of Potential Effect (APE) as defined below and in Attachment 1 and with a finding of no historic properties affected.

The APE for this effort includes the footprint of potential construction activities (see attached maps) and a five mile radius surrounding the installation. Aircraft activity in the five mile radius surrounding Westover ARB would consist of aircraft operations similar to the existing C-5 mission. The existing operations include takeoffs, landings, and flying patterns in the local airspace at Westover ARB. Refueling operations would be conducted at altitudes above 14,000 feet above the ground surface. Preliminary analysis indicates that noise levels from these operations would be less than or similar to noise levels associated with the existing C-5 mission at Westover ARB. Therefore the APE for potential historical building evaluations does not consider airspace outside of the five mile radius or the environment outside of the construction related footprints described above.

Westover ARB recently submitted a determination package of its potentially historic properties. Based on the information contained in the determination package, it is the finding of Westover ARB that no historic properties are present within the APE and therefore there are no potential effects to historic properties as part of the undertaking. The following documentation, as detailed in Section 800.11(d), is included for your review:

- A description of the KC-46A project (see above)
- A delineation of the APE (see attached map)
- A summary of the efforts made to identify historic properties in the project's APE, including, as appropriate, efforts to seek information pursuant to Section 800.4(b), identification of historic properties (See attached facilities list).
- The basis for determining that no historic properties are present or affected (attachment). The addendum to the June 2011 Determination of Eligibility transmitted on 11 February 2016 to your office was also used as a basis for determining that no historic properties are present or affected.

Please review the material enclosed and contact Mr. John B. Moriarty, Chief Environmental Engineer, at (413) 557-2434 if you have any questions. If we do not hear from you within 30 days after you receive this letter, we will assume that you do not object to our proposed determination of no historic properties affected. We then will proceed with the NEPA process, subject to the provisions of 36 CFR 800.13 for treating historic properties discovered during an undertaking.

Sincerely,

Wayne M. Williams

WAYNE M. WILLIAMS, CFM, GS-13, DAF
Base Civil Engineer

2 Attachments:
1. Table: Facilities and Infrastructure Development for Westover ARB
2. Westover ARB Project Map

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

April 28, 2016

Hamid Kamalpour
United States Air Force
AFCEC/CZN
2261 Hughes Ave, Ste. 155
Lackland AFB, TX 78236-9853

RE: KC-46A Third Main Operating Base (MOB 3) Beddown, Westover Air Reserve Base—One of Four Possible Locations Nationwide, Chicopee, MA; MHC# RC.60033

Dear Mr. Kamalpour:

The Massachusetts Historical Commission (MHC) has reviewed the information submitted, received March 29, 2016, concerning the proposed project referenced above. The Westover Air Reserve Base area (MHC# CHI.AA) is included in MHC's Inventory of Historic and Archaeological Assets of the Commonwealth. After a review of the information submitted, MHC staff have the following comments.

The MHC understands from the information you submitted, received March 29, 2016, that the Westover Air Reserve Base is being considered as one of three reasonable alternatives to the Seymour Johnson Air Force Base in North Carolina, which is the preferred alternative of the proposed beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. All four bases and the No Action Alternative will be evaluated as alternatives in the Environmental Impact Statement (EIS) that the United States Air Force is preparing.

The MHC looks forward to receiving and reviewing the EIS when it becomes available.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800). Please do not hesitate to contact Ryan Maciej of my staff if you have any questions.

Sincerely,

Brona Simon

Brona Simon
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

xc: Drew Milroy and John Moriarty, Westover ARB
Chicopee Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
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06/17/2016 16:09 FAX 617 727 5128 MASS HIST COMM 001/003

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

Fax Transmittal Memorandum

To: John Moriarty / Westover Air Reserve Base

Fax #: (413) 557-2419

From: Ryan Maciej / TSD

Date: June 17, 2016

Re: CHI, Eligibility Opinion, Westover Air Reserve Base Management Plan, MHC# RC.12313

Pages, including cover sheet: Three (3)

Comments:

If this communication has been received in error, please notify us immediately.

220 Morrissey Boulevard, Boston, Massachusetts 02125
Tel: (617) 727-8470 · Fax: (617) 727-5128 · Website: www.state.ma.us/sec/mhc

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

June 17, 2016

Wayne M. Williams, CFM
Base Civil Engineer
Department of the Air Force
250 Patriot Avenue
Westover ARB, MA 01022

RE: Eligibility Opinion, Westover Air Reserve Base Management Plan, Westover Air Reserve Base, Chicopee, MA; MHC# RC.12313

Dear Mr. Williams:

The Massachusetts Historical Commission (MHC), office of the Massachusetts State Historic Preservation Officer (MA SHPO), has reviewed the additional information you submitted, received February 16, 2016, concerning the plan referenced above. The MHC appreciates receiving and reviewing the information that was submitted in response to an MHC letter dated July 15, 2011 requesting additional data in order for the MHC to concur with the Westover Air Reserve Base (WARB) National Register eligibility opinion of 2011. After a review of the information submitted, MHC staff have the following comments.

The Westover Air Reserve Base (WARB) had conducted a study in 2011 and made a new Determination of Eligibility (DOE) of facilities at WARB. The WARB 1995 evaluation indicated that a historic district consisting of thirty-nine contributing buildings and seven individually eligible buildings met the criteria of eligibility for listing in the National Register of Historic Places (NRHP) (36 CFR 60). On November 1, 1995, the MHC concurred with that 1995 DOE.

Information within the 2011 study indicated that it is WARB's opinion that the 1995 report incorrectly applied National Register Criteria for Evaluation because it based its eligibility determinations primarily on historic significance and downplayed the base's already substantially-diminished historic integrity. As of 2011, WARB had also demolished twenty of the buildings that were contributing resources identified in the 1995 report. The MHC understands that it is the opinion of the WARB that the WARB has undergone considerable alterations since the period of significance of 1973, which the WARB believes has resulted in a substantial loss of integrity. The 2011 WARB DOE indicated the following:

> WARB, while historically significant, does not contain an eligible National Register district due to its substantial loss of historic integrity needed to represent its Period of Significance. However, two of Westover's WWII-era buildings (Buildings 1502 and 1520) retain enough individual significance and integrity to be considered individually eligible for the NRHP.

In a letter dated July 15, 2011, the MHC noted that it was not able to concur with the 2011 WARB DOE and required that all of the buildings; structures; and other facilities including, but not limited to, fields, grounds, and tennis courts be included in the evaluation information. This should include both resources that are both currently and that have previously been functionally related to WARB. The MHC also requested additional information about Building 1800, Building 1850, and Buildings 5100-5105.

The MHC very much appreciates that information was submitted to assist in providing an eligibility concurrence from the MHC. WARB indicates in their submitted informational packet and the revised eligibility opinion that the current base and the former boundaries of the Westover base do not, in their entirety, meet the criteria of eligibility for listing in the National Register of Historic Places as a potential district. The MHC understands that since 2011, WARB has subsequently demolished other buildings that were contributing resources.

At this time, the MHC is not able to concur with WARB without additional information. The MHC notes that in portions of WARB's eligibility opinion, the fifty-year period is used as the cut-off point for eligibility and that in other portions of the submission, 1973 is utilized instead since that is the period, during the Cold War, when Westover started to sell off pieces of their property as part of their transitioning to a new role in the Armed Forces. It is the opinion of MHC that 1973 would be a good ending date for the period of

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significance since it denotes a major demarcation in the use of Westover and the commencement of selling off portions of its land in response to Westover's changing mission. The MHC requests that a line map diagram similar to the one that WARB provided of the current WARB boundaries proper be provided that illustrates what was once Westover's boundaries in 1973. Although some of this land has been sold, subdivided, and developed under various owners since it was once part of Westover, its 1973 boundaries are historically noteworthy. Color coding the outlines of the buildings based upon the line map diagram of the current WARB boundaries proper, the MHC and other viewers will be able to more readily identify what integrity remains and in what areas, much like the current WARB diagram of the current base. An 11" x 17" diagram may be a useful size to conveniently map the many dozens of resources and aerial view images that the contracted cultural resource team started to digitize.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), and M.G.L. Chapter 9, Section 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00). Please do not hesitate to contact me at this office if you have any questions.

Sincerely,

Ryan T. Maciej
Preservation Planner
Massachusetts Historical Commission

xc: Chicopee Historical Commission
John Moriarty and Andrew Milroy, Westover Air Reserve Base

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

Colonel Karen L. Magnus
439 MSG/CC
250 Patriot Avenue, Box 35
Westover ARB, MA 01022-1670

3 August 2016

Mr. Ryan T. Maciej
Preservation Planner
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

RE: Section 106 Consultation on Proposed Air Force Beddown of the Third Main Operating Base of the KC-46A Tanker aircraft at Westover Air Reserve Base; MHC# RC.60033

Dear Mr. Maciej,

We have reviewed the Massachusetts Historical Commission (MHC) letter dated 28 April 2016, in response to our letter dated 29 March 2016 for the proposed undertaking of the beddown of the Third Main Operating Base (MOB 3) of the KC-46A Tanker aircraft and in support of the KC-46A MOB 3 Environmental Impact Statement (EIS), in which Westover Air Reserve Base (ARB) is identified as one of the reasonable alternatives. In response to your letter, the United States Air Force (USAF) has identified historic properties within the area of potential effect (APE) for the undertaking, including the Westover ARB Historic District (MHC# CHI.AA), determined eligible for listing in the National Register of Historic Places (NRHP) in 1995 (MHC Opinion, 1 November 1995). The USAF has also determined that the proposed undertaking, which includes demolition of Hangar 7071 and Building 2426, contributing resources within the Westover ARB Historic District, will have an adverse effect on the historic property. Pursuant to 36 CFR 800.6, the USAF seeks consultation with the MHC in order to find ways to avoid, minimize or mitigate the potential adverse effects of the undertaking.

The USAF defines the Area of Potential Effect (APE) as the boundaries of the Westover ARB Historic District, including its viewshed, and areas of ground disturbance associated with construction, demolition, and renovation (see Attachment 1). The proposed beddown operation would demolish four buildings (Buildings 2426, 7071, 7045 and 7046), renovate five buildings (Buildings 7072, 7073, 5103, 5375 and 5377) and one parking ramp, relocate one gas station, and construct a new two-bay Hangar/Flight Simulator/Fuselage Trainer/Civil Engineering Grounds Facility, and expand the Building 1700 Fitness Center (see Attachment 2).

Although the proposed demolition, renovation and new construction for the beddown would occur in a limited area of the current Westover ARB boundaries, the undertaking has the potential to directly and indirectly affect the NRHP eligible Westover ARB Historic District, including portions of the district that may lie beyond the current installation boundary. The Westover ARB Historic District was determined eligible for listing in the NRHP under criteria A and C for its associations with military operations during World War II and the Cold War era and for the survival of historic building and structure types representative of air base design from those historic periods (MHC Inventory Form CHI.AA/LUD.G).

The period of significance for the Westover ARB Historic District was defined as 1939-1974, after which the boundaries of the air base started to diminish as land was sold back to the local community. Although the boundaries of the district were not specifically drawn at that time, the MHC recommended that they include the 1974 installation boundary. Although only contributing buildings greater than 50 years old were specifically mentioned in the MHC inventory forms, for the purposes of this undertaking, all buildings and infrastructure dating to the period of significance within the former 1974 Westover ARB boundaries are considered to be potentially contributing to the historic district unless evaluated otherwise. Individual contributing elements that may be affected by the proposed undertaking include Hangars 7071, 7072 and 7073, Buildings 2426, 5103, 5375 and 1700. The remaining buildings, including 7045, 7046, 5377 and the parking ramp were constructed after the period of significance and are not considered to be historic properties.

Although archaeological remains, including prehistoric lithics and ceramics, as well scattered historic artifacts have been recovered from within the boundaries of the Westover ARB, no archaeological sites were identified during installation surveys. The landscape within Westover ARB was significantly modified during the construction of the airfield; and although there may have been prehistoric and historic occupation of the installation at one time, there is a low potential for intact archaeological resources to occur within the APE.

The USAF determines that the proposed undertaking will have an adverse effect on historic properties, in particular Hangar 7071 (built in 1941) and Building 2426 (an avionics shop built in 1960), both determined eligible for the NRHP as contributing elements to the Westover ARB Historic District. A site survey report for the beddown of the KC-46A aircraft at Westover ARB (see Attachment 3) identified that the only three-bay hangars that could house the KC-46A are currently devoted to C-5 flying and Regional Isochronal (RISO) operations that will continue. The remaining five hangars located at Westover were considered not adequately sized and due to deteriorating conditions could not be renovated to house the KC-46A aircraft. Therefore, the beddown would require construction of a new two-bay hangar in place of Hangar 7071 and Building 2426.

Hangar 7071 is one of four similar Hangars (7072, 7073, 7075) constructed in 1941 in the Art Moderne style. As part of the proposed undertaking, Hangars 7072 and 7073 as well as Building 5103 (a dormitory built in 1957) and Building 5375 (a base supply and equipment warehouse built in 1956) would be renovated in order to accommodate the beddown of the KC-46A aircraft operations. The four buildings (Hangar 7072, Hangar 7073, Building 5103 and Building 5375) are considered to be contributing resources to the Westover ARB Historic District. A revised eligibility assessment for the Westover ARB Historic District, currently under review by the MHC, considered the four buildings to have been substantially altered from their original design through a series of renovations that included replacement of doors, windows and siding that considerably diminished their ability to convey their historic character (see Ferguson 2011). The USAF has agreed for the proposed undertaking to renovate the buildings in keeping with the *Secretary of Interior's Standards for the Treatment of Historic Properties* (36 CFR 68), thereby avoiding further adverse effects to these resources.

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

In addition to the construction of a new two-bay hangar, the proposed undertaking also entails new construction (as shown in attachment 2) and expansion of Building 1700 (a gymnasium built in 1949). In the 2011 revised eligibility assessment, Building 1700 was shown to have been substantially expanded since its original construction (Ferguson 2011: 56). The proposed undertaking will allow Building 1700 to continue to be used as a fitness center, and all building additions will be designed so as not to diminish the historic character of the building or the Westover ARB Historic District. As the proposed new facilities further the key Air Force mission at Westover ARB, and the Air Force proposes to design the facilities in keeping with 36 CFR 68, the new construction will have no adverse effect on historic properties.

The USAF respectfully requests concurrence from the MHC on the identification of historic properties within in the APE for the proposed undertaking and on the assessment of effects on those properties. In addition, in order to mitigate adverse effects of demolition of Hangar 7071 and Building 2426, the USAF is proposing HABS/HAER recordation of buildings proposed for demolition, mapping of the current and former boundaries of Westover ARB that identifies which of the original buildings and infrastructure existed and remains, and a reevaluation of the eligibility of the remaining portions of the district. The USAF at Westover ARB also invites the MHC to participate in the design review for new construction.

Please review the material enclosed and provide comment within 30 days. If you have any questions, the Westover ARB point of contact is Mr. John B. Moriarty, Chief Environmental Engineer, at (413) 557-2434.

Sincerely,

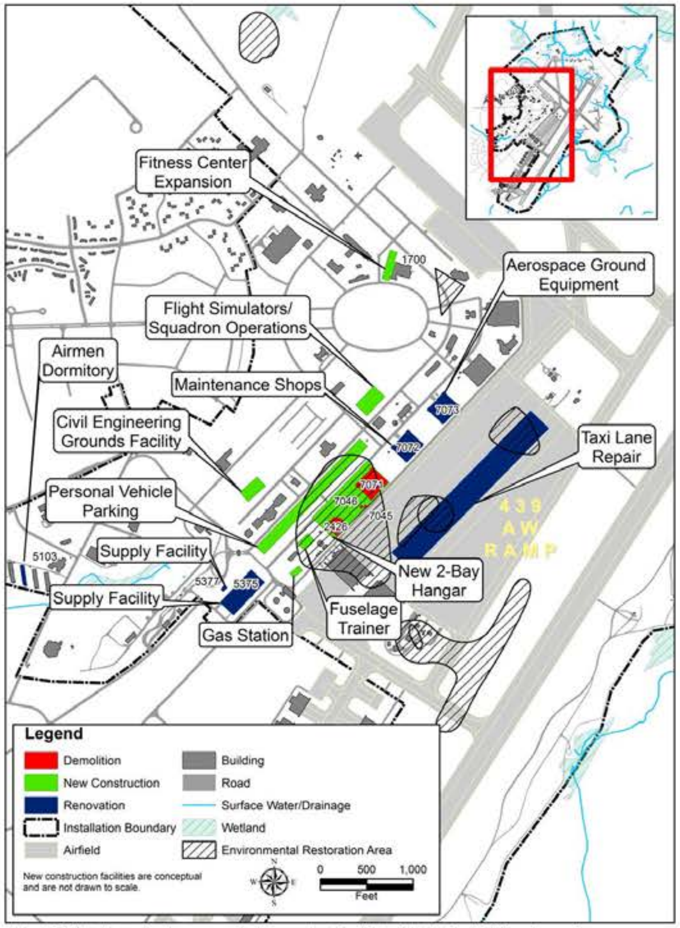
KAREN L. MAGNUS, Colonel, USAF
Commander

Attachment 1 – Map of APE for undertaking (former boundaries of Westover ARB)
Attachment 2 – Attachments for Westover ARB SHPO Letter for KC-46A MOB 3_EIS
Attachment 3 – KC-46A Site Survey Report

Ariel view of the Westover Air Reserve Base showing current (red line) and former (blue line) boundaries (taken from Ferguson 2015: 76).

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



The APE for this project is proposed as the construction footprints for the facilities shown above

Facilities and Infrastructure Projects for the KC-46A MOB 3 at Westover ARB

Table 1. Facilities and Infrastructure Projects for the KC-46A MOB 3 Beddown at Westover ARB

Project	Status	Year Constructed
Demolition		
Building 2426 [a]	Contributing Element	1960
Building 7071 [a]	Contributing Element	1941
Building 7045, Gas station relocation	Not Eligible**	1996
Building 7046, Gas station relocation	Not Eligible**	1996
Renovation		
Parking Ramp Taxi Lane Repair	Not Eligible**	1989
Building 7072, Maintenance Shops	Contributing Element	1941
Building 7073 (Hangar 5), AGE	Contributing Element	1941
Building 5103, Airmen Dormitory	Contributing Element	1957
Building 5375, Supply Facilities	Contributing Element	1956
Building 5377, Supply Facilities	Not Eligible**	2011
New Construction or Building Addition		
2-Bay Hanger (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops, and Personal Vehicle Parking)	NA	NA
Flight Simulators/Squadron Operations	NA	NA
Fuselage Trainer	NA	NA
Civil Engineering Grounds Facility	NA	NA
Gas Station (Relocate)	NA	NA
Building 1700 Fitness Center Expansion	Contributing Element	1949

Notes:

[a] *Potential relocation of underground cables, manholes, and duct work would be associated with these projects.*

** *Not Eligible based on the recent construction dates and the lack of significant cultural context*

A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

For Official Use Only

MAIN OPERATING BASE #3 KC-46A BEDDOWN
WESTOVER ARB, MA
1 – 5 JUNE 2015

HEADQUARTERS
AIR MOBILITY COMMAND
SCOTT AFB IL

CARLTON D. EVERHART, II
General, USAF
Commander

HEADQUARTERS
AIR FORCE RESERVE COMMAND
ROBINS AFB GA

JAMES F. JACKSON
Lt General, USAFR
Commander

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DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

Colonel Karen L. Magnus
439 MSG/CC
250 Patriot Avenue, Box 35
Westover ARB, MA 01022-1670

3 August 2016
① 60033

RECEIVED
AUG 04 2016
MASS. HIST. COMM

Mr. Ryan T. Maciej
Preservation Planner
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

RE: Section 106 Consultation on Proposed Air Force Beddown of the Third Main Operating Base of the KC-46A Tanker aircraft at Westover Air Reserve Base; MHC# RC.60033

Dear Mr. Maciej,

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A.5.4.1 Westover ARB NHPA Section 106 SHPO Consultation Response (Continued)

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The USAF respectfully requests concurrence from the MHC on the identification of historic properties within in the APE for the proposed undertaking and on the assessment of effects on those properties. In addition, in order to mitigate adverse effects of demolition of Hangar 7071 and Building 2426, the USAF is proposing HABS/HAER recordation of buildings proposed for demolition, mapping of the current and former boundaries of Westover ARB that identifies which of the original buildings and infrastructure existed and remains, and a reevaluation of the eligibility of the remaining portions of the district. The USAF at Westover ARB also invites the MHC to participate in the design review for new construction.

Please review the material enclosed and provide comment within 30 days. If you have any questions, the Westover ARB point of contact is Mr. John B. Moriarty, Chief Environmental Engineer, at (413) 557-2434.

Sincerely,

Karen S. Magnus

KAREN L. MAGNUS, Colonel, USAF
Commander

Attachment 1 – Map of APE for undertaking (former boundaries of Westover ARB)
Attachment 2 – Attachments for Westover ARB SHPO Letter for KC-46A MOB 3_EIS
Attachment 3 – KC-46A Site Survey Report

CONCURRENCE: Brona Simon
8/24/16
BRONA SIMON
STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION
RC.60033

A.6 NATURAL RESOURCES CONSULTATION

A.6.1 Grissom ARB Natural Resources Consultation Letters

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

25 March 2016

Mr. Jeffrey A. Woodring
Chief, Environmental Flight
7104 S. Warthog Street
Grissom ARB, IN 46971-1632

Mr. Scott Pruitt, Field Supervisor
U.S. Fish and Wildlife Service
Bloomington Indiana Field Office
620 S. Walker Street Bloomington, Indiana 47403-2121

Dear Mr. Pruitt

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Grissom Air Reserve Base (ARB), Indiana has been proposed as one of four alternative locations for this mission.

The MOB 3 mission involves the basing of 12 KC-46A aircraft. In addition to the aircraft, facilities, infrastructure and manpower would also be required to support the mission. For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required. Two new facilities would be constructed, several facilities would be renovated and two facilities would be demolished. In addition, the MOB 3 mission would require the repair of pavement on the existing KC-135 parking ramp. All construction or ground disturbance proposed by this project would be conducted within the current base boundary and no wetland areas would be impacted.

The addition of KC-46A operations would increase the total number of operations conducted at Grissom ARB by 17 percent. Approximately five percent of the total annual KC-46A sorties would be flown during acoustic night (between 10:00 PM and 7:00 AM). Practice approaches would be conducted by KC-46A aircrews at airfields other than Grissom ARB on an occasional basis. The KC-46A would be operated in existing airspace, and the types of flight operations would be similar to the existing KC-135 aircraft operations. KC-46A aircrews would use existing air refueling (AR) tracks and fuel jettison areas, if necessary. Flight activities involving refueling training would primarily occur in designated aerial refueling tracks. No new flight tracks are proposed for use.

The ROI for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as airspace operations. Grissom Air Reserve Base carefully reviewed the U.S. Fish and Wildlife Service's (USFWS's) Information for Planning and Conservation (IPaC) online system on January 13, 2016, to identify current USFWS trust resources, such as migratory birds, species proposed or listed under the Endangered Species Act (ESA), inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands with potential to be affected by the Proposed Action. Two separate submissions were completed to cover the area within the Region of Influence for biological resources:

Cass County, Indiana IPaC Trust Resource Report identified 1 threatened clam species, the rabbitsfoot (*Quadrula cylindrica cylindrica*); 1 endangered clam species, sheepnose mussel (*Plethobasus cyphyus*); 1 endangered mammal species, Indiana bat (*Myotis sodalis*); 1 threatened mammal species, northern long-eared bat (*Myotis septentrionalis*); 25 migratory birds; and several wetlands. No critical habitat was identified within the project area. No Wildlife Refuges were identified within Cass County. Please see Attachment 2 for a full copy of the Trust Resource Report.

Miami County, Indiana IPaC Trust Resource Report identified 1 threatened clam species, the rabbitsfoot (*Quadrula cylindrica cylindrica*); 1 threatened mammal species, Indiana bat (*Myotis sodalis*); 1 endangered mammal species, northern long-eared bat (*Myotis septentrionalis*); 27 migratory birds; and several wetlands. No critical habitat was identified within the project area. No Wildlife Refugees were identified within Miami County. Please see Attachment 2 for a full copy of the Trust Resource Report.

Additionally, special status species lists by county were obtained via the USFWS's Environmental Conservation Online System (ECOS) to identify species with the potential to occur within Cass and Miami Counties, Indiana. Attachment 3, Table 3-1, lists these species and their habitats.

In accordance with Section 7 of the ESA (16 U.S.C. §§ 1531–1544, as amended), the Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), and as part of the U.S. Air Force's Environmental Impact Analysis Process (EIAP), we request your input in identifying any additional species of concern, general or specific issues, or areas of concern you feel should be addressed in the EIS. The Air Force requests your agency's concurrence with the species list and effects determinations contained in Table 3-1. If your agency has any new or additional information other than that contained in Table 3-1, we request that you please provide your comments by April 25, 2016.

Please provide your comments directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; Building 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely

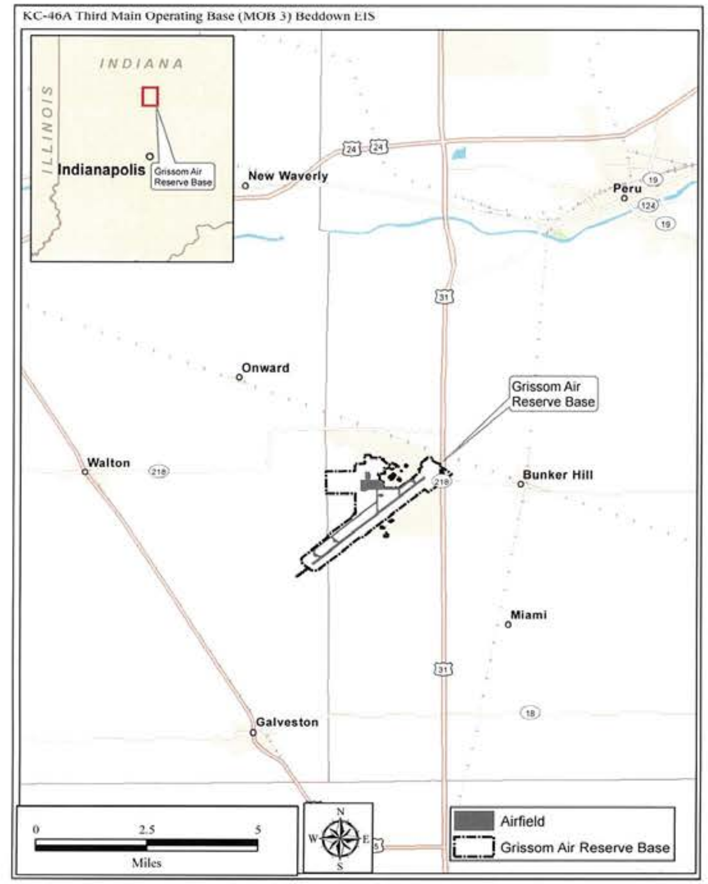
JEFFREY A. WOODRING, GS-12, P.E.
Chief, Environmental Flight

Attachments:
1. Grissom ARB Location Map
2. IPaC Trust Resource Reports for Cass and Miami Counties, Indiana
3. Table 3-1. Potential for Impacts from the Proposed Action to USFWS Special Status Species Known to or Believed to Occur in Cass and Miami Counties, Indiana

cc: Hamid Kamalpour, AFCEC/CZN

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 1. GRISSOM ARB LOCATION MAP



Regional Map of Grissom ARB

March 2016

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 2. IPaC TRUST RESOURCE REPORT

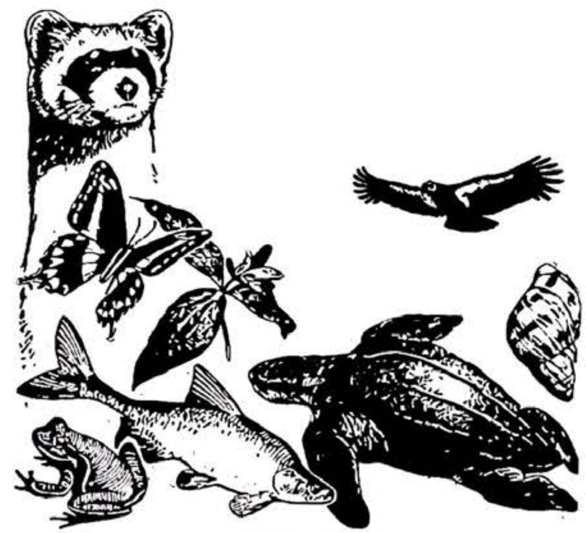
U.S. Fish & Wildlife Service

Grissom - Cass County, IN

IPaC Trust Resource Report

Generated January 13, 2016 09:27 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME

Grissom - Cass County, IN

LOCATION

Cass County, Indiana

DESCRIPTION

MOB 3

IPAC LINK

https://ecos.fws.gov/ipac/project/7PJVT-CRHN5-DXNKF-YZN5J-JVR6UM

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Bloomington Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
(812) 334-4261

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Clams

Rabbitsfoot Quadrula cylindrica cylindrica — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F03X

Sheepnose Mussel Plethobasus cyphyus — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F046

Mammals

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Acadian Flycatcher Empidonax virescens — Bird of conservation concern
Season: Breeding

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Bobolink Dolichonyx oryzivorus — Bird of conservation concern
Season: Breeding

Brown Thrasher Toxostoma rufum — Bird of conservation concern
Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Field Sparrow Spizella pusilla — Bird of conservation concern
Season: Breeding

Henslow's Sparrow Ammodramus henslowii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09D

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Marsh Wren Cistothorus palustris — Bird of conservation concern
Season: Breeding

Northern Flicker Colaptes auratus — Bird of conservation concern
Year-round

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges in this location

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete, or the acreages reported may be inaccurate. Please contact the local U.S. Fish & Wildlife office or visit the NWI map for a full list.

Freshwater Emergent Wetland

PEM1A	905.0 acres
PEM1C	103.0 acres
PEM1Ad	21.3 acres
PEM1F	19.5 acres
PEM1/UBF	13.2 acres
PEM1Cd	8.71 acres
PEM1/UBFh	1.07 acres

Freshwater Forested/shrub Wetland

PFO1A	544.0 acres
PFO1C	73.0 acres
PSS1/EM1C	40.8 acres
PSS1C	33.9 acres
PFO1/EM1A	28.1 acres
PFO1/SS1A	26.6 acres
PSS1A	21.2 acres
PFO1/EM1C	11.5 acres
PSS1/EM1A	9.16 acres
PFO1Cd	0.981 acre

Freshwater Pond

PAB4/EM2G	39.2 acres
PUBGx	24.2 acres
PAB4/UBF	16.3 acres
PAB/UBG	15.4 acres
PABG	13.2 acres
PAB4/UBG	12.7 acres
PAB/UBF	7.6 acres
PAB4/EM1F	7.21 acres
PUBF	5.48 acres
PUBG	3.29 acres
PAB4F	1.7 acres
PAB4/UBGx	1.29 acres
PABF	1.1 acres
PABGx	0.923 acre
PUBGh	0.637 acre
PAB/UBGx	0.53 acre
PUBFx	0.509 acre
PAB/UBFx	0.293 acre

Lake

L1UBHx	192.0 acres
L1UBH	44.1 acres

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

U.S. Fish & Wildlife Service

Grissom - Miami County, IN

IPaC Trust Resource Report

Generated January 13, 2016 09:28 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME

Grissom - Miami County, IN

LOCATION

Miami County, Indiana

DESCRIPTION

MOB 3

IPAC LINK

https://ecos.fws.gov/ipac/project/MXXIJ-72JY5-CALCQ-ZGUT5-YLVL5Q

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Bloomington Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
(812) 334-4261

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Clams

Rabbitsfoot Quadrula cylindrica cylindrica — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F03X

Mammals

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Acadian Flycatcher Empidonax virescens — Bird of conservation concern
Season: Breeding

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Black-crowned Night-heron Nycticorax nycticorax — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EU

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Bobolink Dolichonyx oryzivorus — Bird of conservation concern
Season: Breeding

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Brown Thrasher Toxostoma rufum — Bird of conservation concern
Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Common Tern Sterna hirundo — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09G

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Field Sparrow Spizella pusilla — Bird of conservation concern
Season: Breeding

Henslow's Sparrow Ammodramus henslowii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09D

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Marsh Wren Cistothorus palustris — Bird of conservation concern
Season: Breeding

Northern Flicker Colaptes auratus — Bird of conservation concern
Year-round

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

Refuge data is unavailable at this time.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 3. POTENTIAL FOR IMPACTS FROM THE PROPOSED ACTION TO USFWS SPECIAL STATUS SPECIES KNOWN TO OR BELIEVED TO OCCUR IN CASS AND MIAMI COUNTIES, INDIANA

Table 3-1. Potential for Impacts from the Proposed Action to USFWS Species Known to or Believed to Occur in Cass and Miami Counties, Indiana

Common Name	Scientific Name	Federal Listing Status	Habitat	Historically Observed at Grissom Air Reserve Base?	Potential for Impacts from the Proposed Action/ Effects Determination
Clams					
Rabbitsfoot	*Quadrula cylindrica cylindrica*	Threatened	Prefer shallow areas with sand and gravel along the bank and next to shoals, which provide a refuge in fast-moving rivers. Found in 13 states from Pennsylvania to Oklahoma.	No	No. Habitat for rabbitsfoot does not occur on Base. No effects to aquatic habitats will occur as a result of the Proposed Action.
Sheepnose Mussel	*Plethobasus cyphyus*	Endangered	Found in shallow areas or rivers and streams with moderate to swift currents that flow over coarse sand and gravel. May sometimes be found in areas of mud, cobble and boulders, and in large rivers they may be found in deep runs.	No	No. Habitat for sheepnose mussel does not occur on Base. No effects to aquatic habitats will occur as a result of the Proposed Action.
Mammals					
Indiana Bat	*Myotis sodalis*	Endangered	Found over most of the eastern half of the United States. Almost half of them hibernate in caves in southern Indiana.	No	No. Lack of suitable roost or foraging habitat present on base. No effects to Indiana bat will occur as a result of the Proposed Action.
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Summer roosting habitat includes underneath bark, in cavities, or in crevices of both live and dead trees, caves and mines. Opportunistic in roost selection, using tree species based on suitability to retain bark or provide cavities or crevices. Winter hibernacula include caves and mines. Large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents are preferred.	No	No. Lack of suitable roost or foraging habitat present on base. No effects to northern long-eared bat will occur as a result of the Proposed Action.

Source: Grissom ARB 2010; USFWS 2015a, d-g

A.6.1.1 Grissom ARB USFWS Section 7 Consultation Letter (Continued)

References:

Grissom Air Reserve Base (ARB) 2010. Natural Resources Management. Grissom ARB, Indiana. January 2011.

U.S. Fish and Wildlife Service (USFWS) 2015a. Environmental Conservation Online System. Species by County Reports. Accessed: http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=18017 and http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=18103 on 13 January 2016.

USFWS 2015b. Critical Habitat Portal. Accessed: http://ecos.fws.gov/crithab/ on 13 January 2016.

USFWS 2015c. Information for Planning and Conservation (IPaC). Accessed: https://ecos.fws.gov/ipac/project/KGW6DBT2HVGJLPMZI7DLB4WWOM/resources on 13 January 2016.

USFWS 2015d. Species Profile: Rabbitsfoot (*Quadrula cylindrica cylindrica*). Accessed: http://www.fws.gov/midwest/Endangered/clams/rabbitsfoot/index.html on 19 January 2016.

USFWS 2015e. Endangered Species. Northern Long-Eared Bat (*Myotis septentrionalis*). Accessed: http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html on 19 January 2016.

USFWS 2015f. Endangered Species. Indiana Bat (*Myotis sodalis*). Accessed: http://www.fws.gov/MIDWEST/endangered/mammals/inba/index.html on 19 January 2016.

USFWS 2015g. Endangered Species. Sheepnose Mussel (*Plethobasus cyphyus*). Accessed: http://www.fws.gov/Midwest/endangered/clams/sheepnose/index.html on 21 January 2016.

A.6.1.2 Grissom ARB USFWS Section 7 Consultation Response

United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

April 15, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCEC/CZN; Building 171
2261 Hughes Avenue, Suite 155
Lackland Air Force Base, Texas 78236-9853

Project: Third Main Operating Base (MOB 3) of KC-46A Tanker Aircraft
Location: Grissom Air Reserve Base, Miami and Cass Counties, Indiana

Dear Mr. Kamalpour:

This responds to Mr. Jeffrey A. Woodring's letter dated March 25, 2016, requesting our comments on the aforementioned project.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

The U.S. Air Force is preparing an Environmental Impact Statement to assess potential environmental issues associated with the possible use of Grissom ARB as 1 of 4 alternative locations for basing KC-46A tanker aircraft and the associated manpower and facilities. It is expected that 2 new facilities would be constructed, several would be renovated, and 2 existing facilities would be demolished; the existing aircraft parking ramp would require repaving. Construction would occur within the current base boundary, although information on the exact locations was not provided in the letter. Flights in and out of the air base would increase by 17 percent.

Grissom ARB consists of 1 runway approximately 2.75 miles long, a parallel taxiway, aircraft parking ramps, repair facilities, and various other necessary buildings including offices and housing. The Miami Correctional Facility is located within the boundary fence but is not associated with air base functions. Much of the land is maintained in grass; the facility is surrounded by privately owned croplands and some small, widely scattered woodlands.

The extensive grasslands on the base property provide quality nesting habitat for a number of rare grassland bird species. Perhaps most significant is the Indiana endangered and USFWS species of conservation concern upland sandpiper (*Bartramia longicauda*), which has successfully nested for at least 2 years, as confirmed by birders in 2014 and 2015 (Enclosures No. 1, 2, and 3). Additional grassland and shrubland bird species of conservation concern that are known to nest include bobolink (*Dolichonyx oryzivorus*), brown thrasher (*toxostoma rufum*), dickcissel (*Spiza Americana*), field sparrow (*Spizella pusilla*), Eastern meadowlark (*Sturnella magna*), and grasshopper sparrow (*Ammodramus savannarum*). Also observed and expected to nest are Northern bobwhite (*Colinus virginianus*), savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), killdeer (*Charadrius vociferous*), willow flycatcher (*Empidonax traillii*), and horned lark (*Eremophila alpestris*). The Indiana endangered and USFWS species of conservation concern Northern harrier (*Circus cyaneus*) has been observed during the summer at Grissom ARB (Enclosure No. 4); however, this species forages over large areas and breeding has not been confirmed at or near the base.

We are not aware of any conflicts between these breeding birds at Grissom ARB and aircraft operations. However, bird species that are known to congregate in large flocks at various times of the year, such as European starling (*Sturnus vulgaris*) red-winged blackbird (*Agelaius pheoniceus*), common grackle (*Quiscalus quiscula*), and brown-headed cowbird (*Molothrus ater*), may present some problems. These species are attracted to waste grain in crop fields, which are not present on Grissom ARB but are the main land use surrounding the base.

Most of the other bird species listed in the IPaC Trust Species Reports for Miami and Cass Counties, which were provided with your letter, are not expected to be found at Grissom ARB because the habitats they require, which are wetlands (*e.g.* black-crowned night heron, common tern, pied-billed grebe, marsh wren), shrublands (*e.g.* loggerhead shrike, Bell's vireo, blue-winged warbler), or forestlands (*e.g.* Acadian flycatcher, wood thrush, cerulean warbler, prothonotary warbler) are not present. Henslow's sparrow (*Ammodramus henslowii*) and short-eared owl (*Asio flammeus*) are grassland species but we do not have information on their presence at Grissom ARB.

There is a winter roost of bald eagles (*Haliaeetus leucocephalus*) along the Mississinewa River downstream of Mississinewa Lake, where the river remains open due to water releases from the dam. Although the number of birds varies by weather conditions, which dictate the locations of open water around the state, as many as 89 eagles have been observed at one time (Enclosure No. 5). This roost is located approximately 8.75 miles northeast of the end of Grissom ARB Runway 23.

ENDANGERED SPECIES

Miami and Cass Counties are within the range of the Federally endangered Indiana bat (*Myotis sodalis*) and sheepnose mussel (*Plethobasus cyphyus*) and the threatened northern long-eared bat (*Myotis septentrionalis*) and rabbitsfoot mussel (*Quadrula cylindrica cylindrica*). However,

A.6.1.2 Grissom ARB USFWS Section 7 Consultation Response (Continued)

3

there is no habitat for these species at Grissom ARB. Critical Habitat has been designated for the Indiana bat and rabbitsfoot mussel, but no areas within Miami and Cass Counties are included within those designations. Therefore, we concur with your determination that the proposed project is not likely to adversely affect these endangered and threatened species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. However, should new information arise pertaining to project plans or a revised species list be published, please contact us for further coordination.

For further discussion, please contact Elizabeth McCloskey at (219) 983-9753 or elizabeth_mccloskey@fws.gov.

Sincerely yours,

Elizabeth S. McCloskey
Acting
for Scott E. Pruitt
Supervisor

[IN-BIRD-L] Grissom Uplands: nesting confirmed
1 message

James Haw <in-bird-l@list.indiana.edu> Sat, Jun 7, 2014 at 1:42 PM
Reply-To: jhawillet@aol.com
To: in-bird-l@list.indiana.edu

Thanks to Landon Neumann for finding and posting the 3 Upland Sandpipers at Grissom AFB, Miami Co. I went after them this morning, arriving at Grissom around 9:15. I found the pair of adults on the ground near the AFB fence. As I approached and stopped the car, I saw two half-grown chicks running away from the road and into taller grass while one of the adults gave a series of soft calls. Thus nesting at Grissom is confirmed.

The third adult Upland was on the fence farther west but still in Miami Co.

Since I had essentially no grassland birds on my Miami Co. list, I picked up four additional county birds at Grissom: Savannah Sparrow, Dickcissel, Bobolink, and Eastern Meadowlark.

I then headed to Mississinewa for an 11 a.m. picnic lunch. Finding bird activity slackening rapidly in the midday heat, the recreation areas full of people, and my day's energy expended,.I soon after lunch headed for home.

Jim Haw

ENCLOSURE NO. 1.

A.6.1.2 Grissom ARB USFWS Section 7 Consultation Response (Continued)

[IN-BIRD-L] Upland Sandpiper, Eurasian-collared Dove
1 message

Landon Neumann <landonneumann25@gmail.com> Thu, Jul 10, 2014 at 9:54 PM
Reply-To: Landon Neumann <landonneumann25@gmail.com>
To: in-bird-l@list.indiana.edu

This morning I birded Grissom Airfield. For the 7th time this summer I've had Upland Sandpiper here. Not surprisingly since they are about down nesting they have gotten much harder here. I lucked out and flushed one along the road. Other than that that was the only Upland that I had. Another big surprise was finding a Eurasian-collared Dove on the way back in Walton. This is the farthest east that collared dove have been found in Cass so far. Before this they were only in Royal Center and Young America which are on the far western side of Cass Co. Walton is located on the eastern side of the county.

Grissom Airbase
Northern Bobwhite 1 Cass
Red-tailed Hawk 1
Upland Sandpiper 1 Miami
Killdeer 5
Mourning Dove 5
Yellow-billed Cuckoo 1 Cass
Willow Flycatcher 1 Cass
Brown Thrasher 2
European Starling 25
Savannah Sparrow 5
Grasshopper Sparrow 3 Cass
Song Sparrow 2
Red-winged Blackbird 20
Eastern Meadowlark 30
Common Grackle 1

Walton

Eurasian-collared Dove

Landon Neumann
Logansport, Cass County

ENCLOSURE NO. 2.

[IN-BIRD-L] Upland Sandpiper at Grissom AFB (Miami County this morning.)
1 message

Bud Dodrill <bud1880@gmail.com> Mon, May 18, 2015 at 1:07 PM
Reply-To: Bud Dodrill <bud1880@gmail.com>
To: in-bird-l <in-bird-l@list.indiana.edu>

Keeping tabs on the Upland Sandpiper. Still hanging around Grissom.

Grissom Air Reserve Base, Miami, US-IN
May 18, 2015 8:50 AM - 9:10 AM
Protocol: Traveling
1.0 mile(s)
Comments: Went specifically to find Upland Sandpiper. Found sitting on a fence pole just inside the Miami County line, southeast side of the main runway.
12 species

Upland Sandpiper 1 Continuing bird.
Mourning Dove 1
Barn Swallow 2
American Robin 1
European Starling 1
Savannah Sparrow 2
Song Sparrow 1
Northern Cardinal 1
Red-winged Blackbird 30
Eastern Meadowlark 4
Common Grackle 2
Brown-headed Cowbird 6

View this checklist online at http://ebird.org/ebird/view/checklist?subID=S23513386

This report was generated automatically by eBird v3 (http://ebird.org)

ENCLOSURE NO. 3.

A.6.1.2 Grissom ARB USFWS Section 7 Consultation Response (Continued)

[IN-BIRD-L] Grissom - Northern Harrier x 2
1 message

Jeff Timmons <jeffreytimmons@comcast.net> Fri, Jul 31, 2015 at 5:42 PM
Reply-To: Jeff Timmons <jeffreytimmons@comcast.net>
To: in-bird-l <in-bird-l@list.indiana.edu>

On my way north I stopped at Grissom at daybreak to look for Upland Sandpiper. I was not able to locate them. However, as I drove along the airport there were two Northern Harrier flying low over the field. I noticed the long tail and white rump patch immediately on the brown birds. Lighting was terrible so I was not able to see much else.

Species	Count
Northern Harrier	2
Killdeer	1
Mourning Dove	8
American Kestrel	3
Horned Lark	6
European Starling	6
Savannah Sparrow	6
Grasshopper Sparrow	2
Song Sparrow	4
Eastern Meadowlark	1

Jeff Timmons

ENCLOSURE NO. 4.

Lynnanne <leavesofthefall@EMBARQMAIL.COM>
Sent by: Bird discussion list for Indiana <IN-BIRD-L@LISTSERV.INDIANA.EDU>

01/07/2011 09:39 PM

To IN-BIRD-L@LISTSERV.INDIANA.EDU
cc
bcc
Subject Re: [IN-BIRD-L] Super Eagle Day... Wabash, Miami counties

Hello,

It's been a long day. I forgot to mention the RED-SHOULDERED HAWK (Wabash Co.) located at Salamonie Dam tail waters. It flew from the south to north side of the water. We also had a COOPER'S (Lagro area) and SHARP-SHINNED HAWK (SR 124) (both Wabash Co).

lf

----- Original Message -----
From: "Lynnanne" <leavesofthefall@EMBARQMAIL.COM>
To: IN-BIRD-L@LISTSERV.INDIANA.EDU
Sent: Friday, January 7, 2011 9:24:09 PM
Subject: [IN-BIRD-L] Super Eagle Day... Wabash, Miami counties

John Castrale's post (along with another nudge, you know who you are) on the Parke County roost prompted me to do what I've wanted to do for a few years -- count the Miami roost as the birds take off in the morning. What a thrill!

I was there well before sunup, along with my son who helped tally. The first birds started taking off around 7:15 a.m. and continued until around 8:45 a.m. All total, there were 89 BALD EAGLES that took flight from the roost. I do believe, however, since this roost is on a bend of the river that I was only seeing a partial number of actual birds roosting here. At around 9 a.m., another bird flew in -- an IMMATURE GOLDEN EAGLE -- alongside a baldie. I can't be certain, but it's highly possible this bird has been roosting with the baldies. I didn't realize the two birds were coming in behind me until they crested my shoulder. It and the bald flew low over the river away from me, towards the roost. This is when I first noticed its tail and the wide black terminal band and white area. It landed in a sycamore along the river where I shot a few lousy photos. I didn't take my scope (???), so was only able to view it through binoculars. It's head looked smaller, and golden, but was it? (I emailed a photo to Don Gorney so he could ease my doubts. Thanks Don!) It then flew to the other side of the river (where I was able to get another view of its golden self) which is bordered by trees and field. I lost the bird in the brushy tree line.

ENCLOSURE NO. 5.

A.6.1.3 Grissom ARB IDNR Consultation Response

THIS IS NOT A PERMIT

State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Early Coordination/Environmental Assessment

DNR #: ER-18973 **Request Received:** April 4, 2016

Requestor: United States Air Force, AFCEC/CZN
Mr. Hamid Kamalpour
2261 Hughes Avenue
Suite 155
Lackland AFB, TX 78236-9853

Project: Potential KC-46A Third Main Operation Base (MOB 3) Beddown at Grissom Air Reserve Base

County/Site Info: Miami - Cass

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

If our agency has regulatory jurisdiction over the project, the recommendations contained in this letter may become requirements of any permit issued. If we do not have permitting authority, all recommendations are voluntary.

Regulatory Assessment: Proposals at this site may require the formal approval of our agency pursuant to the Flood Control Act (IC 14-28-1) for any proposal to construct, excavate, or fill in or on the floodway of a stream or other flowing waterbody which has a drainage area greater than one square mile. Please submit more detailed plans to the Division of Water's Technical Services Section if you are unsure whether or not a permit will be required.

Natural Heritage Database: The Natural Heritage Program's data have been checked.
The Nickel Plate Trail and the species below have been documented within 1/2 mile northeast of the project area.

1. American Badger (Taxidea taxus), state species of special concern
2. Kidneyshell (Ptychobranchus fasciolaris), state species of special concern

Fish & Wildlife Comments: As long as standard erosion control measures area implemented, we do not foresee any impacts to the mussel species above as a result of this project. Also, badgers are a wide ranging species that prefer an open, prairie-type habitat, with Indiana being at the eastern edge of their natural range. The range of the badger continues to expand as a result of land-use changes from forest to farmland and open pastureland. Impacts to the American badger or its preferred habitat are unlikely as a result of this project.

We are unable to determine the full extent of potential impacts to fish, wildlife, and botanical resources based on the information provided. However, given the resources located at Grissom Air Reserve Base, we recommend a mitigation plan be developed (and submitted with the permit application, if required) if habitat impacts will occur. The DNR's Floodway Habitat Mitigation guidelines (and plant lists) can be found online at: http://www.in.gov/legislative/iac/20140806-IR-312140295NRA.xml.pdf.

Impacts to non-wetland forest of one (1) acre or more should be mitigated at a minimum 2:1 ratio. If less than one acre of non-wetland forest is removed in a rural setting, replacement should be at a 1:1 ratio based on area. Impacts to non-wetland forest under one (1) acre in an urban setting should be mitigated by planting five trees, at least 2 inches in diameter-at-breast height (dbh), for each tree which is removed that is 10" dbh or greater (5:1 mitigation based on the number of large trees).

THIS IS NOT A PERMIT

State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Early Coordination/Environmental Assessment

The measures below should be implemented to avoid, minimize, or compensate for impacts to fish, wildlife, and botanical resources:
1. Revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue), legumes, and native shrub and hardwood tree species as soon as possible upon completion.
2. Minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush.
3. Do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife.
4. Do not cut any trees suitable for Indiana bat or Northern Long-eared bat roosting (greater than 3 inches dbh, living or dead, with loose hanging bark, or with cracks, crevices, or cavities) from April 1 through September 30.
5. Appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized.

Contact Staff: Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife
Our agency appreciates this opportunity to be of service. Please contact the above staff member at (317) 232-4080 if we can be of further assistance.

Christie L. Stanifer **Date:** April 22, 2016

Christie L. Stanifer
Environ. Coordinator
Division of Fish and Wildlife

A.6.2 Seymour Johnson AFB Natural Resources Consultation Letters

A.6.2.1 Seymour Johnson AFB USFWS Section 7 Consultation Letter

DEPARTMENT OF THE AIR FORCE
4TH FIGHTER WING (ACC)
SEYMOUR JOHNSON AIR FORCE BASE NC

Mr. Dennis G. Goodson, P.E.
Deputy Base Civil Engineer
1095 Peterson Ave
Seymour Johnson AFB, NC 27531-2355

Mr. John Hammond, Endangered Species Coordinator, Military Projects
U.S. Fish and Wildlife Service
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726

Dear Mr. Hammond,

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Seymour Johnson Air Force Base (AFB), North Carolina has been proposed as one of four alternative locations for this mission.

The MOB 3 mission involves the basing of 12 KC-46A aircraft. In addition to the aircraft, facilities, infrastructure and manpower would also be required to support the mission. For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required. Two new facilities would be constructed, several facilities would be renovated and two facilities would be demolished. All construction or ground disturbance proposed by this project would be conducted within the current base boundary and no wetland areas would be impacted.

The addition of KC-46A operations would increase the total number of operations conducted at Seymour Johnson AFB by 68 percent. Approximately five percent of the total annual KC-46A sorties would be flown during acoustic night (between 10:00 PM and 7:00 AM). Seymour Johnson AFB-based KC-46A aircrews would primarily use the Kinston Regional Jetport for off-station practice approaches, conducting up to 1,774 airfield operations at that location. Other airfields would be used on an occasional basis. The KC-46A would be operated in existing airspace, and the types of flight operations would be similar to the existing KC-135 aircraft operations. KC-46A aircrews would use existing air refueling (AR) tracks and fuel jettison areas, if necessary. Flight activities involving refueling training would primarily occur in designated aerial refueling tracks. No new flight tracks are proposed for use.

The ROI for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as airspace operations. Seymour Johnson AFB carefully reviewed the U.S. Fish and Wildlife Service's (USFWS's) Information for Planning and Conservation (IPaC) online system on January 13, 2016, to identify current USFWS trust resources, such as migratory birds, species proposed or listed under the Endangered Species Act (ESA), inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands with potential to be affected by the Proposed Action. A submission for Wayne County, North Carolina was completed to cover the area within the Region of Influence for biological resources:

Wayne County, North Carolina IPaC Trust Resource Report identified 1 endangered bird, the Red-cockaded Woodpecker (*Picoides borealis*), and 23 migratory birds. No wetlands, critical habitat, or Wildlife Refugees were identified within the project area. Please see Attachment 2 for a full copy of the Trust Resource Report.

Additionally, special status species lists by county were obtained via the USFWS's Environmental Conservation Online System (ECOS) to identify species with the potential to occur within Wayne County, North Carolina. Attachment 3, Table 3-1, lists these species and their habitats.

In accordance with Section 7 of the ESA (16 U.S.C. §§ 1531–1544, as amended), the Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), and as part of the U.S. Air Force's Environmental Impact Analysis Process (EIAP), we request your input in identifying any additional species of concern, general or specific issues, or areas of concern you feel should be addressed in the EIS. The Air Force requests your agency's concurrence with the species list and effects determinations contained in Table 3-1. If your agency has any new or additional information other than that contained in Table 3-1, we request that you please provide comment by April 30, 2016.

Please provide your comments directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; Building 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

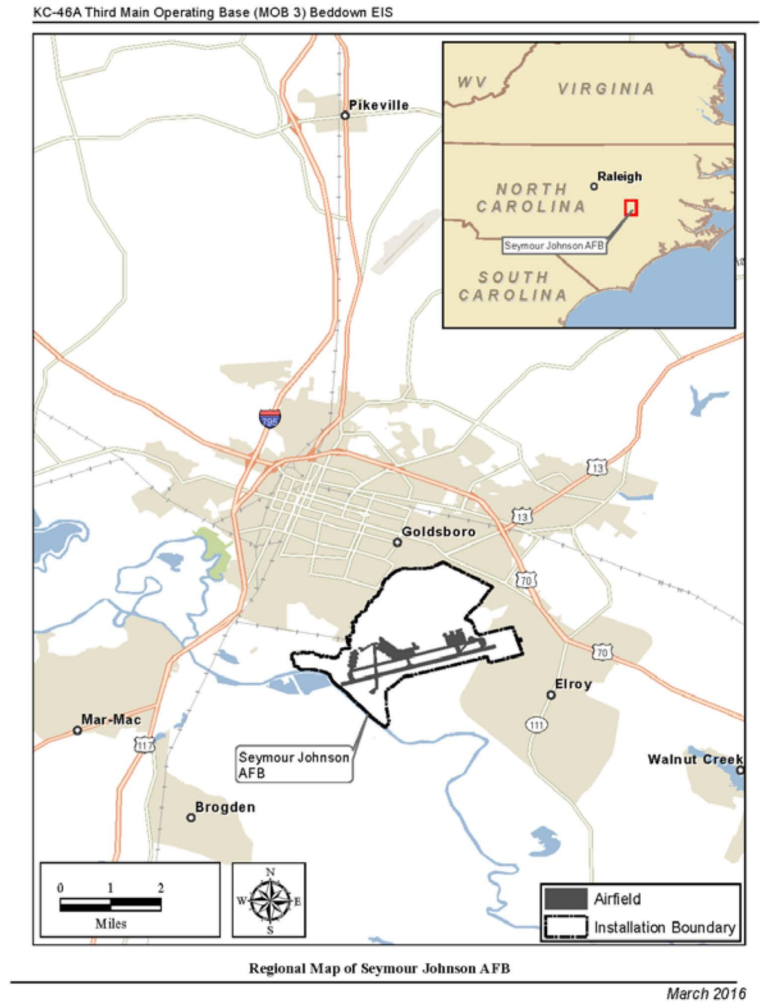
DENNIS G. GOODSON, P.E.

3 Attachments:
1. Seymour Johnson AFB Location Map
2. IPaC Trust Resource Report for Wayne County, North Carolina
3. Table 3-1. Potential for Impacts from the Proposed Action to USFWS Special Status Species Known to or Believed to Occur in Wayne County, North Carolina

cc: Hamid Kamalpour, AFCEC

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 1. SEYMOUR JOHNSON AFB LOCATION MAP



A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 2. IPaC TRUST RESOURCE REPORT

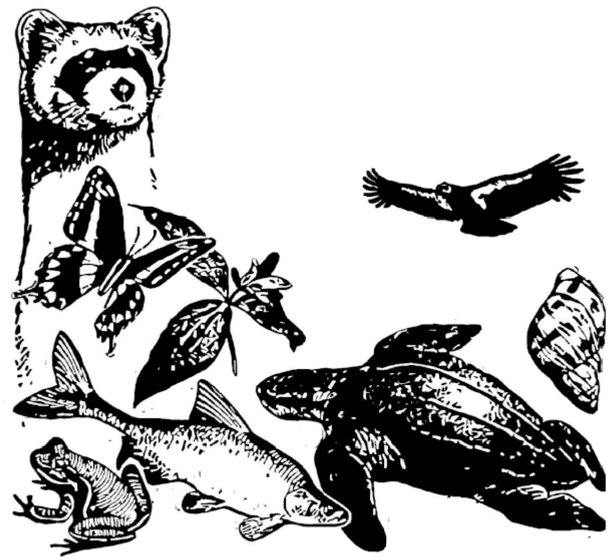
U.S. Fish & Wildlife Service

Seymour Johnson

IPaC Trust Resource Report

Generated January 13, 2016 09:15 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME
Seymour Johnson

LOCATION
Wayne County, North Carolina

DESCRIPTION
MOB 3

IPAC LINK
https://ecos.fws.gov/ipac/project/SEJEI-IGUOJ-BABNL-HBYP3-DJ7XUA

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Red-cockaded Woodpecker *Picoides borealis* Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B04F

Critical Habitats

There are no critical habitats in this location

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

American Kestrel Falco sparverius paulus — Bird of conservation concern
Year-round

American Bittern Botaurus lentiginosus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black-throated Green Warbler Dendroica virens — Bird of conservation concern
Season: Breeding

Brown-headed Nuthatch Sitta pusilla — Bird of conservation concern
Year-round

Chuck-will's-widow Caprimulgus carolinensis — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Henslow's Sparrow Ammodramus henslowii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09D

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Lesser Yellowlegs Tringa flavipes — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MD

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Sedge Wren Cistothorus platensis — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Swainson's Warbler Limnothlypis swainsonii — Bird of conservation concern
Season: Breeding

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Yellow Rail Coturnicops noveboracensis — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JG

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

Refuge data is unavailable at this time.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS
The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

ATTACHMENT 3. POTENTIAL FOR IMPACTS FROM THE PROPOSED ACTION TO USFWS SPECIAL STATUS SPECIES KNOWN TO OR BELIEVED TO OCCUR IN WAYNE COUNTY, NORTH CAROLINA

Attachment 3

Table 3-1. Potential for Impacts from the Proposed Action to USFWS Species Known to or Believed to Occur in Wayne County, North Carolina

Common Name	Scientific Name	Federal Listing Status	Habitat	Historically Observed at SJAFB?	Potential for Impacts from the Proposed Action/ Effects Determination
Birds					
Red-Cockaded woodpecker	*Picoides borealis*	Endangered	Inhabits mature pine forests such as Longleaf pines (*Pinus palustris*) and southern pine. Red-cockaded woodpeckers excavate cavities exclusively in living pine trees. Cavities are excavated in mature pines, generally over 80 years old.	No	No. Basewide surveys conducted in 2002 did not detect presence or potential habitat to support the red-cockaded woodpecker. A USFWS letter of concurrence received in 2002 stated that red-cockaded woodpecker is unlikely to utilize SJAFB for nesting or foraging (USFWS 2002). Additionally, potential nesting sites such as mature longleaf and lolbolly pines will not be disturbed from construction as a result of the Proposed Action. SJAFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes (SJAFB 2015). No effects to red-cockaded woodpecker are anticipated as a result of the Proposed Action.

Source: USFWS 2015a,d, USWFWS 2002

A.6.2.1. Seymour Johnson AFB USFWS Section 7 Consultation Letter (Continued)

References:

Seymour Johnson Air Force Base (SJAFB) 2015. Bird Aircraft Strike Hazard (BASH) Plan. Seymour Johnson Air Force Base Goldsboro, North Carolina. February 2015.

U.S. Fish and Wildlife Service (USFWS) 2002. Potential for Red-cockaded Woodpecker (*Picoides borealis*) and Its Habitat on Seymour Johnson Air Force Base, North Carolina.

USFWS 2015a. Environmental Conservation Online System. Species by County Reports. Accessed: http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=37191 on 13 January 2016.

USFWS 2015b. Critical Habitat Portal. Accessed: http://ecos.fws.gov/crithab/ on 13 January 2016.

USFWS 2015c. Information for Planning and Conservation (IPaC). Accessed: https://ecos.fws.gov/ipac/project/MSRW7UORLFHTTFDCWU2CUD6NRY/resources on 13 January 2016.

USFWS 2015d. Environmental Conservation Online System (ECOS) Species Profile for Red-Cockaded woodpecker (*Picoides borealis*). Accessed: https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B04F on 19 January 2016.

A.6.2.2 Seymour Johnson AFB USFWS Section 7 Consultation Response

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

May 9, 2016

Mr. Hamid Kamalpour
United State Air Force, AFCEC/CZN
Building 171
2261 Hughes Ave., Ste. 155
Lackland AFB, TX 78236-9853

Dear Mr. Kamalpour:

The Fish and Wildlife Service (Service) has reviewed the March 31, 2016 letter and enclosures from Mr. Dennis Goodson, P.E., Seymour Johnson Air Force Base (SJAFB), regarding the proposed beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft on Seymour Johnson Air Force Base (SJAFB), Goldsboro, Wayne County, North Carolina. SJAFB has been proposed as one of four alternative locations for siting of the proposed MOB 3 beddown. Mr. Goodson's letter indicates that in the process of identifying biological resources that could be affected by the proposed action, the United States Air Force (Air Force) found that there are element occurrences for the federally endangered red-cockaded woodpecker (*Picoides borealis*; RCW) within Wayne County. Our comments are provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 USC 1531 et seq.).

Accommodation of the MOB 3 at SJAFB would involve basing of 12 KC-46A Pegasus aircraft on the installation in Wayne County, North Carolina. The proposed action would also include fulfilling facilities, infrastructure and manpower needs associated with MOB 3 at SJAFB to accomplish the mission. The Air Force plans to use as many existing facilities as possible, although some new facility construction would be necessary. Mr. Goodson's letter states that two new buildings would be constructed, several structures would be renovated and two would be demolished. All construction or ground disturbance proposed by this project would be conducted within the current base boundary and no wetland areas would be affected.

The addition of KC-46A operations at SJAFB would increase the overall amount of operations on the installation by 68 percent. Of the total number of annual KC-46A sorties, about five percent would take place between 10:00 PM and 7:00 AM (acoustic night period). SJAFB aircrews would conduct up to 1,774 off-station practice approaches on the Kinston Regional Jetport (Lenoir County). Other airfields would be used on an occasional basis.

The KC-46A would be operated in existing airspace, and the types of flight operations would be similar to the existing KC-135 tanker aircraft operations. KC-46A aircrews would use existing air refueling (AR) tracks and fuel jettison areas, if necessary. Flight activities involving refueling training would primarily occur in designated aerial refueling tracks. No new flight tracks are proposed for use.

The biological evaluation enclosed with Mr. Goodson's March 31, 2016 letter indicates that the Air Force has considered the proposed project's effects on the RCW. There are no known records for RCWs on SJAFB. The installation's 2015 Integrated Natural Resource Management Plan (INRMP) points out that there are pine trees that may be old enough to be used by RCWs for cavity excavation. However, any potential foraging habitat present is sparse and fragmented.

Mr. Goodson's March 31, 2016 letter also points out that the proposed basing of the KC-46A at SJAFB would not require the removal of mature pine forest on the installation. Based on the sparse distribution of the small amounts of pine and mixed pine-hardwood forest on the installation, the Air Force has concluded that the proposed action will have no effect on the RCW.

Based on a review of the information provided, the Service concurs with the Air Force's determination that the proposed action, siting the KC-46A MOB 3 at SJAFB, will have no effect on the red-cockaded woodpecker or any other federally listed species and no federally designated critical habitat for protected species occurs on or in the vicinity of the project.

We believe that the requirements of section 7(a)(2) of the Act have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

If you have any questions regarding this matter, please contact Mr. John Hammond at 919-856-4520 (Ext. 28). Thank you for your continued cooperation with our agency.

Sincerely,

John A. Hammond
for Pete Benjamin
Field Supervisor

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A.6.3 Tinker AFB Natural Resources Consultation Letters

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

17 March 2016

Mr. Tim Taylor
72 ABW/CEIEC
7535 5th Street
Tinker AFB, OK 73145

Mr. Ken Collins, T&E Branch Chief
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

Dear Mr. Collins,

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Tinker Air Force Base (AFB), Oklahoma has been proposed as one of four alternative locations for this mission.

The MOB 3 mission involves the basing of 12 KC-46A aircraft. In addition to the aircraft, facilities, infrastructure and manpower would also be required to support the mission. For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required. Two new facilities would be constructed, several facilities would be renovated and five facilities would be demolished. In addition, the MOB 3 mission would require expansion of the ramp and shoulders along the existing aircraft parking ramp. All construction or ground disturbance proposed by this project would be conducted within the current base boundary. There is a potential that the proposed parking ramp expansion could have wetland impacts.

The addition of KC-46A operations would increase the total number of operations conducted at Tinker AFB by 168 percent. Approximately eleven percent of the total annual KC-46A sorties would be flown during acoustic night (between 10:00 PM and 7:00 AM). Practice approaches would be conducted by KC-46A aircrews at airfields other than Tinker AFB on an occasional basis. The KC-46A would be operated in existing airspace, and the types of flight operations would be similar to the existing KC-135 aircraft operations. KC-46A aircrews would use existing air refueling (AR) tracks and fuel jettison areas, if necessary. Flight activities involving refueling training would primarily occur in designated aerial refueling tracks. No new flight tracks are proposed for use.

The ROI for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as airspace operations. Tinker AFB carefully reviewed the U.S. Fish and Wildlife Service's (USFWS's) Information for Planning and Conservation (IPaC) online system on January 13, 2016, to identify current USFWS trust resources, such as migratory birds, species proposed or listed under the Endangered Species

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

Act (ESA), inter-jurisdiction fishes, wetlands, and USFWS National Wildlife Refuge System lands with potential to be affected by the Proposed Action. A submission for Oklahoma County, Oklahoma was completed to cover the area within the Region of Influence for biological resources:

> **Oklahoma County, Oklahoma IPaC Trust Resource Report** identified 2 endangered bird species, the least tern (*Sterna antillarum*) and whooping crane (*Grus americana*), 2 threatened bird species, the piping plover (*Charadrius melodus*) and red knot (*Calidris canutus rufa*);1 threatened fish species, the Arkansas river shiner (*Notropis girardi*); 28 migratory birds, and several wetlands. No critical habitat or Wildlife Refugees were identified within the project location. Please see Attachment 2 for a full copy of the Trust Resource Report.

Additionally, special status species lists by county were obtained via the USFWS's Environmental Conservation Online System (ECOS) to identify species with the potential to occur within Oklahoma County, Oklahoma. Attachment 3, Table 3-1, lists these species and their habitats.

In accordance with Section 7 of the ESA (16 U.S.C. §§ 1531–1544, as amended), the Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), and as part of the U.S. Air Force's Environmental Impact Analysis Process (EIAP), we request your input in identifying any additional species of concern, general or specific issues, or areas of concern you feel should be addressed in the EIS. The Air Force requests your agency's concurrence with the species list and effects determinations contained in Table 3-1. If your agency has any new or additional information other than that contained in Table 3-1, we request that you please provide comment by April 26, 2016.

Please provide your comments directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; Building 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely,

CATHY R. SCHEIRMAN, P.E.
Base Civil Engineer

Attachments:
1. Tinker AFB Location Map
2. IPaC Trust Resource Report for Oklahoma County, Oklahoma
3. Table 3-1. Potential for Impacts from the Proposed Action to USFWS Special Status Species Known to or Believed to Occur in Oklahoma County, Oklahoma

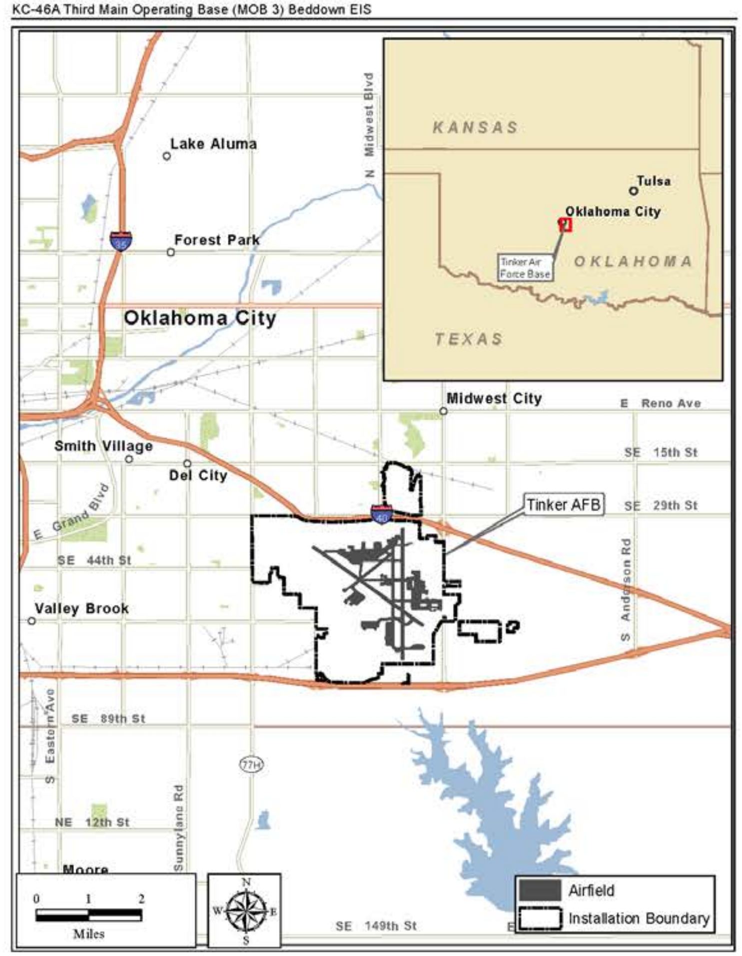
cc: Hamid Kamalpour, AFCEC

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

ATTACHMENT 1. TINKER AFB LOCATION MAP

KC-46A Third Main Operating Base (MOB 3) Beddown EIS



Regional Map of Tinker AFB

March 2016

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

ATTACHMENT 2. IPaC TRUST RESOURCE REPORT

U.S. Fish & Wildlife Service

Tinker

IPaC Trust Resource Report

Generated January 13, 2016 03:24 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME
Tinker

LOCATION
Oklahoma County, Oklahoma

DESCRIPTION
MOB 3

IPAC LINK
https://ecos.fws.gov/ipac/project/H2O4E-JL5CJ-FLFFG-IEP4S-IIUXEQ

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
(918) 581-7458

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Least Tern Sterna antillarum — Endangered

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF ANY OF THE FOLLOWING CONDITIONS APPLY
Towers (i.e. radio, television, cellular, microwave, meterological)
Wind Turbines and Wind Farms

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07N

Piping Plover Charadrius melodus — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Whooping Crane Grus americana — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B003

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

Fishes

Arkansas River Shiner Notropis girardi — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E05X

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Burrowing Owl Athene cunicularia — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC

Cassin's Sparrow Aimophila cassinii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0K2

Chestnut-collared Longspur Calcarius ornatus — Bird of conservation concern
Season: Wintering

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

Golden Eagle Aquila chrysaetos — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV

Harris's Sparrow Zonotrichia querula — Bird of conservation concern
Season: Wintering

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
Season: Migrating

Lark Bunting Calamospiza melanocorys — Bird of conservation concern
Season: Breeding

Le Conte's Sparrow Ammodramus leconteii — Bird of conservation concern
Season: Wintering

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Lewis's Woodpecker Melanerpes lewis — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ

Little Blue Heron Egretta caerulea — Bird of conservation concern
Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Long-billed Curlew Numenius americanus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S

Mississippi Kite Ictinia mississippiensis — Bird of conservation concern
Season: Breeding

Orchard Oriole Icterus spurius — Bird of conservation concern
Season: Breeding

Painted Bunting Passerina ciris — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rufous-crowned Sparrow Aimophila ruficeps — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MX

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Scissor-tailed Flycatcher Tyrannus forficatus — Bird of conservation concern
Season: Breeding

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Sprague's Pipit Anthus spragueii — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GD

Swainson's Hawk Buteo swainsoni — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B070

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

ATTACHMENT 3. POTENTIAL FOR IMPACTS FROM THE PROPOSED ACTION TO USFWS SPECIAL STATUS SPECIES KNOWN TO OR BELIEVED TO OCCUR IN OKLAHOMA COUNTY, OKLAHOMA

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

Attachment 3

Table 3-1. Potential for Impacts from the Proposed Action to USFWS Species Known to or Believed to Occur in Oklahoma County, Oklahoma

Common Name	Scientific Name	Federal Listing Status	Habitat	Historically Observed at Tinker AFB?	Potential for Impacts from the Proposed Action/ Effects determination
Birds					
Whooping Crane	*Grus americana*	Endangered	May pass through Oklahoma each spring and fall during migration. Typically found in shallow wetlands, marshes, the margins of ponds and lakes, sandbars and shorelines of shallow rivers, wet prairies and crop fields near wetlands.	No	No. Suitable habitat for whooping crane is not location on Tinker AFB Tinker AFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes (Tinker AFB 2014).
American Peregrine Falcon	*Falco peregrinus anatum*	Recovery	Global in distribution. General ecosystem types in which peregrine falcon occurs include arctic tundra, tropical ecosystems, deserts, wetlands, grasslands, mountainous regions, continental forests, maritime islands, and urban areas. In Texas and Oklahoma, peregrine falcons are resident in sand shinnery oak communities.	No	No. Tinker AFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes (Tinker AFB 2014).
Piping Plover	*Charadrius melodus*	Threatened	Found on mudflats, sandy beaches and shallow wetlands with sparse vegetation. May be found along the margins of lakes and large rivers where there is exposed (bare) sand or mud. There are two nesting records for the Piping Plover in the Oklahoma panhandle, but this species is normally a spring and fall migrant through the state.	Yes*	No. Suitable habitat for piping plover is not location on Tinker AFB. Tinker AFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes (Tinker AFB 2014).
Least Tern	*Sterna antillarum*	Endangered	Rare species in Oklahoma, but may be found during the late spring and summer breeding season (mid-May through late August) along portions of the Arkansas, Cimarron, Canadian and Red rivers. Lives along large rivers and may sometimes be found	No	No. Tinker AFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes

A.6.3.1 Tinker AFB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

Common Name	Scientific Name	Federal Listing Status	Habitat	Historically Observed at Tinker AFB?	Potential for Impacts from the Proposed Action/ Effects determination
			hunting fish in shallow wetlands and the margins of ponds and lakes. Require bare sand and gravel for nesting and typically nest in small colonies consisting of two to 20 pairs along large rivers on sand bars and scoured bends.		(Tinker AFB 2014).
Red Knot	*Calidris canutus rufa*	Threatened	Rare species in Oklahoma but may occur as a stopover migrant. Red knots use inland saline lakes as stopover habitat in the Northern Great Plains. May also use manmade freshwater habitats along inland migration routes.	No	No. Tinker AFB will continue to operate in compliance with the BASH plan which provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes (Tinker AFB 2014)
Fish					
Arkansas River Shiner	*Notropis girardi*	Threatened	Inhabits the shallow braided channels of wide sandy prairie rivers in the Arkansas River system. Schools of shiners often gather on the lee side of sandbars and ridges of sand it the river channel. In Oklahoma, nearly all of the remaining Arkansas River Shiners occur in the Canadian River.	No	No. Habitat for Arkansas river shiner does not occur on Base. No effects to the Arkansas river shiner will occur as a result of the proposed action.

*One piping plover has been documented at Tinker AFB, resulting from a bird aircraft strike. USFWS was contacted and the plover sent to verify identification. No other piping plovers have been observed loafing or foraging on Tinker AFB property.
Source: ODWC 2011a,b,c,d; Tinker AFB 2014, 2015; USFWS 2014, 2015a, d-h; USFS 2016

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

References:

Oklahoma Department of Wildlife Conservation (ODWC) 2011a. Whooping Crane (*Grus americana*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/crane.htm on 21 January 2016.

ODWC 2011b. Piping Plover (*Charadrius melodus*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/plover.htm on 21 January 2016.

ODWC 2011c. Interior Least Tern (*Sterna antillarum*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/least_tern.htm on 21 January 2016.

ODWC 2011d. Arkansas River Shiner (*Notropis girardi*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/river_shiner.htm on 21 January 2016.

Tinker Air Force Base (AFB) 2014. Tinker AFB. Tinker AFB Plan 91-212, Bird/Wildlife-Aircraft Strike Hazard Plan (TAFB Plan 91-212). February 2014.

Tinker AFB 2015. Draft Integrated Natural Resources Management Plan (INRMP). Environmental Management Division, 72 ABW/CEVOE, Tinker Air Force Base, Oklahoma.

U.S. Forest Service (USFS) 2016. American Peregrine Falcon (*Falco peregrinus*). Accessed: http://www.fs.fed.us/database/feis/animals/bird/fape/all.html on 21 January 2016.

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USFWS 2015a. Environmental Conservation Online System. Species by County Reports. Accessed: http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=40109 on 13 January 2016.

USFWS 2015b. Critical Habitat Portal. Accessed: http://ecos.fws.gov/crithab/ on 13 January 2016.

USFWS 2015c. Information for Planning and Conservation (IPaC). Accessed: https://ecos.fws.gov/ipac/project/OG7U256FZJBULPVM6ULXGACIRA/resources on 13 January 2016.

A.6.3.2 Tinker AFB USFWS Section 7 Consultation Response

KC-46A MOB 3 Beddown EIS
Website Comment

Base	Commenter	Date Submitted	Comment
Tinker	Ken Collins	5/5/2016	The Oklahoma Ecological Services Field Office (OKESFO) received the March 17, 2016, request for information and concurrence with your species list. We have the following comments to offer. The OKESFO agrees that the list of species provided in the March 17, 2016, request is accurate and concur with the list, as provided. However, we cannot concur with your effects determination for the piping plover. Although piping plover habitat is unlikely to exist at Tinker Air Force Base, ongoing operations at Tinker have resulted in the documented take of a single piping plover due to an aircraft strike. Considering the proposed operation would result in an increase in the total number of flight operations at Tinker Air Force Base by 168 percent, the potential for additional aircraft strikes would not decrease under the proposed action. Consequently we believe the potential exists for additional take of piping plovers. We also have concerns with respect to other federally-listed migratory birds but do not have evidence that take may occur. Second, the March 17, 2016, letter states that wetlands may potentially be impacted by the proposed action, specifically the proposed parking ramp expansion. We request that the draft Environmental Impact Statement include a thorough discussion of the potential impacts to existing wetlands and any measures being implemented to minimize or offset the anticipated wetland impacts.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

5 Aug 2016

Mr. Ken Collins, T&E Branch Chief
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

Mr. Laurence Levesque
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

RE: Biological Assessment (BA) for KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS), Tinker Air Force Base (AFB), Oklahoma

Dear Mr. Collins and Mr. Levesque,

In accordance with Section 7 of the Endangered Species Act (ESA) (16 U.S.C. §§ 1531–1544, as amended), the Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), and as part of the U.S. Air Force's Environmental Impact Analysis Process (EIAP), the United States Air Force (Air Force) is preparing a Biological Assessment (BA) to initiate formal consultation under Section 7(a)(2) of the ESA. The BA will facilitate the regulatory review of potential impacts to threatened and endangered species from the proposed KC-46A Third Main Operating Base (MOB 3) Beddown mission at Tinker Air Force Base (AFB), Oklahoma. The Region of Influence (ROI) for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as local airspace affected by aircraft operations resulting from the proposed action.

Tinker AFB has carefully reviewed the U.S. Fish and Wildlife Service's (USFWS's) Information for Planning and Conservation (IPaC) online tool and the special status species lists by county (via the USFWS's Environmental Conservation Online System [ECOS]) to identify species with the potential to occur within Oklahoma County, Oklahoma. The following special status species have been identified for analysis in the BA: least tern, interior population (*Sterna antillarum*) – endangered; whooping crane (*Grus americana*) – endangered; piping plover (*Charadrius melodus*) – threatened; and red knot (*Calidris canutus rufa*) – threatened.

The BA will be prepared using readily available information such as the Oklahoma Department of Wildlife Conservation's (ODWC) threatened, endangered, and rare species profiles; USFWS ECOS species accounts; the installation Integrated Natural Resource Management Plan (INRMP); and migratory avian species inventory reports prepared by the Virginia Polytechnic

DEPARTMENT OF THE AIR FORCE
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Institute and State University. Tinker AFB natural resource biologists currently use the following published resources to assist in identifying and managing endangered, threatened, candidate, rare, and other sensitive fauna species:

- U.S. Fish and Wildlife Service IPaC Trust Resource Report (2016)—Endangered and Threatened Species and Birds of Conservation Concern *https://ecos.fws.gov/ipac/*
- Oklahoma Natural Heritage Inventory Tracking List of Rare Oklahoma Vertebrates *http://www.oknaturalheritage.ou.edu/*
- NatureServe (2011) *http://www.natureserve.org/explorer/servlet/NatureServe?init=Species*
- Oklahoma Department of Wildlife Conservation (ODWC) Oklahoma Species List: Federally-listed, Proposed, Candidate, and Species Under Review (2015) *http://www.wildlifedepartment.com/wildlifemgmt/endangeredspecies.htm*

We formally request any additional species survey reports, GIS population accounts, or habitat surveys the USFWS Oklahoma Ecological Services Field Office may have for the least tern, whooping crane, piping plover, and red knot so that we may prepare our analysis with the most current and relevant species accounts/information to date. (Please see Attachment 1 for the current Data Resources/Reference List).

Additionally, the Air Force requests your input in identifying any additional issues, or areas of concern you feel should be addressed in the BA. We request that you please provide data or comment no later than 12 Aug 2016.

Questions may be directed to Mr. John Krupovage, (405) 739-7074 or john.krupovage@us.af.mil. Please provide your comments directly to Mr. John Krupovage, Civil Engineering Directorate, Building 400, 7535 5th Street, Tinker AFB, OK 73145-9010 and to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely,

Brad C. Beam
for CATHY R. SCHEIRMAN, P.E.

BRAD C. BEAM, PE
Deputy Base Civil Engineer

Attachments:
1. Data Resources/ Reference List

cc:Mr. Hamid Kamalpour, AFCEC
cc:Mr. Tim Taylor, 72 ABW/CEIEC

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

DEPARTMENT OF THE AIR FORCE
72ND AIR BASE WING

ATTACHMENT 1

Data Resources/ Reference List
Oklahoma Department of Wildlife Conservation (ODWC) 2011a. Whooping Crane (*Grus americana*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/crane.htm
ODWC 2011b. Piping Plover (*Charadrius melodus*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/plover.htm
ODWC 2011c. Interior Least Tern (*Sterna antillarum*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/least_tern.htm
ODWC 2011d. Arkansas River Shiner (*Notropis girardi*). Accessed: http://www.wildlifedepartment.com/wildlifemgmt/endangered/river_shiner.htm
St. Germain, Michael J. 2010. Inventory of Avian Species on Tinker Air Force Base (AFB) Oklahoma City, Oklahoma. Conservation Management Institute, Virginia Polytechnic Institute and State University, College of Natural Resources and Environment, Blacksburg, Virginia.
Tinker AFB 2015. Draft Integrated Natural Resources Management Plan (INRMP). Environmental Management Division, 72 ABW/CEIEC. Tinker Air Force Base, Oklahoma. (Note: See Chapter 2 for faunal resources descriptions; Appendix D for TAFB faunal list; and Appendix L for USDA Wildlife Services Cooperative Agreement)
Tinker AFB 2015. TAFB Plan 91-212, Bird/Wildlife-Aircraft Strike Hazard Plan
U.S. Forest Service (USFS) 2016. American Peregrine Falcon (*Falco peregrinus*). Accessed: http://www.fs.fed.us/database/feis/animals/bird/fape/all.html
U.S. Fish and Wildlife Service (USFWS) 2014. Rufa Red Knot Background Information and Threat Assessment. Supplement to Endangered and Threatened Wildlife and Plants; Final Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*). Docket No. FWS–R5–ES–2013–0097; RIN AY17. Accessed: http://www.fws.gov/northeast/redknot/pdf/20141125_REKN_FL_supplemental_doc_FINAL.pdf
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USFWS 2015c. Information for Planning and Conservation (IPaC). Accessed: https://ecos.fws.gov/ipac/project/OG7U256FZJBULPVM6ULXGACIRA/resources
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USFWS 2015f. Environmental Conservation Online System Species Profile for Red Knot (*Calidris canutus rufa*). Accessed: http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B0DM
USFWS 2015g. Environmental Conservation Online System Species Profile for Arkansas River Shiner (*Notropis girardi*). Accessed: http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E05X
USFWS 2015h. Environmental Conservation Online System Species Profile for Whooping crane (*Grus americana*). Accessed: http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B003
U.S. Geological Service (USGS) Patuxent Wildlife Research Center. North American Breeding Bird Survey Routes. http://sagemap.wr.usgs.gov/FTP/unitedstates/NATLAS/birdm.htm

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

September 16, 2016

Mr. Ken Collins, T&E Branch Chief
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

Mr. Laurence Levesque
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

RE: Biological Evaluation (BE) for Air Operations at Tinker Air Force Base (AFB), Oklahoma, Including the Proposed KC-46A Third Main Operating Base (MOB 3) Beddown Mission

Dear Mr. Collins and Mr. Levesque,

In accordance with Section 7 of the Endangered Species Act (ESA) (16 U.S.C. §§ 1531–1544), the Sikes Act (16 U.S.C. 670a-670o), and the United States Air Force (Air Force) Environmental Impact Analysis Process (EIAP), the Air Force prepared the attached Biological Evaluation (BE) to assess the potential effects of current air operations and proposed future air operations at Tinker AFB, Oklahoma on avian species protected under the ESA. The Region of Influence used for biological resources evaluation is defined as the land area (habitats) and airspace that could potentially be affected by aircraft operations at Tinker AFB. Tinker AFB is currently being evaluated as one of four installations that could receive additional aircraft in the currently ongoing KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS) process. In accordance with our assessment, we have concluded that both the current air operations and proposed future operations result in a *may affect, is not likely to adversely affect* determination. Therefore, we are not seeking to initiate formal consultation. We seek your concurrence on this determination.

The BE was prepared using readily available information from the United States Fish and Wildlife Service (USFWS) Environmental Conservation ECOS species accounts, the Oklahoma Department of Wildlife Conservation's threatened, endangered, and rare species profiles, the Tinker AFB Integrated Natural Resource Management Plan (INRMP), and the avian species inventory reports prepared by the Virginia Polytechnic Institute and State University. Information from the Cornell Lab of Ornithology and Audubon Society on bird species life history and habitat preferences was also consulted. Based upon this information, the following special status species

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

were evaluated: Interior Least Tern (*Sterna antillarum*) – endangered, Whooping Crane (*Grus americana*) – endangered, Northern Great Plains Piping Plover (*Charadrius melodus*) – threatened, and Rufa Red Knot (*Calidris canutus rufa*) – threatened.

In addition to assessment of current aircraft operations at Tinker AFB, the BE assessed the potential impacts to threatened and endangered species and their habitat from the proposed bed down of additional aircraft currently being evaluated in the KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS). In that EIS, alternative installations are being evaluated for the bed down of new KC-46A aerial refueling aircraft. Note that the draft EIS does not indicate Tinker AFB as the preferred alternative (location) for KC-46A bed down. Rather, Seymour Johnson AFB in North Carolina is currently identified as the preferred alternative.

Past correspondence with the U.S. Fish and Wildlife Service Oklahoma Ecological Services Field Office includes the original March 17, 2016 letter announcing the Air Force's intent to prepare an EIS to analyze the effects of the proposed KC-46A MOB 3 mission bed down. On May 5, 2016 the USFWS Oklahoma Field Office submitted a comment on the EIS draft via the project website. On August 1, 2016, a teleconference occurred between the Air Force and your office regarding the DC-46A bed down, followed by a letter to your office dated August 5, 2016 in which Tinker AFB (72nd Air Base Wing) requested ESA Section 7 consultation.

Based on the information provided in the attached BE, the USAF requests written concurrence from the USFWS that the current air operations mission and the potential implementation of the KC-46A MOB 3 mission at Tinker AFB results in a *may affect, is not likely to adversely affect* determination for the Northern Great Plains Piping Plover, Interior Least Tern, Rufa Red Knot and Whooping Crane. Please address correspondence to Mr. Kevin Porteck, United States Air Force, AFCEC/CZTQ; 2261 Hughes Ave, Suite 155, Lackland AFB, TX 78236-9853, or electronically to the project website at www.kc-46A-beddown.com. For technical questions on this Biological Evaluation, please contact Mr. John Krupovage, (405) 739-7074, john.krupovage@us.af.mil.

Sincerely,

Kevin G. Porteck

KEVIN G PORTECK, GS-14, DAF
Natural Resources Specialist

Attachment:
Biological Evaluation for Air Operations, Tinker AFB

cc: Mr. John Krupovage, 72 ABW/CEIE

Biological Evaluation for Air Operations
Tinker Air Force Base, Oklahoma

September 16, 2016

Prepared for: **72nd Air Base Wing, Tinker Air Force Base**

Prepared by: **Air Force Civil Engineer Center**

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

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LIST OF ABBREVIATIONS / ACRONYMS

AFB	Air Force Base
AFRC	Air Force Reserve Command
AMC	Air Mobility Command
ANWR	Aransas National Wildlife Refuge
AOA	Air Operations Area
BE	Biological Evaluation
BO	Biological Opinion
BASH	Bird Aircraft Strike Hazard
DoD	Department of Defense
EIS	Environmental Impact Statement
ESA	Endangered Species Act
GI	Green Infrastructure
ILT	Interior Least Tern
INRMP	Integrated Natural Resources Management Plan
NRCS	Natural Resource Conservation Service
OC-ALC	Oklahoma City Air Logistics Complex
OKC	Oklahoma City
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USDA-WS	U.S. Department of Agriculture – Wildlife Services
USFWS	U.S. Fish and Wildlife Service
WHIP	Wildlife Habitat Incentive Program

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

1.0 BACKGROUND/HISTORY

The primary purpose of this Biological Evaluation (BE) is to address the effect of the ongoing Tinker Air Force Base (AFB) flying and aircraft maintenance mission on species listed as endangered or threatened in accordance with the Endangered Species Act (ESA). In addition, this BE will evaluate the effect of a proposed action being evaluated in an Environmental Impact Statement (EIS) that will consider Tinker AFB as one of four alternative installations being considered for the beddown of a KC-46A MOB 3 mission for aerial refueling aircraft. Installations being considered in the EIS as reasonable alternatives for basing this new mission are: Seymour Johnson AFB, North Carolina, Grissom Air Reserve Base, Indiana, Tinker AFB, Oklahoma, and Westover Air Reserve Base, Massachusetts. Seymour Johnson AFB in North Carolina is currently identified in the draft EIS as the preferred alternative.

The federal action agency is Tinker AFB, which is under the command of the 72nd Air Base Wing (72 ABW). Tinker AFB includes the Oklahoma City Air Logistics Complex (OC-ALC) and other tenant units that support Air Force mission activities worldwide. Tinker AFB is located in the "Heart of Oklahoma," just 5 miles from downtown Oklahoma City (OKC). Tinker AFB is considered to be a vital part of the OKC metro area economy and culture. See Figure 1-1 below for a regional map of Tinker AFB and OKC vicinity.

The Tinker AFB flying and aircraft maintenance mission is one of the federal activities with a potential to affect federally listed species either directly by aircraft strikes, or by degradation of habitat. Under the requirements of Section 7 (a)(2) of the ESA, federal agencies are required, in consultation with, and the assistance of the Secretary of the Interior, to insure that any action, authorized, funded or carried out by such agency, is not likely to jeopardize the continued existence of any endangered or threatened species, or result in destruction or adverse modification of the habitat of such species. Details on the ongoing Tinker AFB flying and maintenance mission, and a proposed action to increase air operations, are provided herein.

Tinker's vital national defense mission is to provide logistics support to Air Force aerospace weapon systems, equipment, and commodity items, and this mission encompasses a myriad of responsibilities. OC-ALC performs full depot level maintenance (i.e., high level overhaul maintenance such as engine removal and rebuild, painting, etc. as opposed to routine maintenance) on more than 120 aircraft annually. It also organizes, directs, and controls total life-cycle management of over 1,100 aircraft. The Complex also manages the SRAM, SRAM II, ACLM, and GLCM missile systems, as well as the Air Force's Harpoon missile. The OC-ALC annually overhauls and maintains more than 3,000 major jet engine modules from 11 major commands as well as those from the Army, Navy, and numerous foreign countries. In addition to aircraft/missile maintenance, overhaul, and repair, Tinker AFB provides deployable communications, computer systems, navigational aids, and air traffic control services worldwide for Air Force, Department of Defense (DoD), and other U.S. commitments. See Figure 2.2 for locations of some of the main industrial buildings and roads at Tinker AFB.

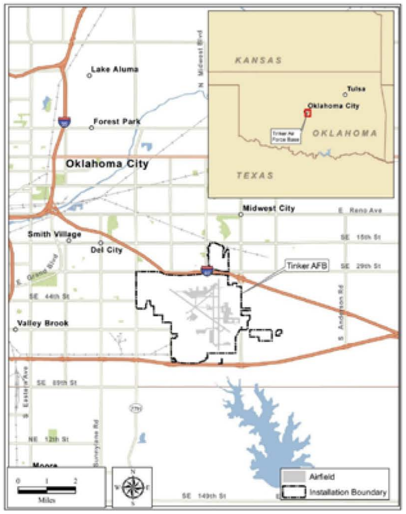
In accordance with the Sikes Act (16 U.S.C. 670), Tinker AFB develops, maintains, and implements an Integrated Natural Resources Management Plan (INRMP) in collaboration with the United States Fish and Wildlife Service (USFWS) Ecological Services Field Office and the Oklahoma Department of Wildlife Conservation. The Tinker AFB INRMP provides goals and objectives for ecosystem management, to include objectives for the conservation of birds and other wildlife, and actions to mitigate conflicts between wildlife and aircraft operations. The USFWS last reviewed, approved, and signed the

Tinker AFB Integrated Natural Resources Management Plan on February 28, 2013, indicating concurrence with the installation's wildlife management practices. The Oklahoma Department of Wildlife Conservation last approved the INRMP by signature on October 18, 2013.

Tinker AFB maintains an active Bird/Wildlife Aircraft Strike Hazard (BASH) reduction program for the purpose of minimizing wildlife strikes by aircraft. In accordance with Air Force policy, BASH program managers report all bird strike occurrences by species, to include utilizing the services of Smithsonian Institute scientists to identify remains when the species is not obvious. On May 11 2009, the remains of a federally threatened Piping Plover that was struck and killed by an unknown aircraft were collected on the main runway, and was reported to the U.S. Fish and Wildlife Service (USFWS) and Oklahoma Department of Wildlife Conservation.

This BE, prepared by the Air Force Civil Engineer Center on behalf of the 72nd Air Base Wing, evaluates the Tinker AFB and OC-ALC current flying and maintenance mission, as well as the proposed beddown of a new KC-46A MOB 3 mission, for compliance with the requirements of Section 7(a)(2) of the ESA. Section 7 assures that, through consultation with the USFWS, a federal proponent's actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat.

Figure 1-1. Regional Location of Tinker AFB



A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

2.0 DESCRIPTION OF THE ACTION & ACTION AREA

Tinker AFB has been identified as one of four reasonable alternatives in a draft Environmental Impact Statement for the KC-46A MOB 3 mission. However, Seymour Johnson AFB in North Carolina is the preferred alternative identified in the EIS. The U.S. Air Force (USAF) is currently evaluating comments on the draft EIS in regards to the preferred alternative and the three reasonable alternative installations identified. This BE addresses both Tinker's on-going mission and the proposed KC-46A MOB 3 addition to the mission footprint if Tinker AFB were to replace Seymour Johnson AFB as the preferred alternative.

Tinker AFB's current flying and maintenance mission includes:

- An annual air traffic control traffic count is over 32,000 aircraft operations (takeoffs/landings/practice approaches), with annual ground vehicle traffic on the airfield at approximately 20,000 vehicles.
- Depot level maintenance (i.e., high level overhaul maintenance such as engine removal and rebuild, painting, etc. as opposed to routine maintenance) on more than 120 aircraft annually.
- Total life-cycle management of over 1,100 aircraft.
- Management of the SRAM, SRAM II, ACLM, and GLCM missile systems, as well as the Air Force's Harpoon missile.
- Overhaul and maintenance of more than 3,000 major jet engine modules from 11 Air Force major commands as well as engine modules from the Army, Navy, and numerous foreign countries.
- Management of deployable communications, computer systems, navigational aids, and air traffic control services worldwide for Air Force, the DoD, and other U.S. commitments.

Proposed Action: KC-46A MOB 3 Beddown Specifics

This section details the actions necessary at Tinker AFB, if selected, for the basing of the KC-46A MOB 3 mission. If Tinker AFB were to be selected for the proposed KC-46A MOB 3 mission, the eight KC-135 aircraft would be replaced by 12 KC46A tankers, resulting in an estimated 4,041 additional airfield operations per year on the runway. The increase would be attributed to an increase to 6,440 KC-46A tanker operations versus the current volume of 2,399 KC-135 tanker operations. The USAF determined that Tinker AFB's infrastructure and base resources could accommodate the new requirements for a KC-46A MOB 3 mission within the constraints set by the alternative narrowing process. Information about the existing KC-135 aircraft and the proposed new KC-46A aircraft are provided below.

The KC-135 Stratotanker currently provides the core aerial refueling capability for the USAF, and has excelled in this role for more than 50 years. This unique asset enhances the Air Force's capability to accomplish its primary mission of global reach. It also provides aerial refueling support to Air Force, Navy, Marine Corps and allied nation aircraft. The KC-135 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations.

The KC-46A Pegasus is the first phase of a 3-phase effort to replace the USAF's aging KC-135 tanker fleet. With more refueling capacity and enhanced capabilities, improved efficiency and increased capabilities for cargo and aeromedical evacuation, the KC-46A will provide aerial refueling support to the Air Force, Navy, Marine Corps as well as allied nation coalition force aircraft.

Facilities and Infrastructure

Figure 2.1 provides an overview of Tinker AFB facilities. Tinker AFB has the basic physical real estate and infrastructure to beddown the KC-46A MOB 3 mission; however, certain projects are required to support the KC-46A MOB 3 beddown at Tinker AFB. A KC-46A aircraft mission beddown would require demolition and renovation of existing facilities, airfield ramp space, and aircraft hangars currently utilized for the day-to-day KC-135 missions. New construction would be limited to the existing development footprint of the aircraft maintenance infrastructure. See Table 2.1 below for details on Facilities and Infrastructure Projects that would occur if the proposed KC-46A MOB 3 Mission were to be placed at Tinker AFB.

If the KC-46A MOB 3 Mission were to be located at Tinker AFB (Note: Seymour Johnson AFB is currently the preferred alternative), two new facilities and additional ramp space would be constructed to support the new mission. The largest new construction would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and would also require the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities and within the current hydrant fueling system on the current KC-135 ramp.

If the KC-46A MOB 3 Mission were to be located at Tinker AFB, interior renovations would occur in Hangar 1053 and Buildings 1056 and 1082 to accommodate mission personnel and equipment storage. Although Buildings 11, 260, 469, 1048, 1059, 1071, and 1112 would be used to house various KC-46A functions, including logistics warehousing, engine storage, maintenance, squadron operations, and airfield equipment, no new renovations would be required for the use of these buildings. The aircraft requirements used to determine ramp parking would require a reconfiguration of parking spaces on the current KC-135 ramp. This relocation of parking spaces would require the existing hydrant pits associated with each KC-135 aircraft to be relocated to the proposed KC-46A parking locations. All proposed demolition and construction would occur within the existing airfield area. Figure 2.2 indicates the location of Facilities and Infrastructure Projects that would be associated with the beddown of the KC-46A MOB 3 Mission at Tinker AFB.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 2-1. Base Overview of Tinker AFB

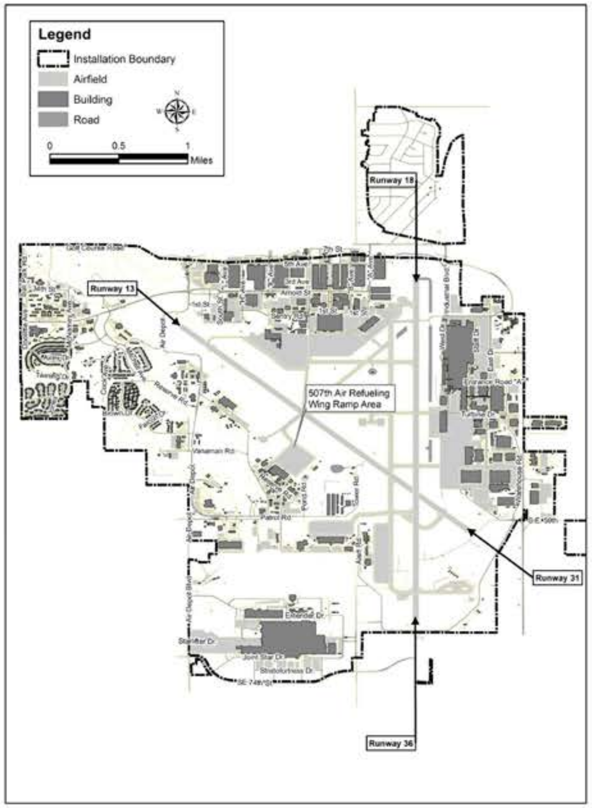


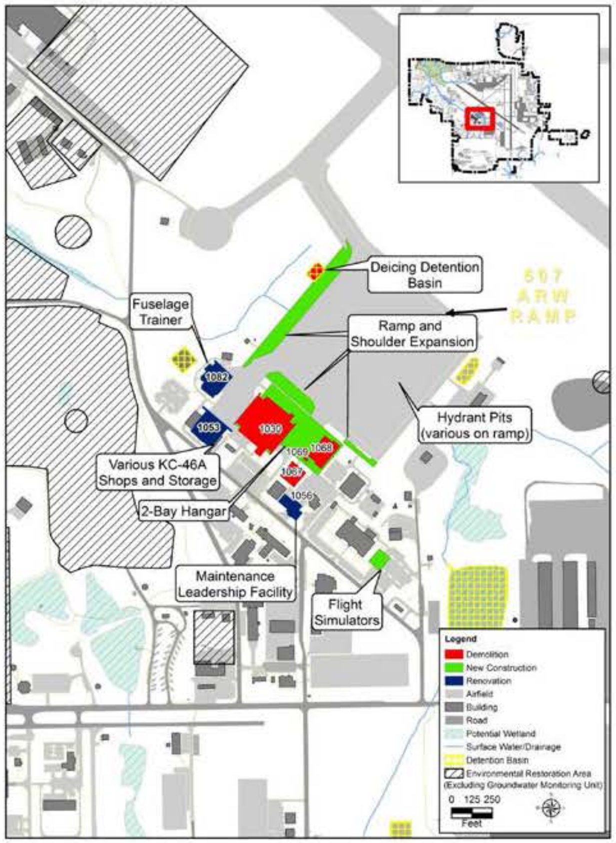
Table 2-1. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

Project	Facility Size (square feet)
Demolition	
Building 1030[a] (to make room for new 2-Bay Hanger with Apron Access)	99,184
Building 1067 (to make room for new 2-Bay Hanger with Apron Access)	11,460
Building 1068[a] (to make room for new 2-Bay Hanger with Apron Access)	19,775
Building 1069 (to make room for new 2-Bay Hanger with Apron Access)	250
Deicing Detention Basin	7,330
Total Square Feet	**137,999**
Renovation	
Hangar 1053, Various KC-46A Shops and Storage	10,000
Building 1056, Maintenance Leadership Facility	10,000
Building 1082, Fuselage Trainer (FuT)	15,000
Hydrant Pit repositioning	Not Applicable
Total Square Feet	**35,000**
New Construction	
2-Bay Hanger with Apron Access (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	200,000
Flight Simulators (WST, BOT)	10,500
Ramp and Shoulder expansion	114,000
Total Square Feet	**324,500**

[a] Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 2-2. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB



Personnel

See Table 2.2 below for existing and proposed changes to personnel that would result if Tinker AFB were chosen to be the preferred alternative for the KC-46A MOB 3 Mission. The 507 ARW at Tinker AFB currently has authorized 1,032 personnel. If the KC-46A MOB 3 Mission were to be located at Tinker AFB, authorized personnel would increase to 1,443 personnel. Air Mobility Command (AMC) would stand up an Active Duty unit associated with part-time Reservists within the Air Force Reserve Command (AFRC) host wing.

Table 2-2. Personnel Changes for the KC-46A MOB 3 Mission at Tinker AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	3	0	3
Dual Status Technician (reserve, civilians, federal)	214	+129	343
Non-Dual Status (DoD civilians)	27	+5	32
Contractors[a]	0	+15	15
Subtotal	**244**	**+308**	**552**
Part Time			
Drill Status Reservists	1,002	+232	1,234
Total Personnel Authorizations[b]	1,246	+540	1,786
Total Personnel on Base[c]	**1,032**	**+411**	**1,443**

a Contractors are not authorized on the UMD. They are categorized as "other base personnel."
b Some personnel work off-site but are assigned to the unit.
c Total personnel supporting the 507 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Tinker AFB would result in a net increase of 411 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 397 dependents currently associated with the non-contractor, full-time personnel in the 507 ARW at Tinker AFB live in communities surrounding the installation. Approximately 476 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

Description of Current Aircraft Operations

Table 2-3 details current baseline airfield operations at Tinker AFB. The annual air traffic control traffic count is over 32,000 aircraft operations per year. An estimated 4,468 sorties (1 sortie = takeoff + landing) are conducted annually at Tinker AFB by KC-135, E-3, B-52, and B-1 aircraft as part of the depot maintenance mission. The 507th Air Reserve Wing (ARW) currently flies 400 sorties per year and an average of two additional practice touch and go approaches per sortie which adds to the total count of runway activity. Of the total annual operations flown by the 507 ARW, approximately 11 percent are flown during acoustic night (i.e., 10:00 p.m. to 7:00 a.m.). Other based aircraft (i.e., E-3, B-737, and E-6) conduct a combined total of 18,708 operations per year, with 10 percent of their total operations occurring during acoustic night. Also, a wide variety of transient aircraft also visit the base, averaging 4,988 operations annually. Depot and transient aircraft infrequently conduct flying operations during acoustic night.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Table 2-3. Baseline Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-135	400	0	360	40	1,371	228	2,131	268	2,399
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	**4,065**	**84**	**3,877**	**272**	**22,042**	**1,859**	**29,984**	**2,215**	**32,199**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 507 ARW.

[b] Night is defined as acoustic night (i.e., 10:00 p.m. to 7:00 a.m.). KC-135 aircrews could depart prior to 10:00 p.m. but return to base and conduct arrivals and approaches after 10:00 p.m.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

A beddown of new KC-46A aircrews associated with the proposed MOB 3 mission would result in approximately 1,150 annual sorties, and an average of 3.5 additional practice approaches per sortie, for a total of 6,440 operations per year (Table 2.4). The 168-percent increase in annual tanker operations would result from an increase in the number of assigned tanker aircraft (from eight KC-135 to 12 KC-46A), an increase in the frequency at which each aircraft is flown, and an increase in the number of practice approaches per sortie. KC-46A aircrews would conduct approximately 11 percent of total operations during acoustic night. KC-46A aircraft would begin to be processed through depot maintenance, increasing total depot airfield operations from 4,468 to 6,104 per year. Practice approaches would be conducted at airfields other than Tinker AFB on an occasional basis.

Table 2-4. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	1,150	0	1,034	116	3,547	593	5,731	709	6,440[c]
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	**4,815**	**84**	**4,551**	**348**	**24,218**	**2,224**	**33,584**	**2,656**	**36,240**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.

[b] Night is defined as acoustic night (i.e., 10:00 p.m. to 7:00 a.m.). KC-46A aircrews could depart prior to 10:00 p.m. but return to base and conduct arrivals and approaches after 10:00 p.m.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

The Bird Aircraft Strike Hazard (BASH) Program

Tinker AFB currently maintains an active and dedicated BASH program, devoting resources and personnel to implement this program in order to minimize bird strikes on the airfield. Since 2001, the USAF has contracted with the U.S. Department of Agriculture (USDA) – Wildlife Services (USDA-WS) to provide daily wildlife control services for Tinker AFB. There are two full-time BASH program biologists on staff to assist with this program. They are housed with and work closely with Tinker AFB natural resources biologists, integrating airfield bird control within the overall management goals of Tinker AFB's INRMP. Their services include hazing and removing migrating and resident birds from the airfield.

The USDA BASH specialists conduct routine runway surveys for bird activity. These surveys are stepped up during or immediately following rain events in the spring and fall months due to increased shorebird (e.g., American Avocets, sandpipers, killdeer) and gull activity. They conduct bird metric surveys using methodology found within the INRMP and a Memorandum of Understanding between Tinker AFB and USDA-WS. These specialists document information such as date, time, weather conditions, species of birds observed, behavior, direction of movement, location on airfield and control methods, if applicable. They also perform small-scale passive services such as eliminating roosting sites, bird/wildlife proofing buildings and hangars and excluding bird/wildlife access to culverts. As needed, they employ active control methods such as the use of live-trapping and the use of pyrotechnics to disperse hazardous resident and migrating bird populations from the airfield. At times during significant threats to aircraft safety, birds persistently unresponsive to hazing (such as gulls and resident geese) may be killed if authorized by the Tinker AFB Natural Resources Specialists, and in accordance with the migratory bird depredation permit issued by the USFWS to conduct intentional takes of migratory birds. USDA-WS and Base Operations staff serve as sub-permittees on the bird depredation permit. The current depredation permit was issued to Tinker AFB by the USFWS in January 2016 with an expiration date of December 2016.

During and after rain events in spring and fall bird migration periods, and prior to aircraft taking off or landing at Tinker AFB, the USDA-WS BASH biologists typically make vehicular searches for birds on the entire length of the runway. This is done primarily for gulls, but shorebirds as well. Vehicular movement alone generally persuades birds to leave the runway. If this is ineffective, the biologist will initiate hazing with pyrotechnics, propane cannons, vehicle horns, and similar means to move birds. Occasionally, for federally unlisted birds unresponsive to hazing, lethal means are used to encourage movement. This is accomplished under the terms of the USFWS-issued depredation permit.

Tinker AFB conducts numerous other measures to prevent bird strikes. These include eliminating any areas of standing water or restricted drainage on the airfield, and seeding or sodding any bare non-grassy areas that could create an attraction for migrating birds. Tinker AFB maintains grass at a uniform height of seven to 14 inches on the airfield, to include the clear zones and lateral surface clear areas. Areas near the airfield with a variety of grass species are mowed when the average grass height, not including seed heads, exceeds tolerances. Most grass seeds found on the airfield are less desirable as food than available weed or native grass seeds. By regimented mowing, Tinker AFB reduces weed seeding to discourage seed-eating birds from feeding on the airfield. Grounds maintenance crews begin mowing areas adjacent to runways and finish in the infield or outermost grass areas. This causes insects and other animals to move away from aircraft takeoff and landing areas. The Natural Resources group at Tinker AFB has also identified species-specific measures to minimize bird use of the airfield. For example, for diving waterfowl species such as mergansers and loons, the installation has removed fish-producing ponds near the airfield.

The USAF implements a variety of different operational mitigation measures during migrations times to prevent bird strikes. With regard to aircraft flight operations, all flying organizations on Tinker AFB are provided information regarding bird activity on a daily basis. These involve changing pattern altitudes, changing pattern directions to avoid bird concentrations, and avoiding takeoffs/landings at dawn or dusk. During actual Phase II operations (high bird activity), Flight Commanders strongly consider reducing or eliminating flight operations within one hour before and after sunrise and sunset.

During periods of high bird activity, additional measures can be implemented by the Control Tower to avoid bird strikes. These include rescheduling local training or transition elsewhere, raising altitude assignments for aircraft enroute to training areas, limiting time on low-level routes to a minimum for

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

accomplishing training requirements, selection of routes or training areas based on bird hazard data from the USAF BASH team internet website (such as the Bird Avoidance Model, Avian Hazard Advisory System or Low-Level Route Analysis), discontinuation of multiple approaches, and making full-stop landings only by prohibiting touch and go landings used for training purposes.

To further improve aircraft safety, Tinker AFB strives to comply with the Federal Aviation Administration's Advisory Circular 150/5200-33B, Hazardous Wildlife Attractants on or Near Airports. This circular provides guidance on certain land uses that cause movement of hazardous wildlife onto, into, or across an airport's approach or departure airspace or air operations area (AOA). The circular recommends specific separation distances from the AOA within which wildlife attractants, such as retention/detention ponds, wetlands, and avoiding, eliminating, or mitigating certain types of agricultural and landscaping activities near the airfield.

Since the mid-1990s, Tinker has eliminated or modified three water bodies which were attracting hazardous levels of wildlife in close proximity of the airfield. A detention basin located adjacent to Landfill 5 (about 800 feet west of Runway 18/36) was outfitted with concrete trickle channels to eliminate standing water. The 10-acre Glenwood wetland, located ½ mile north of Runway 18, was removed. The five-acre Fire Pond located ½ mile west of Runway 18/36 was removed and mitigated off base in collaboration with the USDA's Natural Resource Conservation Service (NRCS) Partners for Wildlife Program. Mitigation required the wetland to be replaced, which was done 18 miles away from the base at an area elementary school in collaboration with NRCS through the Wildlife Habitat Incentive Program (WHIP) and with the help of other agencies. Also, although not removed due to hazardous wildlife attraction, the Fuel Control Facility Wetland, located about ¾ mile east of Runway 18/36, was removed for construction purposes.

In addition to the above mentioned actions, avoidance techniques are being employed, to include preventing the development of any additional ponds or wetlands on base, with the exception of relatively small detention ponds necessary to comply with storm water regulations and policies. For all other existing ponds and wetlands, mitigation is employed to maintain a safe flying environment. Specifically, USDA-WS staff monitor and manage hazardous wildlife populations associated with on- and off-base water bodies to ensure flight safety on and around Tinker AFB.

Although no federally listed species have been documented on the airfield at Tinker AFB before or after the fatal strike of the Northern Great Plains Piping Plover in 2009, if threatened and endangered species are encountered in the future, USDA-WS's contingency procedure is to make notifications to hold aircraft from taking off or landing until the birds move (Krupovage, Per. Comm. 2016). If the birds do not move, Tinker natural resources staff (USFWS depredation permit holder) would contact the USFWS to receive bird dispersal instructions which would allow aircraft flights to resume. Since no live threatened and endangered birds have ever been sighted on the airfield, this procedure has not been used; however, the BASH safeguards described above would further reduce the likelihood of threatened and endangered bird strikes on Tinker.

Tinker AFB covers approximately 5,580 acres of land. Structures include a 10,000-foot runway, 11,200-foot runway, almost 700 family housing units, 48 miles of road, 717 buildings, and 57 aircraft assigned to associate units. The BASH mitigation action area includes all lands within the boundaries of Tinker AFB, but concentrates on the airspace and runways which have the most potential to affect listed species. Direct effects upon listed species could include mortality by aircraft strikes, degradation of habitat from airfield run off into low lying areas and waterways, and depredation by airfield animal control officers. Other direct effects that could occur include loss of mating opportunities due to habitat fragmentation and reduction in numbers of partners, loss of metabolic energy due to course diversion around Tinker.

Biological Evaluation for
Tinker Air Force Base

Indirect effects might result from the 476 additional people having to live and reside around Tinker AFB. More habitat fragmentation might result off base, when or if off-base housing is built in the vicinity of Tinker AFB.

3.0 LISTED SPECIES & CRITICAL HABITAT IN THE ACTION AREA

The following ESA-listed species have the potential to occur within the action area, or may be affected by the proposed action: Northern Great Plains Piping Plover (*Charadrius melodus*), Interior Least Tern (*Sterna antillarum*), Whooping Crane (*Grus Canadensis*), and "Rufa" Red Knot (*Calidris canutus rufa*). Rufa is used to refer to this particular subspecies of Red Knot. There is no designated critical habitat on, or in the vicinity of, Tinker AFB that may be affected by the proposed action. This list of species was generated by the November 23, 2015, USFWS IPaC Trust Resources Report, B7F6B-36Q4N-BETIZ SWYWF-MG3ESA.

The Northern Great Plains Piping Plover and the Rufa Red Knot are migrants that may pass through the Tinker airspace while making the trip between wintering grounds in Central and South America and the breeding grounds in the high tundra of the Canadian Arctic for the Red Knot, and the Great Plains of the northern United States and Canada for the Northern Great Plains Piping Plover. They are usually found near water, but may be found in a variety of habitats (Sibley, 2000). During migration, these shorebirds sometimes gather in large numbers at interior sites with water. Areas that attract the highest numbers of birds are typically shallow bodies of water covering large areas, including managed wetlands, rice fields, lakes, reservoirs and sewage ponds (Sibley, 2001).

Conservation of shorebirds is challenging because relatively little is known about their life cycle requirements and population trends. In addition, they utilize a wide variety of habitats during different times of the year. Loss and habitat by conversion to other land uses is the greatest known threat. In the U.S., about 50 percent of natural wetlands have been filled or drained, and the annual loss of wetlands is estimated to be about 35 square miles of wetland each year. Native prairies have suffered even greater losses resulting in restricted habitat for "grasspipers" passing through or nesting in prairies (O'Brien, et al., 2006). Other environmental factors may negatively affect shorebirds, including pollution, trash, disturbance of nesting birds on the beach by people, their pets and off-road vehicle use. Identifying, preserving and connecting remaining habitat is key to shorebird conservation. Where appropriate, restoring degraded grasslands to native vegetation and maintaining wetlands at a high functioning level (well away from the airfield) is essential. Even relatively narrow corridors (e.g., vegetated riparian zones) connecting larger more valuable tracts are essential as animals make their movements across the landscape. A lack of nearby suitable habitat for resting birds during migration may result in an attraction of migrating birds to an airfield environment.

Northern Great Plains Piping Plover

The Northern Great Plains Piping Plover (*Charadrius melodus*) is a small migratory member of the shorebird family (*Charadriidae*), approximately 6.7 to 7.1 inches long and 1.5 to 2.2 ounces in weight (Haig, 1992). The Piping Plover is about the size of a robin and it is one of six species of belted plovers in North America. During the breeding season, adults have single black bands across both the forehead and breast, orange legs and bill. The bill also has a black tip in breeding season. Their dorsal surface is a pale tan with a white belly. They are plump in appearance and tend to stand and visibly search and then run to find their prey of small invertebrates living in a sandy or muddy substrate. During the winter, the adults lose the black bands and their bill becomes grayish-black. The plumage of juveniles is similar to that of wintering adults.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

The breeding range of the piping plover extends throughout the northern Great Plains, the Great Lakes, and the Atlantic Coast in the U.S. and Canada. The three breeding populations of piping plovers are referred to as the Northern Great Plains population, Great Lakes population, and Atlantic Coast population. Piping plovers require wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. There is no habitat of this nature at Tinker AFB. (https://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html).

Great Lakes piping plovers formerly nested throughout much of the Great Lakes region in the north-central United States and in south-central Canada, but currently nest only in northern Michigan and at two sites in northern Wisconsin. Piping Plovers that breed in the Great Lakes area nest along shorelines. However, according to the USFWS Recovery Plan for the Great Lakes Population of Piping Plovers dated September 16, 2003: "in 1987 and 1988 piping plovers nested at Optima Reservoir, Oklahoma. These are the only known nesting records for Oklahoma (Boyd 1991)." Optima Lake is located in the panhandle of Oklahoma in Texas County on the Beaver River, approximately 250 miles northwest of Tinker AFB.

On the Atlantic Coast, piping plovers nest from Newfoundland, southeastern Quebec, and New Brunswick to North Carolina. Sixty-eight percent of all Atlantic nesting pairs breed in Massachusetts, New York, New Jersey, and Virginia (USFWS 1999).

The Northern Great Plains Piping Plover is federally listed as a threatened species. The plover that was struck at Tinker AFB in 2009 is considered part of the Northern Great Plains population of the piping plover which was listed as threatened under the Endangered Species Act on January 10, 1986 (50 FR 50726). The breeding population of the Northern Great Plains piping plover extends from Nebraska north along the Missouri River through South Dakota, North Dakota, and eastern Montana, and on alkaline lakes along the Missouri River Coteau (a large plateau extending north and east of the Missouri River) in North Dakota, Montana, and extending into Canada. Wintering Piping Plovers in the U.S. are distributed along the Gulf Coast from Florida to Texas, with a small percentage of the population wintering along the Atlantic Coast and in the Bahamas. According to Bird Life International, the Northern Great Plains population was estimated to be about 58 percent of all the Piping Plover subspecies combined in 2009 (http://www.birdlife.org/datazone/speciesfactsheet.php?id=3127).

Interior Least Tern (ILT)

The Interior Least Tern (ITL) was listed as federally endangered on May 28, 1985. All currently recognized subspecies and populations are the smallest members of the subfamily Sternidae, family Laridae, of the diverse order Charadriiformes. They measure 8.2 to 9.4 inches long with a 20-inch wingspread. Sexes are alike, characterized by a black-crowned head with a white forehead, pale grey back, snowy white undersurfaces, and legs and beaks of various orange and yellow colors depending on sex. The male tern's legs and beak are more brightly colored than the female. The beak is tipped with black.

ILT's are only those least terns that breed and nest within the boundary of the continental U.S. on interior rivers and other water bodies. ILT breeding populations are associated with large river habitats from Montana southward through North Dakota, South Dakota, Nebraska, Colorado, Iowa, Kansas, Missouri, Illinois, Indiana and Kentucky to eastern New Mexico, Oklahoma, Arkansas, Tennessee, central Texas, central Louisiana, and central Mississippi. Other breeding populations of least terns are found along coastal and estuarine habitats in the U.S. from Texas to Maine, and along islands of the Gulf of Mexico, Atlantic Ocean, and Caribbean Sea. The ILT is separated from coastal populations by a combination of physical and ecological factors unique to their nesting habitats. Coastal habitats are created and maintained by daily and seasonal tidal and storm surges, while inland habitats of ILT are dynamic,

primarily created and maintained by fluctuating riverine hydrologic conditions. Foraging habitats and prey species differ markedly as well, with coastal least terns foraging on fish and invertebrate prey species associated with brackish and salt water habitats (e.g., anchovy, silversides), while ILT forage on freshwater prey species (e.g., shad, minnows).

The ILT and Eastern least tern are geographically separated from the California least tern (*S. antillarum browni*), which nest and forage in brackish and marine habitats of the Pacific coast of the U.S. and Mexico. Kirsch and Sidle (1999) observed that ILT population increases were not supported by available fledgling success estimates, and hypothesized that ILT increases since listing were due to immigration surges from least terns inhabiting the Gulf Coast. Lott (2006) has hypothesized a wide least tern metapopulation which includes the Gulf Coast and interior populations. Genetic studies indicate at least some degree of interbreeding and genetic exchange between populations of ILT, eastern least tern, and California least tern (Draheim *et al.* 2010). However, there are few banding or other observational data directly supporting the interchange of breeding individuals between interior and Gulf Coast populations.

ILT are migratory and historically bred all along the Mississippi River states, and along the Red and Rio Grande River systems of Texas. Least terns nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops. They hover over and dive into standing or flowing water to catch small fish.

The ILT breeding season is April through August. Nesting in small colonies, least tern nests are shallow depressions scraped in open sandy areas, gravelly patches, or exposed flats. They are also known to nest on the flat roofs of large buildings. Both parents incubate their eggs for about 24 days. Chicks leave the nest only a few days after hatching, but the adults continue to care for them, leading them to shelter in nearby grasses and bringing them food.

Rufa Red Knot

The Rufa Red Knot was listed as federally threatened in 2014. The largest calidridine sandpiper of North America, and in the genus *Calidris* exceeded in size only by the Great Knot (*C. tenuirostris*) of northeastern Siberia, the Red Knot is primarily rusty-red in breeding plumage, changing to dull gray dorsally and white ventrally in Basic (winter) plumage, with few distinct markings. This species is a Holarctic breeder, mainly in middle- and high-arctic zones, with three subspecies (*islandica*, *rufa*, and *roselaari*) distributed in the Nearctic from Greenland to northern Alaska. This account focuses largely on the Western Hemisphere subspecies (Baker, et al. 2013).

Rufa Red Knots are noted for their extraordinary long-distance migrations of up to over 9,000 miles between circumpolar breeding habitats and marine wintering habitats in southern latitudes of South America, Africa, Europe, Australia and New Zealand. Population sizes for knots are in decline around the world, especially *C. c. rufa*, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010. Historical records show Knots and other scolopacids were intensively hunted for sport and market sales (Sibley, 2001), as were many other types of birds nationwide to pack the "larders" of kitchens and restaurants in the mid-1800s in the Northeast. This intense harvest probably led to their original decline and when the harvest was stopped shortly thereafter, the birds slowly began to recover. Then, in the 1980s they began showing a second decline, which was probably mostly fueled by the over exploitation of horseshoe crabs for bait in their vital stopover location in Delaware Bay and vicinity. Historically, horseshoe crabs (*Limulus sp.*) came ashore and deposited copious amounts of eggs in late spring (http://www.nwf.org/Wildlife/Wildlife-Library/Invertebrates/Horseshoe-Crab.aspx). These eggs are important because several species of migratory and resident birds depend on their reliable presence to fatten up prior to migration. Furthermore, contributing to the decline were beach modification practices

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

and pressure from expanding human use of the beaches that the bird depends on to put on fat necessary for their probable non-stop flight to the Arctic.

Rufa Red Knots tend to concentrate in huge numbers at traditional staging grounds during migration. As stated previously, Delaware Bay is an important staging area during spring migration. It is estimated that nearly 90 percent of the entire population of the Red Knot subspecies, *C. c. rufa*, can be present on Delaware Bay in a single day.

Rufa Red Knots are a monogamous and single-brooded species, and like most other northern shorebirds typically lays a 4-egg clutch. Courtship is accompanied by elaborate flight, ground, and vocal displays. For nesting, this knot prefers drier tundra and sparsely vegetated gravel ridges. Rufa Red Knots are principally marine shorebirds in the non-breeding season, when they feed on polychaete worms, small crabs, and marine mollusks, especially bivalves that they swallow whole and crush in their muscular gizzard. During spring migration, however, large flocks switch to gorge on the eggs of horseshoe crabs at Delaware Bay. Recent studies Red Knots fitted with geolocators identified a final stopover at Nelson River in Hudson Bay, before the birds move on to breeding sites in the Arctic where they feed upon terrestrial invertebrates (https://www.allaboutbirds.org/guide/Red_Knot/lifehistory).

The knot's unique and impressive life history depends on suitable habitat, food and weather conditions at far-flung sites across the Western Hemisphere, from the extreme south of Tierra del Fuego to the far north of the central Canadian Arctic. Knots need to encounter favorable habitat, food and weather conditions within narrow seasonal windows as the birds hopscotch along migration stopovers between wintering and breeding areas. For example, the knot population decline that occurred in the 1980s to the 2000s was caused primarily by reduced food availability from increased harvests of horseshoe crabs, and then was exacerbated by small changes in the timing when the knots arrived at the Delaware Bay. Horseshoe crab harvests are now managed with explicit goals to stabilize and recover knot populations.

Rufa Red Knots tend to migrate in single-species flocks with departures typically occurring in the few hours before twilight on sunny days. Size of the departing flocks tends to be large (greater than 50 birds) (Niles et al. 2008, p. 28). Likewise, based on observations of other *Calidris canutus* subspecies departing from Iceland towards Nearctic breeding grounds in spring 1986 to 1988, Alerstam et al. (1990, p. 201) found mean flock sizes of 100 to 200 individuals. These *C. canutus* leaving Iceland in spring departed in flight formations during the afternoon or evening, and during rising or high tide; their departures had significant differences in daily timing between seasons that was associated with between-year differences in the tidal cycle. Within the season, departures took place earlier in relation to high tide as the season progressed (Alerstam et al. 1990, p. 201). Consistent with the afternoon and evening departures of *C. canutus* from Iceland, Red Knots are inferred to migrate during both night and day based on the duration and distance of migratory flight segments estimated from geolocator results (Normandeau Associates, Inc. 2011, p. 203).

Rufa Red Knots may be particularly vulnerable to climate change, which is likely to affect:

- the arctic tundra ecosystem where the knots breed
- coastal habitats due to rising sea levels
- availability of traditional food resources throughout the bird's range when present, and
- storm and weather patterns.

Rufa Red Knot numbers appear to have stabilized in the past few years, but they remain at low levels relative to earlier decades. Biologists from the USFWS, state natural resource agencies, and non-profit organizations all share a concern for this race of red knot and are pooling efforts to identify what needs to be done to prevent further losses.

Whooping Crane

Whooping Cranes are very large, tall birds with a slender build. They have long necks and long black legs. The blackish bill is stout and straight; the overall slender body widens to a plump "bustle" of feathers near the tail. In flight the wings are long and broad and the neck is fully extended. Adults are bright white birds with accents of red on the head. The wingtips are black. Immature birds are whitish below, but mottled brownish-rusty above. The Whooping Crane is listed as federally endangered.

The wild population nests in or near Wood Buffalo National Park in the Northwest Territories and adjacent areas of northeastern Alberta, Canada, and winters on the Texas coast on the Gulf of Mexico at the Aransas National Wildlife Refuge (ANWR) not far from the town of Austwell.

The Whooping Crane, a symbol of national and international efforts to recover endangered species, has returned from the brink of extinction but remains at risk. In the 1800s, this species was widespread but apparently never common in the tall- and mixed-grass prairie marshes of the north-central U.S. and southern Canada. In 1941, the species had reached a low of 15 or 16 migratory individuals wintering in Texas (Boyce, 1987) and 6 non-migratory birds in Louisiana. The small Louisiana population did not survive.

According to Cornell Lab's Birds of North America On-line (https://birdsna.org/Species-Account/bna/home), all Whooping Cranes alive today (437 in the wild + 162 in captivity = 599 as of August 2011 [Stehn, 2011]) are descendants of the small remnant flock in Texas in winter 1941-42 (Urbanek, et al 2015). Several factors, especially human development and long-term water mismanagement on the wintering grounds, continue to place the bird in jeopardy. Note that 437 is a 5-year old figure, the ANWR website indicates there are 329 based on estimates from their 2015-2016 survey. Data from the International Crane foundation (https://www.savingcranes.org/species-field-guide/whooping-crane/) also indicates there are 599 captive and wild cranes.

Despite intense management efforts since the 1940s, the Whooping Crane remains one of the rarest birds in North America. Establishment of additional populations by reintroduction has so far been unsuccessful, although progress has been made in reintroduction methods. Because of the concern this species has generated, it is arguably one of the best-studied birds in North America. Recovery actions are accomplished cooperatively by Canada and the U.S., assisted by provincial and state agencies, nongovernment groups, and the private sector.

In the breeding season, Whooping Cranes use the extensive open wetland marshes and associated habitat of the Peace-Athabasca Delta, a large inland freshwater deltas within the Wood Buffalo National Park and adjoining areas (http://www.pc.gc.ca/eng/pn-np/nt/woodbuffalo/natcul/natcul1.aspx). Outside of the breeding season, Whooping Cranes use fresh, brackish and saltwater marshes and inland habitat of the Aransas National Wildlife Refuge (https://www.fws.gov/refuge/Aransas/wwd/science/updates.html).

This species is perennially monogamous and typically begins egg production at ages 3 or 4 years in the wild, but often not until ages 5 to 11 in captivity. Females usually lay a 2-egg clutch annually but seldom fledge more than one young. Both parents care for the young for 10 to 11 months, and the young learn migration routes by following their parents. Wild birds may survive an estimated 25 years, captive birds 40 or more years.

Attempted reintroductions in the Rocky Mountains (migratory) and in Florida (non-migratory) were unable to produce self-sustaining populations and have been discontinued. Reintroduction of a population migrating between Wisconsin and Florida began in 2001 and met with initial success, but its future will depend on finding a solution to persistent nest failure. In 2010, a fourth reintroduction, to establish a non-

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

migratory population, began in Louisiana. As of June 2014, 164 birds are maintained in captivity: 152 at five captive propagation facilities (Patuxent Wildlife Research Center, Maryland; International Crane Foundation, Wisconsin; Calgary Zoo, Alberta; Audubon Species Survival Center, Louisiana; and San Antonio Zoo, Texas), and an additional 12 birds at seven display facilities (S. Zimorski pers. comm.). Today, the crane remains ecologically dependent on specific inland freshwater wetlands in Canada and, in winter, on coastal brackish wetlands along the Gulf Coast.

On June 25, 2015, Mr. Chester McConnell of Friends of the Wild Whoopers, contacted John Krupovage, Natural Resource manager at Tinker AFB, regarding the possibility of investigating whether there might be potential migratory stopover sites at Tinker AFB for the Whooping Crane (http://friendsofthewildwhoopers.org/).

As stated previously, Whooping Cranes make the long journey between the Aransas National Wildlife Refuge on the central Texas coast to Wood Buffalo Nation Park located in northeastern Alberta and southern Northwest Territories. Along the way, they must stop to seek shelter and food about once or twice a day. Friends of the Wild Whoopers believes that during migration the Cranes stop at relatively small ponds, sometimes on private property and elsewhere, to spend the night. Characteristics of these small ponds include:

- Size – 0.3 to 14 acres
- Some shallow areas with water 5 to 10 inches deep for roosting
- Gradual sloping banks
- Little or no emergent vegetation at the roosting area
- Extensive horizontal visibility from roosting area, and
- 300 yard or more from human disturbance or development.

Mr. McConnell and Mr. Krupovage visited the Prairie Pond Site on Tinker and agreed that it had the potential to be a Whooping Crane stopover site. This site not only has good potential as stopover for Whooping Cranes, but it is inhabited by resident bird species such as American Goldfinch (*Carduelis tristis*), *Epidonax* species (flycatcher) and Little Blue Heron (*Egretta caerula*) as observed on the August 17-19, 2016 site visit. Much work has gone into this site and the water quality appears excellent and surrounding vegetation is healthy and aesthetically pleasing.

4.0 ENVIRONMENTAL BASELINE CONDITIONS

A brief description of environmental baseline conditions is provided below. Prior to its development into a large and highly urbanized and industrialized military landscape, Tinker AFB was already a highly altered human-dominated agricultural location. Early aerial photographs indicate the majority of land currently occupied by Tinker AFB was used for various agricultural purposes. Soil tillage and terracing are evident on historic aerial photographs, indicating much land was farmed before Tinker AFB was established.

Borrowing soil from various on-base locations to build up facility foundations and level the airfield was the primary soil impact during initial urbanization and industrialization of Tinker AFB. No topsoil was replaced at these locations; consequently, revegetation was slow and led to further soil loss and lack of native vegetation. Physical properties of soils have also been further altered by military construction and other activities. For example, vehicular traffic around construction sites and past practices of parking aircraft on grassed areas have compacted soils. Much soil was excavated and redistributed/compacted for projects such as large storm drainage systems and landfill caps across Tinker AFB.

Tinker AFB is located in the physiographic Central Redbed Plains section of the Central Lowland Province which is characterized by level to gently rolling hills, broad flat plains, and bottomlands bisected by small- to medium-sized water courses. Oklahoma County elevations range from about 850 feet above mean sea level (MSL) in the southeastern part to over 1,300 feet MSL in the northwestern part. Tinker AFB elevations range from approximately 1,200 feet MSL (Crutcho Creek – northwestern portion of Tinker AFB) to 1,310 feet MSL (southeast portion of Tinker AFB). Airfield elevation is approximately 1,291 feet MSL.

Based on topography and historical aerial photos, it appears that pre-settlement surface waters on land currently occupied by Tinker AFB consisted only of lotic waters (i.e., streams). There is no known evidence of the presence of lentic waters (e.g., ponds, lakes, wetlands) for that time period, although small beaver-created ponds and wetlands may have occurred along stream systems much as they do today. Streams consisted of intermittent, ephemeral, and possibly perennial flows in wooded or non-wooded stream systems which bisected gently rolling hills of tall/mixed grass prairie. These systems were typically shallow with broad, relatively flat floodplains. Floodplain areas closest to streams may have been heavily vegetated with riparian trees and shrubs; however, it is likely natural fire events would have kept most, if not all, woody vegetation suppressed such that land currently occupied by Tinker AFB may have been mostly treeless. Alternatively, it may have been just the more outlying floodplain fringes and the upper reaches of the first order stream segments that remained free of woody riparian vegetation.

Surface waters occurred in three main stream systems, one which drained to the north (current Crutcho Creek with Kuhlman and Soldier Creek tributaries) and two to the south (current East Elm Creek and West Hog Creek). The north-flowing stream system originated approximately 2 miles south of Tinker's current southern boundary with on-base portions of the system composed of 12 first-order segments (the initial and smallest section of a tributary system), two second-order segments, and one third-order segment. (http://geography.about.com/od/physicalgeography/a/streamorder.htm). The south-flowing systems consisted of only first- and second-order tributaries with higher order tributaries located off-base. Stream flows were generated primarily by precipitation runoff and were probably relatively sluggish. Groundwater seepage and springs may have caused perennial flows in some of the higher-order stream segments, particularly in tributaries on the eastern side of Tinker AFB.

Historical stream channels have been substantially altered by activities such as channelization, native riparian vegetation removal, mowing, fire suppression, flood regime alteration, and exotic species invasion/introduction. Also, development activities have caused soil properties to change substantially over the years, consequently modifying the original plant community. Common soil disturbances include topsoil being removed and not replaced; exotic plant species being used to revegetate disturbed areas; and soil compaction resulting from off-road training exercises, military construction projects, past aircraft parking on airfield, and related activities.

Surface waters in the vicinity of Tinker AFB were historically degraded by accidental fuel spills and non-point source pollution. The most common non-point pollution examples include: sediment from soil erosion associated with construction/demolition activities, automobile oil/fluid runoff from parking lots, runoff from areas treated with fertilizers and pesticides, chemical substances from spills associated with industrial and aircraft activities, and deicing compounds from roadways, taxiways, runways, ramp areas, and aircraft.

Although water quality has degraded since pre-settlement times, improvements have occurred over the last 20 years based on the implementation of modern pollution prevention technology and supported by biological diversity surveys and weekly water quality monitoring. Tinker AFB collects and analyzes water samples from all Tinker AFB streams on a weekly basis. These samples are acquired to monitor

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

compliance with Oklahoma Water Quality Standards assigned to each creek under the National Pollutant Discharge Elimination System and associated installation stormwater permits. In addition to analytical monitoring, other conditions are noted at each creek outfall during each field visit. These parameters include: clarity, algae growth, odors, presence of foam, and presence of oil sheen. All of these indicators are used to locate and eliminate illicit or harmful discharges.

Much of the original prairie was farmed as evidenced by historical aerial photographs and remaining farmland terraces at numerous locations on Tinker AFB. Livestock grazing also appears to have been a significant past agricultural practice as seen by extant barbed wire fencing. Past grazing is also apparent by the absence of some plant species which would be expected to be present on existing prairie remnants had livestock grazing not occurred. Less than 2 percent of the pre-settlement prairie ecosystem currently remains on Tinker AFB. Very few, small, fragmented prairie remnants currently occur on Tinker AFB. These remnants total less than 100 acres and are in a degraded condition. Further native vegetation community change has occurred due to the exclusion of historical natural events such as wildfire and grazing by native herbivores such as bison. The elimination of these natural disturbance events favored the invasion trees, shrubs and non-native herbaceous plants on historical prairie areas. Although historical pristine native prairie and bottomland areas are lacking on the installation, an installation program to implement INRMP objectives for prairie restoration is active and ongoing. The INRMP directs the restoration of degraded areas to native grasses in some of these areas.

Within land areas which have been converted to urban and industrial use, the plant community is comprised primarily of turf grasses and ornamental trees and shrubs. The predominant turf grass on Tinker AFB is exotic Bermuda grass, although native buffalo grass is often found mixed with Bermuda grass. Other less maintained areas are typically a mixture of exotic and native plants. Trees and shrubs are composed of a mix of native and exotic plants and, contrary to pre-settlement plant distribution, woody plants have migrated from bottomland sites to more upland areas due to fire suppression and other environmental factors.

The highly urbanized area in the vicinity of Tinker AFB is host to people-tolerant wildlife such as raccoon (*Procyon lotor*), deer (*Odocoileus virginianus*) and coyote (*Canis latrans*). Other typical wildlife species that have been sighted within boundaries of Tinker AFB include the eastern fox squirrel (*Sciurus niger*), eastern cottontail rabbit (*Sylvilagus floridanus*), beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), red-winged blackbird (*Agelaius phoeniceus*), meadowlark (*Sturnella* spp.), scissor-tailed flycatcher (*Tyrannus florficatus*), bobwhite quail (*Colinus virginianus*), Texas horned lizard (*Phrynosoma cornutum*), three-toed box turtle (*Terrapene carolina*), and bullfrog (*Rana catesbeiana*). Bobcats (*Lynx rufus*), grey fox (*Urocyon cinereoargenteus*) and turkey (*Meleagris gallopavo*) are also present (Krupovage, pers. comm. 2016). Other birds seen on the airfield during an August 16 through 17, 2016 reconaissance were American Kestral (*Falco sparverius*), Mississippi Kite (*Ictinia mississippiensis*), American Crow (*Corvus Brachyryncos*), Meadowlark species (*Sturnella*) and Swainson's Hawk (*Buteo swainsoni*). In general, there is not enough food, water or habitat to attract the diversity of wildlife that would occur at less urbanized and more ecologically diverse areas in Oklahoma.

However, despite the degree of urbanization at Tinker AFB, much time, effort and money have been spent restoring approximately 200 acres of native habitat beginning in the 1990's (INRMP, 2014). Much of this work is still in progress. INRMP directed efforts include large scale eradication of numerous invasive species associated with a typical disturbed urban setting such as Johnson grass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), brome (*Bromus* spp.), Sericea lespedeza (*Lespedeza cuneata*) and crab grass (*Digitaria* species). Also being eliminated are non-native woody species such as

Siberian Elm (*Ulmus pumila*), lacebark elm (*Ulmus parvifolia*), Callery pear (*Pyrus calleryana*), bush honeysuckle (*Lonicera* spp.) and Japanese honeysuckle (*Lonicera japonica*). Native plantings in restoration areas include burr oak (*Quercus macrocarpa*), little blue stem (*Schizachium scoparium*), and Indian grass (*Sorghastrum nutans*). This considerable conservation and restoration effort is described in greater detail in the pages that follow.

The Canadian River, at its nearest point, lies approximately 15 miles to the southwest of Tinker AFB, and cuts a very winding path roughly west to east through the state of Oklahoma. Directly south of Oklahoma City and Tinker AFB is Lake Stanley Draper, and a little further south is Lake Thunderbird which is part of Lake Thunderbird State Park. The northern-most tip of Lake Stanley Draper is visible from the south end of runway 18-36. The Canadian River and the two reservoirs would provide suitable stop-overs for migratory birds. Details on the two reservoirs are provided in Table 4-1 below, and are derived from the Oklahoma Water Resources Board (https://www.owrb.ok.gov/).

Table 4-1. Reservoirs in the General Vicinity of Tinker AFB

Name	Year Built	Area (acres)	Shoreline (miles)	Maximum Depth (ft)
Lake Stanley Draper	1962	2,519	32	93
Lake Thunderbird	1965	5,377	59.6	58

There is potential shorebird habitat at these two lakes. Interior Least Terns have been observed foraging at Lake Stanley Draper by Tinker biologists. Use by other threatened and endangered species there is unknown.

The airspace above Tinker AFB is part of the Central Flyway for migratory birds. The Central Flyway is one of four major North American flyways and carries millions of avian migrants to the north and south on their two seasonal journeys. Migrating birds of all species from the smallest songbirds to the tallest bird in North America, the Whooping Crane, generally follow this route. When migrants fly over Tinker AFB itself, depending on the species, they may not see resources that would sustain them, so they continue on their way or stop at the Canadian River or the two large reservoirs mentioned above.

Commercial, military, and private air traffic in the vicinity of Oklahoma City and Tinker AFB potentially places birds within the Central Flyway on a lethal path with aircraft. BASH risk depends on the season of year and height of the bird's flight path. Even though preferred habitat for bird species is not technically present on Tinker, many species are attracted to the airfield environment, such as grassland songbirds, shorebirds, waterfowl and raptors. Large bodied birds that are attracted to the airfield present the biggest threat to aircraft and human safety, and these are the ones that are most strongly discouraged from utilizing the airfield and surrounding areas. However, smaller birds and mammals are discouraged as well because their presence attracts both avian and mammalian predators. In addition, flocks of smaller birds can also pose a significant hazard because of the increased probability of birds being ingested by one or more engines.

Restoration and Conservation of Natural Areas on Tinker AFB – Green Infrastructure Plan

This section discusses restoration and conservation efforts at Tinker AFB, and the philosophy that guides these efforts. One of the primary goals of the Tinker AFB Integrated Natural Resources Management Plan is to enhance degraded habitat away from the airfield for benefit of birds, pollinators and other wildlife, as well as to provide a landscape that enhances the quality of life for airmen, employees and visitors. Provided below are some definitions from the Green Infrastructure Plan (Tinker Air Force Base. 2015), a component plan of the INRMP.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Definitions:

- Regulated Areas – areas that contain environmentally sensitive features, such as waterways (and their associated buffers), 500-year floodplains, and wetlands that are regulated (i.e., protected) during the land development process.
- Green Infrastructure (GI) – An interconnected network of waterways, wetlands, woodlands, grasslands, and other natural areas of base-wide significance.
- Gray Infrastructure – buildings, roads, runways, ramps, utilities, and other man-made features in the landscape.
- Evaluation Areas – areas that contain environmentally sensitive features (or are adjacent to environmentally sensitive features) such as native grasslands/woodlands, sensitive wildlife species, or rare plant species that are not regulated (i.e., no regulatory stature) during the land development process. Evaluation areas will be considered during the review process as areas of high priority for ongoing conservation. These are developable areas; however, consideration must be given to natural resources that exist on the site and their priority for preservation and long term conservation.
- Network Gaps – areas either inside or outside regulated areas that are critical to the connection of fragmented natural areas. These have been included in the GI Plan to provide areas of possible connectivity. These areas should be evaluated during the land development review process for possible restoration opportunities to enhance the ecological functioning of the network and/or to make critical connections in the green infrastructure network.
- 500-year floodplain – the lowland and relatively flat areas adjoining waters, including at a minimum, that area subject to a 0.2-percent chance of flooding in any given year.
- Wetlands – areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

The Green Infrastructure Plan, first published in 2007, is a comprehensive vision for interconnecting and managing natural environmental systems on and adjacent to Tinker AFB to ensure the sustainability of both the ecosystem and the military mission. The Green Infrastructure Plan vision is to balance the natural infrastructure with build infrastructure and human needs. Sensitive environmental resources (e.g., floodplains, wetlands, creek systems) have been identified across the base, and the GI plan is intended to guide development to support current and future military mission needs while not degrading sensitive environments. A basic objective is to sustain a green infrastructure network to provide optimal military operational sustainability, and promote societal, economical, and ecological benefits for Tinker AFB and its neighboring communities in concert with the desired development pattern of the Installation Development Plan. Without this plan, rapid, and often times indiscriminate, land development could jeopardize future sustainability.

Developable land is very limited on Tinker AFB; therefore, every piece of land is extremely valuable and important for future mission needs. The Green Infrastructure Plan recognizes and supports this reality by encouraging development where it is most appropriate and setting forth recommendations to direct it away from areas where it is not appropriate. Tinker's total green infrastructure is comprised of 1,033 acres, or 21% of the total base land area (Figure 4-1). The majority of the on-base green infrastructure network is not on developable land as it lies within the 500-year floodplain which inherently has many development limitations. Some undeveloped lands are in regulated areas such as the safety clear zones around the airfield where certain habitat restoration goals would not apply under the current land use.

Regulated areas comprise 46% of the green infrastructure network; evaluation areas comprise 42%; and network gaps comprise 12%.

One of Tinker AFB's objectives reflects the commitment to natural resource via the GI Plan: "By 2020, continue to restore and maintain Tinker's green infrastructure to improve habitat structure/health for species at risk, reduce base mowing requirements, increase and sustain the free ecological services provided by the GI network, promote wildland fire safety, and enhance aesthetics for military personnel and visitors.

Outside of grey infrastructure (e.g., buildings and roads), most of the areas described above in Tinker AFB's Green Infrastructure Plan are where intense restoration and conservation are occurring.

Some guiding principles and restoration actions being accomplished by Tinker AFB include:

- Create and maintain a permanent healthy native prairie/savannah upland and wooded bottomland system that enhances fish and wildlife diversity
- Increase habitat complexity and structure
- Manage for a variety of restored prairie stages and disturbance regimes to increase faunal diversity and abundance
- Convert exotic turf grass to native grasses/forbs
- Remove invasive native and non-native grasses, forbs, vines, shrubs, and trees
- Plant a diversity of native aquatic plants in ponds
- Plant high diversity of sustainable grasses, forbs, and woody species consistent with local ecoregion
- Restore and maintain natural corridor connectivity wherever possible
- Employ natural vegetation patch stepping stones if continuous connectivity cannot be achieved
- Decrease stepping stone distance wherever possible
- Prioritize restoration by focusing first on higher order streams versus lower order streams and gaps away from roads as opposed to close to roads.
- Emphasize larger patches over smaller ones
- Provide both quality interior area and edge diversity
- Clear up pond turbidity
- Place/anchor artificial snags (standing tree stumps) and other natural log/root structures in ponds
- Stabilize shorelines
- Reintroduce native wildlife, and
- Burn/mow in blocks, always leaving some unburned.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 4-1. Green Infrastructure Network Within and Around Tinker AFB

The Tinker AFB Green Infrastructure Plan implements a "land ethic" first expressed most convincingly by Aldo Leopold in 1949. For example, an area of Tinker AFB referred to as Glenwood is an area that used to contain base housing units, but no longer does, because of three plane crashes that occurred there. The houses were removed and the area is being restored with native plants. Since 2013, 36.5 acres of large eastern red cedars were removed in Glenwood in order to restore more open habitat to harbor the Texas Horned Lizard. The cedars were removed by masticators to create more open habitat for the Texas Horned Lizard and other grassland species. In addition, other "satellite" areas are also in the process of being restored to native ecosystems. See Tinker INRMP for more details of conservation activities on the installation.

Compliance with Federal Regulations and Policy

Implementation of the Tinker AFB Integrated Natural Resources Management Plan and associated Green Infrastructure Plan enhances and ensures proactive compliance with the following regulatory requirements, and ensures continued availability of land for military operations:

- Executive Order 11988, Floodplain Management (May 24, 1977, as amended)

- Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (Jan 30, 2015)
- Executive Order 11990, Protection of Wetlands (May 24, 1977, as amended)
- Executive Order 13693, Planning for Federal Sustainability in the Next Decade (Mar 19, 2015)
- Council on Environmental Quality Instructions for Sustainable Locations for Federal Facilities (Sep 15, 2011)
- Guidance for Federal Agencies for Sustainable Practices for Designed Landscapes (Oct 31, 2011, as supplemented)
- Oct 22, 2014 Presidential Memorandum—Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators, and
- Section 438 of the Energy Independence and Security Act of 2007 (EISA).

Federally protected species

While it is possible that no nesting or loafing habitat exists on Tinker AFB for the Northern Great Plains Piping Plover, Interior Least Turn, Rufa Red Knot or Whooping Crane, plenty of other habitat is available for neotropical migrant birds (e.g. mature bur oak stands), other shore birds, heron, egrets and rails (ponds, wetlands, streams and restored grasslands), grassland birds (restored and unrestored native grasslands/turf), and raptors.

Figure 4-2. Photos of Ecosystem Restoration Efforts at Tinker AFB.

Reserve 1 of Tinker AFB Urban Greenway (before) with Bermuda grass (above) converted to mixed prairie (below).

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Reserve 1 of Tinker AFB Urban Greenway After (above) converted to mixed prairie.

Close up of Reserve 1 of Tinker AFB Urban Greenway showing mixed grass prairie.

Above, Tinker AFB Urban Greenway Entrance dominated by exotic fescue circa 1994 (above) and transitioning to native prairie/savannah following restoration action circa 2012 – below.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

In conclusion, the guiding principles discussed above and ongoing conservation actions demonstrate Tinker AFB's strong commitment to the military mission and the natural environment and the wildlife that depend on the landscape for food, water and habitat. In addition, military members and civilians benefit from the improved esthetic aspects of the "green" areas and screened off industrial areas while exercising or driving on Tinker Air Force Base.

5.0 EFFECTS OF THE ACTION

While Seymour-Johnson AFB is location of the preferred alternative, if Tinker AFB is chosen instead, implementation of the proposed KC-46A MOB 3 mission, concurrent with Tinker's ongoing flying and maintenance mission, would only increase total aircraft operations by less than 13%, or 4,041 operations per year at Tinker AFB. The greatest increase would attributed to the increase in air tanker refueling operations. There are eight KC-135 aircraft in use currently, and the proposed MOB 3 mission would replace these eight aircraft with 12 KC-46A aircraft. Although the USAF recognizes that aircraft operations at Tinker AFB would increase over time if the installation were to be selected for the additional mission, the USAF does not anticipate a relative increases in bird strikes because due to the mitigation measures to avoid bird strikes that are currently in place at Tinker AFB in accordance with the INRMP and BASH plan.

Discussion of Migratory Bird Species and Federally Listed Species at or in the Vicinity of Tinker AFB

In an extensive 2010 avian survey, there were 5,485 individual birds observed on Tinker AFB, representing 137 species reported in the study entitled: *Inventory of Avian Species on Tinker AFB, Oklahoma City, Oklahoma, 2010.* No federally listed threatened or endangered species were observed during this survey. This inventory noted that spring time represented the highest diversity with 107 species, followed by summer with 68 species, fall with 56 species, and winter with 49 species (St. Germain, 2010). Prior to the strike of the listed Northern Great Plains Piping Plover in 2009, no birds of this particular species have been documented at Tinker AFB. No Northern Great Plains Piping Plovers have been observed since that incident.

Smaller birds on the airfield present a serious hazard because some flock in large numbers during the migration and wintering periods. A solitary individual will potentially cause less damage to an aircraft than will a flock. Typically ducks, geese, herons, owls and doves collide with aircraft as individuals (Sodhi, 2002). However, shorebirds and starlings usually hit aircraft in flocks. The greatest flocking bird hazards to aircraft can be from European starlings during the fall months. Starlings constitute 37% of all observations on the airfield. However, only three strikes of European starlings have been reported, each occurring outside of the fall period (St. Germain, 2010).

On Tinker AFB, a most prevalent aircraft strike threats comes from the Eastern Meadowlark, which represents a significant proportion of detections during the fall (11%), spring (5%,), and summer (28%). The Meadowlark also constitutes 19.4% of the strikes reported on Tinker AFB with an even distribution among those three seasons. The Horned lark becomes the leading threat in the winter when the Meadowlark is predominantly absent. Horned larks represent 84% of the hazard and 71% of the observations; however they only represent 2.2% of the total strikes reported. Killdeer are significant contributors to the bird strikes on aircraft at Tinker AFB. Killdeer represent 11% of the total strikes reported, with most of them occurring in the fall. The Killdeer appears to have a lower threat level than other species with a 15% hazard based off 6.5% of the observations, however these calculations do not take into consideration behavior of the Killdeer. Most of the Killdeer observations came while the species

was actively on or near the edge of the runways and taxiways. This species often forages on the impervious surfaces the runways provide, and will nest on the gravelly edges of these surfaces or roads. It is these behavioral traits that put Killdeer at greater risk and hazard than the observational data (6.5%) indicates.

The species representing BASH threats described above have strong open habitat preferences that are met to varying degrees by the airfield environment (St. Germain, 2010). In other words, the airfield environment resembles the open grassland-type habitat which is preferred by Eastern Meadowlark, Horned Lark, Killdeer, shorebirds, several species of sparrows and other grassland birds.

Overall the density of birds is much lower on the airfield than in other survey regions of the installation. In the study entitled *Inventory of Avian Species on Tinker AFB, Oklahoma City, Oklahoma, 2010*, the author believes there is an over inflation of winter density estimations due to low sample sizes combined with high variance and large cluster (flock) sizes. In addition, the number of individuals, species richness, and diversity is also much lower on the airfield. This is a good indication that the management practices of keeping birds away from the airfield, while promoting them in the green-space, is thus far successful (St. Germain, 2010).

Northern Great Plains Piping Plover

The Plover that was struck at Tinker is considered to be part of the Northern Great Plains population of the Piping Plover that is classified as threatened. According to Bird Life International, there are an estimated 4,662 breeders composing the Northern Great Plains population (http://www.birdlife.org/datazone/speciesfactsheet.php?id=3127).

No statistical analysis is possible on the one Northern Great Plains Piping Plover strike at Tinker AFB in the 30-year period since the bird was listed as threatened in 1986. As stated previously, more than 192,000 aircraft operations have occurred at Tinker AFB since the single Northern Great Plains Piping Plover was struck by an aircraft in 2009, with no additional Northern Great Plains Piping Plover sightings or strikes on base occurring in the last seven years. In addition, no nesting habitat is known for this species at Tinker AFB proper, or currently in Oklahoma County. Therefore, any Northern Great Plains Piping Plovers occurring in the region are anticipated to be temporary migrants.

The Northern Great Plains Piping Plover is one of 137 documented species occurring at Tinker AFB. According to Lt. Colonel Beth Dittmer, Chief of Flight Safety at Tinker AFB, over the last 20 years, there have been over 383 bird fatalities, or approximately 20 strikes per year, resulting from collisions with aircraft at that installation. Likely due to its extreme rarity at Tinker, only one of those fatalities was a Northern Great Plains Piping Plover, and that fatality occurred over 7 years ago. The Air Force cannot entirely dismiss the possibility that the ongoing flying mission and proposed KC-46A MOB 3 mission could result in a aircraft strike of an individual Northern Great Plains Piping Plover species sometime in the future. Since the likelihood of striking another Northern Great Plains Piping Plover is very low, as evidenced by historical BASH records, the USAF determined that the ongoing flying mission, as well as the proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect this species.

Interior Least Tern

The ILT population has been surveyed from 1984 to present. It was federally listed as endangered in 1985. Survey effort and coverage increased during 1984 through 1986, yet because colonies are

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

ephemeral, riverine nesting habitat is remote, and salt flat nesting habitat is vast, consistent timing and coverage of surveys have not currently been logistically possible. Colonies in interior sites are typically small: ranging from 5 to 20 nests, and rarely greater than 50 nests. Best information available suggests that the interior population has increased during the time period of 1986 to 1991 from approximately 4,125 to 6,830 (EMK and J. Sidle unpubl. data). Tern numbers increased one hundred percent along lower Mississippi River (Cape Girardeau, MO, to Vicksburg, MS) between 1989 and 1990 (from 2,503 to 5,038 birds), which cannot be accounted for by increased survey effort or change in survey method. This area of the lower Mississippi supports 52 to 65 percent of all known nesting ILTs (http://bna.birds.cornell.edu/bna/species/290/articles/demography).

In addition, the Interior Least Tern is increasingly using rooftops for nesting (especially from North Carolina southward), and dredged-material islands (Fisk 1978, Parnell et al. 1986, Hovis and Robson 1989, Gore 1991, M. Harris pers. comm., M. Dodd pers. comm.), but productivity at rooftop sites is highly variable relative to natural sites (Robertson and Woolfenden 1992).

The USFWS 1990 Recovery Plan for the ILT estimated that there were 5,000 ILTs at that time, and the plan set a recovery goal of 7,000 birds. Although serious threats to the Tern continues, and the best means to count them remains a challenge, current population numbers appear to suggest that the birds are holding their own. There is a potential possibility of ILT nesting on flat roofs at Tinker AFB. If such nesting were to occur, aircraft strikes would be more likely when the birds are on or near the airfield. It is also possible, but difficult to determine, whether the birds are more interested in foraging or loafing in the restored natural areas on Tinker AFB rather than on the airfield itself. ILTs have preference for larger bodies of water than those found in Tinker AFB's ongoing restoration of riparian corridor sites. In addition, quality habitat may exist at the two nearby lakes, Lake Stanley Draper and Lake Thunderbird.

Air Force BASH data has never recorded an aircraft strike of an Interior Least Tern at Tinker AFB. Given the apparent population growth, survival and adaptability of the Tern as described above, the USAF has determined that the ongoing flying mission, and proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect, members of the ILT species.

Rufa Red Knot

As stated previously, Rufa Red Knot populations are in decline around the world, especially *C. c. rufa*, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010.

Geolocator results from eight red knots (one with 2 years of data) wintering in Texas showed that all these birds used a central, overland flyway across the midwest United States. Birds flew 1,600 to 2,000 miles to the first stopover. A Northern Great Plains stopover (Saskatchewan, Canada, and North Dakota, United States) was used by five of six birds in 2010, while southern Hudson Bay in Manitoba, Canada (the Nelson River delta and James Bay), was used by one bird in 2010 and all three birds in 2011 (Newstead et al. 2013). These findings support earlier reports of large numbers (1,000 to 2,500) of red knots in Saskatchewan and Alberta, Canada, between January and June (Skagen et al. 1999).

All birds departed Texas in the second half of May, and spent an average of 18.3 ± 3.2 days (range of 13 to 22 days) at the northbound stopover (Newstead et al. 2013). Although these geolocator results show consistent use of the central flyway, re-sightings of marked birds suggest a more complex pattern of movements between Texas and the Atlantic coast, including both the Southeast wintering areas and Delaware Bay (BandedBirds.org 2012; D. Newstead pers. comm. August 20, 2012; Niles et al. 2008,

p.74). In addition, at least one bird marked in Argentina passed through Texas during spring migration (Niles et al. 2008, p. 74). Higher counts of roughly 700 to 2,500 knots have recently been made on Padre Island, Texas, during October, which could include wintering birds (Newstead et al. 2013; Niles et al. 2009, p. 1).

This paragraph focuses on the Rufa Red Knot's coastal nonbreeding habitats. Rufa Red Knots are restricted to ocean coasts during winter, and occur primarily along the coasts during migration. However, small numbers of Rufa Red Knots are reported annually across the interior United States (i.e., greater than 25 miles from the Gulf or Atlantic Coasts) during spring and fall migration. These reported sightings are concentrated along the Great Lakes, but multiple reports have been made from nearly every interior State (eBird.org, 2012). Information on the specific noncoastal stopover habitats used by Rufa Red Knots is lacking.

Based on the above information, Rufa Red Knots are moving through Texas and Oklahoma on their way either to the Great Lakes or Delaware Bay and/or their breeding grounds in northern Canada with an estimated arrival of June 10 based on geolocator data. They are most likely to pass over Tinker AFB during spring and fall. Rufa Red Knots tend to migrate in single-species flocks with departures typically occurring in the few hours before twilight on sunny days. Size of the departing flocks tends to be large (greater than 50 birds) (Niles et al. 2008, p. 28). Likewise, based on observations of other *Calidris canutus* subspecies departing from Iceland towards Nearctic breeding grounds in spring 1986 to 1988, Alerstam et al. (1990, p. 201) found mean flock sizes of 100 to 200 individuals.

It appears that migrating Red Knots would pass over Tinker AFB in single species flocks of anywhere from 50 to 200 birds. They are also a fairly good sized bird and a flock of 50 or more individuals would be easy to detect during the day, but not at night. Radar would be required to detect them at night.

Air Force BASH data has never recorded an aircraft strike of a Rufa Red Knot at Tinker AFB. Given their habits as described above, the ongoing flying mission, and proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect, the Rufa Red Knot.

Whooping Crane

According to the Aransas National Wildlife Refuge website data for 2015-2016, there are only 329 Whooping Cranes living in the wild today; which is the flock that winters at the Aransas National Wildlife Refuge on the Texas coast and spends the spring and summer at Wood Buffalo National Park in the Northwest Territories and adjacent areas of northeastern Alberta, Canada.

Although Tinker AFB is potentially within the confines of the migratory path of this species, a Whooping Crane has never been observed at Tinker AFB. Due to its extreme rarity, it would be an exceptional occasion to observe a Whooping Crane at Tinker AFB. If observed, the air traffic control tower would be alerted so that an air strike could be prevented. Therefore, the USAF has determined that the ongoing flying mission and proposed KC-46A MOB 3 mission may affect, but is not likely to adversely affect, members of the Whooping Crane species.

Effects of the Proposed Action on Northern Great Plains Piping Plover, Interior Least Tern, Rufa Red Knot and Whooping Crane

With Tinker's flying mission in place for the last 75 or so years, and with passage of the ESA in 1973 and 43 years gone by since, and only one documented strike of the listed Northern Great Plains Piping Plover,

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

it is unlikely that the four listed bird species will be struck and killed in significant enough numbers at Tinker AFB to affect their survival.

Based on the information listed above, the USAF does not anticipate that a proposed 13% increase in overall operations will increase the potential for a future bird strike involving the Interior Least Tern, Rufa Red Knot, Whooping Crane or Northern Great Plains Piping Plover. This determination is based on the fact that more than 192,000 aircraft operations have occurred at Tinker AFB since the single Northern Great Plains Piping Plover was struck by an aircraft in 2009, with no additional Northern Great Plains Piping Plover sightings or strikes occurring in the last 7 years. In addition, no nesting habitat is known for this species, or the Interior Least Tern, Rufa Red Knot or Whooping Crane at Tinker AFB proper, or currently in Oklahoma County. Therefore, any of these species occurring in the region are anticipated to be temporary migrants.

6.0 CUMULATIVE EFFECTS

No cumulative effects are expected to result from Tinker's ongoing flying mission. The installation has been an active Air Force Base since World War II. The ongoing flight mission represents baseline conditions.

Should the proposed KC-46A MOB 3 mission occur at Tinker AFB, there would be dust, noise and increased personnel (demolition and construction workers) present on the installation during the demolition and construction period. The effects of this are expected to be temporary and are only occurring on the airfield. There would also be increased traffic on the roads at Tinker AFB during construction, but this will decrease after demolition and construction. There would be a slight permanent increase of traffic on Tinker's road due to the increase in personnel associated with the proposed KC-46A MOB 3.

If chosen for the proposed KC-46A MOB 3 mission, aircraft operation at Tinker AFB would increase by 13 percent, and additional personnel required to staff the mission would increase the number of personnel on Tinker by 476. More housing and service oriented businesses might be required. However, the increase of 476 personnel is insignificant compared to the Oklahoma City proper area population of 579,999 and the Oklahoma City Metro, seven county population of 1,459,788 (source: suburbanstats website and Wikipedia).

There is no designated critical habitat at or in the vicinity of Tinker AFB, so there will be no impact upon critical habitat from the proposed action.

7.0 CONCLUSIONS

Based on the information provided in this BE, the USAF requests concurrence from the USFWS that the current mission and implementation of the KC-46A MOB 3 mission at Tinker AFB, *may affect, but is not likely to adversely affect,* the Northern Great Plains Piping Plover, Interior Least Tern, Rufa Red Knot or Whooping Crane. Although Tinker AFB is not currently the preferred alternative in the KC-46A MOB 3 beddow EIS, the USAF would engage with the USFWS if Tinker AFB were to be selected to implement any measures that could reduce and minimize the potential for future impacts to Northern Great Plains Piping Plovers, ILT, Rufa Red Knot and Whooping Crane. These measures would be incorporated into the installation Integrated Natural Resources Management Plan during the required annual review and update sessions with the USFWS and Oklahoma Department of Wildlife Conservation.

USDA-WS staff are already collecting extensive information on bird species at Tinker AFB, and are working with the USAF natural resources program staff to provide abundance and population trend data for listed birds and other bird species that may occur on Tinker AFB. Through the Sikes Act mandated collaboration on the INRMP, the USAF, USFWS, and State will continue to implement a well-defined monitoring plan for sensitive species to provide abundance numbers and trends for all species of concern.

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9.0 LIST OF CONTACTS MADE AND PREPARERS

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A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

November 2, 2016

Mr. Ken Collins, T&E Branch Chief
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

Mr. Laurence Levesque
U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

RE: Revised Biological Evaluation (BE) for Proposed KC-46A Third Main Operating Base (MOB 3) Beddown Mission, Tinker Air Force Base (AFB), Oklahoma

Dear Mr. Collins and Mr. Levesque,

As per recent communications between the Oklahoma Ecological Services Field Office and the natural resources management staff at Tinker AFB, Air Force resubmits for your review our Biological Evaluation regarding the potential use of Tinker AFB as an alternative location for the beddown of an aerial refueling mission entitled "KC-46A Third Main Operating Base (MOB 3)." This BE replaces and supersedes the BE we transmitted to your office on September 16, 2016.

In accordance with Section 7 of the Endangered Species Act (ESA) (16 U.S.C. §§ 1531–1544), the Sikes Act (16 U.S.C. 670a-670o), and the United States Air Force (Air Force) Environmental Impact Analysis Process (EIAP), the Air Force prepared the attached Biological Evaluation (BE) to assess the potential effects of this proposed action on avian species protected under the ESA. Tinker AFB is currently being evaluated as one of four installations that could receive additional aircraft in the currently ongoing KC-46A Third Main Operating Base (MOB 3) Beddown Environmental Impact Statement (EIS) process. Currently, Seymour Johnson AFB, North Carolina is identified in the draft EIS document as the preferred location of the mission beddown.

The BE was prepared using readily available information from the United States Fish and Wildlife Service Environmental Conservation ECOS species accounts, the Oklahoma Department of Wildlife Conservation's threatened, endangered, and rare species profiles, the Tinker AFB Integrated Natural Resource Management Plan (INRMP), the Bird/Wildlife Airstrike Hazard (BASH) program bird strike data for Tinker AFB, and the avian species inventory reports prepared by the Virginia Polytechnic Institute and State University. Information from the Cornell Lab of Ornithology and Audubon Society on bird species life history and habitat preferences was also consulted. Based upon this information, the following special status species were evaluated: Interior Least Tern (*Sterna antillarum*) – endangered, Whooping Crane (*Grus americana*) – endangered, Northern Great Plains Piping Plover (*Charadrius melodus*) – threatened, and Rufa Red Knot (*Calidris canutus rufa*) – threatened.

Past correspondence with the U.S. Fish and Wildlife Service Oklahoma Ecological Services Field Office includes the original March 17, 2016 letter announcing the Air Force's intent to prepare an EIS to analyze the effects of the proposed KC-46A MOB 3 mission bed down, and the aforementioned draft BE submitted on September 16, 2016. On May 5, 2016 the USFWS Oklahoma Field Office submitted a comment on the draft EIS via the project website. On August 1, 2016, a teleconference occurred between the Air Force and your office regarding the KC-46A bed down, followed by a letter to your office dated August 5, 2016 in which Tinker AFB (72nd Air Base Wing) requested ESA Section 7 consultation. A site visit at Tinker AFB was attended by Oklahoma Ecological Services Field Office staff on October 20, 2016.

Based on the information provided in the attached BE, the USAF requests written concurrence from the USFWS that the potential implementation of the KC-46A MOB 3 mission at Tinker AFB results in a *may affect, is not likely to adversely affect* determination for the Northern Great Plains Piping Plover, Interior Least Tern, Rufa Red Knot and Whooping Crane. Please address correspondence to Mr. Kevin Porteck, United States Air Force, AFCEC/CZTQ; 2261 Hughes Ave, Suite 155, JBSA Lackland, TX 78236-9853, or electronically to the project website at www.kc-46A-beddown.com. For technical questions on this Biological Evaluation, please contact Mr. John Krupovage, (405) 739-7074, john.krupovage@us.af.mil.

Sincerely,

Kevin G. Porteck

KEVIN G PORTECK, GS-14, DAF
Natural Resources Specialist

Attachment:
Biological Evaluation for Air Operations, Tinker AFB

cc: Mr. John Krupovage, 72 ABW/CEIE

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Biological Evaluation for Air Operations
Tinker Air Force Base, Oklahoma

September 16, 2016

Prepared for: **72nd Air Base Wing, Tinker Air Force Base**

Prepared by: **Air Force Civil Engineer Center**

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LIST OF ABBREVIATIONS / ACRONYMS

AFB	Air Force Base
AFRC	Air Force Reserve Command
AMC	Air Mobility Command
ANWR	Aransas National Wildlife Refuge
AOA	Air Operations Area
BE	Biological Evaluation
BO	Biological Opinion
BASH	Bird Aircraft Strike Hazard
DoD	Department of Defense
EIS	Environmental Impact Statement
ESA	Endangered Species Act
GI	Green Infrastructure
ILT	Interior Least Tern
INRMP	Integrated Natural Resources Management Plan
NRCS	Natural Resource Conservation Service
OC-ALC	Oklahoma City Air Logistics Complex
OKC	Oklahoma City
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USDA-WS	U.S. Department of Agriculture – Wildlife Services
USFWS	U.S. Fish and Wildlife Service
WHIP	Wildlife Habitat Incentive Program

1.0 BACKGROUND/HISTORY

The primary purpose of this Biological Evaluation (BE) is to address the potential effect of adding the proposed KC-46A MOB 3 mission to Tinker Air Force Base (AFB) on species listed as endangered or threatened in accordance with the Endangered Species Act (ESA). Tinker AFB has been identified as one of three reasonable alternatives for the location of new KC-46A aerial refueling aircraft in an Environmental Impact Statement (EIS) being prepared by the United States Air Force (USAF). The EIS currently identifies Seymour Johnson AFB in North Carolina as the preferred alternative for beddown of the KC-46A MOB 3 mission. Grissom Air Reserve Base, Indiana, Tinker AFB, Oklahoma, and Westover Air Reserve Base, Massachusetts are currently being evaluated only as reasonable alternatives in the Environmental Impact Statement for the KC-46A MOB 3 mission. The proposed KC-46A MOB 3 action would replace eight existing aerial refueling aircraft with 12 new KC-46A aircraft, resulting in a net gain of four aircraft with a concurrent increase in air operations as described herein.

The federal action agency is Tinker AFB, which is under the command of the 72nd Air Base Wing (72 ABW). Tinker AFB is an urban industrial installation located five miles from downtown Oklahoma City (OKC). See Figure 1-1 below for a regional map of Tinker AFB and OKC vicinity. The installation is considered to be a vital part of the OKC metro area economy and culture. Tinker's vital national defense mission is to provide logistics support to Air Force aerospace weapon systems, equipment, and commodity items, and this mission encompasses a myriad of responsibilities including depot level maintenance and overhaul and deployable communications systems. See Figure 2.2 for locations of some of the main industrial buildings and roads at Tinker AFB.

The Air Force has identified Seymour Johnson AFB in North Carolina as the preferred alternative in the EIS for the beddown of new aircraft associated with the KC-46A MOB 3 mission. However, if the preferred location would be changed to Tinker AFB, it would be considered a federal activity with the potential to affect federally listed species resulting from aircraft strikes. Under the requirements of Section 7 (a)(2) of the ESA, federal agencies are required, in consultation with, and with the assistance of the Secretary of the Interior, to insure that any action, authorized, funded or carried out by such agency, is not likely to jeopardize the continued existence of any endangered or threatened species, or result in destruction or adverse modification of the habitat of such species. Section 7 assures that, through consultation with the United States Fish and Wildlife Service (USFWS), a federal proponent's actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat. Therefore, as part of the EIS analysis process, this BE addresses the potential effect of selecting Tinker AFB as an alternative location for the proposed KC-46A MOB 3 mission. This BE is prepared by the Air Force Civil Engineer Center on behalf of the 72nd Air Base Wing, and evaluates the addition of the KC-46A MOB 3 mission for compliance with the requirements of Section 7(a)(2) of the ESA.

In accordance with the Sikes Act (16 U.S.C. 670), Tinker AFB develops, maintains, and implements an Integrated Natural Resources Management Plan (INRMP) in collaboration with the United States Fish and Wildlife Service (USFWS) Ecological Services Field Office and the Oklahoma Department of Wildlife Conservation. The Tinker AFB INRMP provides goals and objectives for ecosystem management, to include objectives for the conservation of birds and other wildlife, and actions to mitigate conflicts between wildlife and aircraft operations. The USFWS last reviewed, approved, and signed the Tinker AFB Integrated Natural Resources Management Plan on February 28, 2013, indicating concurrence with the installation's wildlife management practices. The Oklahoma Department of Wildlife

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Conservation last approved the INRMP by signature on October 18, 2013. In 2015, the agencies conducted a tri-partite review and update of the Tinker AFB INRMP.

Tinker AFB maintains an active Bird/Wildlife Aircraft Strike Hazard (BASH) reduction program for the purpose of minimizing wildlife strikes by aircraft. In accordance with Air Force policy, BASH program managers report all bird strike occurrences by species, to include utilizing the services of Smithsonian Institute scientists to identify remains when the species is not obvious. Tinker has been documenting all known bird strikes, by species struck, from pilots, aircraft maintenance personnel, and runway operations personnel since 1995. On May 11 2009, the remains of a federally threatened Piping Plover that was struck and killed by an unknown aircraft were collected on the main runway, and was reported to the U.S. Fish and Wildlife Service (USFWS) and Oklahoma Department of Wildlife Conservation.

Figure 1-1. Regional Location of Tinker AFB

2.0 DESCRIPTION OF THE ACTION & ACTION AREA

Seymour Johnson AFB in North Carolina is the preferred alternative identified in the KC-46A MOB 3 EIS. Tinker AFB has been identified as one of the three reasonable alternatives for the KC-46A MOB 3 mission. The U.S. Air Force (USAF) is currently preparing a draft EIS which analyzes the preferred alternative and the three reasonable alternatives. This BE addresses the proposed KC-46A MOB 3 mission footprint if Tinker AFB were selected to replace Seymour Johnson AFB as the preferred alternative.

Proposed Action: KC-46A MOB 3 Beddown Specifics

This section details the actions necessary at Tinker AFB, if selected, for the basing of the KC-46A MOB 3 mission. If Tinker AFB were to be selected for the proposed KC-46A MOB 3 mission, the eight KC-135 aircraft would be replaced by 12 KC-46A tankers. KC-135 aircrews currently conduct 2,399 annual operations at Tinker AFB. Should the KC-46A MOB 3 mission be located at Tinker AFB, KC-46A MOB 3 aircrews would conduct approximately 6,440 annual operations, resulting in an estimated increase of 4,041 airfield operations per year on the runway. The USAF determined that Tinker AFB's infrastructure and base resources could accommodate the new requirements for the KC-46A MOB 3 mission within the constraints set by the alternative narrowing process. Information about the existing KC-135 aircraft and the proposed new KC-46A aircraft are provided below.

The KC-135 Stratotanker currently provides the core aerial refueling capability for the USAF, and has excelled in this role for more than 50 years. This unique asset enhances the Air Force's capability to accomplish its primary mission of global reach. It also provides aerial refueling support to Air Force, Navy, Marine Corps and allied nation aircraft. The KC-135 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations.

The KC-46A Pegasus is the first phase of a 3-phase effort to replace the USAF's aging KC-135 tanker fleet. With more refueling capacity and enhanced capabilities, improved efficiency and increased capabilities for cargo and aeromedical evacuation, the KC-46A will provide aerial refueling support to the Air Force, Navy, Marine Corps as well as allied nation coalition force aircraft.

Facilities and Infrastructure

Figure 2.1 provides an overview of Tinker AFB facilities. Tinker AFB has the basic physical real estate and infrastructure to beddown the KC-46A MOB 3 mission; however, certain projects are required to support the KC-46A MOB 3 beddown at Tinker AFB. A KC-46A aircraft mission beddown would require demolition and renovation of existing facilities, airfield ramp space, and aircraft hangars currently utilized for the day-to-day KC-135 missions. New construction would be limited to the existing development footprint of the aircraft maintenance infrastructure. No undeveloped land or natural habitat would be affected from the beddown of the KC-46A MOB 3 mission. See Table 2.1 below for details on Facilities and Infrastructure Projects that would occur if the proposed KC-46A MOB 3 mission were to be located at Tinker AFB.

If the KC-46A MOB 3 mission were to be located at Tinker AFB (Note: Seymour Johnson AFB is currently the preferred alternative), two new facilities and additional ramp space would be constructed to support the new mission. The largest new construction would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and would also require the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities and within the current hydrant fueling system on the current KC-135 ramp.

If the KC-46A MOB 3 mission were to be located at Tinker AFB, interior renovations would occur in Hangar 1053 and Buildings 1056 and 1082 to accommodate mission personnel and equipment storage. Although Buildings 11, 260, 469, 1048, 1059, 1071, and 1112 would be used to house various KC-46A functions, including logistics warehousing, engine storage, maintenance, squadron operations, and airfield equipment, no new renovations would be required for the use of these buildings. The aircraft requirements used to determine ramp parking would require a reconfiguration of parking spaces on the current KC-135 ramp. This relocation of parking spaces would require the exising hydrant pits associated with each KC-135 aircraft to be relocated to the proposed KC-46A parking locations. All proposed demolition and construction would occur within the existing airfield area. Figure 2.2 indicates the location of Facilities and Infrastructure Projects that would be associated with the beddown of the KC-46A MOB 3 Mission at Tinker AFB.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 2-1. Base Overview of Tinker AFB

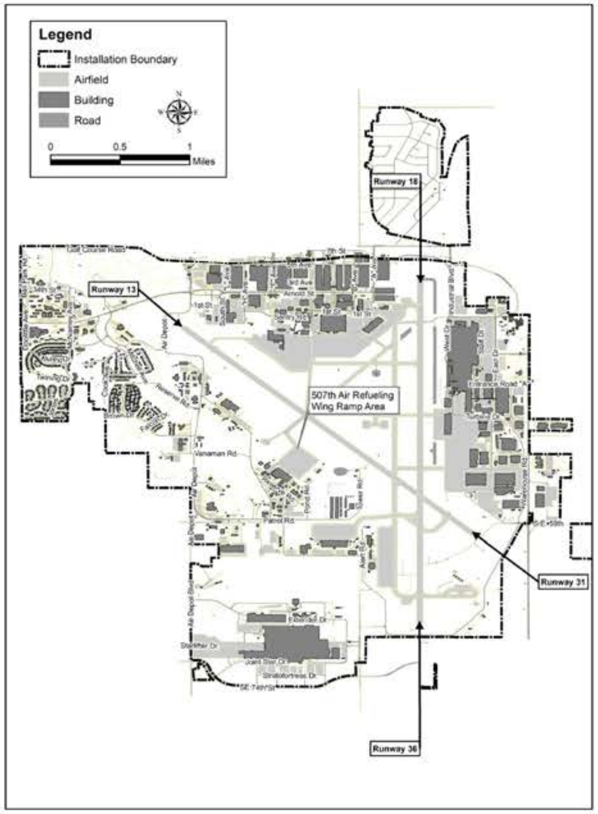


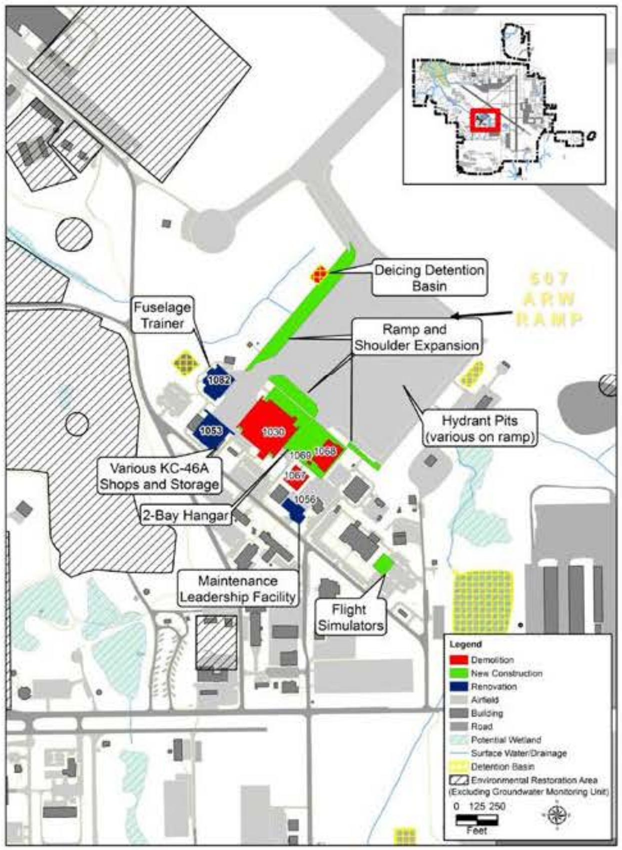
Table 2-1. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

Project	Facility Size (square feet)
Demolition	
Building 1030[a] (to make room for new 2-Bay Hanger with Apron Access)	99,184
Building 1067 (to make room for new 2-Bay Hanger with Apron Access)	11,460
Building 1068[a] (to make room for new 2-Bay Hanger with Apron Access)	19,775
Building 1069 (to make room for new 2-Bay Hanger with Apron Access)	250
Deicing Detention Basin	7,330
Total Square Feet	**137,999**
Renovation	
Hangar 1053, Various KC-46A Shops and Storage	10,000
Building 1056, Maintenance Leadership Facility	10,000
Building 1082, Fuselage Trainer (FuT)	15,000
Hydrant Pit repositioning	Not Applicable
Total Square Feet	**35,000**
New Construction	
2-Bay Hanger with Apron Access (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	200,000
Flight Simulators (WST, BOT)	10,500
Ramp and Shoulder expansion	114,000
Total Square Feet	**324,500**

[a] Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 2-2. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB



Personnel

See Table 2.2 below for existing and proposed changes to personnel that would result if Tinker AFB were selected to be the preferred alternative for the KC-46A MOB 3 Mission. The 507 ARW at Tinker AFB currently has authorized 1,032 personnel. If the KC-46A MOB 3 Mission were to be located at Tinker AFB, authorized personnel would increase to 1,443 personnel. Air Mobility Command (AMC) would stand up an Active Duty unit associated with part-time Reservists within the Air Force Reserve Command (AFRC) host wing.

Table 2-2. Personnel Changes for the KC-46A MOB 3 Mission at Tinker AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	3	0	3
Dual Status Technician (reserve, civilians, federal)	214	+129	343
Non-Dual Status (DoD civilians)	27	+5	32
Contractors[a]	0	+15	15
Subtotal	**244**	**+308**	**552**
Part Time			
Drill Status Reservists	1,002	+232	1,234
Total Personnel Authorizations[b]	1,246	+540	1,786
Total Personnel on Base[c]	**1,032**	**+411**	**1,443**

[a] Contractors are not authorized on the UMD. They are categorized as "other base personnel."
[b] Some personnel work off-site but are assigned to the unit.
[c] Total personnel supporting the 507 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Tinker AFB would result in a net increase of 411 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 397 dependents currently associated with the non-contractor, full-time personnel in the 507 ARW at Tinker AFB live in communities surrounding the installation. Approximately 476 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

Description of Current Aircraft Operations

Table 2-3 details current baseline KC-135 operations at Tinker AFB. An estimated 2,399 KC-135 operations are conducted annually at Tinker AFB. The 507th Air Reserve Wing (ARW) currently flies 400 sorties per year and an average of two additional practice touch and go approaches per sortie. Of the total annual operations flown by the 507 ARW, approximately 11 percent are flown during acoustic night (i.e., 10:00 p.m. to 7:00 a.m.).

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Table 2-3. Baseline KC-135 Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-135	400	0	360	40	1,371	228	2,131	268	2,399
Total	**400**	**0**	**360**	**40**	**1,371**	**228**	**2,131**	**268**	**2,399**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 507 ARW.
[b] Night is defined as acoustic night (i.e., 10:00 p.m. to 7:00 a.m.). KC-135 aircrews could depart prior to 10:00 p.m. but return to base and conduct arrivals and approaches after 10:00 p.m.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

A beddown of new KC-46A aircrews associated with the proposed MOB 3 mission would result in approximately 1,150 annual sorties, and an average of 3.5 additional practice approaches per sortie, for a total of 6,440 operations per year (Table 2.4). The 168-percent increase in annual aerial refueling tanker operations would result from an increase in the number of assigned tanker aircraft (from eight KC-135 to 12 KC-46A), an increase in the frequency at which each aircraft is flown, and an increase in the number of practice approaches per sortie. KC-46A aircrews would conduct approximately 11 percent of total operations during acoustic night. Practice approaches would be conducted at airfields other than Tinker AFB on an occasional basis.

Table 2-4. Projected Annual KC-46A MOB 3 Mission Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total[a]		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night[b]	
KC-46A	1,150	0	1,034	116	3,547	593	5,731	709	6,440[c]
Total	**1,150**	**0**	**1,034**	**116**	**3,547**	**593**	**5,371**	**709**	**6,440**

[a] An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.
[b] Night is defined as acoustic night (i.e., 10:00 p.m. to 7:00 a.m.). KC-46A aircrews could depart prior to 10:00 p.m. but return to base and conduct arrivals and approaches after 10:00 p.m.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.
[c] The annual total represents a combination of operations resulting from local training sorties and mission sorties.

The Bird Aircraft Strike Hazard (BASH) Program

Tinker AFB currently maintains an active and dedicated BASH program, devoting resources and personnel to implement this program in order to minimize bird strikes on the airfield. Since 2001, the USAF has contracted with the U.S. Department of Agriculture (USDA) – Wildlife Services (USDA-WS) to provide daily wildlife control services for Tinker AFB. There are two full-time BASH program biologists on staff to assist with this program. They are housed with and work closely with Tinker AFB natural resources biologists, integrating airfield bird control within the overall management goals of Tinker AFB's INRMP. Their services include hazing and removing migrating and resident birds from the airfield.

The USDA BASH specialists conduct routine runway surveys for bird activity. These surveys are stepped up during or immediately following rain events in the spring and fall months due to increased shorebird (e.g., American Avocets, sandpipers, killdeer) and gull activity. They conduct bird metric surveys using methodology found within the INRMP and a Memorandum of Understanding between Tinker AFB and USDA-WS. These specialists document information such as date, time, weather conditions, species of birds observed, behavior, direction of movement, location on airfield and control methods, if applicable. They also perform small-scale passive services such as eliminating roosting sites, bird/wildlife proofing

buildings and hangars and excluding bird/wildlife access to culverts. As needed, they employ active control methods such as the use of live-trapping and the use of pyrotechnics to disperse hazardous resident and migrating bird populations from the airfield. At times during significant threats to aircraft safety, birds persistently unresponsive to hazing (such as gulls and resident geese) may be killed if authorized by the Tinker AFB Natural Resources Specialists, and in accordance with the migratory bird depredation permit issued by the USFWS to conduct intentional takes of migratory birds. USDA-WS and Base Operations staff serve as sub-permittees on the bird depredation permit. The current depredation permit was issued to Tinker AFB by the USFWS in January 2016 with an expiration date of December 2016.

During and after rain events in spring and fall bird migration periods, and prior to aircraft taking off or landing at Tinker AFB, the USDA-WS BASH biologists typically make vehicular searches for birds on the entire length of the runway. This is done primarily for gulls, but shorebirds as well. Vehicular movement alone generally persuades birds to leave the runway. If this is ineffective, the biologist will initiate hazing with pyrotechnics, propane cannons, vehicle horns, and similar means to move birds. Occasionally, for federally unlisted birds unresponsive to hazing, lethal means are used to encourage movement. This is accomplished under the terms of the USFWS-issued depredation permit.

Tinker AFB conducts numerous other measures to prevent bird strikes. These include eliminating any areas of standing water or restricted drainage on the airfield, and seeding or sodding any bare non-grassy areas that could create an attraction for migrating birds. Tinker AFB maintains grass at a uniform height of seven to 14 inches on the airfield, to include the clear zones and lateral surface clear areas. Areas near the airfield with a variety of grass species are mowed when the average grass height, not including seed heads, exceeds tolerances. Most grass seeds found on the airfield are less desirable as food than available weed or native grass seeds. By regimented mowing, Tinker AFB reduces weed seeding to discourage seed-eating birds from feeding on the airfield. Grounds maintenance crews begin mowing areas adjacent to runways and finish in the infield or outermost grass areas. This causes insects and other animals to move away from aircraft takeoff and landing areas. The Natural Resources group at Tinker AFB has also identified species-specific measures to minimize bird use of the airfield. For example, for diving waterfowl species such as mergansers and loons, the installation has removed fish-producing ponds near the airfield.

The USAF implements a variety of different operational mitigation measures during migration times to prevent bird strikes. With regard to aircraft flight operations, all flying organizations on Tinker AFB are provided information regarding bird activity on a daily basis. These involve changing pattern altitudes, changing pattern directions to avoid bird concentrations, and avoiding takeoffs/landings at dawn or dusk. During actual Phase II operations (high bird activity), Flight Commanders strongly consider reducing or eliminating flight operations within one hour before and after sunrise and sunset.

During periods of high bird activity, additional measures can be implemented by the Control Tower to avoid bird strikes. These include rescheduling local training or transition elsewhere, raising altitude assignments for aircraft enroute to training areas, limiting time on low-level routes to a minimum for accomplishing training requirements, selection of routes or training areas based on bird hazard data from the USAF BASH team internet website (such as the Bird Avoidance Model, Avian Hazard Advisory System or Low-Level Route Analysis), discontinuation of multiple approaches, and making full-stop landings only by prohibiting touch and go landings used for training purposes.

To further improve aircraft safety, Tinker AFB strives to comply with the Federal Aviation Administration's Advisory Circular 150/5200-33B, Hazardous Wildlife Attractants on or Near Airports. This circular provides guidance on certain land uses that cause movement of hazardous wildlife onto,

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

into, or across an airport's approach or departure airspace or air operations area (AOA). The circular recommends specific separation distances from the AOA within which wildlife attractants, such as retention/detention ponds, wetlands, and avoiding, eliminating, or mitigating certain types of agricultural and landscaping activities near the airfield.

Since the mid-1990s, Tinker has eliminated or modified three water bodies which were attracting hazardous levels of wildlife in close proximity of the airfield. A detention basin located adjacent to Landfill 5 (about 800 feet west of Runway 18/36) was outfitted with concrete trickle channels to eliminate standing water. The 10-acre Glenwood wetland, located ½ mile north of Runway 18, was removed and as mitigation for the wetland impacts, a wetland was constructed off-installation in collaboration with the USFWS Partners for Wildlife Program. The five-acre Fire Pond located ½ mile west of Runway 18/36 was also drained. Additionally, a wetland near the Fuel Control Facility was also removed. Mitigation for that action occurred 18 miles away from the installation at Grove Valley Elementary School in collaboration with Natural Resource Conservation Service through the Wildlife Habitat Incentive Program (WHIP), the USFWS, and with the help of other agencies.

In addition to the above mentioned actions, avoidance techniques are being employed, to include preventing the development of any additional ponds or wetlands on base, with the exception of relatively small detention ponds necessary to comply with storm water regulations and policies. For all other existing ponds and wetlands, mitigation is employed to maintain a safe flying environment. Specifically, USDA-WS staff monitor and manage hazardous wildlife populations associated with on- and off-base water bodies to ensure flight safety on and around Tinker AFB.

Although no federally listed species have been documented on the airfield at Tinker AFB before or after the fatal strike of the Northern Great Plains Piping Plover in 2009, if threatened and endangered species are encountered in the future, USDA-WS's contingency procedure is to make notifications to hold aircraft from taking off or landing until the birds move (Krupovage, Per. Comm. 2016). If the birds do not move, Tinker natural resources staff (USFWS depredation permit holder) would contact the USFWS to receive bird dispersal instructions which would allow aircraft flights to resume. Since no live threatened and endangered birds have ever been sighted on the airfield, this procedure has not been used; however, the BASH safeguards described above would further reduce the likelihood of threatened and endangered bird strikes on Tinker.

Tinker AFB covers approximately 5,580 acres of land. Structures include a 10,000-foot runway, 11,200-foot runway, almost 700 family housing units, 48 miles of road, 717 buildings, and 57 aircraft assigned to associate units. The BASH mitigation action area includes all lands within the boundaries of Tinker AFB, but concentrates on the airspace and runways which have the most potential to affect listed species. Direct effects upon listed species could include mortality by aircraft strikes, airfield mowing, and depredation by USDA APHIS airfield animal control officers. Other direct effects that could occur include loss of mating opportunities due to habitat fragmentation and reduction in numbers of partners, loss of metabolic energy due to course diversion around Tinker. Indirect effects might result from the 476 additional people having to live and reside around Tinker AFB. More habitat fragmentation might result off base, when or if off-base housing is built in the vicinity of Tinker AFB.

3.0 LISTED SPECIES & CRITICAL HABITAT IN THE ACTION AREA

The following ESA-listed species have the potential to occur within the action area, or may be affected by the proposed action: Northern Great Plains Piping Plover (*Charadrius melodus*), Interior Least Tern (*Sterna antillarum*), Whooping Crane (*Grus Canadensis*), and "Rufa" Red Knot (*Calidris canutus rufa*).

Rufa is used to refer to this particular subspecies of Red Knot. There is no designated critical habitat on, or in the vicinity of, Tinker AFB that may be affected by the proposed action. This list of species was generated by the November 23, 2015, USFWS IPaC Trust Resources Report, B7F6B-36Q4N-BETIZ SWYWF-MG3ESA.

The Northern Great Plains Piping Plover and the Rufa Red Knot are migrants that may pass through the Tinker airspace while making the trip between wintering grounds in Central and South America and the breeding grounds in the high tundra of the Canadian Arctic for the Red Knot, and the Great Plains of the northern United States and Canada for the Northern Great Plains Piping Plover. They are usually found near water, but may be found in a variety of habitats (Sibley, 2000). During migration, these shorebirds sometimes gather in large numbers at interior sites with water. Areas that attract the highest numbers of birds are typically shallow bodies of water covering large areas, including managed wetlands, rice fields, lakes, reservoirs and sewage ponds (Sibley, 2001).

Conservation of shorebirds is challenging because relatively little is known about their life cycle requirements and population trends. In addition, they utilize a wide variety of habitats during different times of the year. Loss and habitat by conversion to other land uses is the greatest known threat. In the U.S., about 50 percent of natural wetlands have been filled or drained, and the annual loss of wetlands is estimated to be about 35 square miles of wetland each year. Native prairies have suffered even greater losses resulting in restricted habitat for "grasspipers" passing through or nesting in prairies (O'Brien, et al., 2006). Other environmental factors may negatively affect shorebirds, including pollution, trash, disturbance of nesting birds on the beach by people, their pets and off-road vehicle use. Identifying, preserving and connecting remaining habitat is key to shorebird conservation. Where appropriate, restoring degraded grasslands to native vegetation and maintaining wetlands at a high functioning level (well away from the airfield) is essential. Even relatively narrow corridors (e.g., vegetated riparian zones) connecting larger more valuable tracts are essential as animals make their movements across the landscape. A lack of nearby suitable habitat for resting birds during migration may result in an attraction of migrating birds to an airfield environment.

Northern Great Plains Piping Plover

The Northern Great Plains Piping Plover (*Charadrius melodus*) is a small migratory member of the shorebird family (*Charadriidae*), approximately 6.7 to 7.1 inches long and 1.5 to 2.2 ounces in weight (Haig, 1992). The Piping Plover is about the size of a robin and it is one of six species of belted plovers in North America. During the breeding season, adults have single black bands across both the forehead and breast, orange legs and bill. The bill also has a black tip in breeding season. Their dorsal surface is a pale tan with a white belly. They are plump in appearance and tend to stand and visibly search and then run to find their prey of small invertebrates living in a sandy or muddy substrate. During the winter, the adults lose the black bands and their bill becomes grayish-black. The plumage of juveniles is similar to that of wintering adults.

The breeding range of the piping plover extends throughout the northern Great Plains, the Great Lakes, and the Atlantic Coast in the U.S. and Canada. The three breeding populations of piping plovers are referred to as the Northern Great Plains population, Great Lakes population, and Atlantic Coast population. Piping plovers require wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. There is no habitat of this nature at Tinker AFB. (https://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html).

Great Lakes piping plovers formerly nested throughout much of the Great Lakes region in the north-central United States and in south-central Canada, but currently nest only in northern Michigan and at two

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

sites in northern Wisconsin. Piping Plovers that breed in the Great Lakes area nest along shorelines. However, according to the USFWS Recovery Plan for the Great Lakes Population of Piping Plovers dated September 16, 2003: "in 1987 and 1988 piping plovers nested at Optima Reservoir, Oklahoma. These are the only known nesting records for Oklahoma (Boyd 1991)." Optima Lake is located in the panhandle of Oklahoma in Texas County on the Beaver River, approximately 250 miles northwest of Tinker AFB.

On the Atlantic Coast, piping plovers nest from Newfoundland, southeastern Quebec, and New Brunswick to North Carolina. Sixty-eight percent of all Atlantic nesting pairs breed in Massachusetts, New York, New Jersey, and Virginia (USFWS 1999).

The Northern Great Plains Piping Plover is federally listed as a threatened species. The plover that was struck at Tinker AFB in 2009 is considered part of the Northern Great Plains population of the piping plover which was listed as threatened under the Endangered Species Act on January 10, 1986 (50 FR 50726). The breeding population of the Northern Great Plains piping plover extends from Nebraska north along the Missouri River through South Dakota, North Dakota, and eastern Montana, and on alkaline lakes along the Missouri River Coteau (a large plateau extending north and east of the Missouri River) in North Dakota, Montana, and extending into Canada. Wintering Piping Plovers in the U.S. are distributed along the Gulf Coast from Florida to Texas, with a small percentage of the population wintering along the Atlantic Coast and in the Bahamas. According to Bird Life International, the Northern Great Plains population was estimated to be about 58 percent of all the Piping Plover subspecies combined in 2009 (http://www.birdlife.org/datazone/speciesfactsheet.php?id=3127).

Interior Least Tern (ILT)

The Interior Least Tern (ILT) was listed as federally endangered on May 28, 1985. All currently recognized subspecies and populations are the smallest members of the subfamily Sternidae, family Laridae, of the diverse order Charadriiformes. They measure 8.2 to 9.4 inches long with a 20-inch wingspread. Sexes are alike, characterized by a black-crowned head with a white forehead, pale grey back, snowy white undersurfaces, and legs and beaks of various orange and yellow colors depending on sex. The male tern's legs and beak are more brightly colored than the female. The beak is tipped with black.

ILT's are only those least terns that breed and nest within the boundary of the continental U.S. on interior rivers and other water bodies. ILT breeding populations are associated with large river habitats from Montana southward through North Dakota, South Dakota, Nebraska, Colorado, Iowa, Kansas, Missouri, Illinois, Indiana and Kentucky to eastern New Mexico, Oklahoma, Arkansas, Tennessee, central Texas, central Louisiana, and central Mississippi. Other breeding populations of least terns are found along coastal and estuarine habitats in the U.S. from Texas to Maine, and along islands of the Gulf of Mexico, Atlantic Ocean, and Caribbean Sea. The ILT is separated from coastal populations by a combination of physical and ecological factors unique to their nesting habitats. Coastal habitats are created and maintained by daily and seasonal tidal and storm surges, while inland habitats of ILT are dynamic, primarily created and maintained by fluctuating riverine hydrologic conditions. Foraging habitats and prey species differ markedly as well, with coastal least terns foraging on fish and invertebrate prey species associated with brackish and salt water habitats (e.g., anchovy, silversides), while ILT forage on freshwater prey species (e.g., shad, minnows).

The ILT and Eastern least tern are geographically separated from the California least tern (*S. antillarum browni*), which nest and forage in brackish and marine habitats of the Pacific coast of the U.S. and Mexico. Kirsch and Sidle (1999) observed that ILT population increases were not supported by available fledgling success estimates, and hypothesized that ILT increases since listing were due to immigration

surges from least terns inhabiting the Gulf Coast. Lott (2006) has hypothesized a wide least tern metapopulation which includes the Gulf Coast and interior populations. Genetic studies indicate at least some degree of interbreeding and genetic exchange between populations of ILT, eastern least tern, and California least tern (Draheim *et al.* 2010). However, there are few banding or other observational data directly supporting the interchange of breeding individuals between interior and Gulf Coast populations.

ILT are migratory and historically bred all along the Mississippi River states, and along the Red and Rio Grande River systems of Texas. Least terns nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops. They hover over and dive into standing or flowing water to catch small fish.

The ILT breeding season is April through August. Nesting in small colonies, least tern nests are shallow depressions scraped in open sandy areas, gravelly patches, or exposed flats. They are also known to nest on the flat roofs of large buildings. Both parents incubate their eggs for about 24 days. Chicks leave the nest only a few days after hatching, but the adults continue to care for them, leading them to shelter in nearby grasses and bringing them food.

Rufa Red Knot

The Rufa Red Knot was listed as federally threatened in 2014. The largest calidridine sandpiper of North America, and in the genus *Calidris* exceeded in size only by the Great Knot (*C. tenuirostris*) of northeastern Siberia, the Red Knot is primarily rusty-red in breeding plumage, changing to dull gray dorsally and white ventrally in Basic (winter) plumage, with few distinct markings. This species is a Holarctic breeder, mainly in middle- and high-arctic zones, with three subspecies (*islandica*, *rufa*, and *roselaari*) distributed in the Nearctic from Greenland to northern Alaska. This account focuses largely on the Western Hemisphere subspecies (Baker, et al. 2013).

Rufa Red Knots are noted for their extraordinary long-distance migrations of up to over 9,000 miles between circumpolar breeding habitats and marine wintering habitats in southern latitudes of South America, Africa, Europe, Australia and New Zealand. Population sizes for knots are in decline around the world, especially *C. c. rufa*, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010. Historical records show Knots and other scolopacids were intensively hunted for sport and market sales (Sibley, 2001), as were many other types of birds nationwide to pack the "larders" of kitchens and restaurants in the mid-1800s in the Northeast. This intense harvest probably led to their original decline and when the harvest was stopped shortly thereafter, the birds slowly began to recover. Then, in the 1980s they began showing a second decline, which was probably mostly fueled by the over exploitation of horseshoe crabs for bait in their vital stopover location in Delaware Bay and vicinity. Historically, horseshoe crabs (*Limulus sp.*) came ashore and deposited copious amounts of eggs in late spring (http://www.nwf.org/Wildlife/Wildlife-Library/Invertebrates/Horseshoe-Crab.aspx). These eggs are important because several species of migratory and resident birds depend on their reliable presence to fatten up prior to migration. Furthermore, contributing to the decline were beach modification practices and pressure from expanding human use of the beaches that the bird depends on to put on fat necessary for their probable non-stop flight to the Arctic.

Rufa Red Knots tend to concentrate in huge numbers at traditional staging grounds during migration. As stated previously, Delaware Bay is an important staging area during spring migration. It is estimated that nearly 90 percent of the entire population of the Red Knot subspecies, *C. c. rufa*, can be present on Delaware Bay in a single day.

Rufa Red Knots are a monogamous and single-brooded species, and like most other northern shorebirds typically lays a 4-egg clutch. Courtship is accompanied by elaborate flight, ground, and vocal displays.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

For nesting, this knot prefers drier tundra and sparsely vegetated gravel ridges. Rufa Red Knots are principally marine shorebirds in the non-breeding season, when they feed on polychaete worms, small crabs, and marine mollusks, especially bivalves that they swallow whole and crush in their muscular gizzard. During spring migration, however, large flocks switch to gorge on the eggs of horseshoe crabs at Delaware Bay. Recent studies Red Knots fitted with geolocators identified a final stopover at Nelson River in Hudson Bay, before the birds move on to breeding sites in the Arctic where they feed upon terrestrial invertebrates (https://www.allaboutbirds.org/guide/Red_Knot/lifehistory).

The knot's unique and impressive life history depends on suitable habitat, food and weather conditions at far-flung sites across the Western Hemisphere, from the extreme south of Tierra del Fuego to the far north of the central Canadian Arctic. Knots need to encounter favorable habitat, food and weather conditions within narrow seasonal windows as the birds hopscotch along migration stopovers between wintering and breeding areas. For example, the knot population decline that occurred in the 1980s to the 2000s was caused primarily by reduced food availability from increased harvests of horseshoe crabs, and then was exacerbated by small changes in the timing when the knots arrived at the Delaware Bay. Horseshoe crab harvests are now managed with explicit goals to stabilize and recover knot populations.

Rufa Red Knots tend to migrate in single-species flocks with departures typically occurring in the few hours before twilight on sunny days. Size of the departing flocks tends to be large (greater than 50 birds) (Niles et al. 2008, p. 28). Likewise, based on observations of other *Calidris canutus* subspecies departing from Iceland towards Nearctic breeding grounds in spring 1986 to 1988, Alerstam et al. (1990, p. 201) found mean flock sizes of 100 to 200 individuals. These *C. canutus* leaving Iceland in spring departed in flight formations during the afternoon or evening, and during rising or high tide; their departures had significant differences in daily timing between seasons that was associated with between-year differences in the tidal cycle. Within the season, departures took place earlier in relation to high tide as the season progressed (Alerstam et al. 1990, p. 201). Consistent with the afternoon and evening departures of *C. canutus* from Iceland, Red Knots are inferred to migrate during both night and day based on the duration and distance of migratory flight segments estimated from geolocator results (Normandeau Associates, Inc. 2011, p. 203).

Rufa Red Knots may be particularly vulnerable to climate change, which is likely to affect:

- the arctic tundra ecosystem where the knots breed
- coastal habitats due to rising sea levels
- availability of traditional food resources throughout the bird's range when present, and
- storm and weather patterns.

Rufa Red Knot numbers appear to have stabilized in the past few years, but they remain at low levels relative to earlier decades. Biologists from the USFWS, state natural resource agencies, and non-profit organizations all share a concern for this race of red knot and are pooling efforts to identify what needs to be done to prevent further losses.

Whooping Crane

Whooping Cranes are very large, tall birds with a slender build. They have long necks and long black legs. The blackish bill is stout and straight; the overall slender body widens to a plump "bustle" of feathers near the tail. In flight the wings are long and broad and the neck is fully extended. Adults are bright white birds with accents of red on the head. The wingtips are black. Immature birds are whitish below, but mottled brownish-rusty above. The Whooping Crane is listed as federally endangered.

The wild population nests in or near Wood Buffalo National Park in the Northwest Territories and adjacent areas of northeastern Alberta, Canada, and winters on the Texas coast on the Gulf of Mexico at the Aransas National Wildlife Refuge (ANWR) not far from the town of Austwell.

The Whooping Crane, a symbol of national and international efforts to recover endangered species, has returned from the brink of extinction but remains at risk. In the 1800s, this species was widespread but apparently never common in the tall- and mixed-grass prairie marshes of the north-central U.S. and southern Canada. In 1941, the species had reached a low of 15 or 16 migratory individuals wintering in Texas (Boyce, 1987) and 6 non-migratory birds in Louisiana. The small Louisiana population did not survive.

According to Cornell Lab's Birds of North America On-line (https://birdsna.org/Species-Account/bna/home), all Whooping Cranes alive today (437 in the wild + 162 in captivity = 599 as of August 2011 [Stehn, 2011]) are descendants of the small remnant flock in Texas in winter 1941-42 (Urbanek, et al 2015). Several factors, especially human development and long-term water mismanagement on the wintering grounds, continue to place the bird in jeopardy. Note that 437 is a 5-year old figure, the ANWR website indicates there are 329 based on estimates from their 2015-2016 survey. Data from the International Crane foundation (https://www.savingcranes.org/species-field-guide/whooping-crane/) also indicates there are 599 captive and wild cranes.

Despite intense management efforts since the 1940s, the Whooping Crane remains one of the rarest birds in North America. Establishment of additional populations by reintroduction has so far been unsuccessful, although progress has been made in reintroduction methods. Because of the concern this species has generated, it is arguably one of the best-studied birds in North America. Recovery actions are accomplished cooperatively by Canada and the U.S., assisted by provincial and state agencies, nongovernment groups, and the private sector.

In the breeding season, Whooping Cranes use the extensive open wetland marshes and associated habitat of the Peace-Athabasca Delta, a large inland freshwater deltas within the Wood Buffalo National Park and adjoining areas (http://www.pc.gc.ca/eng/pn-np/nt/woodbuffalo/natcul/natcul1.aspx). Outside of the breeding season, Whooping Cranes use fresh, brackish and saltwater marshes and inland habitat of the Aransas National Wildlife Refuge (https://www.fws.gov/refuge/Aransas/wwd/science/updates.html).

This species is perennially monogamous and typically begins egg production at ages 3 or 4 years in the wild, but often not until ages 5 to 11 in captivity. Females usually lay a 2-egg clutch annually but seldom fledge more than one young. Both parents care for the young for 10 to 11 months, and the young learn migration routes by following their parents. Wild birds may survive an estimated 25 years, captive birds 40 or more years.

Attempted reintroductions in the Rocky Mountains (migratory) and in Florida (non-migratory) were unable to produce self-sustaining populations and have been discontinued. Reintroduction of a population migrating between Wisconsin and Florida began in 2001 and met with initial success, but its future will depend on finding a solution to persistent nest failure. In 2010, a fourth reintroduction, to establish a non-migratory population, began in Louisiana. As of June 2014, 164 birds are maintained in captivity: 152 at five captive propagation facilities (Patuxent Wildlife Research Center, Maryland; International Crane Foundation, Wisconsin; Calgary Zoo, Alberta; Audubon Species Survival Center, Louisiana; and San Antonio Zoo, Texas), and an additional 12 birds at seven display facilities (S. Zimorski pers. comm.). Today, the crane remains ecologically dependent on specific inland freshwater wetlands in Canada and, in winter, on coastal brackish wetlands along the Gulf Coast.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

On June 25, 2015, Mr. Chester McConnell of Friends of the Wild Whoopers, contacted Tinker AFB natural resources management staff regarding the possibility of investigating whether there might be potential migratory stopover sites at Tinker AFB for the Whooping Crane (http://friendsofthewildwhoopers.org/).

As stated previously, Whooping Cranes make the long journey between the Aransas National Wildlife Refuge on the central Texas coast to Wood Buffalo Nation Park located in northeastern Alberta and southern Northwest Territories. Along the way, they must stop to seek shelter and food about once or twice a day. Friends of the Wild Whoopers believes that during migration the Cranes stop at relatively small ponds, sometimes on private property and elsewhere, to spend the night. Characteristics of these small ponds include:

- Size – 0.3 to 14 acres
- Some shallow areas with water 5 to 10 inches deep for roosting
- Gradual sloping banks
- Little or no emergent vegetation at the roosting area
- Extensive horizontal visibility from roosting area, and
- 300 yard or more from human disturbance or development.

Mr. McConnell, r. Krupovage, and Mr. Felipe Chavez-Ramirez (Director, Conservation Programs Gulf Coast Bird Observatory), and other Tinker AFB Biologists visited the Prairie Pond Site on Tinker and agreed that it had the potential to be a Whooping Crane stopover site. This site not only has good potential as stopover for Whooping Cranes, but it is inhabited by resident bird species such as American Goldfinch (*Carduelis tristis*), *Epidonax* species (flycatcher) and Little Blue Heron (*Egretta caerula*) as observed on the August 17-19, 2016 site visit. Much work has gone into this site and the water quality appears excellent and surrounding vegetation is healthy and aesthetically pleasing.

4.0 ENVIRONMENTAL BASELINE CONDITIONS

A brief description of environmental baseline conditions is provided below. Prior to its development into a large and highly urbanized and industrialized military landscape, Tinker AFB was already a highly altered human-dominated agricultural location. Early aerial photographs indicate the majority of land currently occupied by Tinker AFB was used for various agricultural purposes. Soil tillage and terracing are evident on historic aerial photographs, indicating much land was farmed before Tinker AFB was established.

Borrowing soil from various on-base locations to build up facility foundations and level the airfield was the primary soil impact during initial urbanization and industrialization of Tinker AFB. No topsoil was replaced at these locations; consequently, revegetation was slow and led to further soil loss and lack of native vegetation. Physical properties of soils have also been further altered by military construction and other activities. For example, vehicular traffic around construction sites and past practices of parking aircraft on grassed areas have compacted soils. Much soil was excavated and redistributed/compacted for projects such as large storm drainage systems and landfill caps across Tinker AFB.

Tinker AFB is located in the physiographic Central Redbed Plains section of the Central Lowland Province which is characterized by level to gently rolling hills, broad flat plains, and bottomlands bisected by small- to medium-sized water courses. Oklahoma County elevations range from about 850 feet above mean sea level (MSL) in the southeastern part to over 1,300 feet MSL in the northwestern part. Tinker AFB elevations range from approximately 1,200 feet MSL (Crutcho Creek – northwestern portion of

Tinker AFB) to 1,310 feet MSL (southeast portion of Tinker AFB). Airfield elevation is approximately 1,291 feet MSL.

Based on topography and historical aerial photos, it appears that pre-settlement surface waters on land currently occupied by Tinker AFB consisted only of lotic waters (i.e., streams). There is no known evidence of the presence of lentic waters (e.g., ponds, lakes, wetlands) for that time period, although small beaver-created ponds and wetlands may have occurred along stream systems much as they do today. Streams consisted of intermittent, ephemeral, and possibly perennial flows in wooded or non-wooded stream systems which bisected gently rolling hills of tall/mixed grass prairie. These systems were typically shallow with broad, relatively flat floodplains. Floodplain areas closest to streams may have been heavily vegetated with riparian trees and shrubs; however, it is likely natural fire events would have kept most, if not all, woody vegetation suppressed such that land currently occupied by Tinker AFB may have been mostly treeless. Alternatively, it may have been just the more outlying floodplain fringes and the upper reaches of the first order stream segments that remained free of woody riparian vegetation.

Surface waters occurred in three main stream systems, one which drained to the north (current Crutcho Creek with Kuhlman and Soldier Creek tributaries) and two to the south (current East Elm Creek and West Hog Creek). The north-flowing stream system originated approximately 2 miles south of Tinker's current southern boundary with on-base portions of the system composed of 12 first-order segments (the initial and smallest section of a tributary system), two second-order segments, and one third-order segment. (http://geography.about.com/od/physicalgeography/a/streamorder.htm). The south-flowing systems consisted of only first- and second-order tributaries with higher order tributaries located off-base. Stream flows were generated primarily by precipitation runoff and were probably relatively sluggish. Groundwater seepage and springs may have caused perennial flows in some of the higher-order stream segments, particularly in tributaries on the eastern side of Tinker AFB.

Historical stream channels have been substantially altered by activities such as channelization, native riparian vegetation removal, mowing, fire suppression, flood regime alteration, and exotic species invasion/introduction. Also, development activities have caused soil properties to change substantially over the years, consequently modifying the original plant community. Common soil disturbances include topsoil being removed and not replaced; exotic plant species being used to revegetate disturbed areas; and soil compaction resulting from off-road training exercises, military construction projects, past aircraft parking on airfield, and related activities.

Surface waters in the vicinity of Tinker AFB were historically degraded by accidental fuel spills and non-point source pollution. The most common non-point pollution examples include: sediment from soil erosion associated with construction/demolition activities, automobile oil/fluid runoff from parking lots, runoff from areas treated with fertilizers and pesticides, chemical substances from spills associated with industrial and aircraft activities, and deicing compounds from roadways, taxiways, runways, ramp areas, and aircraft.

Although water quality has degraded since pre-settlement times, improvements have occurred over the last 20 years based on the implementation of modern pollution prevention technology and supported by biological diversity surveys and weekly water quality monitoring. Tinker AFB collects and analyzes water samples from all Tinker AFB streams on a weekly basis. These samples are acquired to monitor compliance with Oklahoma Water Quality Standards assigned to each creek under the National Pollutant Discharge Elimination System and associated installation stormwater permits. In addition to analytical monitoring, other conditions are noted at each creek outfall during each field visit. These parameters include: clarity, algae growth, odors, presence of foam, and presence of oil sheen. All of these indicators are used to locate and eliminate illicit or harmful discharges.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Much of the original prairie was farmed as evidenced by historical aerial photographs and remaining farmland terraces at numerous locations on Tinker AFB. Livestock grazing also appears to have been a significant past agricultural practice as seen by extant barbed wire fencing. Past grazing is also apparent by the absence of some plant species which would be expected to be present on existing prairie remnants had livestock grazing not occurred. Less than 2 percent of the pre-settlement prairie ecosystem currently remains on Tinker AFB. Very few, small, fragmented prairie remnants currently occur on Tinker AFB. These remnants total less than 100 acres and are in a degraded condition. Further native vegetation community change has occurred due to the exclusion of historical natural events such as wildfire and grazing by native herbivores such as bison. The elimination of these natural disturbance events favored the invasion trees, shrubs and non-native herbaceous plants on historical prairie areas. Although historical pristine native prairie and bottomland areas are lacking on the installation, an installation program to implement INRMP objectives for prairie restoration is active and ongoing. The INRMP directs the restoration of degraded areas to native grasses in some of these areas.

Within land areas which have been converted to urban and industrial use, the plant community is comprised primarily of turf grasses and ornamental trees and shrubs. The predominant turf grass on Tinker AFB is exotic Bermuda grass, although native buffalo grass is often found mixed with Bermuda grass. Other less maintained areas are typically a mixture of exotic and native plants. Trees and shrubs are composed of a mix of native and exotic plants and, contrary to pre-settlement plant distribution, woody plants have migrated from bottomland sites to more upland areas due to fire suppression and other environmental factors.

The highly urbanized area in the vicinity of Tinker AFB is host to people-tolerant wildlife such as raccoon (*Procyon lotor*), deer (*Odocoileus virginianus*) and coyote (*Canis latrans*). Other typical wildlife species that have been sighted within boundaries of Tinker AFB include the eastern fox squirrel (*Sciurus niger*), eastern cottontail rabbit (*Sylvilagus floridanus*), beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), red-winged blackbird (*Agelaius phoeniceus*), meadowlark (*Sturnella* spp.), scissor-tailed flycatcher (*Tyrannus forficatus*), bobwhite quail (*Colinus virginianus*), Texas horned lizard (*Phrynosoma cornutum*), three-toed box turtle (*Terrapene carolina*), and bullfrog (*Rana catesbeiana*). Bobcats (*Lynx rufus*), grey fox (*Urocyon cinereoargenteus*) and turkey (*Meleagris gallopavo*) are also present (Krupovage, pers. comm. 2016). Other birds seen on the airfield during an August 16 through 17, 2016 reconaissance were American Kestral (*Falco sparverius*), Mississippi Kite (*Ictinia mississippiensis*), American Crow (*Corvus Brachyryncos*), Meadowlark species (*Sturnella*) and Swainson's Hawk (*Buteo swainsoni*). In general, there is not enough food, water or habitat to attract the diversity of wildlife that would occur at less urbanized and more ecologically diverse areas in Oklahoma.

However, despite the degree of urbanization at Tinker AFB, much time, effort and money have been spent restoring approximately 200 acres of native habitat beginning in the 1990's (INRMP, 2014). Much of this work is still in progress. INRMP directed efforts include large scale eradication of numerous invasive species associated with a typical disturbed urban setting such as Johnson grass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), brome (*Bromus* spp.), Sericea lespedeza (*Lespedeza cuneata*) and crab grass (*Digitaria* species). Also being eliminated are non-native woody species such as Siberian Elm (*Ulmus pumila*), lacebark elm (*Ulmus parvifolia*), Callery pear (*Pyrus calleryana*), bush honeysuckle (*Lonicera* spp.) and Japanese honeysuckle (*Lonicera japonica*). Native plantings in restoration areas include burr oak (*Quercus macrocarpa*), little blue stem (*Schizachium scoparium*), and Indian grass (*Sorghastrum nutans*), and many other native herbaceous and woody plants. This considerable conservation and restoration effort is described in greater detail in the pages that follow.

The Canadian River, at its nearest point, lies approximately 15 miles to the southwest of Tinker AFB, and cuts a very winding path roughly west to east through the state of Oklahoma. Directly south of Oklahoma City and Tinker AFB is Lake Stanley Draper, and a little further south is Lake Thunderbird which is part of Lake Thunderbird State Park. The northern-most tip of Lake Stanley Draper is visible from the south end of runway 18-36. The Canadian River and the two reservoirs would provide suitable stop-overs for migratory birds. Details on the two reservoirs are provided in Table 4-1 below, and are derived from the Oklahoma Water Resources Board (https://www.owrb.ok.gov/).

Table 4-1. Reservoirs in the General Vicinity of Tinker AFB

Name	Year Built	Area (acres)	Shoreline (miles)	Maximum Depth (ft)
Lake Stanley Draper	1962	2,519	32	93
Lake Thunderbird	1965	5,377	59.6	58

There is potential shorebird habitat at these two lakes. Interior Least Terns have been observed foraging at Lake Stanley Draper by Tinker biologists. Use by other threatened and endangered species there is unknown.

The airspace above Tinker AFB is part of the Central Flyway for migratory birds. The Central Flyway is one of four major North American flyways and carries millions of avian migrants to the north and south on their two seasonal journeys. Migrating birds of all species from the smallest songbirds to the tallest bird in North America, the Whooping Crane, generally follow this route. When migrants fly over Tinker AFB itself, depending on the species, they may not see resources that would sustain them, so they continue on their way or stop at the Canadian River or the two large reservoirs mentioned above.

Commercial, military, and private air traffic in the vicinity of Oklahoma City and Tinker AFB potentially places birds within the Central Flyway on a lethal path with aircraft. BASH risk depends on the season of year and height of the bird's flight path. Even though preferred habitat for bird species is not technically present on Tinker, many species are attracted to the airfield environment, such as grassland songbirds, shorebirds, waterfowl and raptors. Large bodied birds that are attracted to the airfield present the biggest threat to aircraft and human safety, and these are the ones that are most strongly discouraged from utilizing the airfield and surrounding areas. However, smaller birds and mammals are discouraged as well because their presence attracts both avian and mammalian predators. In addition, flocks of smaller birds can also pose a significant hazard because of the increased probability of birds being ingested by one or more engines.

Restoration and Conservation of Natural Areas on Tinker AFB – Green Infrastructure Plan

This section discusses restoration and conservation efforts at Tinker AFB, and the philosophy that guides these efforts. One of the primary goals of the Tinker AFB Integrated Natural Resources Management Plan is to enhance degraded habitat away from the airfield for benefit of birds, pollinators and other wildlife, as well as to provide a landscape that enhances the quality of life for airmen, employees and visitors. Provided below are some definitions from the Green Infrastructure Plan (Tinker Air Force Base, 2015), a component plan of the INRMP.

Definitions:

- Regulated Areas – areas that contain environmentally sensitive features, such as waterways (and their associated buffers), 500-year floodplains, and wetlands that are regulated (i.e., protected) during the land development process.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

- Green Infrastructure (GI) – An interconnected network of waterways, wetlands, woodlands, grasslands, and other natural areas of base-wide significance.
- Gray Infrastructure – buildings, roads, runways, ramps, utilities, and other man-made features in the landscape.
- Evaluation Areas – areas that contain environmentally sensitive features (or are adjacent to environmentally sensitive features) such as native grasslands/woodlands, sensitive wildlife species, or rare plant species that are not regulated (i.e., no regulatory stature) during the land development process. Evaluation areas will be considered during the review process as areas of high priority for ongoing conservation. These are developable areas; however, consideration must be given to natural resources that exist on the site and their priority for preservation and long term conservation.
- Network Gaps – areas either inside or outside regulated areas that are critical to the connection of fragmented natural areas. These have been included in the GI Plan to provide areas of possible connectivity. These areas should be evaluated during the land development review process for possible restoration opportunities to enhance the ecological functioning of the network and/or to make critical connections in the green infrastructure network.
- 500-year floodplain – the lowland and relatively flat areas adjoining waters, including at a minimum, that area subject to a 0.2-percent chance of flooding in any given year.
- Wetlands – areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

The Green Infrastructure Plan, first published in 2007, is a comprehensive vision for interconnecting and managing natural environmental systems on and adjacent to Tinker AFB to ensure the sustainability of both the ecosystem and the military mission. The Green Infrastructure Plan vision is to balance the natural infrastructure with built infrastructure and human needs. Sensitive environmental resources (e.g., floodplains, wetlands, creek systems) have been identified across the base, and the GI plan is intended to guide development to support current and future military mission needs while not degrading sensitive environments. A basic objective is to sustain a green infrastructure network to provide optimal military operational sustainability, and promote societal, economical, and ecological benefits for Tinker AFB and its neighboring communities in concert with the desired development pattern of the Installation Development Plan. Without this plan, rapid, and often times indiscriminate, land development could jeopardize future sustainability.

Developable land is very limited on Tinker AFB; therefore, every piece of land is extremely valuable and important for future mission needs. The Green Infrastructure Plan recognizes and supports this reality by encouraging development where it is most appropriate and setting forth recommendations to direct it away from areas where it is not appropriate. Tinker's total green infrastructure is comprised of 1,033 acres, or 21% of the total base land area (Figure 4-1). The majority of the on-base green infrastructure network is not on developable land as it lies within the 500-year floodplain which inherently has many development limitations. Some undeveloped lands are in regulated areas such as the safety clear zones around the airfield where certain habitat restoration goals would not apply under the current land use. Regulated areas comprise 46% of the green infrastructure network; evaluation areas comprise 42%; and network gaps comprise 12%.

One of Tinker AFB's objectives reflects the commitment to natural resource via the GI Plan: "By 2020, continue to restore and maintain Tinker's green infrastructure to improve habitat structure/health for

species at risk, reduce base mowing requirements, increase and sustain the free ecological services provided by the GI network, promote wildland fire safety, and enhance aesthetics for military personnel and visitors.

Outside of grey infrastructure (e.g., buildings and roads), most of the areas described above in Tinker AFB's Green Infrastructure Plan are where intense restoration and conservation are occurring.

Some guiding principles and restoration actions being accomplished by Tinker AFB include:

- Create and maintain a permanent healthy native prairie/savannah upland and wooded bottomland system that enhances fish and wildlife diversity
- Increase habitat complexity and structure
- Manage for a variety of restored prairie stages and disturbance regimes to increase faunal diversity and abundance
- Convert exotic turf grass to native grasses/forbs
- Remove invasive native and non-native grasses, forbs, vines, shrubs, and trees
- Plant a diversity of native aquatic plants in ponds
- Plant high diversity of sustainable grasses, forbs, and woody species consistent with local ecoregion
- Restore and maintain natural corridor connectivity wherever possible
- Employ natural vegetation patch stepping stones if continuous connectivity cannot be achieved
- Decrease stepping stone distance wherever possible
- Prioritize restoration by focusing first on higher order streams versus lower order streams and gaps away from roads as opposed to close to roads.
- Emphasize larger patches over smaller ones
- Provide both quality interior area and edge diversity
- Clear up pond turbidity
- Place/anchor artificial snags (standing tree stumps) and other natural log/root structures in ponds
- Stabilize shorelines
- Reintroduce native wildlife, and
- Burn/mow in blocks, always leaving some unburned.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Figure 4-1. Green Infrastructure Network Within and Around Tinker AFB

The Tinker AFB Green Infrastructure Plan implements a "land ethic" first expressed most convincingly by Aldo Leopold in 1949. For example, an area of Tinker AFB referred to as Glenwood is an area that used to contain base housing units, but no longer does, because of three plane crashes that occurred there. The houses were removed and the area is being restored with native plants. Since 2013, 36.5 acres of large eastern red cedars were removed in Glenwood and other areas on base in order to restore more open habitat for the Texas Horned Lizard and other grassland species. In addition, other "satellite" areas are also in the process of being restored to native ecosystems. See Tinker INRMP for more details of conservation activities on the installation.

Compliance with Federal Regulations and Policy

Implementation of the Tinker AFB Integrated Natural Resources Management Plan and associated Green Infrastructure Plan enhances and ensures proactive compliance with the following regulatory requirements, and ensures continued availability of land for military operations:

- Executive Order 11988, Floodplain Management (May 24, 1977, as amended)

- Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (Jan 30, 2015)
- Executive Order 11990, Protection of Wetlands (May 24, 1977, as amended)
- Executive Order 13693, Planning for Federal Sustainability in the Next Decade (Mar 19, 2015)
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.
- Council on Environmental Quality Instructions for Sustainable Locations for Federal Facilities (Sep 15, 2011)
- Guidance for Federal Agencies for Sustainable Practices for Designed Landscapes (Oct 31, 2011, as supplemented)
- Oct 22, 2014 Presidential Memorandum—Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators, and
- Section 438 of the Energy Independence and Security Act of 2007 (EISA).

Federally protected species

While it is possible that no nesting or loafing habitat exists on Tinker AFB for the Northern Great Plains Piping Plover, Interior Least Turn, Rufa Red Knot or Whooping Crane, plenty of other habitat is available for neotropical migrant birds (e.g. mature bur oak stands), other shore birds, heron, egrets and rails (ponds, wetlands, streams and restored grasslands), grassland birds (restored and unrestored native grasslands/turf), and raptors.

Figure 4-2. Photos of Ecosystem Restoration Efforts at Tinker AFB.

Reserve 1 of Tinker AFB Urban Greenway (before) with Bermuda grass (above), and then converted to mixed prairie (below).

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Reserve 1 of Tinker AFB Urban Greenway After (above) converted to mixed prairie.

Close up of Reserve 1 of Tinker AFB Urban Greenway showing mixed grass prairie.

Above, Tinker AFB Urban Greenway Entrance dominated by exotic fescue circa 1994 (above) and transitioning to native prairie/savannah following restoration action circa 2012 – below.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

In conclusion, the guiding principles discussed above and ongoing conservation actions demonstrate Tinker AFB's strong commitment to the military mission and the natural environment and the wildlife that depend on the landscape for food, water and habitat. In addition, military members and civilians benefit from the improved esthetic aspects of the "green" areas and screened off industrial areas while exercising or driving on Tinker Air Force Base.

5.0 EFFECTS OF THE ACTION

While Seymour-Johnson AFB is the preferred alternative for the KC-46A MOB 3 mission, if Tinker AFB is instead selected, implementation of the proposed KC-46A MOB 3 mission would increase annual tanker aircraft operations from 2,399 to 6,440. There are eight KC-135 aircraft in use currently, and the proposed MOB 3 mission would replace these eight aircraft with 12 KC-46A aircraft. Although the USAF recognizes that aircraft operations at Tinker AFB would increase over time, if the installation were to be selected for the MOB 3 mission, the USAF does not anticipate relative increases in bird strikes because of the mitigation measures implemented to avoid bird strikes that are currently in place at Tinker AFB in accordance with the INRMP and BASH plan.

Discussion of Migratory Bird Species and Federally Listed Species at or in the Vicinity of Tinker AFB

In an extensive 2010 avian survey, there were 5,485 individual birds observed on Tinker AFB, representing 137 species reported in the study entitled: *Inventory of Avian Species on Tinker AFB, Oklahoma City, Oklahoma, 2010.* No federally listed threatened or endangered species were observed during this survey. This inventory noted that spring time represented the highest diversity with 107 species, followed by summer with 68 species, fall with 56 species, and winter with 49 species (St. Germain, 2010). Prior to the strike of the listed Northern Great Plains Piping Plover in 2009, no birds of this particular species have been documented at Tinker AFB. No Northern Great Plains Piping Plovers have been observed since that incident.

Smaller birds on the airfield present a serious hazard because some flock in large numbers during the migration and wintering periods. A solitary individual will potentially cause less damage to an aircraft than will a flock. Typically ducks, geese, herons, owls and doves collide with aircraft as individuals (Sodhi, 2002). However, shorebirds and starlings usually hit aircraft in flocks. The greatest flocking bird hazards to aircraft can be from European starlings during the fall months. Starlings constitute 37% of all observations on the airfield. However, only three strikes of European starlings have been reported, each occurring outside of the fall period (St. Germain, 2010).

On Tinker AFB, a most prevalent aircraft strike threats comes from the Eastern Meadowlark, which represents a significant proportion of detections during the fall (11%), spring (5%,), and summer (28%). The Meadowlark also constitutes 19.4% of the strikes reported on Tinker AFB with an even distribution among those three seasons. The Horned lark becomes the leading threat in the winter when the Meadowlark is predominantly absent. Horned larks represent 84% of the hazard and 71% of the observations; however they only represent 2.2% of the total strikes reported. Killdeer are significant contributors to the bird strikes on aircraft at Tinker AFB. Killdeer represent 11% of the total strikes reported, with most of them occurring in the fall. The Killdeer appears to have a lower threat level than other species with a 15% hazard based off 6.5% of the observations, however these calculations do not take into consideration behavior of the Killdeer. Most of the Killdeer observations came while the species was actively on or near the edge of the runways and taxiways. This species often forages on the impervious surfaces the runways provide, and will nest on the gravelly edges of these surfaces or roads.

It is these behavioral traits that put Killdeer at greater risk and hazard than the observational data (6.5%) indicates.

The species representing BASH threats described above have strong open habitat preferences that are met to varying degrees by the airfield environment (St. Germain, 2010). In other words, the airfield environment resembles the open grassland-type habitat which is preferred by Eastern Meadowlark, Horned Lark, Killdeer, shorebirds, several species of sparrows and other grassland birds.

Overall the density of birds is much lower on the airfield than in other survey regions of the installation. In the study entitled *Inventory of Avian Species on Tinker AFB, Oklahoma City, Oklahoma, 2010*, the author believes there is an over inflation of winter density estimations due to low sample sizes combined with high variance and large cluster (flock) sizes. In addition, the number of individuals, species richness, and diversity is also much lower on the airfield. This is a good indication that the management practices of keeping birds away from the airfield, while promoting them in the green-space, is thus far successful (St. Germain, 2010).

Northern Great Plains Piping Plover

The Plover that was struck at Tinker is considered to be part of the Northern Great Plains population of the Piping Plover that is classified as threatened. According to Bird Life International, there are an estimated 4,662 breeders composing the Northern Great Plains population (http://www.birdlife.org/datazone/speciesfactsheet.php?id=3127).

No statistical analysis is possible on the one Northern Great Plains Piping Plover strike at Tinker AFB in the 30-year period since the bird was listed as threatened in 1986. As stated previously, more than 192,000 aircraft operations have occurred at Tinker AFB since the single Northern Great Plains Piping Plover was struck by an aircraft in 2009, with no additional Northern Great Plains Piping Plover sightings or strikes on base occurring in the last seven years. In addition, no nesting habitat is known for this species at Tinker AFB proper, or currently in Oklahoma County. Therefore, any Northern Great Plains Piping Plovers occurring in the region are anticipated to be temporary migrants.

The Northern Great Plains Piping Plover is one of 137 documented species occurring at Tinker AFB. According to Lt. Colonel Beth Dittmer, Chief of Flight Safety at Tinker AFB, over the last 20 years, there have been over 383 bird fatalities, or approximately 20 strikes per year, resulting from collisions with aircraft at that installation. Likely due to its extreme rarity at Tinker, only one of those fatalities was a Northern Great Plains Piping Plover, and that fatality occurred over 7 years ago. The Air Force cannot entirely dismiss the possibility that the ongoing flying mission and proposed KC-46A MOB 3 mission could result in a aircraft strike of an individual Northern Great Plains Piping Plover species sometime in the future. Since the likelihood of striking another Northern Great Plains Piping Plover is very low, as evidenced by historical BASH records, the USAF determined that the ongoing flying mission, as well as the proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect this species.

Interior Least Tern

The ILT population has been surveyed from 1984 to present. It was federally listed as endangered in 1985. Survey effort and coverage increased during 1984 through 1986, yet because colonies are ephemeral, riverine nesting habitat is remote, and salt flat nesting habitat is vast, consistent timing and coverage of surveys have not currently been logistically possible. Colonies in interior sites are typically

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

small: ranging from 5 to 20 nests, and rarely greater than 50 nests. Best information available suggests that the interior population has increased during the time period of 1986 to 1991 from approximately 4,125 to 6,830 (EMK and J. Sidle unpubl. data). Tern numbers increased one hundred percent along lower Mississippi River (Cape Girardeau, MO, to Vicksburg, MS) between 1989 and 1990 (from 2,503 to 5,038 birds), which cannot be accounted for by increased survey effort or change in survey method. This area of the lower Mississippi supports 52 to 65 percent of all known nesting ILTs (http://bna.birds.cornell.edu/bna/species/290/articles/demography).

In addition, the Interior Least Tern is increasingly using rooftops for nesting (especially from North Carolina southward), and dredged-material islands (Fisk 1978, Parnell et al. 1986, Hovis and Robson 1989, Gore 1991, M. Harris pers. comm., M. Dodd pers. comm.), but productivity at rooftop sites is highly variable relative to natural sites (Robertson and Woolfenden 1992).

The USFWS 1990 Recovery Plan for the ILT estimated that there were 5,000 ILTs at that time, and the plan set a recovery goal of 7,000 birds. Although serious threats to the Tern continues, and the best means to count them remains a challenge, current population numbers appear to suggest that the birds are holding their own. There is a potential possibility of ILT nesting on flat roofs at Tinker AFB. If such nesting were to occur, aircraft strikes would be more likely when the birds are on or near the airfield. It is also possible, but difficult to determine, whether the birds are more interested in foraging or loafing in the restored natural areas on Tinker AFB rather than on the airfield itself. ILTs have preference for larger bodies of water than those found in Tinker AFB's ongoing restoration of riparian corridor sites. In addition, quality habitat may exist at the two nearby lakes, Lake Stanley Draper and Lake Thunderbird.

Air Force BASH data has never recorded an aircraft strike of an Interior Least Tern at Tinker AFB. Given the apparent population growth, survival and adaptability of the Tern as described above, the USAF has determined that the ongoing flying mission, and proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect, members of the ILT species.

Rufa Red Knot

As stated previously, Rufa Red Knot populations are in decline around the world, especially *C. c. rufa*, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010.

Geolocator results from eight red knots (one with 2 years of data) wintering in Texas showed that all these birds used a central, overland flyway across the midwest United States. Birds flew 1,600 to 2,000 miles to the first stopover. A Northern Great Plains stopover (Saskatchewan, Canada, and North Dakota, United States) was used by five of six birds in 2010, while southern Hudson Bay in Manitoba, Canada (the Nelson River delta and James Bay), was used by one bird in 2010 and all three birds in 2011 (Newstead et al. 2013). These findings support earlier reports of large numbers (1,000 to 2,500) of red knots in Saskatchewan and Alberta, Canada, between January and June (Skagen et al. 1999).

All birds departed Texas in the second half of May, and spent an average of 18.3 ± 3.2 days (range of 13 to 22 days) at the northbound stopover (Newstead et al. 2013). Although these geolocator results show consistent use of the central flyway, re-sightings of marked birds suggest a more complex pattern of movements between Texas and the Atlantic coast, including both the Southeast wintering areas and Delaware Bay (BandedBirds.org 2012; D. Newstead pers. comm. August 20, 2012; Niles et al. 2008, p.74). In addition, at least one bird marked in Argentina passed through Texas during spring migration (Niles et al. 2008, p. 74). Higher counts of roughly 700 to 2,500 knots have recently been made on Padre

Island, Texas, during October, which could include wintering birds (Newstead et al. 2013; Niles et al. 2009, p. 1).

This paragraph focuses on the Rufa Red Knot's coastal nonbreeding habitats. Rufa Red Knots are restricted to ocean coasts during winter, and occur primarily along the coasts during migration. However, small numbers of Rufa Red Knots are reported annually across the interior United States (i.e., greater than 25 miles from the Gulf or Atlantic Coasts) during spring and fall migration. These reported sightings are concentrated along the Great Lakes, but multiple reports have been made from nearly every interior State (eBird.org. 2012). Information on the specific noncoastal stopover habitats used by Rufa Red Knots is lacking.

Based on the above information, Rufa Red Knots are moving through Texas and Oklahoma on their way either to the Great Lakes or Delaware Bay and/or their breeding grounds in northern Canada with an estimated arrival of June 10 based on geolocator data. They are most likely to pass over Tinker AFB during spring and fall. Rufa Red Knots tend to migrate in single-species flocks with departures typically occurring in the few hours before twilight on sunny days. Size of the departing flocks tends to be large (greater than 50 birds) (Niles et al. 2008, p. 28). Likewise, based on observations of other *Calidris canutus* subspecies departing from Iceland towards Nearctic breeding grounds in spring 1986 to 1988, Alerstam et al. (1990, p. 201) found mean flock sizes of 100 to 200 individuals.

It appears that migrating Red Knots would pass over Tinker AFB in single species flocks of anywhere from 50 to 200 birds. They are also a fairly good sized bird and a flock of 50 or more individuals would be easy to detect during the day, but not at night. Radar would be required to detect them at night.

Air Force BASH data has never recorded an aircraft strike of a Rufa Red Knot at Tinker AFB. Given their habits as described above, the ongoing flying mission, and proposed KC-46A MOB 3 mission, may affect, but is not likely to adversely affect, the Rufa Red Knot.

Whooping Crane

According to the Aransas National Wildlife Refuge website data for 2015-2016, there are only 329 Whooping Cranes living in the wild today; which is the flock that winters at the Aransas National Wildlife Refuge on the Texas coast and spends the spring and summer at Wood Buffalo National Park in the Northwest Territories and adjacent areas of northeastern Alberta, Canada.

Although Tinker AFB is potentially within the confines of the migratory path of this species, a Whooping Crane has never been observed at Tinker AFB. Due to its extreme rarity, it would be an exceptional occasion to observe a Whooping Crane at Tinker AFB. If observed, the air traffic control tower would be alerted so that an air strike could be prevented. Therefore, the USAF has determined that the ongoing flying mission and proposed KC-46A MOB 3 mission may affect, but is not likely to adversely affect, members of the Whooping Crane species.

Effects of the Proposed Action on Northern Great Plains Piping Plover, Interior Least Tern, Rufa Red Knot and Whooping Crane

With Tinker's flying mission in place for the last 75 or so years, and with passage of the ESA in 1973 and 43 years gone by since, and only one documented strike of the listed Northern Great Plains Piping Plover, it is unlikely that the four listed bird species will be struck and killed in significant enough numbers at Tinker AFB to affect their survival.

A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

Based on the information listed above, the USAF does not anticipate that a proposed 13% increase in overall operations will increase the potential for a future bird strike involving the Interior Least Tern, Rufa Red Knot, Whooping Crane or Northern Great Plains Piping Plover. This determination is based on the fact that more than 192,000 aircraft operations have occurred at Tinker AFB since the single Northern Great Plains Piping Plover was struck by an aircraft in 2009, with no additional Northern Great Plains Piping Plover sightings or strikes occurring in the last 7 years. In addition, no nesting habitat is known for this species, or the Interior Least Tern, Rufa Red Knot or Whooping Crane at Tinker AFB proper, or currently in Oklahoma County. Therefore, any of these species occurring in the region are anticipated to be temporary migrants.

6.0 CUMULATIVE EFFECTS

No cumulative effects are expected to result from Tinker's ongoing flying mission. The installation has been an active Air Force Base since World War II. The ongoing flight mission represents baseline conditions.

Should the proposed KC-46A MOB 3 mission occur at Tinker AFB, there would be dust, noise and increased personnel (demolition and construction workers) present on the installation during the demolition and construction period. The effects of this are expected to be temporary and are only occurring on the airfield. There would also be increased traffic on the roads at Tinker AFB during construction, but this will decrease after demolition and construction. There would be a slight permanent increase of traffic on Tinker's road due to the increase in personnel associated with the proposed KC-46A MOB 3.

If selected over Seymour Johnson AFB for the proposed KC-46A MOB 3 mission, tanker aircraft operations at Tinker AFB would increase from 2,399 to 6,440 operations per year, and additional personnel required to staff the mission would increase the number of personnel on Tinker by 476. More housing and service oriented businesses might be required. However, the increase of 476 personnel is insignificant compared to the Oklahoma City proper area population of 579,999 and the Oklahoma City Metro, seven county population of 1,459,788 (source: suburbanstats website and Wikipedia).

There is no designated critical habitat at or in the vicinity of Tinker AFB, so there will be no impact upon critical habitat from the proposed action.

7.0 CONCLUSIONS

Based on the information provided in this BE, the USAF requests concurrence from the USFWS that implementation of the KC-46A MOB 3 mission at Tinker AFB, *may affect, but is not likely to adversely affect,* the Northern Great Plains Piping Plover, Interior Least Tern (ILT), Rufa Red Knot or Whooping Crane. Although Tinker AFB is not currently the preferred alternative in the KC-46A MOB 3 beddown EIS, the USAF would engage with the USFWS if Tinker AFB were to be selected to implement any measures that could reduce and minimize the potential for future impacts to Northern Great Plains Piping Plovers, ILT, Rufa Red Knot and Whooping Crane. These measures would be incorporated into the installation Integrated Natural Resources Management Plan during the required annual review and update sessions with the USFWS and Oklahoma Department of Wildlife Conservation.

USDA-WS staff are already collecting extensive information on bird species at Tinker AFB, and are working with the USAF natural resources program staff to provide abundance and population trend data

for listed birds and other bird species that may occur on Tinker AFB. Through the Sikes Act mandated collaboration on the INRMP, the USAF, USFWS, and State will continue to implement a well-defined monitoring plan for sensitive species to provide abundance numbers and trends for all species of concern.

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A.6.3.3 Tinker AFB USFWS Section 7 Correspondence (Continued)

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United States Fish and Wildlife Service: Whooping Crane Survey Results: Winter 2015-2016 https://www.fws.gov/refuge/aransas/

9.0 LIST OF CONTACTS MADE AND PREPARERS

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USAF, Tinker AFB, Oklahoma City Air Logistics Center (OC-ALC):
John R. Krupovage, 405-739-7074 desk; 405-620-7473 mobile, Natural Resources Manager
72 Civil Engineering Directorate

USAF, Air Force Civil Engineering Center (AFCEC):
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A.6.4 Westover ARB Natural Resources Consultation Letters

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter

DEPARTMENT OF THE AIR FORCE
439TH MISSION SUPPORT GROUP (AFRC)

29 March 2016

Mr. Wayne M. Williams, CFM
Base Civil Egineer
250 Patriot Avenue
Westover ARB, MA 01022

Mr. John Warner, Assistant Supervisor Federal Activities/Endangered Species
U.S. Fish and Wildlife Service
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094

Dear Mr. Warner,

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with the beddown of the Third Main Operating Base (MOB 3) of the KC-46A tanker aircraft. Westover Air Reserve Base (ARB), Massachusetts has been proposed as one of four alternative locations for this mission.

The MOB 3 mission involves the basing of 12 KC-46A aircraft. In addition to the aircraft, facilities, infrastructure and manpower would also be required to support the mission. For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required. Six new facilities would be constructed, several facilities would be renovated and two facilities would be demolished. In addition, the MOB 3 mission would require the repair of the taxilane located in the center of the existing aircraft parking ramp. All construction or ground disturbance proposed by this project would be conducted within the current base boundary and no wetland areas would be impacted.

The addition of KC-46A operations would increase the total number of operations conducted at Westover ARB by 41 percent. Approximately five percent of the total annual KC-46A sorties would be flown during acoustic night (between 10:00 PM and 7:00 AM). Practice approaches would be conducted by KC-46A aircrews at airfields other than Westover ARB on an occasional basis. The KC-46A would be operated in existing airspace, and the types of flight operations would be similar to the existing C-5 aircraft operations. KC-46A aircrews would use existing air refueling (AR) tracks and fuel jettison areas, if necessary. Flight activities involving refueling training would primarily occur in designated aerial refueling tracks. No new flight tracks are proposed for use.

The ROI for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as airspace operations. Westover ARB has carefully reviewed the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation (IPaC) online system on January 13, 2016, to identify current USFWS trust resources, such as migratory birds, species proposed or listed under the Endangered Species Act (ESA), wetlands, and USFWS National Wildlife Refuge System lands with potential to be affected by the Proposed Action. A submission for Hampden County, Massachusetts was completed to cover the area within the Region of Influence for biological resources:

> "**Hampden County, Massachusetts IPaC Trust Resource Report** identified one threatened flowering plant, the small whorled pogonia (Isotria medeoloides); one threatened mammal species, the northern long-eared bat (Myotis septentrionalis); 19 migratory birds; and the Silvio O. Conte National Fish and Wildlife Refuge. No wetlands or critical habitats were identified within the project area. Please see Attachment 2 for a full copy of the Trust Resource Report."

Additionally, special status species lists by county were obtained via the USFWS's Environmental Conservation Online System (ECOS) to identify species with the potential to occur within Hampden County, Massachusetts. Attachment 3, Table 3-1, lists these species and their habitats.

In accordance with Section 7 of the ESA (16 U.S.C. §§ 1531–1544, as amended), the Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), and as part of the U.S. Air Force's Environmental Impact Analysis Process (EIAP), we request your input in identifying any additional species of concern, general or specific issues, or areas of concern you feel should be addressed in the EIS. The Air Force requests your agency's concurrence with the species list and effects determinations contained in Table 3-1. If your agency has any new or additional information other than that contained in Table 3-1, we request that you please provide your comments by April 25, 2016.

Please provide your comments directly to Mr. Hamid Kamalpour, United States Air Force, AFCEC/CZN; Building 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853 or to the project website at www.kc-46A-beddown.com. Thank you for your assistance in this matter.

Sincerely,

Wayne M. Williams

WAYNE M. WILLIAMS, CFM, GS-13, DAF
Base Civil Engineer

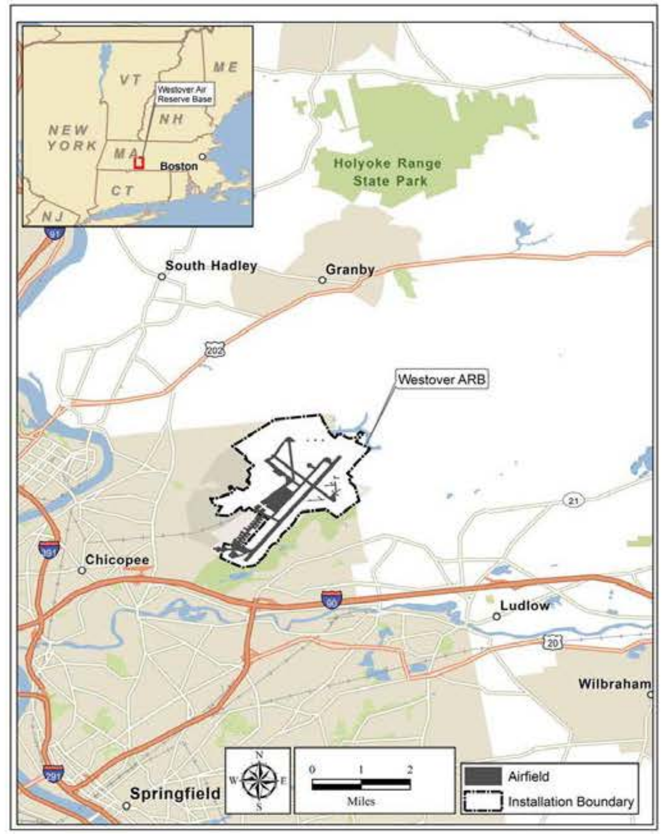
3 Attachments:
1. Westover ARB Location Map
2. IPaC Trust Resource Report for Hampden County, Massachusetts
3. Table 3-1. Potential for Impacts from the Proposed Action to USFWS Special Status Species Known to or Believed to Occur in Hampden County, Massachusetts

cc: Hamid Kamalpour, AFCEC

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 1. AREA OF POTENTIAL EFFECT MAP



Regional Map of Westover ARB, Massachusetts

March 2016

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 2. IPaC TRUST RESOURCE REPORT

U.S. Fish & Wildlife Service

Westover

IPaC Trust Resource Report

Generated January 13, 2016 05:19 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

IPaC Trust Resource Report

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME
Westover

LOCATION
Hampden County, Massachusetts

DESCRIPTION
MOB 3

IPAC LINK
https://ecos.fws.gov/ipac/project/GNKMG-ZHOVF-CF3NU-OZ3UO-OZOEHU

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

01/13/2016 09:19 AM Information for Planning and Conservation (IPaC) v2.3.2 Page 2

IPaC Trust Resource Report

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Flowering Plants

Small Whorled Pogonia Isotria medeoloides — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1XL

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

01/13/2016 09:19 AM Information for Planning and Conservation (IPaC) v2.3.2 Page 3

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

American Bittern Botaurus lentiginosus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
Season: Breeding

Cerulean Warbler Dendroica cerulea — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Louisiana Waterthrush Parkesia motacilla — Bird of conservation concern
Season: Breeding

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps all or part of the following National Wildlife Refuges:

Silvio O. Conte National Fish And Wildlife Refuge 340.91 acres

PHONE (413) 548-8002

ADDRESS
103 East Plumtree Road
Sunderland, MA 01375

http://www.fws.gov/refuges/profiles/index.cfm?id=53590

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

ATTACHMENT 3. POTENTIAL FOR IMPACTS FROM THE PROPOSED ACTION TO USFWS SPECIAL STATUS SPECIES KNOWN TO OR BELIEVED TO OCCUR IN HAMPDEN COUNTY, MASSACHUSETTS

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

Table 3-1. Potential for Impacts from the Proposed Action to USFWS Species Known to or Believed to Occur in Hampden County, Massachusetts

Common Name	Scientific Name	Federal Listing Status	Habitat	Historically Observed at Westover Air Reserve Base?	Potential for Impacts from the Proposed Action/ Effects determination
Clams					
Dwarf wedgemussel	*Alasmidonta heterodon*	Endangered	May inhabit a variety of aquatic habitats from small streams to large rivers; found in a variety of substrate types including clay, sand, gravel and pebble, and sometimes in silt depositional areas near banks; usually inhabits hydrologically stable areas, including very shallow water along streambanks and under root mats, but may be found at depths of 25 feet in the Connecticut River.	No	No. No effects to aquatic habitats will occur as a result of the Proposed Action. Habitat for dwarf wedgemussel does not occur at Westover Air Reserve Base.
Flowering Plants					
Small whorled pogonia	*Isotria medeoloides*	Threatened	Grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. May grow in stands of softwoods such as hemlock. Prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams.	No	No. No effects to native vegetation will occur as a result of the Proposed Action. Habitat for small whorled pogonia does not occur at Westover Air Reserve Base.
Mammals					
Northern long-eared bat	*Myotis septentrionalis*	Threatened	Summer roosting habitat includes underneath bark, in cavities, or in crevices of live and dead trees, caves and mines. Opportunistic in roost selection, using tree species based on suitability to retain bark or provide cavities or crevices. Winter hibernacula include caves and mines. Large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents are preferred.	No	No. Species not detected during base-wide surveys completed in 1995. No known roosting habitat occurs on Base. Potential foraging habitat, may be present, however no adverse effects to the northern long-eared bat are anticipated.

Source: USFWS 2015a, d-f, Westover ARB 2014

A.6.4.1 Westover ARB USFWS Section 7 Consultation Letter (Continued)

DEPARTMENT OF THE AIR FORCE
439th MISSION SUPPORT GROUP (AFRC)

References:

U.S. Fish and Wildlife Service (USFWS) 2015a. Environmental Conservation Online System. Species by County Reports. Accessed: http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=25013 on 13 January 2016.

USFWS 2015b. Critical Habitat Portal. Accessed: http://ecos.fws.gov/crithab/ on 13 January 2016.

USFWS 2015c. Information for Planning and Conservation (IPaC). Accessed: https://ecos.fws.gov/ipac/project/QZIQYV3DNJHAFPJWDX2A3ACVEU/resources on 13 January 2016.

USFWS 2015d. Species Profile: Dwarf wedgemussel (*Alasmidonta heterodon*) Accessed: http://www.fws.gov/raleigh/species/es_dwarf_wedgemussel.html on 19 January 2016.

USFWS 2015e. Endangered Species. Small Whorled Pogonia (*Isotria medeoloides*) Fact Sheet. Accessed: http://www.fws.gov/midwest/endangered/plants/smallwhorledpogoniafs.html on 19 January 2016.

USFWS 2015f. Endangered Species. Northern Long-Eared Bat (Myotis septentrionalis). Accessed: http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html on 19 January 2016.

Westover Air Reserve Base (ARB) 2014. Draft Integrated Natural Resources Management Plan. Westover ARB, Massachusetts. Headquarters, Air Force Reserve Command Environmental Division. April 2005.

A.6.4.2 Westover ARB USFWS Section 7 Consultation Response

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

REF: Beddown, Third Main Operating Base, KC-46A tanker aircraft, Westover ARB, MA

June 30, 2016

Mr. Hamid Kamalpour
United States Air Force
AFCE/CZN
Building 171, 2261 Hughes Avenue, Suite 155
Lackland AFB, Texas 78236-9853

Dear Mr. Kamalpour:

This responds to a letter, dated March 29, 2016, from Wayne Williams of Westover Air Reserve Base (ARB), requesting our concurrence with the United States Air Force's (Air Force) determinations of effects on listed species that may occur as a result of the Air Force's proposed beddown of the Third Main Operating Base of the KC-46A tanker aircraft at the Westover ARB in Massachusetts. The request is pursuant to the Air Force's ongoing preparation of an Environmental Impact Statement evaluating the potential environmental consequences associated with the proposed project. The request and our comments are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531, *et seq.*) (Act).

We reviewed the Westover IPaC Trust Resource Report (Report), dated January 13, 2016, included with the March 29, 2016 letter, and determined the Report identifies all proposed, candidate, threatened, and endangered species that may occur in the proposed project area or could potentially be affected by the proposed action. We also reviewed Table 3-1 (Attachment 3 to the March 29, 2016 letter), entitled "Potential for Impacts from the Proposed Action to USFWS Species Known to or Believed to Occur in Hampden County, Massachusetts," and noted that the Air Force determined the project would have "no effect" on the dwarf wedgemussel (*Alasmidonta heterodon*), small whorled pogonia (*Isotria medeoloides*), or the northern long-eared bat (*Myotis septentrionalis*). We are not aware of any information at this time that would cause us to disagree with the Air Force's determinations.

In the future, we recommend that the Air Force generate official species lists from the Regulatory Documents page of the IPaC website, because it may negate the need for additional correspondence with this office. Please note that neither section 7 of the Act, nor the Act's implementing regulations (50 C.F.R. 402), require Federal agencies to obtain the U.S. Fish and Wildlife Service's concurrence for "no effect" determinations.

Mr. Hamid Kamalpour
June 30, 2016

2

Preparation of a Biological Assessment is not necessary, and no further consultation with us under section 7 of the Act regarding the subject project is required for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available or the project description changes and listed or proposed species could be affected.

Thank you for your cooperation, and please contact Mr. Anthony Tur of this office at (603) 223-2541 if you need any further assistance.

Sincerely yours,

Acting for:

Thomas R. Chapman
Supervisor
New England Field Office

A.7 DRAFT ENVIRONMENTAL IMPACT STATEMENT CORRESPONDENCE AND OUTREACH

A.7.1 Draft Environmental Impact Statement Public Hearing Notification Materials

A.7.1.1 Federal Register Notice of Availability

Federal Register / Vol. 81, No. 223 / Friday, November 18, 2016 / Notices 81765

~~Dated: October 13, 2016.~~

~~**Delores J. Barber,**~~

~~*Director, Information Technology and Resources Management Division, Office of Pesticide Programs.*~~

~~[FR Doc. 2016–27865 Filed 11–17–16; 8:45 am]~~

~~BILLING CODE 6560–50–P~~

~~**ENVIRONMENTAL PROTECTION AGENCY**~~

~~**[EPA–HQ–OPP–2009–0317; FRL–9955–18]**~~

~~**Registration Review; Draft Malathion Human Health Risk Assessment; Extension of Comment Period**~~

~~**AGENCY:** Environmental Protection Agency (EPA).~~

~~**ACTION:** Notice; extension of comment period.~~

~~**SUMMARY:** EPA issued a notice in the **Federal Register** of September 22, 2016 (81 FR 65355) (FRL–9952–53), opening a 60-day comment period for the draft malathion human health risk assessment. This document extends that comment period for 30 days. The new closing date will be December 21, 2016 rather than November 21, 2016. The comment period is being extended in response to a request from FMC Corporation citing the scope and complexity of the assessments, including the use of new models, risk assessment approaches, and science policy issues that require additional review time.~~

~~**DATES:** Comments, identified by docket identification (ID) number EPA–HQ–OPP–2009–0317, must be received on or before December 21, 2016.~~

~~**ADDRESSES:** Follow the detailed instructions provided under ADDRESSES in the **Federal Register** document of September 22, 2016.~~

~~**FOR FURTHER INFORMATION CONTACT:** Richard Dumas, Pesticide Re-Evaluation Division (7508P), Office of Pesticide Programs, Environmental Protection Agency, 1200 Pennsylvania Ave. NW., Washington, DC 20460–0001; telephone number: (703) 308–8015; email address: *dumas.richard@epa.gov*.~~

~~**SUPPLEMENTARY INFORMATION:** This document extends the public comment period established in the **Federal Register** document of September 22, 2016. In that document, EPA opened a 60-day comment period for a draft human health risk assessment for the registration review of malathion. EPA is hereby extending the closing date of the comment period by 30 days from November 21, 2016, to December 21, 2016.~~

~~To submit comments, or access the docket, please follow the detailed instructions provided under ADDRESSES in the **Federal Register** document of September 22, 2016. If you have questions, consult the person listed under FOR FURTHER INFORMATION CONTACT.~~

~~**Authority:** 7 U.S.C. 136 *et seq.*~~

~~Dated: November 10, 2016.~~

~~**Linda Arrington,**~~

~~*Acting Director, Pesticide Re-evaluation Division, Office of Pesticide Programs.*~~

[FR Doc. 2016–27867 Filed 11–17–16; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9030–3]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/nepa.*

Weekly receipt of Environmental Impact Statements (EISs)

Filed 11/07/2016 Through 11/11/2016

Pursuant to 40 CFR 1506.9

Notice:

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html*

EIS No. 20160269, Draft, USAF, IN, KC–46A Third Main Operating Base (MOB–3) Beddown, Comment Period Ends: 01/03/2017, Contact: Hamid Kamalpour 210–925–3001

~~*EIS No. 20160270, Final, FTA, WA,* Federal Way Link Extension, Review Period Ends: 12/19/2016, Contact: Daniel Drais 206–220–7954~~

~~*EIS No. 20160271, Draft, BLM, ID,* Bruneau-Owyhee Sage-Grouse Habitat Project (BOSH), Comment Period Ends: 01/03/2017, Contact: Michael McGee 208–384–3464~~

~~*EIS No. 20160272, Final Supplement, USFS, CO,* Rulemaking for Colorado Roadless Areas, Review Period Ends: 12/19/2016, Contact: Jason Robertson 303–275–5470~~

~~*Amended Notices:*~~

~~*EIS No. 20160200, Draft, USACE, NY,* Atlantic Coast of New York, East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, Comment Period Ends: 12/02/2016, Contact: Robert J. Smith 917–790–8729~~

~~Revision to Federal Register Notice Published 09/02/2016; Extending Comment Period from 11/17/2016 to 12/02/2016~~

~~Dated: November 15, 2016.~~

~~**Karin Leff,**~~

~~*Acting Director, NEPA Compliance Division, Office of Federal Activities.*~~

~~[FR Doc. 2016–27845 Filed 11–17–16; 8:45 am]~~

~~BILLING CODE 6560–50–P~~

~~**EQUAL EMPLOYMENT OPPORTUNITY COMMISSION**~~

~~**SES Performance Review Board—Appointment of Members**~~

~~**AGENCY:** Equal Employment Opportunity Commission.~~

~~**ACTION:** Notice.~~

~~**SUMMARY:** Notice is hereby given of the appointment of members to the Performance Review Board of the Equal Employment Opportunity Commission.~~

~~**FOR FURTHER INFORMATION CONTACT:** Traci M. DiMartini, Chief Human Capital Officer, U.S. Equal Employment Opportunity Commission, 131 M Street NE., Washington, DC 20507, (202) 663–4306.~~

~~**SUPPLEMENTARY INFORMATION:** Publication of the Performance Review Board (PRB) membership is required by 5 U.S.C. 4314(c)(4). The PRB reviews and evaluates the initial appraisal of a senior executive's performance by the supervisor, and makes recommendations to the Chair, EEOC, with respect to performance ratings, pay level adjustments and performance awards.~~

~~The following are the names and titles of executives appointed to serve as members of the SES PRB. Members will serve a 12-month term, which begins on November 29, 2016.~~

~~PRB Chair:~~

~~Ms. Germaine P. Roseboro, Chief Financial Officer, Equal Employment Opportunity Commission.~~

~~Members:~~

~~Ms. Peggy R. Mastroianni, Legal Counsel, Equal Employment Opportunity Commission;~~

~~Mr. Bryan G. Burnett, Chief Information Officer, Equal Employment Opportunity Commission;~~

~~Ms. Veronica Venture, Director, EEO and Diversity, Department of Homeland Security;~~

~~Mr. John M. Robinson, Director, Office of Civil Rights/Chief Diversity Officer, U.S. State Department.~~

~~By the direction of the Commission.~~

A.7.1.2 Draft EIS Memorandum

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

01 November 2016

MEMORANDUM FOR INTERESTED INDIVIDUALS, ORGANIZATIONS, PUBLIC GROUPS, GOVERNMENT AGENCIES AND OTHERS

FROM: AFCEC/CZN
2261 Hughes Ave, Suite 155
JBSA Lackland, TX 78236-9853

SUBJECT: Draft Environmental Impact Statement (EIS) for the KC-46A Third Main Operating Base (MOB 3) Beddown

We are pleased to provide you with a copy of the *KC-46A Third Main Operating Base (MOB 3) Draft EIS.* This document is provided in accordance with the National Environmental Policy Act (NEPA). Libraries are requested to have this document remain available throughout the 45-day public comment period which ends on January 2, 2017. This document is also available at http://www.kc-46a-beddown.com.

Notification of the availability of the Draft EIS will appear in the *Federal Register* on November 18, 2016. The EIS analyzes alternative actions for the U.S. Air Force's (USAF's) proposal to beddown and conduct KC-46A flight operations for the MOB 3 mission.

The USAF will hold four public hearings on the Draft EIS at the dates and locations listed below. The purpose of the hearings is to receive public and agency input on the proposed action/alternatives and the Draft EIS analysis. The hearings will also be announced through local media.

December 6, 2016	Tinker AFB	Sheraton Midwest City Hotel and Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, OK 73110
December 8, 2016	Grissom ARB	Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970
December 13, 2016	Westover ARB	Westover Airport Departure Lounge 255 Padgette Street, Chicopee, MA 01020
December 15, 2016	Seymour Johnson AFB	Herman Park Center, 901 East Ash St., Goldsboro, NC 27530

Substantive comments presented at the public hearings and submitted to the USAF will be considered in the Final EIS. Comments must be postmarked by January 2, 2017 for incorporation into the Final EIS. Questions or comments can be submitted via the website or to the Air Force Civil Engineer Center (AFCEC) project manager: Mr. Hamid Kamalpour, U.S. Air Force, AFCEC/CZN, 2261 Hughes Ave., Ste 155, Lackland AFB, Texas 78236-9853. Additional information can be found on the project website listed above.

Sincerely,

H. Kamalpour

Hamid Kamalpour, GS-13 (AFCEC/CZN)
Project Manager, NEPA Center
Environmental Directorate

A.7.1.3 Postcard

KC-46A MOB 3 EIS
13397 Lakefront Drive
Suite 100
Earth City, MO 63045

Public Hearing Dates and Locations – Please Attend!

The public hearing venues will open at 5:00 p.m. At approximately 5:30 p.m., the hearing will be called to order, followed by a USAF presentation and an opportunity for public testimony. The hearing venue will close at 8:00 p.m.

Dec. 6, 2016	Tinker AFB, Sheraton Midwest City Hotel and Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, OK 73110
Dec. 8, 2016	Grissom ARB, Milestone Event Center, 1458 North Liberator Road, Peru, IN 46970
Dec. 13, 2016	Westover ARB, Westover Airport Departure Lounge, 255 Padgette Street, Chicopee, MA 01020
Dec. 15, 2016	Seymour Johnson AFB, Herman Park Center, 901 East Ash Street, Goldsboro NC 27530

The U.S. Air Force (USAF) has prepared a Draft Environmental Impact Statement (EIS) for public review. The Draft EIS includes analysis of the potential environmental impacts associated with the proposal to beddown KC-46A tanker aircraft, associated infrastructure, and manpower for the Third Main Operating Base (MOB 3) at an Air Force Reserve Command (AFRC)-led unit on a USAF installation within the continental United States.

The USAF is soliciting comments on the Draft EIS from interested local, state, and federal agencies, as well as interested members of the public and others. The USAF will hold public hearings, advertised on the back of this postcard, to provide the public with an opportunity to learn about the proposal and provide input.

Review of the Draft EIS is an important part of the environmental process. Public input supports the USAF in making informed decisions. Please review a copy of the Draft EIS and provide comments. Copies can be obtained as follows:

- ☒ Download a copy from: **www.KC-46A-beddown.com.**
- ☒ Review a hardcopy at one of the libraries listed to the right.
- ☒ Request a hardcopy or electronic copy on CD from the contact below.

Please submit comments on the Draft EIS before January 2, 2017, at the public hearings or in writing to:
Mr. Hamid Kamalpour, USAF AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland AFB, TX 78236-9853

Comments may also be submitted electronically to:
www.KC-46A-beddown.com

Libraries Holding Copies of the Draft EIS:

- Peru Public Library, 102 East Main, Peru, IN 46970
- Kokomo-Howard County Public Library Main, 220 North Union, Kokomo, IN 46901
- Seymour Johnson AFB Library, 1520 Goodson St., Bldg. 3660, NC 27531
- Wayne County Public Library, 1001 E Ash St., Goldsboro, NC 27530
- Tinker Library, 6120 Arnold St., Bldg. 5702, Tinker AFB, OK 73145
- Midwest City Public Library, 8143 E. Reno Ave., Midwest City, OK 73110-7589
- Del City Library, 4509 SE. 15th St., Del City, OK 73115
- Chicopee Public Library, 449 Front St., Chicopee, MA 01013
- Ludlow Public Library, 24 Center St., Ludlow, MA 01056
- South Hadley Public Library, 2 Canal St., South Hadley, MA 01075

A.7.1.4 Newspaper Advertisements and Media Releases

Table A-2. Newspaper Advertisements, Public Service Announcements, and Press Releases

Media Format	Public Hearing Release/Publication Date(s)
Newspaper Advertisements	
The Oklahoman (Tinker AFB, OK)	Sunday, 20 November 2016
Peru Tribune (Grissom ARB, IN)	Sunday, 20 November 2016
Kokomo Tribune (Grissom ARB, IN)	Sunday, 20 November 2016
The Republican (Westover ARB, MA)	Sunday, 20 November 2016
Goldsboro News Argus (Seymour Johnson AFB, NC)	Sunday, 20 November 2016
The Free Press (Seymour Johnson AFB, NC)	Sunday, 20 November 2016
Public Service Announcements and Press Releases	
Tinker AFB, OK	Tuesday, 22 November 2016
Grissom ARB, IN	Friday, 18 November 2016
Westover ARB, MA	Monday, 5 December 2016
Seymour Johnson AFB, NC	Friday, 18 November 2016

A.7.1.4.1 Grissom ARB Newspaper Advertisements

U.S. AIR FORCE

The U.S. Air Force (USAF) Invites You to Review the Draft Environmental Impact Statement (EIS) and Attend Public Hearings for the Proposed Beddown of KC-46A Tanker Aircraft for the Third Main Operating Base (MOB 3)

Proposed Action and Alternatives

Pursuant to the National Environmental Policy Act (NEPA), the USAF has prepared a Draft EIS for public review that analyzes the potential environmental impacts associated with the beddown of KC-46A tanker aircraft, associated infrastructure, and manpower for the MOB 3 at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC-46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft are located. Along with the No Action Alternative, all four bases have been evaluated as alternatives in the EIS.

Where to Obtain the Draft EIS

The Draft EIS is available for download at www.KC-46A-beddown.com and may be reviewed at the Peru and Kokomo-Howard County Public Libraries.

Public Hearing – Please Attend

The USAF is soliciting comments on the Draft EIS. The USAF will hold a public hearing to provide the public with an opportunity to learn about the proposal and provide input. Public input supports the USAF in making informed decisions.

The public hearing venue will open at 5:00 P.M. At 5:30 P.M., the USAF will give a brief presentation, followed by formal public testimony beginning at 6:15 P.M. The hearing venue will close at 8:00 P.M. All members of the public are invited. The date for the hearing is provided below.

December 8, 2016 Grissom ARB
Milestone Event Center, 1458 Liberator Rd., Peru, IN 46970

Public Comment

Your input is valuable and assists the USAF in making informed decisions. Comments on the Draft EIS can be submitted electronically at www.KC-46A-beddown.com, orally or in writing at public hearings, or by providing written comments to the address below. For further information, please contact: Mr. Hamid Kamalpour, USAF, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853

The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Final EIS, please submit comments by January 2, 2017!***

A.7.1.4.2 Seymour Johnson AFB Newspaper Advertisements

U.S. AIR FORCE

The U.S. Air Force (USAF) Invites You to Review the Draft Environmental Impact Statement (EIS) and Attend Public Hearings for the Proposed Beddown of KC-46A Tanker Aircraft for the Third Main Operating Base (MOB 3)

Proposed Action and Alternatives

Pursuant to the National Environmental Policy Act (NEPA), the USAF has prepared a Draft EIS for public review that analyzes the potential environmental impacts associated with the beddown of KC-46A tanker aircraft, associated infrastructure, and manpower for the MOB 3 at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC-46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft are located. Along with the No Action Alternative, all four bases have been evaluated as alternatives in the EIS.

Where to Obtain the Draft EIS

The Draft EIS is available for download at www.KC-46A-beddown.com and may be reviewed at the Wayne County Public Library and the Seymour Johnson AFB Library

Public Hearing – Please Attend

The USAF is soliciting comments on the Draft EIS. The USAF will hold a public hearing to provide the public with an opportunity to learn about the proposal and provide input. Public input supports the USAF in making informed decisions.

The public hearing venue will open at 5:00 P.M. At 5:30 P.M., the USAF will give a brief presentation, followed by formal public comment beginning at 6:15 P.M. The hearing venue will close at 8:00 P.M. All members of the public are invited. The date for the hearing is provided below.

December 15, 2016	**Seymour Johnson AFB**	**Herman Park Center, 901 East Ash St., Goldsboro, North Carolina 27530**

606-608324

Public Comment

Your input is valuable and assists the USAF in making informed decisions. Comments on the Draft EIS can be submitted electronically at www.KC-46A-beddown.com, orally or in writing at public hearings, or by providing written comments to the address below. For further information, please contact: Mr. Hamid Kamalpour, USAF, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853

The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Final EIS, please submit comments by January 2, 2017!***

A.7.1.4.3 Tinker AFB Newspaper Advertisement

U.S. AIR FORCE

The U.S. Air Force (USAF) Invites You to Review the Draft Environmental Impact Statement (EIS) and Attend Public Hearings for the Proposed Beddown of KC 46A Tanker Aircraft for the Third Main Operating Base (MOB 3)

Proposed Action and Alternatives

Pursuant to the National Environmental Policy Act (NEPA), the USAF has prepared a Draft EIS for public review that analyzes the potential environmental impacts associated with the beddown of KC 46A tanker aircraft, associated infrastructure, and manpower for the MOB 3 at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC 46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft are located. Along with the No Action Alternative, all four bases have been evaluated as alternatives in the EIS.

Although all practicable measures were taken to minimize and avoid impacts to floodplains and wetlands, Implementation of the KC-46A MOB 3 mission at Tinker AFB in Oklahoma, would affect approximately 3.5 acres of floodplain and approximately 45 linear feet of jurisdictional water. Consistent with the requirements and objectives of Executive Orders 13690, 11988 and 11990, state and federal regulatory agencies with special expertise in wetlands and floodplains have been contacted regarding these impacts.

Where to Obtain the Draft EIS

The Draft EIS is available for download at **www.KC-46A-beddown.com** and may be reviewed at the Midwest City and Del City Public Libraries and the Tinker AFB Library.

Public Hearing – Please Attend

The USAF is soliciting comments on the Draft EIS. The USAF will hold a public hearing to provide the public with an opportunity to learn about the proposal and provide input. Public input supports the USAF in making informed decisions.

The public hearing venue will open at 5:00 P.M. At 5:30 P.M., the USAF will give a brief presentation, followed by formal public comment beginning at 6:15 P.M. The hearing venue will close at 8:00 P.M. All members of the public are invited. The date for the hearing is provided below.

December 6, 2016	**Tinker AFB**	**Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, Oklahoma 73110**

Public Comment

Your input is valuable and assists the USAF in making informed decisions. Comments on the Draft EIS can be submitted electronically at **www.KC-46A-beddown.com**, orally or in writing at public hearings, or by providing written comments to the address below. For further information, contact: Mr. Hamid Kamalpour, USAF, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853.

The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Final EIS, please submit comments by January 2, 2017!***

A.7.1.4.4 Westover ARB Newspaper Advertisement

U.S. AIR FORCE

The U.S. Air Force (USAF) Invites You to Review the Draft Environmental Impact Statement (EIS) and Attend Public Hearings for the Proposed Beddown of KC-46A Tanker Aircraft for the Third Main Operating Base (MOB 3)

Proposed Action and Alternatives

Pursuant to the National Environmental Policy Act (NEPA), the USAF has prepared a Draft EIS for public review that analyzes the potential environmental impacts associated with the beddown of KC-46A tanker aircraft, associated infrastructure, and manpower for the MOB 3 at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The Strategic Basing Process resulted in the identification of Seymour Johnson Air Force Base (AFB) in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission. The KC-46A MOB 3 mission could be an additive or replacement mission depending on where the aircraft are located. Along with the No Action Alternative, all four bases have been evaluated as alternatives in the EIS.

Where to Obtain the Draft EIS

The Draft EIS is available for download at www.KC-46A-beddown.com and may be reviewed at the Chicopee, Ludlow, and South Hadley Public Libraries

Public Hearing – Please Attend

The USAF is soliciting comments on the Draft EIS. The USAF will hold a public hearing to provide the public with an opportunity to learn about the proposal and provide input. Public input supports the USAF in making informed decisions.

The public hearing venue will open at 5:00 P.M. At 5:30 P.M., the USAF will give a brief presentation, followed by formal public comment beginning at 6:15 P.M. The hearing venue will close at 8:00 P.M. All members of the public are invited. The date for the hearing is provided below.

December 13, 2016	**Westover ARB**	**Westover Airport Departure Lounge** **255 Padgette Street, Chicopee, MA 01020**

Public Comment

Your input is valuable and assists the USAF in making informed decisions. Comments on the Draft EIS can be submitted electronically at www.KC-46A-beddown.com, orally or in writing at public hearing, or by providing written comments to the address below. For further information, please contact: Mr. Hamid Kamalpour, USAF, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853. The USAF will accept comments at any time during the environmental process. ***However, to ensure the USAF has sufficient time to consider public input in the preparation of the Final EIS, please submit comments by January 2, 2017!***

A.7.1.5 Draft EIS Distribution List

A.7.1.5.1 Grissom ARB, Indiana, Draft EIS Distribution List

Mrs. Susan Hovermale, Farm Service Agency
Ms. Susan Meadows, Natural Resources Conservation Service
Mr. Scott Pruitt, U.S. Fish and Wildlife Service
Ms. Jennifer Boyle-Warner, Indiana Association of Soil and Water Conservation Districts
Mr. Cameron Clark, Indiana Department of Natural Resources
Mr. Ted McKinney, Indiana State Department of Agriculture
Mr. Jason Hill, Ducks Unlimited
Mr. Andy Kron, Indiana Farm Bureau
Mr. Robert Suseland, Pheasants Forever
Ms. Mary McConnell, The Nature Conservancy
Mr. Steven Howell, Indiana Department of Environmental Management (IDEM)
Mr. Kenneth Westlake, U.S. Environmental Protection Agency Region V
Mr. Greg Goodnight, City of Kokomo
Ms. Brenda Brunnemer-Ott, City of Kokomo
Mr. Gabriel Greer, City of Peru
Ms. Trish Soldi, City of Peru
Mr. Dennis See, City of Peru
Mr. Dave Kitchell, City of Logansport
Ms. Carol Sue Hayworth, City of Logansport
Mr. CJ Crist, Town of Bunker Hill
Ms. Rose Jackson, Galveston Town Hall
Mr. Patrick Robinson, Walton Town Hall
Mr. Josh Francis, Miami County courthouse
Mr. James L. Sailors, Cass County
Mr. Arin Shaver, Cass County Government Building
Mr. Steven Ray, North Central Indiana Regional Planning Council
Mr. Paul Wyman, Howard County Administration Center
The Honorable, Mike Pence Indiana State House
The Honorable Eric Holcomb, Indiana State House
The Honorable James Buck, Indiana State House
The Honorable Randall Head, Indiana State House
The Honorable William Friend, Indiana State House
The Honorable Heath VanNatter, Indiana State House
Mr. Duane Embree, Indiana Office of Defense Development
Ms. Brandye Hendrickson, Indiana Department of Transportation
Mr. Jason Kaiser, INDOT
Mr. Jim Schellinger, Indiana Economic Development Corporation
Mr. Bill Konyha, Indiana Office of Community and Rural Affairs
Ms. Jennifer Vandenberg, Indiana Office of Community and Rural Affairs
The Honorable Dan Coats, Indiana U.S. Senators
The Honorable Joe Donnelly, Indiana U.S. Senators
The Honorable Jackie Walorski, Indiana U.S. Representatives
The Honorable Susan Brooks, Indiana U.S. Representatives
The Honorable Todd Rokita, Indiana U.S. Representatives

A.7.1.5.1 Grissom ARB, Indiana, Draft EIS Distribution List (Continued)

Mr. Barry Cooper, Federal Aviation Administration, Great Lakes Regional Office
Mr. Robert Kaplan, US EPA Region V
Ms. Sandy Chittum, Miami County Chamber of Commerce
Mr. Bill Cuppy, Logansport-Cass County Chamber of Commerce
Mr. Jim Tidd, Miami County Economic Development Authority
Ms. Christy Householder, Cass County Economic Development Authority
Mr. John Gilpin, Grissom Community Council
Mr. Timothy Cox, Grissom Community Council
Mr. Jim Price, Grissom Air Museum
Ms. Amy Pate, REALTORS Association of Central Indiana
Mr. Sean White, Montgomery Aviation, Inc.
Mr. Chris Renteria, Dean Baldwin Painting
Mr. Tom Davies, Associated Press
Mr. Brandon Smith, Indiana Public Broadcasting Stations
Mr. Jake Robinson, Network Indiana
Indiana Herald
Mr. Greg Andrews, Indianapolis Business Journal
Ms. Amanda Heckert, Indianapolis Monthly
Mr. William Mays, Indianapolis Recorder
Ms. Patricia Miller, Indianapolis Star
Ms. Julie Inskeep, Journal Gazette
Mr. Keith Smiley, WBRI-Radio
Ms. Michelle Kiefer, WNDE-Radio
Mr. Jay Michaels, WRWM-Radio
Mr. Bob Richards, WLHK-Radio
Ms. Michelle Johnson, WFYI-Radio
Mr. Chuck Williams, WTLC-Radio
Mr. Jim Ganley, WSQM-Radio
Mr. JR Ammons, WZPL-Radio
Ms. Tina Cosby, WISH/WNDY-TV
Mr. Jimmy Love, WRTV-TV
Ms. Julie McQuoid, WTHR-TV
Mr. Brad Norris, WXIN-TV
Ms. Shannon Crouch, Kokomo Herald
Mr. Pat Munsey, Kokomo Perspective
Mr. Jeff Kovaleski, Kokomo Tribune
Ms. Camellia Pflum, WZWZ-Radio
Mr. Allan James, WWKI-Radio
Ms. Michelle Dials, Cass County Info
Ms. Mitsy Knisely, Pharos-Tribune
Mr. Ken Holtzinger, WSAL-Radio
Ms. Linda Kelsay, Chronicle-Tribune
Mr. Ben Quiggle, Peru Tribune
Mr. Doug Roorbach, News Herald
Mr. Edward Thurman, WBAT/WCJC/WMRI/WXXC-Radio
Mr. Jack Crummer, WIWU-Radio

A.7.1.5.1 Grissom ARB, Indiana, Draft EIS Distribution List (Continued)

Mr. Wayne Rees, The Paper
Mr. Eric Seaman, Wabash Plain Dealer
Mr. Wade Weaver, WJOT-Radio
Ms. Toni Metzger, WKUZ-Radio
Ms. Maryann Farnham, Peru Public Library
Ms. Faith Brautigam, Kokomo-Howard County Public Library Main
Ms. Diane Hunter, Miami Tribe of Oklahoma
Chairman John "Rocky" Barrett, Citizen Potawatomi Nation
Chairman Harold "Gus" Frank, Forest County Potawatomi
Chairperson Kenneth Meshigaud, Hannahville Indian Community
Chairman Lester Randall, Kickapoo Tribe in Kansas
Chairman David Pacheco Jr., Kickapoo Tribe of Oklahoma
Chief John Froman, Peoria Tribe of Indians of Oklahoma
Chairperson Liana Onnen, Prairie Band of Potawatomi Nation
Dr. Andrea Hunter, Osage Nation
Mr. Rex Stitsworth, Individual
Mr. Jason Wesaw, Pokagon Band of Potawatomi Indians
Ms. Sheryl Wes, Individual
Mr. Michael Conner, Individual
Mr. Joshua Francis, Individual
Mr. Jason Kaiser, Individual
Mr. Jim Xates, Individual
Mr. James Todd, Individual
Mr. Hal Job, Individual
Mr. Steve Kitts, Individual

A.7.1.5.2 Seymour Johnson AFB, North Carolina, Draft EIS Distribution List

The Honorable Louis Pate, North Carolina State Senate
The Honorable Jimmy Dixon, North Carolina House of Representatives
The Honorable John Bell IV, North Carolina House of Representatives
The Honorable Larry Bell, North Carolina House of Representatives
The Honorable Pat McCrory, North Carolina Governor
The Honorable Howard Hunter, North Carolina House of Representatives
Mr. John Hammond, U.S. Fish and Wildlife Service
Mr. Michael P. Huerta, U.S. Department of Transportation
Mr. Chris Militscher, U.S. Environmental Protection Agency, Region IV
Ms. Heather McTeer Toney, U.S. Environmental Protection Agency, Region IV
Mr. Gordon Myers, North Carolina Wildlife Resources Commission
Ms. Renee Gledhill-Earley, North Carolina Department of Natural and Cultural Resources
Mr. Donald van der Vaart, North Carolina Department of Environmental Quality
Ms. Crystal Best, North Carolina State Environmental Review Clearinghouse
Ms. Sheila Holman, North Carolina Division of Air Quality
Mr. Braxton Davis, North Carolina Division of Coastal Management
Mr. Bobby Walston, North Carolina Division of Aviation
Secretary Nick Tennyson, North Carolina Department of Transportation
Mr. Gregory Richardson, North Carolina Commission of Indian Affairs

A.7.1.5.2 Seymour Johnson AFB, North Carolina, Draft EIS Distribution List (Continued)

The Honorable Chuck Allen, City of Goldsboro
Mr. George Wood, Wayne County Manager
Ms. Ashley Smith, Wayne County Soil & Water Conservation
Ms. Kate Daniels, Wayne County Chamber of Commerce
Mr. Davin Madden, Environmental Health Department
Mr. Chip Crumpler, Wayne County Planning Department
Mr. James Rowe, City of Goldsboro
Mr. Scott Stevens, City of Goldsboro
Mr. Joe Daughtery, Wayne County Board of Commissioners
Ms. Natasha Francois, Wayne County Public Library
Ms. Kim Webb, Seymour Johnson AFB Library
Mr. Dennis Hill, Goldsboro News-Argus
Mr. Thomas Vick, Goldsboro Daily News
Mr. Jared Brumbaugh, Public Radio East - NPR
Mr. Bruce Ferrell, WPTF - 680 AM
Mr. Rick Gall, WRAL-TV
Ms. Andrea Parquet-Taylor, WNCN-TV
Ms. Michelle Germano, WTVD-TV
Mr. Gregory Ruhl, Wayne Executive Jetport
Mr. BJ Murphy, Individual
Mr. Craig Hill, Individual
Ms. Monique Hicks, Individual
Mr. Richard Barkes, Kinston Regional Jetport
Mr. Greg Thompson, Kinston Department of Public Safety
The Honorable Richard, Burr U.S. Senate
The Honorable Thom, Tillis U.S. Senate
The Honorable G.K. Butterfield, U.S. House of Representatives
The Honorable George Holding, U.S. House of Representatives
Mr. Will Best, Individual
Mr. Allen Pedersen, Individual
Mr. Toney Denton, Curtis Media
Mr. Jimmy O'Neal, Individual
Mr. Archie Moore, Individual
Mr. Bruce Gates, MAC/NCAR
Mr. Philip Kerstetter, University of Mount Olive
Mr. Glenn Barwick, Landvest Development Co.
Mr. Bob Hill, MAC
Mr. Steve Herring, New-Argus
Mr. James Bryn, MAC
Mr. Ben Seegus, MAC
Mr. Wallace Brown, Individual
Mr. Ven Faulk, Shumate-Faulk Funeral Home
Mr. James Galimi, Individual
Mr. Chad Goggins, North Carolina Department of Transportation
Mr. Booker Pullen, North Carolina Department of Environmental Quality
Mr. Gene Aycole, City of Goldsboro

A.7.1.5.2 Seymour Johnson AFB, North Carolina, Draft EIS Distribution List (Continued)

Ms. Sarah Merritt, Arts Council of Wayne Co.
Ms. Shycole Simpson-Corter, City of Goldsboro
Mr. Charles Edwards, NC DOT
Mr. W.W. Albertson, Individual
Mr. James Rowe, City of Goldsboro
Mr. Tyrone Norris, Curtis Media
Ms. Joyce Doughtery, Individual
Mr. Jamie Livengood, Wayne County Schools
Mr. Lonnie C., Watchdogs
Mr. Mark Chenier, Individual
Mr. S. Dillon Wooten, MAC and Wooten Development Co.
Mr. Borden Parker, Individual
Mr. Jeremiah Daniels, NCMAC Wayne County MAC
Ms. Julie Metz, City of Goldsboro
Mr. Scott Stevens, City of Goldsboro
Mr. Rick Summer, MAC and Wooten Development Co.
Mr. Lee Perkins, Individual
Mr. David Sloan, Individual
Mr. George Wood, Wayne County
Mr. Elton Brewington, BM and I
Ms. Viola Figueroa, Citizens w/ concerns
Mr. Tom Dody, Individual
Ms. Kate Daniels, Wayne County Chamber of Commerce
Ms. Anne Hornez, Individual
Mr. Stewart Bryan, Individual
Mr. Charles Perkins, Individual
Mr. Jack Best, Individual
Mr. John Bell, NC GA House of Representative
Ms. Karon Williford, Individual
Ms. Sherry Archibald, City of Goldsboro
Mr. Joe Doughtery, Wayne County
Ms. Betsy Rosemann, City of Goldsboro
Ms. Martha Bryan, DGDC Chamber
Mr. Mark Lesnav, North Carolina Community Federal Credit union (NCCFCU)
Mr. Will Bland, Individual
Mr. Scott LaFevers, LaFevers Dental Team
Mr. Chip Crumpler, Wayne County
Mr. Randy Guthrie, City of Goldsboro
Ms. Julie Daniels, MAC/BB&T
Mr. Thomas Vick Jr., Goldsboro Daily News
Mr. Bob Waller, Individual
Ms. Sandy Korschoh, Individual
Mr. Michael West, Police/City of Goldsboro
Mr. Sebastian Montange, NCDOT
Mr. George Aycock Jr., Wayne County
Mr. Darrel Horne, Individual

A.7.1.5.2 Seymour Johnson AFB, North Carolina, Draft EIS Distribution List (Continued)

Mr. Jim Womble, Individual
Mr. Hal Tanner III, News Argus
Mr. Edward Cromartie, Wayne County Commissioner
Mr. Don Davis, NC Senate
Ms. Sherry Frye, Individual
Ms. David Ham, City Council Member

A.7.1.5.3 Tinker AFB, Oklahoma, Draft EIS Distribution List

Mr. Brian Maughanm, Oklahoma County
Mr. Ken Collins, U.S. Fish and Wildlife Service
Mr. Gary O'Neill, U.S. Department of Agriculture
Mr. John Hendrix, U.S. Fish and Wildlife Services
Mr. Ross Richardson, Federal Emergency Management Association (FEMA)
Ms. Carolyn Schultz, U.S. Army Corps of Engineers, Tulsa District
Mr. Michael Jansky, U.S. Environmental Protection Agency, Region 6
Ms. Julie Cunningham, Oklahoma Water Resource Board
Ms. Bob Anthony, Oklahoma Corporation Commission
Mr. George Geissler, Oklahoma Department of Agriculture, Food and Forestry
Mr. Kevin Grant, U.S. Department of Agriculture
Mr. Richard Hatcher, Oklahoma Department of Wildlife Conservation
Dr. Jeremy Boak, Oklahoma Geological Survey
Mr. Jeff Pearl, Oklahoma Department of Transportation
Ms. Jennifer Wright, Oklahoma Department of Environmental Quality
Ms. Melvena Heisch, State Historic Preservation Office
Mr. Eric Pollard, Association of Central Oklahoma Governments
Ms. Marsha Slaughter, City of Oklahoma City
Mr. Mark VanLandingham, Greater Oklahoma City Chamber of Commerce
Mr. Pete White, City of Oklahoma City
Mr. Patrick Menefee, City of Midwest City
Ms. Monica Cardin, City of Del City
Mr. Erik Brandt, Oklahoma County
Mr. William Janacek, Tinker Restoration Advisory Board
Mr. Andy McDaniels, Oklahoma Wildlife Federation
Mr. Johnson Bridgwater, Sierra Club
Ms. Susie Beasley, Choctaw Public Library
Mr. Ron Curry, EPA Region VI
Mr. Bill Diffin, Audubon Society of Central Oklahoma
The Honorable Mick Cornett, City of Oklahoma City
Ms. Rhonda Smith, EPA Region VI
Ms. Kellie Gilles, Midwest City
Mr. John Johnson, Association of Central Oklahoma Governments (ACOG)
Mr. Eric Wenger, Oklahoma City
The Honorable James Inhofe, U.S. Senate
The Honorable James Lankford, U.S. Senate
The Honorable Thomas Cole, U.S. House of Representatives
The Honorable Jack Fry, Oklahoma State Senate

A.7.1.5.3 Tinker AFB, Oklahoma, Draft EIS Distribution List (Continued)

The Honorable Charlie Joyner, Oklahoma House of Representatives
The Honorable Mary Fallin, Oklahoma Governor
The Honorable Brian Linley Sr., City of Del City
The Honorable Dee Collins, City of Midwest City
Mr. Eddie Streater, Bureau of Indian Affairs
Mr. Dan Deerinwater, Bureau of Indian Affairs
Ms. Kelly Dyer Fry, The Oklahoman
Ms. Natalie Hughes, KFOR-TV
Ms. Rebecca Gaylord, KOCO-TV
Mr. Rob Krier, KWTV-DT
Mr. Adam Pursch, KOKH-TV
Mr. Tom Travis, KTOK
Mr. Jack Taylor, KOKO
Mr. Chris Kennedy, Midwest City Public Library
Mr. David Newyear, Del City Library
Mr. Peter Nardin, Tinker Library
Mr. Mark Kranenburg, Will Rogers World Airport
Ms. Tamara Francis-Fourkiller, THPO (Acting) Caddo Nation of Oklahoma
Chief James Floyd, Principal Chief Muscogee (Creek) Nation
Dr. Andrea Hunter, THPO Osage Nation
Ms. Natalie Harjo, HPO Seminole Nation
President Terri Parton, President Wichita & Affiliated Tribes

A.7.1.5.4 Westover ARB, Massachusetts, Draft EIS Distribution List

Dr. Jeffrey DeCarlo, Massachusetts Department of Transportation Aeronautics Division
Mr. Matthew Beaton, Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs
Mr. Leo Roy, Department of Conservation and Recreation
Mr. Jack Buckley, Massachusetts Division of Fisheries and Wildlife
Mr. Steve Hubbard, Chicopee Memorial State Park
Ms. Emily L. Partyka, Chicopee Public Library
Ms. Judy Kelly, Ludlow Public Library
Mr. Joseph Rodio, South Hadley Public Library
Mr. James Reidy, City of Chicopee-Chicopee City Hall
Mr. Lee Pouliot, City of Chicopee
Mr. Jason Martowski, Town of Ludlow
Mr. Douglas Stefancik, Town of Ludlow
Mr. Domenic Sarno, City of Springfield
Mr. Alex Morse, City of Holyoke
Mr. Christopher Martin, Town of Granby
Mr. Mike Sullivan, Town of South Hadley
The Honorable Charlie Baker, Massachusetts Governor Office
The Honorable Donald F. Humason Jr., Massachusetts State Senate
The Honorable James T. Welch, Massachusetts State Senate
The Honorable Eric P. Lesser, Massachusetts State Senate
The Honorable Stanley C. Rosenberg, Massachusetts State Senate

A.7.1.5.4 Westover ARB, Massachusetts, Draft EIS Distribution List (Continued)

The Honorable John Scibak, Massachusetts House of Representatives
The Honorable Ellen Story Massachusetts House of Representatives
The Honorable Thomas M. Petrolati, Massachusetts House of Representatives
The Honorable Joseph F. Wagner Massachusetts House of Representatives
The Honorable Jose F. Tosado, Massachusetts House of Representatives
Ms. Wendi Weber, United States Fish and Wildlife Service
Mr. Maurice Lourdes, Federal Aviation Administration
Mr. Timothy W. Brennan, Pioneer Valley Planning Commission
Mr. Tim Timmermann, U.S. Environmental Protection Agency, Region 1
Ms. Gina McCarthy, U.S. Environmental Protection Agency New England, Region 1
Ms. Mary T. Walsh, Federal Aviation Administration New England Region
Ms. Eileen Drumm, Moore Chicopee Chamber of Commerce
Mr. Jeffrey Ciuffreda, Affiliated Chambers of Commerce of Greater Springfield, Inc.
Mr. Michael W. Bolton, Westover Metropolitan Airport
Mr. Rick Sullivan, Economic Development Council
Mr. Brian P. Barnes, Westfield-Barnes Airport
Ms. Marie Laflamme, Westover Metropolitan Development Corporation
Ms. Kathy Brown, East Springfield Neighborhood Council
Mr. Gary Clayton, Mass Audubon
Mr. Eric Stiles, New Jersey Audubon Society Headquarters
Mr. Scott Surner, Hampshire Bird Club
Ms. Jaana Cutson, Hitchcock Center for the Environment
Mr. Dave Gallup, Springfield Naturalists' Club
Mr. George Arwady, The Republican
Mr. Michael Gorski, Massachusetts Department of Environmental Protection
Mr. William Galvin, Massachusetts Historical Commission (SHPO)
Mr. Kevin Kennedy, City of Springfield
Mr. Marcos A. Marrero, City of Holyoke
Ms. Cathy Leonard, Town of Granby
Mr. Richard Harris, Town of South Hadley
Mr. William Jebb, City of Chicopee
Mr. Paul Madera, Town of Ludlow
Mr. John Barbieri, City of Springfield
Mr. James M. Neiswanger, City of Holyoke
Mr. Alan Wishart, Town of Granby
Mr. David LaBrie, Town of South Hadley
Ms. Shannon Bliven, East of the River 5
Ms. Kathleen Anderson, City of Holyoke
Mr. Dale Johnson, Town of Granby and South Handley
Mr. Glenn X. Joslyn, City of Chicopee
Mr. Mark Babineau, Town of Ludlow
Mr. Robert Hassett, City of Springfield
Mr. Stephen Riffenburg, City of Holyoke
Mr. Russell Anderson, Town of Granby
Ms. Sharon Hart, Town of South Hadley
Mr. Michael Ashe Jr., Hampden County

A.7.1.5.4 Westover ARB, Massachusetts, Draft EIS Distribution List (Continued)

Ms. Laura Gentile, Hampden County
Mr. Kevin Walsh, Massachusetts Department of Transportation
Ms. Deirdre Buckley, Executive Office of Energy and Environmental Affairs (EEA)
Ms. Cecelia Roy, Individual
The Honorable Richard Neal, U.S. House of Representatives
The Honorable James T. McGovern, U.S. House of Representatives
The Honorable Elizabeth Warren, U.S. Senate
The Honorable Edward Markey, U.S. Senate
Ms. Patty Coleman, Individual
Mr. Jack Valley, Individual
Mr. Jack Ryan, Individual
Mr. Harry Pray, Individual
Mr. Arnold Craven, Individual
Mr. Ken Kula, Individual
Mr. Henry Dumas, Individual
Ms. Nancy Derby, Individual
Mr. Alan Small, Individual
Mr. Bud Shuback, Galaxy Community Council
Mr. Richard Dobrowski, Individual
Mr. Stan Walczak, City Council
Mr. Neil Noble, Individual
Mr. Frank Koler, Individual
Mr. Craig Boyer Individual
Mr. Mike Bolton, Individual
Mr. Leonard Carrineau, Individual
Mr. Don Ferrell, Individual
Ms. Deborah Willette, Individual
Mr. Robert Wilfred, Individual
Mr. Paul Gillis, Individual
Ms. Carol Bachand, Individual
Mr. Robert Crorfeger, Individual
Mr. James Patnaude, Individual
Mr. Kevin Chafee, City of Springfield
Mr. Roger Korell, Individual
Mr. Robert Lolilee, Individual
Mr. Richard Marek, Individual
Ms. Cheryl Walker, Individual
Mr. Richard Gagne, Individual
Mr. P. Beregeron, Individual
Chairman Rodney Butler, Mashantucket Pequot Tribal Nation
Chief Silent Drum Lopez, Mashpee Wampanoag Tribe
Chief Thomas Sachem, Narragansett Indian Tribe of Rhode Island
President Shannon Holsey, Stockbridge-Munsee Band of Mohican Tribe
Chief Ryan Malonson, Wampanoag Tribe of Gay Head

A.7.2 Draft Environmental Impact Statement Comments, Public Hearing Sign-in Sheets, and Transcripts

A.7.2.1 Draft Environmental Impact Statement Comment Directory

All Draft EIS comments, including both written correspondence and verbal comments, were carefully evaluated, considered, and assigned unique comment numbers. The comment numbers are organized using the alpha-numeric system shown in Table A-3. A number was assigned to every comment received. The first character of the comment number is the first letter of the applicable base (e.g., the letter “G” signifies a comment applicable to Grissom ARB). In some cases, the letter “A” indicates a comment applicable to all four bases. The second set of characters in the numbering system is the running number of each comment. The third letter of the numbering system denotes the affiliation of the commenter (i.e., agency, organization, individual or tribe).

All of the comments are included in Volume II, Appendix A, Section A.7.

Table A-3. Draft EIS Comment Numbering System Legend

1. By Base		2. Comment Number	3. Commenter[a]	
A	All 4 bases	**01, 02, 03, 04, etc.**	**A**	Agency
G	Grissom		**O**	Organization
S	Seymour Johnson		**I**	Individual
T	Tinker		**T**	Tribe
W	Westover			

[a] Comments received from elected officials were recorded as organization comments.

Two examples of how the comment numbers were assigned are shown below.

Examples:

G01_A = Grissom ARB, comment #1, comment from an agency.

T04_I = Tinker AFB, comment #4, comment from an individual.

A.7.2.2 Draft Environmental Impact Statement Comment Review

The USAF appreciates submission of all comments. The fact that a change in the proposed actions or the EIS analysis did not occur as a result of a comment does not reduce the value of the comment or an individual’s participation in the Environmental Impact Analysis Process (EIAP). Public and agency involvement is an important part of the National Environmental Policy Act (NEPA) process, and all comments were considered by the USAF during its decision-making process.

Many comment authors expressed personal opinions, histories, or experiences which are not appropriately addressed as part of the NEPA process. Such comments do not require a specific USAF response, but are included as part of the public input. In accordance with 40 *Code of Federal Regulations (CFR)* 1503.4, the USAF carefully considered all comments received during the Draft EIS public review period. The USAF determined none of the comments to be substantive; therefore, no specific USAF responses were developed and no changes to the Draft EIS were necessary.

A.7.2.2.1 Locating Comments

A directory of commenters (Table A-4) appears on page A.7-18. As noted on the public displays, sign-in sheets, and comment sheets at the public hearings, providing names during the public review process meant that each commenter understood that his/her name and comment would be made a part of the public record for this EIS. Table A-4 provides an alphabetical listing of commenters, organized first by the name of the organization (or “Private Citizen”), then by last name, followed by the unique number assigned to each comment submittal.

Table A-4. Directory of Commenters

Organization (Agency, Private Citizen, etc.)	Commenter Name	Comment Number
Chairman, Friends of Seymour Johnson AFB	Edmundson, Jimmie	S12_O
Chairman, North Carolina Military Affairs Commission	Martin, Mabry (Bud)	S09_O
Chairman, Wayne County Board of Commissioners	Pate, Bill	S13_O
City of Goldsboro Housing Authority	Goodson, Anthony	S17_O
Mayor, City of Goldsboro	Allen, Lawrence (Chuck)	S14_O
Mayor, City of Logansport	Kitchell, Dave	G07_O
North Carolina Department of Military and Veterans' Affairs	Wilson Jr., Cornell	S08_O
Governor, State of North Carolina	McCrory, Pat	S02_O
Military Affairs Committee	Hill, Robert	S05_O
Military Affairs Committee	Smith, Henry	S11_O
Military Affairs Committee	Albertson, W.W.	S03_I
Private Citizen	Bachand, Vincent and Carol	W01_I
Private Citizen	Burpee, Richard	T01_I
Private Citizen	Dobrowski, Richard	W03_I
Grissom Community Council	Faulkner, Frank	G01_I
Private Citizen	Forsythe, Bob	S07_I
Private Citizen	Goldschlager, Glen	T02_I
Cass County Economic Development Authority	Householder, Christy	G02_I
Private Citizen	Jinnette, Henry	S16_I
Private Citizen	Kotkoski, William	G06_I
Private Citizen	McGrath, Doug	S04_I
Private Citizen	Moran, John	W04_I
Cass County Commissioner	Sailors, James	G03_I
Private Citizen	The Bachand Family	W02_I
Executive Director, Miami County Economic Development Authority	Tidd, Jim	G04_I, G08_I
Private Citizen	Walker, James	G05_I
Military Affairs Committee and Wooten Development Co.	Wooten, S. Dillon	S06_I
Staffer, U.S. Senator Richard Burr	Bradbury, Janet	S15_O
U.S. Department of the Interior	Stanley, Joyce	A02_A
U.S. Environmental Protection Agency	Farmer, G. Alan	A01_A
President, Wayne County Chamber of Commerce	Daniels, Kate	S10_O
Member-Elect of Congress	Budd, Ted	S01_O
Member of Congress	Adams, Alma	
Member of Congress	Butterflied, G.K.	
Member of Congress	Foxx, Virginia	
Member of Congress	Holding, George	
Member of Congress	Hudson, Richard	
Member of Congress	Jones, Walter	
Member of Congress	McHenry, Patrick	
Member of Congress	Meadows, Mark	
Member of Congress	Pittenger, Robert	
Member of Congress	Price, David	
Member of Congress	Rouzer, David	
Member of Congress	Walker, Mark	
U.S. Senator	Burr, Richard	
U.S. Senator	Tillis, Thom	

A.7.2.3 All Bases – Draft EIS Comments

A01_A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

DEC 19 2016

Mr. Hamid Kamalpour
U.S Air Force
AFCEC CZN
2261 Hughes Ave., Ste.155
JBSA Lackland AFB, TX 78236-9853

Re: EPA's Comments on the Draft Environmental Impact Statement (DEIS) for the proposed KC-46A Third Main Operating Base (MOB 3) Beddown: Westover ARB, MA; Grissom ARB, IN; Seymour Johnson AFB, NC and Tinker AFB, OK. ERP UAF-E1107800; CEQ No. 20160269

Dear Mr. Hamid Kamalpour:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed KC-46A Third Main Operating Base (MOB 3) Beddown: Westover ARB, MA; Grissom ARB, In; Seymour Johnson AFB, NC; and Tinker AFB, OK.

As background information, the U.S. Congress authorized and appropriated funds supporting the U.S. Air Force's (USAF's) selection of the KC-46A as the newest aerial refueling aircraft to replace a portion of the aging tanker fleet (H.R. 933, the Consolidated and Further Continuing Appropriations Act, 2013, H.R. 3304 - National Defense Authorization Act for Fiscal Year 2014, H.R. 4435 - Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, H.R. 1735 National Defense Authorization Act For Fiscal Year 2016). Beginning in 2010, the deployment of new USAF aircraft and missions must follow Air Force Instruction (AFI) 10-503, "Strategic Basing". Per AFI 10-503, the USAF must perform an enterprise-wide evaluation of Air Force Bases (AFBs) that could be considered as basing locations for the KC-46A. An initial Beddown of a Formal Training Unit (FTU) and the First Main Operating Base (MOB 1) occurred at Altus AFB, Oklahoma, and McConnell AFB, Kansas, respectively. The units were led by active duty personnel. Additionally, a Second Main Operating Base (MOB 2) Beddown, led by the Air National Guard (ANG), occurred at Pease Air National Guard Station, New Hampshire.

The EPA recognizes that the USAF has identified and evaluated four alternative bases for the proposed MOB 3 mission: Grissom Air Reserve Base (ARB), Indiana; Seymour Johnson Air Force Base (AFB), North Carolina; Tinker AFB, Oklahoma; and Westover ARB, Massachusetts. The EPA has reviewed the potential environmental impacts resulting from the KC-46A MOB 3 Beddown. Based on our review of the information provided in the DEIS, it appears that you have addressed the EPA's primary concerns that we generally focus on for these types of proposed actions, such as

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media areas that significantly adversely impact human health and the environment. However, any alternative selected should closely monitor and mitigate noise levels greater than 65 decibels (dB) and the community should be made aware of any procedures to follow for noise complaints. The EPA acknowledges that USAF prefers Seymour Johnson AFB as its preferred alternative. This proposed KC-46A MOB 3 mission would replace 16 KC-135 aircraft with 12 KC-46A aircraft. This proposed MOB 3 mission would also potentially result in an increase of 1,746 annual airfield operations, or an approximate 3 percent increase in overall annual airfield operations at Seymour Johnson AFB. The EPA acknowledges the use of best management practices (BMPs) referenced in this DEIS for the management of hazardous materials, underground storage tanks (USTs), toxic substances and the commitment to minimize and reduce vehicle emission during construction.

In summary, the EPA has no immediate environmental concerns regarding the overall scope this project has proposed, and has rated the DEIS as EC-1 (Environmental Concerns) with sufficient information provided. The EPA requests that the USAF continue to seek measures to avoid and minimize potential environmental impacts (i.e., Noise) in order to fully protect the environment and any nearby communities. Please provide the EPA with a copy of the Final EIS and a copy of the Record of Decision (ROD) when they become available.

We recommend that the USAF continue to keep the affected communities informed on the status of the Third Main Operating Base (MOB 3) KC-46A Beddown EIS process. We appreciate your coordination with us. If you have any questions, please contact Larry Gissentanna, of my staff, at 404-562-8248 or by e-mail at gissentanna.larry@epa.gov.

Sincerely,

G. Alan Farmer
Director
Resource Conservation and Restoration Division

A.7.2.3 All Bases – Draft EIS Comments (Continued)

A02_A

United States Department of the Interior

TAKE PRIDE® IN AMERICA

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Ted Turner Drive, S.W., Suite 1144
Atlanta, Georgia 30303

ER 16/0664
9043.1

December 30, 2016

Mr. Hamid Kamalpour
USAF, AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

Re: Comments and Recommendations on the Draft Environmental Impact Statement (EIS) for the KC-46A Pegasus Third Main Operating Base (MOB 3) Beddown by the United States Air Force

Dear Mr. Kamalpour:

The United States Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (EIS) for the KC-46A Pegasus Third Main Operating Base (MOB 3) Beddown by the United States Air Force. We have no comments at this time.

Thank you for the opportunity to provide comments. I can be reached at (404)331-4524 or via email at joyce_stanley@ios.doi.gov.

Sincerely,

J Stanley

Joyce Stanley, MPA
Regional Environmental Officer

cc: Christine Willis – FWS
Michael Norris – USGS
Anita Barnett – NPS
Chester McGhee – BIA
Alison McCartney – BLM
OEPC - WASH

A.7.2.4 Grissom ARB Draft EIS Comments

Verbal comments recorded by the court reporter are contained in the public hearing transcript in Section A.7.2.6.

G01_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: GRISSOM AEROPLEX DATE: 12/08/2016

I CURRENTLY SERVE WITH THE LEADERSHIP OF THE GRISSOM COMMUNITY COUNCIL (GCC). GRISSOM ARB & THE 434th AIR REFUELING WING HAS A LONG AND DISTINGUISHED HISTORY OF EXCELLENCE AS AN AIR REFUELING WING - WITH KC-135 AIR CRAFT.

AS A MEMBER OF THE GRISSOM COMMUNITY COUNCIL, I BELIEVE GRISSOM ARB IS A MOST EXCELLENT CHOICE AS A BED DOWN LOCATION FOR THE KC-46 "PEGASUS" REFUELING AIRCRAFT.

**** CONTINUE ON BACK FOR MORE SPACE **** Frank R Faulkner

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: FRANK R. FAULKNER

Organization: [redacted]

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

G02_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: Grissom DATE: 12/8/16

I am in support of the KC-46A beddown at Grissom. You will not find better communities that will support this location in the US. We value Grissom and what it brings to our communities. The economic impact would be very significant in these communities.

Cass Co. has completed a zoning & planning ordinance for the west side of Grissom.

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: Christy Householder.

Organization: [redacted]

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

A.7.2.4 Grissom ARB Draft EIS Comments (Continued)

G03_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: GRISSOM

DATE: 12-8-2016

THIS BASE IS + HAS BEEN A VALUABLE ASSET TO OUR COMMUNITIES. WE ENCOURAGE THE DICISION MAKERS TO GIVE US A VERY GOOD LOOK TO MAKE GRISSOM A K46 BASE. THE BASE WORES WELL WITH US AND WE WORK FOR THE BASE. THANK YOU

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: JAMES L. SAILORS

Organization: [redacted]

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

G04_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: Grissom ARB

DATE: 12/8/16

The regional community + the State totally support the selection of Grissom as the location for the KC-46 A Beddown.

The community is prepared to support the additional military presence + expansion. Based on the environmental study results Grissom offers less impact than other choices both in the short + long term. No residential development or encroachment issues

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: Jim Tidd

Organization: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

A.7.2.4 Grissom ARB Draft EIS Comments (Continued)

G05_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: Grissom ARB DATE: 12-8-16

I AM IN FULL SUPPORT OF THE KC 46A BED DOWN BEING LOCATED AT GRISSOM AIR RESERVE BASE.
AS A FORMER MAYOR OF PERU I KNOW THAT OUR ENTIRE COMMUNITY UNDERSTANDS THE VALUE OF THIS PROJECT AND WILL SUPPORT IT AS WELL.
FURTHERMORE, OUR COMMUNITY HAS ALWAYS EMBRACED THE MILITARY PERSONNEL AT GRISSOM.
THIS BASE WILL BE AN EXCELLENT CHOICE FOR THE KC46As.

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: JAMES R. WALKER

Organization: [redacted]

Address:

City/State/Zip:

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

G06_I

KC-46A MOB 3 Draft EIS Website Comment
Date Comment Received: 12/13/16
Subject: Grissom ARB

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<Start Comment Text>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

Talk about impact of GAFB: I met my wife after being stationed here; 45 years ago. I spent time at Grissom in active duty, the reserves, and civil service until the base was decommissioned from being active. I cemented some long relationships through being stationed here. Both of my sons have developed a love of aircraft because of the base. The planes very often fly over my home and were greatly missed, immediately after 9/11. The base has to be important. Why else would the president's " back-up" plane have been placed here when Grissom was active? How many times have planes been flown in from east coast bases for safety ,during tornadoes? How many Colonels were stationed here and became generals because of the importance of their/Grissom's mission? Ted Williams received training here. The record-holding B-58s were based here. Barbara Bush visited Grissom. A Russian plane stopped at Grissom on a humanitarian mission to pick up supplies years ago because of Grissom's long runway. If it were ever needed, the Space Shuttle could have landed there in an emergency. Grissom is needed in the community. The new KC-46Aa would ensure that for years to come

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<End Comment Text>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

A.7.2.5 Grissom ARB Public Hearing Sign-In List

Sign-In List Attendee Name	Organization (Agency, Private Citizen, etc.)
Brugh, Mercedes	City of Logansport
Cahoon, William T.	Grissom Regional Defense Alliance
Foye, Marty	Grissom ARB, CIV
Faulkner, Frank	Grissom Community Council
Gornto, William	Bunker Hill and Miami County Zoning
Householder, Christy	Cass County Economic Development Authority
Kitchell, Dave	Mayor, City of Logansport
Kotkoski, William	Private Citizen
Lombardi, Anthony	*Peru Tribune*
Robertson, Brooke	Miami County Economic Development Authority
Sailors, James	Cass County Commissioner
Santos, Jennifer	North Carolina Infrastructure and Research Policy Committee
Shearer, Dave	Grissom Community Council
Tidd, Jim	Executive Director, Miami County Economic Development Authority
Walker, James	Private Citizen
Yates, Jim	Miami County Economic Development Authority

A.7.2.6 Grissom ARB Public Hearing Transcript

(Transcript contained on the following pages.)

ORIGINAL

IN THE MATTER OF THE DRAFT

ENVIRONMENTAL IMPACT STATEMENT FOR THE KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN

TRANSCRIPT OF PROCEEDINGS AT PUBLIC HEARING

The following public hearing and proceedings were held in the matter of the Draft Environmental Impact Statement for the KC-46A Third Main Operating Base (MOB 3) Beddown on **Wednesday, December 8, 2016,** at the Milestone Event Center, 1458 Liberator Road, Peru, Indiana, 46970.

APPEARANCES

HEARING OFFICER/JUDGE —

COLONEL JOE MOORE
209 Gardenville Drive
Yorktown, VA 23693

FOR THE AIR FORCE RESERVE COMMAND —

LIEUTENANT COLONEL JAMES VINUP, AFRC/A8M
155 Richard Ray Boulevard
Robins AFB, GA 31098

FOR THE AIR FORCE NEPA DIVISION —

HAMID KAMALPOUR, P.E.
Project Manager
AF NEPA Division
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

COMMENTS FROM THE PUBLIC —

MAYOR DAVE KITCHELL
601 E. Broadway
Logansport, IN 46947

EXECUTIVE DIRECTOR JIM TIDD
Miami County Economic Development Authority
1525 West Hoosier Boulevard
Peru, IN 46970

INDEX OF TRANSCRIPT

♦ KEY TO PUNCTUATION & PHRASES ♦

--	interruptions, change of thought, parenthetical asides
...	speech trailing off
[indicating]	using a gesture to indicate something
[*sic*]	transcribed exactly as said

[THE FOLLOWING PROCEEDINGS WERE HELD BEFORE HEARING OFFICER COLONEL JOE MOORE AT A PUBLIC HEARING IN THE MATTER OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KC-46A THIRD MAN OPERATING BASE (MOB 3) BEDDOWN AT THE MILESTONE EVENT CENTER, 1458 LIBERATOR ROAD, PERU, INDIANA, 46970, ON WEDNESDAY, DECEMBER 8, 2016, COMMENCING AT 5:34 P.M., TO-WIT:]

HEARING OFFICER MOORE: The time is now five thirty-four. So we'll begin the hearing. I'd like to thank you for attending. This public hearing is for the Draft Environmental Impact Statement or Draft EIS for the proposed Third Main Operating Base Beddown of the KC-46A tanker aircraft, hereinafter referred to as MOB 3.

I am Colonel Joe Moore, and I will be your hearing officer tonight. I am an Air Force Judge and will be acting as the moderator this evening. As the moderator, my role is to ensure that the Air Force provides a fair, orderly, and impartial hearing where you have an opportunity to make comments about the proposal. I do not work for anyone at the Air Force Reserve Command, the Air Force Civil Engineer Center, the Air Mobility Command, or any of the Air Force bases under consideration for the proposed action. I am not involved in any way with the development of this Draft Environmental Impact Statement, which we'll hereinafter refer to as the EIS, and I do not act as a legal advisor to the Air Force representatives working on this proposal.

This hearing is held in accordance with the provisions of the National Environmental Policy Act or NEPA as implemented by the Council on

4

Environmental Quality Regulations and the Air Force instructions. We are here tonight to present information on the environmental impacts of the proposed KC-46A MOB 3 Beddown and to receive your comments on the draft EIS. Tonight's hearing is one of several opportunities for public comments. This hearing is an opportunity for you to express your views and concerns about the adequacy of the environmental analysis contained in the Draft EIS, as well as any issues related to the NEPA process.

This hearing is not a debate or a vote on the Draft EIS and is not a question-and-answer session. We welcome your input on the environmental analysis presented in the Draft EIS. Comments about other unrelated issues can certainly be made, but they will not assist in the decision-making process for the Draft EIS.

I would like to begin this hearing by introducing the NEPA team beginning with the team leader, Lieutenant Colonel Vinup, with the Air Force Reserve Command, immediately to my left, who will present details of the proposed action and alternatives. Next to far left is Mr. Hamid Kamalpour, the EIS Project Manager at the Air Force NEPA Division, who will discuss results of the NEPA process. Representatives from Grissom Air Reserve Base, led by Colonel Larry Shaw, are also present. Although not a part of the analysis, they have provided detailed Base information which is critical to a thorough analysis of impacts in this Draft EIS.

Lastly, representatives from Leidos are here supporting the Air Force as the contractor. Transcribing tonight's hearing is Miss Gail Armstrong. I would also like to recognize the following individuals present this evening: Mayor Dave Kitchell, the Mayor of Logansport, Indiana.

Lieutenant Colonel Vinup will first present information on the proposed action and the alternatives. Then Mr. Kamalpour will provide an overview of the NEPA process and will summarize the potential environmental consequences of the proposal.

After their presentations, which should take about twenty minutes, we, we will begin our oral comment period during which you can provide input on the proposed action, Draft EIS analysis, and potential environmental impacts. Your comments will become part of the official record of the final EIS. Please note that informal discussions at our informational displays will not become part of the EIS record. So if you have items of concern about the analysis in the Draft EIS you would like to bring to our attention, please do so during our formal comment opportunity or in writing.

If you do not choose to make an oral statement, you can submit written comments either by turning in a comment form this evening or by mailing it to the address shown on the screen. Comments may also be submitted online at www.kc-46a-beddown.com.

If you have not had a chance to review the Draft EIS, it is available on the website or at one of the public libraries listed here. The Air Force welcomes public comments in writing at any time during the environmental impact analysis process. To receive timely consideration for the final EIS, please submit your comments by January 3rd, 2017. Your comments will provide the decision-maker, in this case the Secretary of the Air Force, with information to assist in making a decision regarding where the MOB 3 will be located. Your comments during this process provide the benefit of your knowledge of the local area and your concerns about the environmental,

environmental impacts or analysis.

We will now move into the briefing. During the briefing, our speakers will be reading from prepared scripts. The briefing is written to make certain each speaker covers all pertinent information and that it is consistent for all four hearings. With that, I will turn the microphone over to Lieutenant, Lieutenant Colonel Vinup from the Air Force Reserve Command.

LIEUTENANT COLONEL VINUP: Good evening and welcome. I'm Lieutenant Colonel Vinup, representing Air Force Reserve Command, a previous KC-10 pilot and T-1 pilot serving on the staff and the A-8 Director of Air Force Reserve Command. Welcome to this evening's meeting. As a team leader, I encourage you to assist the Air Force in meeting its requirements to comply with the NEPA process.

Your attendance tonight indicates your interest in the proposed action, and I hope your comments will provide us with additional information or areas where further analysis is needed. All comments will be properly reviewed, analyzed, and addressed in the final EIS. The purpose of the proposed action involves the KC-46A's role in the Air Force tanker fleet modern, modernization effort.

The goal of this effort is to ensure future tankers are the best available to support a high-threat, multiwar, multirole war-fighting capability to commanders worldwide. To perform this mission, trained aircrews, maintenance, and support personnel must be available to meet KC-46A inventory delivery dates as older tanker aircraft are removed from the inventory.

While we will continue to operate the legacy tanker fleet of aircraft, the KC-46A provides several advantages including: ability to refuel any certified, fixed-wing aircraft on any mission and the ability to complete a mobility mission while at the same time conduct a refueling mission which is also known as a force multiplier; the capability of refueling multiple aircraft at once; the increased airlift capability and the capability to refuel in flight and that is to receive fuel in flight. It also has improved force protection and survivability.

The Air Force is proposing to establish the Third Main Operating Base for the KC-46A aircraft along with required infrastructure and manpower at one Air Force installation in the continental United States where the Air Force Reserve Command leads a Mobility Air Force mission. The Third Main Operating Base would utilize pilots, copilots, boom operators, and other support staff who operate and maintain the aircraft to provide worldwide refueling, cargo, or aeromedical evacuation support.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. Implementation of the MOB 3 mission would increase area populations and would result in an overall increase in total annual aircraft operations at Seymour Johnson Air Force Base, Tinker Air Force Base, and Westover Air Reserve Base and a decrease in total annual aircraft operations at Grissom Air Reserve Base.

At each Base, KC-46A aircrews would utilize existing aircraft flight tracks, air refueling tracks, and fuel jettison areas, if necessary. The no-action alternative is required by the National Environmental Policy Act and was evaluated at each proposed beddown location to provide a baseline for the decision-maker. The no-action alternative evaluates the environmental consequences of not basing the KC-46A aircraft at any Base.

In the Draft EIS, the Air Force analyzed the environmental consequences of basing the MOB 3 mission at Grissom Air Reserve Base in Indiana, Seymour Johnson Air Force Base in North Carolina, Tinker Air Force Base in Oklahoma or Westover Air Reserve Base in Massachusetts. In October of 2015, the Secretary of the Air Force announced Seymour Johnson Air Force Base as the preferred alternative for the KC-46A MOB 3 mission. Grissom Air Reserve Base, Tinker Air Force Base, and Westover Air Reserve Base were announced as reasonable alternatives for the MOB 3 mission.

This table summarizes the Bases being considered and how the existing missions could be impacted. The following slides summarize the aircraft facilities and manpower changes anticipated to be required to support the KC-46A MOB 3 mission. Grissom Air Reserve Base has been identified as a reasonable alternative for the MOB 3 mission. If Grissom is selected to host the MOB 3 mission, the existing sixteen KC-135 aircraft would be replaced with twelve KC-46A aircraft.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately five hundred and thirty people including estimate dependents and would result in a nine percent decrease in annual aircraft operations.

Seymour Johnson Air Force Base has been identified as the preferred alternative for the MOB 3 mission. If Seymour Johnson is selected to host the MOB 3 mission, the sixteen existing KC-135 aircraft would be replaced with twelve KC-46A aircraft. The F-15E mission would continue with no change. Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction and renovation. This mission would increase the area population by approximately one hundred people including estimated dependents and would result in a three percent increase in annual aircraft operations.

KC-46A aircrews associated with the MOB 3 mission at Seymour Johnson Air Force Base would also continue to use the Kinston Regional Jetport as an auxiliary airfield. The Kinston Regional Jetport is currently being used by KC-135 aircrews. If Tinker Air Force Base is selected to host the MOB 3 mission, the existing eight KC-135 aircraft would be replaced by twelve KC-46A aircraft. Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately seven hundred and sixty-nine people including estimated dependents and would result in an approximate thirteen percent increase in annual aircraft operations.

If Westover is selected to host the MOB 3 mission, the KC-46A MOB 3 would be a new mission, and the existing C-5 mission would remain in place. Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately one thousand and forty people including estimated dependents and would result in an approximate one, an approximate forty-one percent increase in annual aircraft operations.

We would like to emphasize that, although the preferred alternative for the MOB 3 mission has been announced, no final decision has been made on basing the KC-46A MOB 3 mission currently under analysis in the Draft EIS. We look forward to inputs provided from the public and the affected communities as we proceed through the environmental impact analysis.

Once the requirements of the environmental impact analysis process are complete, the Air Force will make its final basing decision. Thank you for your attention. I will now turn the presentation over to Mr. Hamid Kamalpour, the Air Force Project Manager for the EIS, to discuss the NEPA process and provide greater detail on potential impacts as described in the Draft Environmental Impact Statement.

MR. KAMALPOUR: Good, good evening. I am Hamid Kamalpour, the Air Force NEPA Division Project Manager for the analysis of this proposed action. I am here tonight to discuss the results of the environmental impact analysis for the proposal presented by Lieutenant Colonel Vinup. The Draft EIS has been prepared in accordance with the requirements of NEPA, which is the National Environmental Policy Act law, which requires Federal agencies to analyze the potential environmental consequences of a proposed action and reasonable alternatives, including a no-action alternative, before any action is taken.

The goal of conducting an EIS is to support sound decisions throughout the assessment of potential environmental consequences as well as involving the public in the process. The results of this analysis and other relevant factors will be considered before a decision is made by the Air Force on this proposal. Your input during the past scoping period and the public comments period will help the Secretary of the Air Force to make the most informed decision possible on this proposal.

As you can see on this slide, there are several key steps to the environmental impact analysis process. We are currently at the public and agency Draft EIS review stage. This period began with Federal Register publication of the notice of availability for the Draft EIS. At that time, copies of the Draft EIS were mailed to local libraries, State and Federal representatives, and individuals who requested copies during the EIS scoping period.

The normal review period required by NEPA is forty-five days. The Draft EIS public comment period will be, will end on January 2, 2017. The public hearings are being held in the same communities as the previous scoping meetings in order to provide the affected communities with the opportunity to comment on the Draft EIS. All substantive comments received prior to the close of the public comment period will be considered during preparation of the final EIS. The Air Force responds to substantive comments on a Draft EIS in the final EIS.

The final EIS is, is scheduled to be released in May, 2017. After the final EIS notice of availability is published in the Federal Register, the Air Force must observe a waiting period of at least thirty days before signing the final Record of Decision or ROD to document which alternative the Air Force selects for implementation.

The draft EIS presented, presents information on potential environmental consequences associated with implementing the MOB 3 mission at each of the four Bases. The potential environmental consequences are grouped into the five categories shown on this, this slide and the subcategories represent the eleven resource, resource areas evaluated at each Bases. The next set of slides describes the potential environmental consequences at each of the four Bases. For the purposes of this presentation, the potential environmental consequences at each Base have been summarized in broad terms. For a more detailed evaluation of the potential consequences, please refer to Chapter four of the Draft EIS.

Implementation of the MOB 3 mission at Grissom would result in a decrease of twenty-one acres of land exposed to sixty-five decibels or greater noise levels, and no off-base residents would be exposed to, to these noise levels. As shown on the, the noise contour map, nearly all of the land exposed to the noise is located to the north and south of the runway. No other resource areas are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission would add up to five hundred and thirty full-time military staff and dependents to this area resulting in a point seven percent increase in area populations. A variety, a variety of demolition, construction, and renovation projects would be required for the MOB 3 mission resulting in positive economic impacts to the, to Cass, Cass and, Cass and Miami Counties and surrounding areas.

Implementation of the MOB 3 mission at Seymour Johnson Air Force Base would expose an additional one acre of off-base land and an estimated one additional off-base resident to noise levels of sixty-five decibels or greater over baseline conditions. The implementation of the MOB 3 mission would add up to a hundred full-time military staff and dependents to Wayne County resulting in a point, point zero-eight percent increase in the Wayne County population. No other resources, no other resource areas are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission at Tinker Air Force Base would expose an additional seven acres of off-base land and an estimated six off-base residents to the noise levels sixty-five decibels or greater. Implementation of the MOB 3 mission would add up to seven hundred and sixty-nine full-time military staff and dependents to Oklahoma County resulting in a point one percent increase in the county population. As part of the MOB 3 mission, the five hundred and seven Air Reserve wing aircraft parking ramp requires expansion which would impact a jurisdictional water and flood plains.

A nationwide wetland permit would be obtained for the impacts to the jurisdictional water and a finding of practical [*sic*] alternative would be prepared for impact to the flood plain. To minimize potential flood plain impacts, construction decision would incorporate measures for construction in the flood plain. In addition, the Air Force prepared a biological evaluation to evaluate the potential for additional impacts to threatened and endangered species resulting from the less than thirteen percent increase in aircraft operations.

As a result of the biological evaluation, the Air Force determined that implementation of the KC-46A MOB 3 mission at Tinker Air Force Base may affect but is not likely to adversely affect the interior least tern, the whooping crane, and the piping plover, and the red knot. To minimize further impacts to birds, Tinker Air Force Base will continue to contract with the U.S.D.A. to provide daily wildlife control services to prevent birds from using the installation, manage vegetation on the installation to discourage bird use, and during times of high bird activities, if possible, aircraft pattern altitudes and directions will be modified to avoid bird concentrations.

Lastly, the Oklahoma archaeological survey has required, requested that an archaeological field inspection of the construction area be conducted prior to commencing construction. No other consequences are anticipated to result from implementation of the MOB 3 mission at Tinker Air Force Base.

The C, the C, the C-5 is the dominant noise source at Westover Air Reserve Base, and the independence planned conversion of C, C dash, C dash 5B to quieter C dash 5M aircraft, coinciding with the proposed MOB 3 beddown in 2019, would result in a three hundred and ninety-six-acre decrease in off-land, off-base land and a decrease of an estimated thirty-eight off-base residents exposed to the noise level of sixty-five decibels or greater.

Implementation of the MOB 3 mission at Westover Air Reserve Base would result in adverse effects to historic properties. Hangar 7071 and Building 2426 are contributing resources within the Westover Air Reserve Base historic district. Both of these structures would be demolished to make room for the new KC-46A hangar. As mitigation for these impacts, the Air Force has proposed historical recommendation of these buildings and mapping of the current and former boundaries of the installation as well as inviting the Massachusetts Historical Commission to participate in the design review process for new construction should the MOB 3 mission be implemented at Westover Air Reserve Base.

The, the Massachusetts Historical Commission concurred, the Massachusetts Historical Commission concurred with the proposed mitigation measures on August 26, 2016. No other consequences are anticipated for the MOB 3 mission at Westover Air Reserve Base. That, that concluded, that concludes the environmental consequences' portion of our briefing. I will now turn the microphone over to our hearing officer.

HEARING OFFICER MOORE: Thank you. We will now move into the oral comment part of our hearing. For those wishing to speak, here's the format. Please fill out a white speaker form. If you did not get one of these and want to speak, please raise your hand and one of the staff will give you a form. What we'll do is we'll take a ten-minute recess at this point. We'll gather up the comment cards and once we've done that, we will resume with the public comment period. So we -- the hearing will be in recess for ten minutes at this point.

[A RECESS IS TAKEN FROM 5:59 P.M. TO 6:11 P.M. AFTER WHICH TIME THE COURT REPORTER IS INSTRUCTED TO RECOMMENCE THE RECORD AS FOLLOWS:]

HEARING OFFICER MOORE: Make your way back to your seats. All right, the hearing is, the hearing is called back to order. When I call your name, you may approach the microphone here. To help our stenographer, please begin by stating your name and the name of the organization, if any, that you represent. It will also help if you spell your last name. Please do not provide any other personal information such as your home address or phone number. Again, your comments are recorded verbatim. They will be used to develop a transcript and permanent record of this hearing and will be published in the final EIS.

Your name will be included along with your comments. Personal home addresses and phone numbers will not be published in the final EIS. Each speaker will have three minutes to provide his or her oral comments on the proposed action and alternatives. We have a timekeeper to help keep track of the time. This person will hold up a yellow card when you have about thirty seconds left and a red card when your time is up. At that time, please conclude your comments so I can call on the next person.

Of course, there's no obligation to use the entire three minutes. You do not need to yield any remaining time to someone else. I will just move on to the next speaker when you've finished. Also, in the interest of time, we ask that you submit any individual electronic presentations as written comments. Tonight's hearing is set to end at eight p.m. If everyone who has signed up to speak has had a chance to do so before that time, I will ask if any speaker would like another three minutes to expand on your comments.

If you want to do that, just let me know and we'll put another three minutes back on the clock for you. If you want to add something later to your oral comments or if you would rather not speak here tonight, you can submit written comments. There is no page limit on written comments, and the Air Force gives equal weight to oral and written comments. Both become part of the official record and are included in the final EIS.

Just a few reminders before we get started. First, please limit your comments to the analysis in the Draft EIS. That is the purpose of this public comment period. As I mentioned earlier, this is not a Q-and-A session. It is an opportunity for you to put on the record your views and concerns about the proposal that you want the decision makers to consider. Questions that you pose during your verbal testimony will become part of the record and will be considered.

After we've completed the formal part of this hearing, Air Force representatives will continue to be available for discussion. Are there any questions regarding the procedures we will follow? I have been provided a list of individuals who would like to speak. We will first invite elected officials to speak followed by others as we have received their speaker cards. So we'll begin with Mayor Kitchell. Mayor Dave Kitchell, if you would come forward.

G07_O MAYOR DAVE KITCHELL: Colonel, Moore, welcome everyone to --

THE COURT REPORTER: Excuse me. Could he --

MAYOR DAVE KITCHELL: -- on the Grissom Air Force Base. We'd love to have you here

THE COURT REPORTER: Oh, I just --

MAYOR DAVE KITCHELL: Gail, I'll get where you can see me or --

THE COURT REPORTER: Well, I need you behind the stand please.

HEARING OFFICER MOORE: She's using this microphone for recording. You need to use that one.

MAYOR DAVE KITCHELL: You need to use that one. Right here? Speak here?

G07_O

THE COURT REPORTER: Thank you. Oh, no, just if you could leave it there.

MAYOR DAVE KITCHELL: Just right here? Speak here?

THE COURT REPORTER: If you want to just turn the microphone, the other one around please. Thank you. Thank you.

MAYOR DAVE KITCHELL: We'll do a karoake contest later on too.

THE COURT REPORTER: Yeah. There you go.

MAYOR DAVE KITCHELL: Welcome everyone to Grissom Air Force Base. We're glad to have you. This is a laborious process. Obviously, and you've done a lot work on this. I guess a couple of things I should relate. One is Cass County Commissioners' President Jim Sailors is here as well, and he has informed me and I would share this information that the zoning for the west side of the Base has been done to complement the runway clearance which extends into Cass County neighboring to the west. So we've taken care of the planning and zoning issues, and we stand prepared to help in any way we can with that.

One of the concerns we would have is the economic impact long-term of the Base not getting a, the KC-46A, and you have to understand this Base and its previous history. It's had a very colorful past with the Doomsday plane. Ronald Reagan landed here in '84. Lyndon Johnson landed here in '65. Bill Russell played here with the Air Force All Stars and K.C. Jones.

It's been a great Base but it's -- the, the economies of Logansport and Kokomo and Peru are sort of intertwined with the Base's history and future, and I guess the question becomes for the public -- it's kind of a public

G07_O relations' situation for the Air Force and the Reserve -- is what happens with the KC-135 if they don't get the 46's eventually? Will they phase out Grissom Air Reserve Base or do they just keep KC-135's forever, what the plan is there, and obviously, you're between Secretaries of Defense right now.

It's not maybe a question at your pay grade that you want to answer or feel comfortable answering. We understand that, and this isn't a Q-and-A session, but I think for the long-term viability of this site and this Base, that's going to be something that, that the residents here are probably going to want to know and plan accordingly. So we stand prepared to help you and be ready for you. Lots of good things can happen here.

There's been discussions with the, the Indiana Department of Transportation about changing the main entrance to the Base to accommodate that, and we'd be glad to do that as well. I'm sure that Commissioner Sailors would address maybe the county road upgrades that would be necessary if you expand the Base in any way.

So other than that, I'd just say that Purdue did not steal Air Force's football coach, and we tried to do the Air Force a favor by doing that and whatever we can do to help you, we stand ready to do. Thank you.

HEARING OFFICER MOORE: Thank you, sir. The next commentor is Mr. Jim Tidd.

G08_I MR. JIM TIDD: Thank you, sir. Again, my name is Jim Tidd, last name T-i-d-d, and I'm with the -- I'm the Executive Director of the Miami County Economic Development Authority that has responsibility for the redevelopment of the former Base that was declared excess during the

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G08_I

BRAC '91 process.

One of the things that's not necessarily really a question but I can probably turn it into a question, but I just wanted to make sure that the environmental team knew that we recently received the grant from the Office of Economic Adjustment to pursue a joint land use study. So in cooperation with the 434th, we have secured a grant to do this study. We just had our first, initial kickoff meeting, local kickoff meeting yesterday. So we're in the process now of securing a consultant that would help us do that.

A lot of the items that I know that you did your environmental assessment on would be included in this joint land use looking at the long-term protection of not only the airfield but the operational footprint of Grissom outside of just the runway environment.

I would also point out that this is a four-county regional effort between not only Miami County but Cass County as well, Howard County, and Wabash County. So it's basically the four adjoining counties that, that adjoin Grissom Air Reserve Base, and we look forward to doing this study. Again, our goal is to whatever we can put in place, whether it deals with zoning or restrictions on heights or those kind of things to protect the, the airfield and the footprint in the long term.

So I just wanted to make sure. I don't know if that can be included in the study but wanted to make sure that you were aware of it because it is, is an effort in the community and the region to do that, and so I just wanted to make sure that you were aware of it. Thank you very much.

HEARING OFFICER MOORE: And thank you, Mr. Tidd. That concludes the oral comments that we have at this time. As I stated before, the hearing will remain open until eight p.m. So if anyone wants to reattack, have, has any additional comments, if you come up with any comments that you want to make before we formally close at eight p.m., you can do that. What we'll do is we'll stand in recess until that time or until we receive additional comments and at that, we are in recess. Thank you.

[A RECESS IS TAKEN FROM 6:20 P.M. TO 7:59 P.M. AFTER WHICH TIME THE COURT REPORTER IS INSTRUCTED TO RECOMMENCE THE RECORD AS FOLLOWS:]

HEARING OFFICER MOORE: There being no more speakers, this hearing is adjourned.

[WHICH WERE ALL THE PROCEEDINGS HELD BEFORE HEARING OFFICER COLONEL JOE MOORE AT A PUBLIC HEARING IN THE MATTER OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KC-46A THIRD MAN OPERATING BASE (MOB 3) BEDDOWN AT THE MILESTONE EVENT CENTER, 1458 LIBERATOR ROAD, PERU, INDIANA, 46970, ON WEDNESDAY, DECEMBER 8, 2016, CONCLUDING AT 8:00 P.M.]

————========♦========————

STATE OF INDIANA
SS:
COUNTY OF MIAMI

REPORTER'S CERTIFICATE

I, Gail Malm Armstrong, Notary Public for the State of Indiana, do hereby certify that the above, within and foregoing is a true, full, complete, and correct transcript of all of the proceedings held in the matter of Draft Environmental Impact Statement for the KC-46A Third Main Operating Base (MOB 3) Beddown on **Wednesday, December 8, 2016,** at the Milestone Event Center, 1458 Liberator Road, Peru, Indiana, 46970.

That said proceedings were taken down by means of two digital recording systems running simultaneously and by means of my log notes and afterwards reduced to printed page by me and that the same is the original transcript of the hearing as made by me from my log notes and my digital recordings.

I do further certify that I am a disinterested person in this cause of action, that I am not a relative or attorney of any of the parties or otherwise interested in the event of this action and am not in the employ of any attorneys for the respective parties or of the United States Air Force.

WITNESS MY HAND, this 28th day of December, 2016.

Gail Malm Armstrong

Gail Malm Armstrong, Notary Public
Residing in Cass County, Indiana
My commission expires: 10/30/24
American Association of Electronic
Reporters & Transcribers Cert #00232

A.7.2.7 Seymour Johnson AFB Draft EIS Comments

Verbal comments recorded by the court reporter are contained in the public hearing transcript in Section A.7.2.9.

S01_O

Congress of the United States
Washington, DC 20515

December 20, 2016

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Avenue, Suite 155
JBSA Lackland, TX 78236-9853

Dear Mr. Kamalpour,

As members of the North Carolina Congressional Delegation, we are writing to convey our strong support for Seymour Johnson Air Force Base as the future home of the KC-46A tanker aircraft. We share the views expressed by community leaders in Goldsboro, North Carolina on December 15, 2016, at the public hearing on the Draft Environmental Impact Statement (EIS) evaluating candidate sites for the beddown of the KC-46A Third Main Operating Base (MOB-3). The Draft EIS and the public comments make a convincing case that Seymour Johnson is unquestionably the right place for the Air Force to beddown the KC-46A tanker aircraft.

While all four locations may meet the mission, Seymour Johnson can meet it better, more quickly, more cost effectively and with the full support of the community. We urge the Air Force to select Seymour Johnson for the following reasons:

- *No significant impacts.* The Air Force has undertaken a very thorough EIS analysis of environmental and social impacts of locating the MOB-3 at four locations. The data and analyses in the Draft EIS indicate that Seymour Johnson has no significant impacts to environmental and social resource areas.
- *Low cost.* Of the four sites under consideration, Seymour Johnson is the lowest cost option for the Air Force to beddown the KC-46A. In this austere budget environment, locating the mission at Seymour Johnson frees up millions of dollars for other Air Force priorities - environmental, operational and training.
- *High efficiency.* KC-46A tanker aircraft located at Seymour Johnson would support Air Force operations and flight training missions, and would also benefit the Navy and Marine Corps installations located in reasonable proximity to the base – reinforcing and enabling the joint force.
- *Universal support.* There is overwhelming public enthusiasm for bedding down the KC-46A tanker at Seymour Johnson AFB, including support from federal, state and local elected officials, business owners, community organizations, and, area residents.
- *Quality of life.* Dozens of programs are in place to support and provide quality of life amenities and benefits to the airmen and their families at and around Seymour Johnson.

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We remain committed to supporting the Air Force's decision-making process and look forward to providing any assistance necessary as you make important decisions regarding the beddown of the KC-46A tanker.

Sincerely,

David Rouzer Member of Congress	Thom Tillis United States Senator	Richard Burr United States Senator
Walter B. Jones Member of Congress	Patrick McHenry Member of Congress	Virginia Foxx Member of Congress
George Holding Member of Congress	G. K. Butterfield Member of Congress	Richard Hudson Member of Congress
David E. Price Member of Congress	Mark Walker Member of Congress	Alma S. Adams, Ph.D. Member of Congress
Robert Pittenger Member of Congress	Mark Meadows Member of Congress	Ted Budd Member-elect of Congress

cc: Secretary Deborah James
1670 Air Force Pentagon
Washington, D.C. 20330

Chief of Staff David L. Goldfein
1670 Air Force Pentagon
Washington, D.C. 20330

ASAF Miranda A. A. Ballentine
1665 Air Force Pentagon
Washington, D.C. 20330

A.7.2.7 Seymour Johnson AFB Draft EIS Comments (Continued)

S02_O

STATE OF NORTH CAROLINA
OFFICE OF THE GOVERNOR

PAT MCCRORY
GOVERNOR

December 6, 2016

The Honorable Deborah Lee James
Secretary of the Air Force
3000 Air Force Pentagon
Washington, DC 20350-1000

Dear Secretary James:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (EIS) for the KC-46A base development. North Carolina has a vibrant military past dating back to the colonial era and North Carolinians have made significant contributions to our country's warfighting efforts throughout history. Today our state remains at the forefront of American defense and security, and we are proud to host the fourth largest military presence in the country. Military personnel throughout North Carolina are contributing to critical missions around the globe. I have made it a priority for my Administration to do everything we can to make North Carolina the most military friendly state in the nation.

I was thankful to receive the news in October 2015 that Seymour Johnson Air Force Base was chosen as the preferred alternative for the Third Main Operating Base (MOB 3) for a squadron of twelve KC-46A refueling aircraft. We strongly support the Air Force's decision to name Seymour Johnson as the preferred site for KC-46A base development and will work with the installation and local community to maintain a positive and productive relationship with the Air Force as plans for the base development continue to progress.

I am pleased with the results of the Strategic Basing Process and the EIS, which found that the MOB 3 mission would have no significant impacts on air quality, soil and water resources, biological resources and wetlands, hazardous materials and waste, land use resources or infrastructure systems. In addition, no significant increases in noise level or net increases in safety risks are anticipated. I also welcome the findings that the proposed MOB 3 mission is expected to produce a net increase of 53 full-time on base military personnel in addition to 22 DOD civilian and contractor jobs. Furthermore, I was pleased to learn that the new mission is expected to generate 1,144 construction-related jobs with construction costs estimated to exceed $103 million.

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WWW.GOVERNOR.STATE.NC.US

S02_O
Page 2

Our state is privileged to host Seymour Johnson Air Force Base, which is home to the Air Combat Command's 4th Fighter Wing and the location of the Razor Talon monthly exercise that provides a unique opportunity for our service members to achieve mission readiness. Seymour Johnson is the ideal location for the MOB 3 mission. As stated in the EIS, the installation already has fully adequate capacity in its existing infrastructure to provide a range of base services to support the new mission including housing, fitness, dining facilities and child care.

Seymour Johnson has also established a robust community partnership with Goldsboro and Wayne County. We are proud that this year, Goldsboro earned national recognition as a "Great American Defense Community" by the Association of Defense Communities and the Defense Communities Caucus. The award was a result of several successful community initiatives implemented by Seymour Johnson Air Force Base and Goldsboro/Wayne County to leverage their capabilities and resources to provide mutual benefits to the installation and the community.

On behalf of all North Carolinians, thank you again for choosing Seymour Johnson Air Force Base as the preferred base for the KC-46A squadron. North Carolina would be honored to support the important mission that these aircraft will fulfill for the Air Force, Navy, Marine Corps and allied nations. We look forward to a final decision in the near future.

Sincerely,

Pat McCrory

Governor Pat McCrory
State of North Carolina

A.7.2.7 Seymour Johnson AFB Draft EIS Comments (Continued)

S03_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: DATE:

SJ is The obvious first choice It is superior to the other bases being considered.

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: W.W Albertson

Organization: [redacted]

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

S04_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: Goldsboro NC DATE: 12/15/16

Having reviewed the Executive Summary it seems this project represents a significant & positive opportunity for SJAFB. The study indicates minimal changes in environmental issues while making major investments which would ensure a stronger outlook for the base & community. Seems like a win/win.

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: Doug McGrath

Organization: [redacted]

Address:

City/State/Zip:

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

A.7.2.7 Seymour Johnson AFB Draft EIS Comments (Continued)

S05_O

I am extremely honored to have this opportunity to present this information for your consideration.

With the runway, ramp and maintenance facilities here at Seymour being capable of handling the KC- 46A, this should be a positive for locating here.

As to geographic location; eastern North Carolina is not subject to tornados, flooding or icing. It is perfect for trans-oceanic and trans-continental flying to support all available aircraft.

In terms of community support; there are over 40,000 retirees within a 50 mile radius of Seymour.

As to history; Seymour Johnson field was dedicated on December 1, 1941. After Pearl Harbor, a few days later, the U. S. Army was in need of an airfield to conduct engine repair facilities. In June of 1942, Goldsboro's new municipal airport became Seymour Johnson Field. It had many missions throughout the war including repair, pilot training, glider training and even had a German prisoner of war camp here. When the war was over some prisoners didn't want to leave and some even came back to visit.

At the end of the war Seymour became a separation center and then closed down in 1946. With the wooden buildings there was an attempt to make an industrial and business center, but that didn't seem to work. In the 1950s a world war one pilot and a world war two pilot got a committee together, and with overwhelming community support got approval to re-open Seymour Johnson Air Force Base in 1956.

Since I personally conducted daily interviews at the base for 56 years through WGBR radio and traveled with the TAC, SAC, ADC and ACC units all over the world and the continental US, I think this is an indication of total community support, especially since I also presented the Newcomers Briefing for 40 years for the Chamber of Commerce Military Affairs Committee.

With the facilities for the KC- 46A and the record of Seymour Johnson's recognition as one of the most outstanding community support bases in the USA, it should be on the top of the list for the KC- 46A.

Respectively, Robert E."Bob" Hill Military Affairs Committee.

S06_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: Goldsboro NC DATE: 12/15/16

The Community strongly supports SJAFB and looks toward to supporting the KC46A Tanker operations

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: S. Dillon Wooten

Organization: [redacted]

Address:

City/State/Zip:

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

A.7.2.7 Seymour Johnson AFB Draft EIS Comments (Continued)

S07_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: SEYMOUR JOHNSON DATE: 15 DEC 16

AFTER 30 YEARS ACTIVE DUTY AND 7 YEARS AS A DAF CIVILIAN I HAVE NEVER BEEN IN A MORE PRO-MILITARY COMMUNITY - STRONG SUPPORT TO SJ - ECONOMY IS GOOD FOR MILITARY - ACTIVE MILITARY AFFAIRS COMMITTEE - WEATHER IS GOOD, NO OR FEW NO FLY DAYS - CLOSE TO RALEIGH FOR MANY ACTIVITY BOTH CULTURE AND EDUCATIONAL - NEW ELEMENTARY SCHOOL BEING BUILT NEXT TO SEYMOUR JOHNSON - SPORTS COMPLEX SHARED WITH GOLDSBORO AND BASE, BEACH + MOUNTAINS WITHIN DRIVING DISTANCE - GREAT COLLEGES AND UNIVERSITIES WITHIN DRIVING DISTANCE - LESS COST TO DoD TO SELECT S.J. - EASY SUPPORT TO OUR OTHER MILITARY BASE IN N.C., VA + SC

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: CMSGT (RET) BOB FORSYTHE

Organization: [redacted]

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

A.7.2.8 Seymour Johnson AFB Public Hearing Sign-In List

Sign-In List Attendee Name	Organization (Agency, Private Citizen, etc.)
Adams, Alma	Member of Congress
Albertson, W.W.	Military Affairs Committee
Allen, Lawrence (Chuck)	Mayor, City of Goldsboro
Auger, Chris	Seymour Johnson AFB, 4 FW
Aycock, Gene	Goldsboro City Council
Aycock, Wayne	Wayne County
Best, Will	North Carolina Department of Commerce
Bradbury, Janet	Staffer, U.S. Senator Richard Burr
Broadway, Bill	Goldsboro City Council
Bryan, Jimmy	Military Affairs Committee
Bryan, Martha	Military Affairs Committee
Budd, Ted	Member-elect of Congress
Burr, Richard	U.S. Senator
Butterflied, G.K.	Member of Congress
Cain, Jason	Governor-Elect Roy Cooper Transition Team
Clark, Steve	Golden K. Kiwanis Club
Daniels, Jeremiah	Wayne County Military Affairs Committee and North Carolina Military Affairs Committee
Daniels, Kate	President, Wayne County Chamber of Commerce
Davis, Trace	City of Goldsboro
Dunsmore, Michael	Wayne County Public Schools
Edmundson, Jimmie	Chairman, Friends of Seymour Johnson AFB
Forsythe, Bob	Private Citizen
Forsythe, James	Private Citizen
Foxx, Virginia	Member of Congress
Frye, Jack	Private Citizen
Frye, Sherry	Private Citizen
Gilbert, Mike	Private Citizen
Goodson, Anthony	City of Goldsboro Housing Authority
Guthrie, Randy	City of Goldsboro
Ham, David	Goldsboro City Council
Harvin, Allan	Private Citizen
Harvin, Nancy	Private Citizen
Hill, Lynda	Military Affairs Committee
Hill, Robert	Military Affairs Committee
Hinnant, Jim	Xpress Communications, LLC, and Chamber of Commerce
Herring, Steve	*Goldsboro News-Argus*
Hogarty, David	Military Affairs Committee
Holding, George	Member of Congress
Holowiti, Troy	North Carolina Department of Military and Veteran's Affairs
Hudson, Richard	Member of Congress
Jernigan, Kent	Private Citizen
Jinnette, Henry	Private Citizen
Jinnette, Louise	Private Citizen
Johnstone, Don	Private Citizen
Jones, Walter	Member of Congress

A.7.2.8 Seymour Johnson AFB Public Hearing Sign-In List (Continued)

Sign-In List Attendee Name	Organization (Agency, Private Citizen, etc.)
Kelly, Joseph	North Carolina Department of Military and Veterans' Affairs
Kerstetter, Philip	University of Mount Olive
Klern, Ken	Private Citizen
LaFevers, Scott	Military Affairs Committee and Chamber of Commerce
Lawrence, Pamela	Private Citizen
Lovings, Ernie	Private Citizen
Mabry, Martin (Bud)	Chairman, North Carolina Military Affairs Commission
McCrory, Pat	Governor, State of North Carolina
McGrath, Doug	Private Citizen
McHenry, Patrick	Member of Congress
Meadows, Mark	Member of Congress
Metzler, Mark	Private Citizen
Pate, Bill	Chairman, Wayne County Board of Commissioners
Pate, William	Private Citizen
Pedersen, Allan	Private Citizen
Perkins, Lee	Private Citizen
Pittenger, Robert	Member of Congress
Price, David	Member of Congress
Price, J.B.	Military Affairs Committee
Rouzer, David	Member of Congress
Simpson-Carter, Shycole	City of Goldsboro
Smith, Henry	Military Affairs Committee
Smithwick, Gary	Private Citizen
Sloan, Stoney	Military Affairs Committee
Stevens, Scott	City of Goldsboro
Summer, Rick	Military Affairs Committee and Wooten Development Co.
Tillis, Thom	U.S. Senator
Tillman, Joey	Military Affairs Committee
Walizer, William	Private Citizen
Walker, Mark	Member of Congress
Wilson Jr., Cornell	North Carolina Department of Military and Veterans' Affairs
Wilson, Edward	Military Affairs Committee
Womble, Jim	Private Citizen
Wooten, S. Dillon	Military Affairs Committee and Wooten Development Co.
Young, Tate	Private Citizen

A.7.2.9 Seymour Johnson AFB Public Hearing Transcript

(Transcript contained on the following pages.)

KC-46A MOB 3 BEDDOWN

PUBLIC HEARING

UNITED STATES AIR FORCE

DECEMBER 15, 2016

GOLDSBORO, NORTH CAROLINA

C O N T E N T S

P R O C E E D I N G S

COL JOE MOORE

Welcome everyone. The time is just past 5:30, so we will begin the hearing. Thank you for attending this public hearing for the draft environmental impact statement or draft EIS for the proposed third main operating based Beddown of the KC-46A tanker aircraft, hereinafter referred to as MOB 3.

I'm Colonel Joe Moore, and I will be your hearing officer tonight. I'm an Air Force Judge, and will be acting as the moderator tonight. As the moderator my role is to ensure that the Air Force provides a fair, orderly, and an impartial hearing where you have an opportunity to make comments on the proposal. I do not work for anyone at the Air Force Reserve Command, the Air Force Civil Engineer Center, the Air Mobility Command, or any of the Air Forces bases under consideration for the proposed action. I'm not involved in any way with the development of this draft EIS hereinafter referred to as the EIS, and I not do act as legal advisor to the Air Force representatives working on this proposal.

This hearing is held in accordance with

the provisions of the National Environmental Policy Act or NEPA as implemented by counsel on environmental quality regulations and the Air Force. We're here tonight to present information on the environmental impacts of the proposed KC-46A MOB 3 Beddown and to receive your comments on the draft EIS.

Tonight's hearing is one of several opportunities for public comments. This hearing is an opportunity for you to express your views and concerns about the adequacy of the environmental analysis contained in the draft EIS, as well as any issues related to the NEPA process. This hearing is not a debate or a vote on the draft EIS, and it is not a question-and-answer session. We welcome your input on the environmental analysis presented in the draft EIS. Comments about other unrelated issues can certainly be made, but they will not assist in the decision making process for the draft EIS.

I would like to begin this hearing by introducing the NEPA Team, beginning with the team leader, Lt Col Jim Vinup to my left with the Air Force Reserve Command, who will present details of the proposed action and alternatives.

Next is Mr. Hamid Kamalpour, the EIS Project Manager at the Air Force NEPA Division, who will discuss results of the NEPA process.

Representatives from Seymour Johnson Air Force Base led by Col Scobel Kerin of the 916 Air Refueling Wing Vice Commander are present. Although not a part of the analysis team, they have provided detailed base information which is critical to a thorough analysis of the impacts in the draft EIS.

Lastly representatives from Leidos are here supporting the Air Force as the contractor. Transcribing tonight's hearing is Ms. Sarah Mills. I would also like to recognize the following individuals present. I'm a little older than I was when I started this.

Mr. Jason Cain, staffer for Governor Elect Roy Cooper. Ms. Janet Bradbury, staffer for U.S. Senator Richard Burr. Mr. Cornell Wilson, Jr., State of North Carolina, Department of Military Affairs. Mr. Martin Mabry, North Carolina Military Affairs Commission. Anthony Goodson, Goldsboro Housing Authority. Kate Daniels, Wayne County Chamber of Commerce. Henry Smith, Goldsboro Military Affairs Committee.

Jimmie Edmundson, Friends of Seymour Johnson Air Force Base. Bill Pate, Wayne County Commissioners. And chuck Allen, Mayor of the City of Goldsboro. Thank you all for your attendance.

Lt Col Vinup will first present information on the proposed action and the alternatives. Then Mr. Kamalpour will provide an overview of the NEPA process and will summarize the potential environmental consequences of the proposal.

After their presentations, which should take about 20 minutes, we'll begin our oral comment period, during which you can provide input on the proposed action draft EIS analysis and potential environmental impacts. Your comments will become part of the official record of the final EIS. Please note that informal discussions at our informational displays will not become part of the EIS record. So if you have items of concern about the analysis in the draft EIS you would like to bring to our attention, please do so during our formal comment opportunity or in writing. If you do not choose to make an oral comment, you can submit written comments, either by turning in a comment form this evening or by mailing it to the address shown on the screen. Comments may also be submitted online at www.kc46Abeddown.com.

If you have not had a chance to review the draft EIS, it is available on the website or at one of the public libraries listed here. The Air Force welcomes public comments in writing at any time during the environmental impact analysis process. To receive timely consideration for the final EIS, please submit your comments by January 3, 2017. Your comments will provide the decision maker, in this case, the Secretary of the Air Force, with information to assist in making a decision regarding where the MOB 3 will be located. Your comments during this process provide the benefit of your knowledge at the local area and your concerns about the environmental impacts or analysis.

We will now move into the briefing. During the briefing our speakers will be reading from prepared scripts. The briefing is written to make certain that each speaker covers all pertinent information and that it is consistent for all four hearings. With that, I will turn the microphone over to Lt Col Vinup from the Air Force

Reserve Command.

LT COL JIM VINUP

Good evening, I am Lt Col Vinup representing the Air Force Reserve Command. I'm a previous tanker pilot serving on the staff there.

Welcome to this evening's meeting. As a Team Leader I encourage you to assist the Air Force in meeting its requirements to comply with the NEPA process. Your attendance tonight indicates your interest in the proposed action. I hope your comments will provide us with additional information or areas where further analysis is needed. All comments will be properly reviewed, analyzed, and addressed in the final EIS.

The purpose of the proposed action involves the KC-46A's role in the Air Force tanker fleet modernization effort. The goal of this effort is to ensure future tankers are the best available to support a high threat, multirole war fighting capability to commanders worldwide.

To perform this mission, trained air crews, maintenance, and support personnel must be available to meet KC-46A inventory delivery dates as older tanker aircraft are removed from the inventory.

While we continue to operate the legacy tanker fleet of aircraft, the KC-46A provides several advantages, including the ability to refuel any certified fixed wing aircraft on any mission. The ability to complete a mobility mission while at the same time conduct a refueling mission, also known as a force multiplier. The capability of refueling multiple aircraft at once. It has increased airlift capability. It has the capability to receive fuel in flight, and it has improved force protection and survivability.

The Air Force is proposing to establish a third main operating base for the KC-46A aircraft, along with required infrastructure and manpower at one Air Force installation in the continental United States where the Air Force Reserve Command leads a mobility Air Force mission.

The third main operating base would utilize pilots, copilots, boom operators, and other support staff who operate and maintain the aircraft to provide worldwide refueling, cargo, and air medical evacuation support.

Implementation of this mission would require a variety of on base development projects, including demolition, new construction, and renovation. Implementation of the MOB 3 mission would increase area populations and would result in an overall increase in total annual aircraft operations at Seymour Johnson Air Force Base, Tinker Air Force Base, and Westover Air Reserve Base. And a decrease in total annual aircraft operations at Grissom Air Reserve Base.

At each base KC-46A air crews would utilize existing aircraft flight tracks, air refueling tracks, and fuel jettison areas if necessary. The no action alternative is required by the National Environmental Policy Act and was evaluated at each proposed Beddown location to provide a baseline for the decision maker. The no action alternative evaluates the environmental consequences of not basing the KC-46A aircraft at any base.

In the draft EIS, the Air Force analyzed the environmental consequences of basing the MOB 3 mission at Grissom Air Reserve Base in Indiana, Seymour Johnson Air Force Base in North Carolina, Tinker Air Force in Oklahoma, or Westover Air Reserve Base in Massachusetts.

In October 2015, the Secretary of the Air

Force announced Seymour Johnson Air Force Base as the preferred alternative for the KC-46A MOB 3 mission. Grissom Air Reserve Base, Tinker Air Force Base, and Westover Air Reserve Base were announced as reasonable alternatives for the MOB 3 mission.

This table summarizes the bases being considered and how the existing missions could be impacted. The following slides summarize the aircraft facilities and manpower changes anticipated to be required to support the KC-46A MOB 3 mission. Grissom Air Reserve Base has been identified as a reasonable alternative for the MOB 3 mission. If Grissom is selected to host the MOB 3 mission, the existing 16-KC 135 aircraft would be replaced with 12 KC 46A aircraft. Implementation of the MOB 3 mission will require a variety of on base development projects, including demolition, new construction, and renovation. This mission would increase the area population by approximately 530 people, including estimated dependents, and would result in a 9 percent decrease in annual aircraft operations.

Seymour Johnson Air Force Base has been identified as the preferred alternative for the

MOB 3 mission. If Seymour Johnson is selected to host the MOB 3 mission, the 16 existing KC-135 aircraft would be replaced with 12 KC-46A aircraft. The F-15E mission will continue with no change.

Implementation of the MOB 3 mission will require a variety of on base development projects, including demolition, new construction, and renovation. This mission would increase the area population by approximately 100 people, including estimated dependents, and would result in a 3 percent increase in annual aircraft operations.

KC-46A air crews associated with the MOB 3 mission at Seymour Johnson Air Force Base would also continue to use the Kinston Regional Jetport as an auxillary air field. The Kinston Regional Jetport is currently being used by KC-135 air crews.

If Tinker Air Force is selected to host the MOB 3 mission, the existing eight KC-135 aircraft would be replaced by 12 KC-46A aircraft. Implementation of the MOB 3 mission would require a variety of on base development projects, including demolition, new construction, and renovation.

This mission would increase the area population by approximately 769 people, including estimated dependents, and would result in an approximate 13 percent increase in annual aircraft operations.

If Westover Air Reserve Base is selected to host the MOB 3 mission, the KC-46A MOB 3 would be a new mission and the existing C5 mission would remain in place. Implementation of the MOB 3 mission would require a variety of on base development projects, including demolition, new construction, and renovation.

This mission would increase the area population by approximately 1040 people, including estimated dependents, and would result in an approximate 41 percent increase in annual aircraft operations.

We would like to emphasize that although the preferred alternative for the MOB 3 mission has been announced, no final decision has been made on the basing of the KC-46A MOB 3 mission currently under analysis in the draft EIS.

We look forward to inputs provided from the public and the affected communities as we proceed through the environmental impact analysis.

Once the requirements of the environmental impact analysis process are complete, the Air Force will make it's final basing decision.

Thank you for your attention. I will now turn the presentation over to Mr. Hamid Kamalpour, the Air Force Project Manager for the EIS, to discuss the NEPA process and provide greater detail of the potential impacts as described in the draft EIS.

HAMID KAMALPOUR

Good evening, I am Hamid Kamalpour, the Air Force NEPA Division Project Manager for the analysis of this proposed action. I am here tonight to discuss the results of the Environmental Impact Analysis for the proposal presented by Lt Col Vinup.

The draft EIS has been prepared in accordance with the requirements of the NEPA, which is National Environmental Policy Act Law, which requires federal agencies to analyze the potential environmental consequences of a proposed action, and reasonable alternatives, including a no action alternative, before any action is taken. The goal of conducting an EIS is to support sound decisions through the assessment of potential environmental consequences, as well as involving the public in the process. The result of this analysis and other relevant factors will be considered before a decision is made by the Air Force on the proposal. Your input during the past public scoping period and this public comment period will help the Secretary of the Air Force make the most informed decision possible on this proposal.

As you can see on this slide, there are several key steps to the Environmental Impact Analysis process. We are currently at the public and agency draft EIS review stage. The period began with the Federal Register Publication of the notice of availability for the draft EIS. At that time, copies of the draft EIS were mailed to local libraries, State and Federal representative and individuals who requested copies during the EIS scoping period.

The normal review period required by NEPA is 45 days. The draft EIS public comment period will end on January 3, 2017. The public hearings are being held in the same communities as the previous scoping meetings in order to provide the affected communities with the opportunity to comment on the draft EIS.

All substantive comments received prior to the close of the public comment period will be considered during preparation of the final EIS. The Air Force responds to substantive comments on a draft EIS in the final EIS.

The final EIS is scheduled to be released in May 2017. After the final EIS notice of availability is published in the Federal Register, the Air Force must observe a waiting period of at least 30 days before signing the final Record of Decision, the ROD, to document which alternative the Air Force selects for implementation.

The draft EIS presents information on potential environmental consequences associated with implementing the MOB 3 mission at each of the four bases. The potential environmental consequences are grouped into the five categories shown on this slide and the subcategories represent the eleven resource area evaluated at each base.

The next set of slides describes the potential consequences at each of the four bases for the purposes of presentation, the potential environmental consequences at each base have been summarized in broad terms. For a more detailed evaluation on the potential consequences, please refer to Chapter 4 of the draft EIS.

Implementation of MOB 3 mission at Grissom Air Reserve Base would result in a decrease of 21-acre of land exposed to 65 decibels or greater noise level and no off-base resident would be exposed to these noise levels. As shown on the noise contour map, nearly all of the lend exposed to the noise is located to the north and south of the runway. No other resource areas are anticipated to be impacted by MOB 3 mission.

Implementation of MOB 3 mission would add up to 530 full-time military staff and dependents to this area resulting in a .07 percent increase the area populations. A variety of demolition, construction and renovation projects would be required for the MOB 3 mission resulting in positive economic impacts to CASS and Miami Counties and surrounding areas.

Implementation of the MOB 3 mission at Seymour Johnson Air Force would expose an additional 1 acre of off-base land and an estimated one additional off-base resident to the noise levels of 65 decibels or greater over baseline conditions. Implementation of the MOB 3 mission would add up to 100 full-time military staff and dependents to Wayne County resulting in a 0.08 percent increase in the Wayne County population. No other resource areas are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission at Tinker Air Force Base would expose an additional 7 acres of off-base land and an estimated 6 off-base residents to the noise levels 65 decibel or greater.

Implementation of MOB 3 mission would add up to 769 full-time military staff and dependents to Oklahoma County resulting in a 0.1 percent increase in the county population.

As part of the MOB 3 mission, the 507 Air Reserve parking ramp requires expansion, which would impact jurisdictional water and floodplain. A nationwide wetland permit would be obtained for the impact to the jurisdictional water and a finding of no practical alternative would be prepared for impact to the floodplain. To minimize potential floodplain impact, construction design would incorporate measures for construction in the floodplain. In addition, the Air Force prepared a biological evaluation to evaluate the potential for additional impact to threatened and endangered species resulting from the less than 13 percent increase in aircraft operation. As a result of the biological evaluation, the Air Force determined that implementation of the KC-46 MOB 3 mission at Tinker Air Force Base may affect, but it is not likely to adversely affect the interior level -- interior least tern. The Whooping Crane, Piping Plover and the Red Nut. To minimize further impacts to birds, Tinker Air Force Base will continue to contract with the USDA to provide daily control service to prevent birds from using the installation. They will manage vegetation on the installation to discourage bird use. In addition, during times of high bird activity, if possible, aircraft pattern altitude and direction will be modified to avoid bird concentration. Lastly, the Oklahoma Archaeological Survey has requested that an archaeological field inspection of the construction area be conducted prior to commencing construction.

No other consequences are anticipated to result from the implementation of the MOB 3 mission at Tinker Air Force base.

The C-5 is the dominant noise source at Westover Air Reserve Base. And the independent planned conversion of C-5B to quieter C-5 aircraft coinciding with the proposed MOB 3 Beddown in 2019 will result in an 396-acre decrease in the off-base land and a decrease of an estimated 38 off-base residents exposed to noise levels of 65 decibels or greater.

Implementation of the MOB 3 mission at Westover Air Reserve Base would result in an adverse effect to the historic properties, Hangar 7071 and the Building 2426 are contributing resources within the Westover Air Reserve Base historic history. Both of these structures would be demolished to make room for the new KC-46A Hangar. As mitigation for these impacts, the Air Force has proposed historical recordation of these buildings and mapping of the current and former boundaries of the installation, as well as inviting Massachusetts Historic Commission to participate in the desired review process for new construction. Should the MOB 3 mission be implemented at Westover Air Reserve Base. The Massachusetts Historic Commission concurred with the proposed mitigation measure on August 26, 2016.

No other consequences are anticipated for MOB 3 mission at Westover Air Reserve Base. That concludes the environmental consequences portion of the briefing. I will not now turn the microphone over to our hearing officer.

COL JOE MOORE

Thank you, Mr. Kamalpour. We will now move into the oral comment part of the hearing. For those wishing to speak here's the format. Please fill out a white speaker form. If you did not get one of these and you want to speak, please raise your hand or you can get one in the recess that we're about to take here.

We will now take a ten-minute recess in order for us to collect the forms and prepare for public comments. And so at that, the hearing is recessed for ten minutes. Thank you.

(RECESS TAKEN FROM 5:56 P.M. TO 6:11 P.M.)

COL JOE MOORE

All right. The hearing is back in order. We'll go ahead and proceed into the oral comment portion of the evening.

When I call your name, please come

forward to the podium. I'll hand over the microphone. If you could, it would help our stenographer if you would start out by stating your name and spelling your last name, especially if it's particularly challenging. It would also help -- also please do not provide any other personal information, such as your home address or phone number. Again, your comments are recorded verbatim. They will be used to develop a transcript as a permanent record of the hearing, and will be published in the final EIS. Your name will be included, along with your comments. Personal home addresses and phone numbers will not be published in the final EIS.

Each speaker will have three minutes to provide his or her oral comments on the proposed action and alternatives. We have a timekeeper to help keep track of the time. This person will hold up a yellow card when you have about 30 seconds left and a red card when it is time to stop. At that time please conclude your comments so I can call on the next person. Of course, there's no obligation to use the entire three minutes. You do not need to yield any remaining time to someone else. I'll just move on to the next speaker when you're finished. Also in the interest of time, we ask that you submit any individual electronic presentations as written comments.

Tonight's hearing is set to end at 8:00 p.m. If everyone who signed up to speak has had a chance to do so before that time, I will ask if any speaker would like another three minutes to expand on your comments. If you want to do that, just let me know and we'll put on another three minutes for the clock for you.

If you want to add something later to your oral comments, or if you would rather not speak here tonight, you can submit written comments. There is no page limit on written comments, and the Air Force gives equal weight to oral and written comments. Both become part of the official record and are included in the final EIS.

Just a few final reminders before we get started. First, please limit your comments to the analysis in the draft EIS. That is the purpose of this public comment period. As I mentioned earlier, this is not a Q&A session. It's an opportunity for you to put on the record your views and concerns about the proposal that you want the decision makers to consider. Questions that you pose during your verbal testimony will become part of the record and will be considered. After we've completed the formal part of this hearing, Air Force representatives will continue to be available for discussion.

I have been provided a list of individuals who would like to speak. So we will begin with Mr. Cornell Wilson.

* * * * * * * * *

S08_O CORNELL WILSON, JR.

Thank you. Good evening, Colonel, everyone. As the Secretary for the North Carolina Department of Military and Veterans Affairs and on behalf of the Governor of North Carolina, I am pleased to voice support for the selection of Seymour Johnson Air Force as the preferred location for the Third Main Operating Base for a squadron of twelve KC-46A refueling aircraft.

North Carolina has a vibrant military past dating back to the colonial era and North Carolina have made a specific contribution to our country's war fighting efforts throughout history. Proud to host the fourth largest military presence

S08_O in the country. Military personnel throughout North Carolina are contributing to critical missions around the globe. Governor McCrory has made it a priority in this administration to make North Carolina the most military friendly state in the nation.

Seymour Johnson is the best choice for five reasons to have the KC-46 tanker based here.

No. 1, after a rigorous analysis of the four locations, there were no significant impacts from the Environmental Impact Study to the environment and the social resource area.

No. 2, Low Cost. Of the four sites under consideration, Seymour Johnson Air Force Base is the lowest cost option for the Air Force to beddown the KC-46A. In this austere budget environment, locating the mission at Seymour Johnson frees up millions of dollars for other Air Force priorities -- environmental, operational, and training. For 2015 DoD determined that construction and labor costs in the Goldsboro community are 18 percent less than the national average and they range from 11 percent to 32 percent less than the other three alterative locations considered in the

S08_O environmental study. We respectfully request that the construction and labor costs be included in the socio-economic review of each base.

No. 3, High Efficiency. The KC-46A tanker aircraft located at Seymour Johnson will support Air Force operations and the F-15E flight training missions and would also benefit the Navy and the Marine Corps located reasonably close by. The next generation Joint Strike Fighter will be based just 70 miles away at Seymour Johnson Air Force -- at Marine Corp Station Cherry Point allowing for joint missions. And then you have the six squadrons at Beaufort, South Carolina of F/A-18s that are also utilized in refueling tankers. Marine Corp has KC-130 refueling aircraft but their demand for refueling has always been a lot higher than what they have in capability. The beddown of KC-46A tanker would also support the ability to increase regional range areas within North Carolina to support the latest and future generations of military aircraft and weapons systems; ranges like 506A Cherry Point and the range 5314, Dare County host regular large exercises to include joint and coalition forces; regional ranges and exercise offer increasingly

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efficient means for flying units to train in a limited physical environment as units pay for regional exercises within their annual flying budget, as opposed to TDY money and other sources to fund their exercises. Also Seymour Johnson maintains an active associate squadron with its years of experience of active duty and reserve components working together making a model for the Air Force.

No. 4, Universal Support. There's overwhelming public support for bedding down the KC-46 tanker at Seymour Johnson, including support from Federal, State and local elected officials, business owners, community organizations and area residents. Stop. We want it here. Thank you.

COL MOORE: Next speaker Mr. Bud Mabry.

S09_O

GEN MABRY E. MARTIN

Thank you, Colonel. Good evening everyone. Yes, I am Mabry E. Martin, and as Chairman of the North Carolina Military Affairs Commission, I am pleased to voice my support for the selection of Seymour Johnson Air Force Base as the preferred location for the MOB 3. In 2013, Governor McCrory established a Military Affairs Commission to provide recommendations on military

S09_O issues. And the commission provides a unique form to bring together high ranking, retired military leaders, members of the General Assembly, and community leaders from areas near military installations, representatives from other state agencies and other key stakeholders to discuss ways to preserve and enhance North Carolina's military value.

The North Carolina Military Affairs Commission's strategic plan for supporting and enhancing the North Carolina military missions and installation was published in February 2016. Within the strategic plan, one of our key goals was to promote Seymour Johnson Air Force Base as the final basing location for the KC-46.

Another was to expand and protect North Carolina's military ranges, special use air space, military training routes, and maritime operating areas. And there are several lines of efforts underway that will enhance North Carolina's military value and ensure that the military can operate unimpeded on installations and military training routes throughout the State.

The North Carolina Department of

S09_O

Commerce is supporting a joint land use study involving Seymour Johnson Air Force Base and Dare County range to collaborate with local communities to develop plans for compatible land use.

North Carolina also established a program called Sentinel Landscapes, which develops combatable use partnerships to prevent encroachment off base and leverages funding opportunities and incentives that make it easier for landowners to hold onto their working farms or forest lands while protecting our military missions.

The State of North Carolina and Virginia work together to secure language. And the FY17 National Defense Authorization Act and the FY17 Defense Appropriation Act directing the Department of Defense to develop a strategic investment plan for enhancing the Dare County range, offshore ranges, and institutionalize support for the monthly Ranger Talon exercise which has been conducted here at Seymour Johnson.

We hope these efforts send a positive signal to the Air Force and DoD that North Carolina is committed to protecting Seymour

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Johnson and all our military bases throughout the State. Support for the military is deeply embedded in the economic and social fabric of the North Carolina and enhancing the military value of Seymour Johnson and other installations is a top priority. The beddown of the KC-46A at Seymour Johnson is strongly supported by the State of North Carolina. Thank you very much.

Thank you.

COL MOORE: Next we'll recognize Mr. Anthony Goodson.

(MR. GOODSON WAS NOT PRESENT WHEN CALLED.)

COL MOORE: All right, moving on. Kate Daniels?

S10_O

KATE DANIELS

Good evening. My name is Kate Daniels, and I am the President of the Wayne County Chamber of Commerce. I will stay within the time limits and pare it down for two hours. How about that?

As home to the 916 Air Refueling Wing, Seymour Johnson Air Force Base is the first North Carolina Air Force Reserve Unit with nearly 1100 reservists, the wing class 1600 KC-135 Stratotanker air-to-air refueling aircraft, which we all know is over 50 years. The KC-46A will

S10_O

replace the aging tanker fleet and would continue to support the mission of providing worldwide refueling cargo and air medical evacuation support.

After extensive review from the United States Air Force, we all know that it was concluded that Seymour Johnson is the best choice to be named as home to the KC-46 aircraft based on costs, impact on the mission, and support from not only the local community, but regional and state, as both gentlemen that spoke before me shared this evening.

Seymour Johnson maintains an active associate wing that has almost a decade of experience with active duty and reserve components working together. And it works very well. And serves as a model for the rest of the United States Air Force.

So why Seymour Johnson? Why Goldsboro, North Carolina? Low risk, low costs, and best value. The local contracting climate in the Goldsboro area offers the best opportunity for the Air Force to efficiently establish the KC-46 third main operating base mission, which includes the basing of the 12 KC-46 aircraft facilities and

S10_O

infrastructure, manpower, and continuation training for the pilots boom operators and maintainers.

Annually and discussed earlier, the DoD conducts a national survey of construction markets. And I'll go a little bit further than Secretary Wilson did.

The survey is developed based on local construction costs or the market basket for eight labor craft. There are 18 construction materials, four equipment items, and seven other factors that reflect local conditions affecting construction costs; such as weather, climate, seismic, contractor overhead and profit, life support mobilization.

What does this have to do with anything? Well, in 2015 when looking at Westover Air Refueling Base, it came in at 1.15. Grissom Air Refueling Base was .96. Tinker Air Force Base .93. And coming in at the best and lowest cost factor was Seymour Johnson. And that came in at .82. In addition, the lower local average cost of labor and materials identified for initial construction will also reduce that.

So I'll wrap things up. Seymour

S10_O Johnson is by far the lowest cost option and best option for the Air Force. So while efficiency and costs are not a direct factor, I echo Secretary Wilson's, please consider that. The Goldsboro community is proud to support our military by offering an efficient and effective alternative station and safe operation for the KC-46A.

COL MOORE: Next speaker, Mr. Henry Smith.

S11_O HENRY SMITH

Good evening. My name is Henry Smith. I'm a native of Goldsboro. I practice law here currently, and I am a 28 year member of the Military Affairs Committee. I appreciate the opportunity to briefly share my comments regarding why Seymour Johnson will present the highest military value and be a multiplier for the joint forces.

Seymour Johnson Air Force Base is home to two F-15E operational squadrons, as well as the only FTU, our Formal Training Unit for the F-15E. Every new fighter pilot qualifying for the F-15E and even experienced fighter pilots requalifying in this aircraft require at least one daytime and one nighttime front seat refueling event.

S11_O

Weapon systems operators and pilots upgrading to instructor pilots require these daytime and nighttime refueling flights for the back seat of the aircraft. All these aircraft, including the operational squadrons here at Seymour, have currency requirements for refueling both day and night. Upgrading the air-to-air refueling tankers from KC-135s to the KC-46 that Seymour Johnson Air Force will face will be a great benefit for both the operational and the Formal Training Unit missions.

As General Wilson mentioned, the beddown of the KC-46 at Seymour Johnson will also benefit the Navy and Marine Corp. As he mentioned with Marine Air Corps Station, Cherry Point just 70 miles away and Marine Corps Air Base in Beaufort being down in South Carolina, the Marine Corps has the opportunity or will have the opportunity to use and supplement their limited number of KC-130 aircraft for refueling with new tankers at Seymour Johnson Force Base. Their demand has always grossly outweighed the supply from their limited capability of the KC-130. Additionally, the Marine pilots are required to qualify on Air Force tankers since that's the

S11_O

tanker that's available in theater and war time. These Marine Corps aircraft used probe and drove refueling methods as opposed to the boom method used on Air Force aircraft.

The current KC-135 tanker has to be prefitted with wing pods or the drove basket has to be fitted to the refueling boom before take-off to refuel the Marine Corps Navy aircraft. The KC-46 has the capability of multipoint probe and drove refueling on every mission. Two baskets from the wing and a third from the center mount. A big plus for flexibility while airborne as these baskets on the KC-46 have no impact on the ability to do the boom and receptacle refueling on the Air Force aircraft. The Navy insisted on this capability on the KC-46 and the Air Force agreed to do so.

The F-15E squadrons, including those at Seymour, are in very high demand around the world, but especially in Europe and the Middle East. And Seymour Johnson has a very high deployment rate. The tanker drag and fighters across the ocean are called Coronet Missions. Having the tankers colocated at Seymour Johnson Air Force Base gives -- and next to the Atlantic ocean are huge pluses

S11_O

for the Coronet Missions, as well as for the routine local mission planning and preparation.

While the tanker receiver demand model that it was considered in the analysis is useful in planning, it doesn't take into account all the suppressed demand for the joint force refueling requirements. Seymour Johnson's score of 18 out of 25 is very high but it's much lower than we believe the actual demand on these KC-46s will be.

The conclusion is obvious, designating Seymour Johnson as MOB 3 will undoubtedly provide the highest military value as home to the KC-46, particularly when you consider the multiplier effect for the joint force opportunities that Seymour Johnson Air Force Base presents.

The thorough analysis by the Air Force concluded that we were the right place to put the MOB 3 and nothing has been found that suggests that conclusion should be ignored. Thank you for your time.

COL MOORE: Next speaker Mr. Jimmie Edmundson.

S12_O

JIMMIE EDMUNDSON

Good evening. My name is Jimmie Edmundson and I am the Chairman of Friends of

S12_O Seymour Johnson Air Force Base, and I have a member of the Military Affairs Committee here for 30 years, this year actually.

Speaking in terms of enabling more comprehensive and integrative training ranges, Seymour Johnson is the epicenter of the F-15E Strike Eagle training. Last year the air space off the coast of North Carolina was significantly expanded and air traffic control consolidated for military operations. These actions will increase the demand signal for tanker refueling in the area. Regional ranges like the R53068 for Cherry Point and R5314 Dare County host regular large force exercises, including joint and coalition forces.

The States of North Carolina and Virginia work together to secure language in the FY-17 National defense Authorization Act and the FY-17 Defense Appropriations Act directing the Department of Defense to develop a strategic investment plan for enhancing the Dare County range. Offshore ranges and institutionalized support for the monthly Ranger Talon exercise here at Seymour.

The monthly Ranger Talon exercise, as

S12_O hosted by Seymour, provide joint units with integrated training opportunities on the east coast. Regional combat units train with assets from the combat Air Forces, mobility Air Forces, and Global Strike Command, as well as forces from Forward Air Control units, Special Operations, and the other services. Primary missions task during Ranger Talon include air superiority, interdiction deep strike, suppression of enemy air defenses, close air support, sea control, defense counter air and offensive counter air.

Regional ranges and exercises offer an increasingly efficient means for flying units to train in a limited physical environment. Overall training costs are reduced as units pay for regional exercises within their annual flying hour programs, as opposed to finding additional funding to send entire units to national training ranges for extended periods.

In addition to an era of continued high deployments, regional exercise reduced the time air crews are away from their home station and families as participants return to their home station at the end the day.

Beddown of the KC-46A at Seymour Johnson

S12_O would support the ability to increase regional range training opportunities within North Carolina to support the latest and future generations of military aircraft and weapons systems. Thank you.

COL MOORE: Our next speaker, Mr. Bill Pate.

S13_O BILL PATE

Good evening. I'm Bill Pate. I'm the Chairman of the Wayne County Board of Commissioners, and I appreciate your letting me speak tonight.

You are aware of the rich history and support that Wayne County community and Seymour Air Base has enjoyed over the years. I stand before you in full support of not only continued such support, but strengthening support in any way that we can. Example, education is supporting all of us. Wayne County Public Schools serves nearly 1600 students who are military dependents. That is 8 percent of the total student population. Wayne County Public School stamp also includes military veterans, military spouses, and individuals who grew up as military children. These ties to the military community have helped to strength the focused partnership that Wayne

S13_O County Schools at Seymour Johnson Air Force Base share. For over 50 years, it's this partnership that has allowed our community to be forward thinking and how it addresses the needs of military dependent students.

In the last four years, the Wayne County Board of Commissioners, along with the Board of Education has spent 80 plus million dollars in school building projects. That includes two military schools that just received the national recognition for Gray Technologies, renovations completed at Seymour -- CB Acock, and Southern Wayne that were scheduled, along with 20 additional classrooms and two of them in schools in the northern part of the county.

And lastly with this funding we will build a new Middle Lane Elementary and a Wake Edgewood Community Elementary School. The school sets adjacent to Seymour Johnson Air Force and houses the highest military student population in the district. Planning process for school construction has begun. Disbelievers are gathered and stakeholder input is there, including military parents and key military leaders. This is an example of the countless partnerships that are in

S13_O

place that we ensure that we are lifting many assets that are in Wayne County.

This commitment is enhanced by the courageous men and women who serve the valleys of Wayne County home and our neighbors. In addition to the KC-46 at Seymour Johnson is welcomed, encouraged. We enjoy the sounds of freedom down here in Wayne County, and thank you for your time. We want you here.

COL MOORE: Next we'll hear from Mr. Lawrence C. Allen.

S14_O

LAWRENCE C. ALLEN

Good evening, sir. First off, I am Chuck Allen, the mayor of this great city. It's an honor to have you folks here tonight. We're really glad you're here.

And the first thing I want to tell you, you've heard all the facts and figures from these smart people out here, but I want to tell you where you are. You're in North Carolina, as you know, we're home, and we're the best military friendly state there is in the country. But more importantly, you're in Goldsboro, North Carolina, and we're home to Seymour Johnson, the 4th Fighter Wing, the 96 refueling wing, and they're the best

S14_O

on Planet Earth, and they're right here in Goldsboro. So that's why we need the KC-46 because we need to continue our tradition to being the best. We partner every day.

I want to tell you about a few of the partnerships we have. We just were one of the first in the Air Force to have the P4, Initiative, which is an initiative to build a multisports complex, a partnership between the city, the county, the base, and the school system. It's right on the back gate of the base. It's 64 acres. It's base property. And we work through the base and their legal system to get this done. And so we're very excited. We've started construction on it. So that's a really big win for us and our community. It's just one of the few things we're doing. We work tirelessly with our partners, our federal state partners to work on protecting land around the base. We talk about it a lot. We've got a good zoning in place. And we're very very aware and we try to work off all our partners in the State do that.

Our country was instrumental with working with our Federal partners to get the $17 million for the new aircraft controller at

S14_O

Seymour Johnson. That hadn't been funded and we were able to work through a lot of our Senators and get that done. That's been a really big win for the base, and I think it will be really important for the KC-46.

We were also named one of ten -- one of only ten great American defense communities in 2016 in the nation. So we're really proud of that. We think that's a good thing.

And lastly, kind of important, we want you while you're here to have a minute to ride through our downtown. We just spent about $15 million redoing our downtown. It's a huge thing. Our military folks have really enjoyed what we've done and our citizens. A if you five minutes, if you can't eat downtown while you're here, at least ride through our downtown. We've got another $5 million project, and we're on the move here in Goldsboro. And we need -- as Mr. Pate said, we need this KC-46. And if we didn't General Wilson and Mr. Bud and all these folks wouldn't be here advocating for us. So thank you for coming.

COL MOORE: Thank you. Our next speaker is Ms. Janet Bradbury.

S15_O

JANET BRADBURY

Hi. I'm Janet Bradbury and I work with U.S. Senator Richard Burr. When I came tonight I did not really come intending to speak, but as I get here I realized the Senator would be disappointed in me if I didn't get up and just commend the Air Force on the work they've already done demonstrating that Seymour Johnson is the place for the KC-46s. And I think we've heard from the State and from this community, county and city, about the partnerships and the support here is unrivaled I think that we can all -- we all know that this would be a win for our community and absolutely a win for the Air Force.

And so I did want to say that, and thank you to the Air Force for being here and go forward with your plan and your choice.

COL MOORE: Thank you. All right. Next we have Mr. Henry Jinnette.

S16_I

HENRY JINNETTE

Thank you, sir. Henry Jinnette, a sixth generation native of Wayne County. Talking with them earlier. Previously had the fun of serving with the Strategic Air Command, both the 509 and the 3918th bomb wing.

S16_I

After my visit with the Air Force, I had the opportunity to work with Boeing building fine aircraft like these. My son has served as commander of 330 Field Fighter Squadron at Seymour Johnson. Recently retired as Chief of Air Force Operations in the Pentagon. So we're familiar with the Air Force. And I stand before you today speaking on behalf of all the good people of Greater Goldsboro, Greater Wayne County, we welcome the KC-96s to Seymour Johnson Air Force Base, North Carolina. Thank you for coming.

COL MOORE: All right. I'm informed Mr. Goodson has arrived. Mr. Anthony Goodson. Thank you.

S17_O

ANTHONY GOODSON

Sorry for being late. We had another meeting this morning or this evening.

Good evening. My name is Anthony Goodson. I'm the CEO of the Housing Authority for the City of Goldsboro. Thank you for the opportunity to spend a few minutes with you this evening.

Seymour Johnson Air Force Base plays a vital role in our country's national defense strategy. The Fourth Fighter Wing has played a

S17_O key role in every major conflict in the last 60 years with this aircraft and airmen being involved in all stages of conflict. It was on October 29, 2015, that the Secretary of the Air Force announced Seymour Johnson Air Force Base was named the preferred alternative to the base and the reserve squadron of 12 KC-46 Pegasus aircraft tankers beginning in 2019. Nearly six months later the Air Force issues a notice of intent to prepare an environmental impact statement for the beddown of the KC-46 tanker aircraft associated infrastructure and personnel in support of the main operating base three missions at existing installation where the Air Force Reserve Command leads a mobility Air Force mission.

Once the announcement was made, Seymour Johnson Air Force Base was the preferred alternative. Our community also learned that Grissom Air Reserve Base, Tinker Air Force Base, and Westover Air Force Base -- refueling base would be evaluated as alternatives.

We are confident that Seymour Johnson Air Force Base will remain the No. 1 host to the KC-46s. I recognize the goal of your presence tonight here to justify the selection of Seymour

S17_O

Johnson Air Force Base as the third KC-46 main operating base. Ladies and gentlemen, there is no finer community to become home of the incredible aircraft than Seymour Johnson Air Force Base. Thank you for your time this evening.

COL MOORE: That concludes all the cards that I have. Is there anyone who has not spoken who would like to speak at this time? Apparently not. Is there anyone who's previously spoken who would like three additional minutes? General Wilson, we're dying to hear Point No. 5.

S08_O

CORNELL WILSON

Thank you very much. I appreciate that.

The 5th point was Quality of Life. And we have a lot programs in place that you might have heard about already, such as the public partnership with the base itself. And also the school that has been approved to be built for the school right outside the base, as well as the housing, fitness, and child care on the base itself.

One thing we've added this past year was a new cemetery, Veterans State Veterans Cemetery. So when they do retire out of the

S08_O

Air Force and they find a resting place, they can go right here to Goldsboro as well. So we think that's a very important part of the life cycle of keeping the airmen here in this are.

Those are the five points I wanted to make. I want to thank you so much for giving us the time to do this and an outstanding opportunity for this community, for the State, and for the Air Force. We love you for it. Thank you.

COL MOORE: All right. We have now heard from everyone who desires to speak. If anyone wants to make further comments, the hearing will remain open until 8:00 p.m. We will stand in recess until that time. We're in recess at this point.

(RECESS TAKEN FROM 6:44 P.M. TO 8:00 P.M.)

COL MOORE: There being no more speakers, this hearing is adjourned.

(Whereupon, at 8:00 p.m., the hearing in the above-entitled matter ceased.)

CERTIFICATE OF REPORTER

STATE OF NORTH CAROLINA)

COUNTY OF WAKE)

I, SARAH K. MILLS, the officer before whom the foregoing hearing was taken, do hereby certify was taken by me to the best of my ability and thereafter reduced to typewriting under my direction.

This, the 28th day of December, 2016.

Sarah K. Mills

SARAH K. MILLS

Notary Public #19933190088

A.7.2.10 Tinker AFB Draft EIS Comments

Verbal comments recorded by the court reporter are contained in the public hearing transcript in Section A.7.2.12.

T01_I

From: KAMALPOUR, HAMID GS-13 USAF HAF AFCEC/CZN <hamid.kamalpour@us.af.mil>
Sent: Thursday, December 08, 2016 10:52 AM
To: Leidos
Subject: FW: Tinker AFB EIS

Tom - See the comment below, I am not sure he is associated with any organization.

Hamid Kamalpour, P.E. Inactive, DAF
Program Manager, (AFCEC/CZN)
Phone: (210)925-3001, DSN 945-3001
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(ATTN: Mr. Hamid Kamalpour)
3515 S. General McMullen, Bldg 171
San Antonio TX 78226-2018

-----Original Message-----
From: Richard Burpee [redacted]
Sent: Thursday, December 08, 2016 10:49 AM
To: KAMALPOUR, HAMID GS-13 USAF HAF AFCEC/CZN <hamid.kamalpour@us.af.mil>
Subject: Tinker AFB EIS

Hamid

This mornings Daily Oklahoman carried an article about the possible basing of the KC-46a to Tinker AFB, 507 Air Reserve Wing. I noted that the meeting for environmental comments was held in Midwest City December 6, 2016.

One of the environmental concerns I have is the location of the Del City shopping center in the Tinker accident potential zone II. The property is located in an accident potential zone according to Tinker's Air Installation Compatible Use Zone (AICUZ) North West of the Tinker runway 310 on Sooner Road. The shopping center with two major hotels should be an environmental concern for both an operational aircraft accident hazard and noise.

I would think that your environmental assessment study would look into the location of this shopping center at the end of runway 310 and assess whether it is compatible for KC-46a operations.

A.7.2.11 Tinker AFB Public Hearing Sign-In List

Sign-In List Attendee Name	Organization (Agency, Private Citizen, etc.)
Amend, Chris	Tinker AFB, 507 ARW
Bartlett, Ken	Vice Mayor, Del City
Beam, Brad	Tinker AFB, 72 ARW/CE
Coleman, Jillian	Tinker AFB, TT0/72 ARW PA
Croak, Robert	Private Citizen
Delaney, Josh	Private Citizen
Dukes, Matt	Midwest City
Goldschlager, Glen	Private Citizen
Harrison, Jeff	*Midwest City Beacon*
McNayr, Seth	Private Citizen
Wilson, Stephanie	Tinker AFB, 72 ABW/CC

A.7.2.12 Tinker AFB Public Hearing Transcript

(Transcript contained on the following pages.)

KC-46A MOB 3 BEDDOWN

PUBLIC HEARING

TAKEN ON BEHALF OF

THE UNITED STATES AIR FORCE/RESERVE BASE

IN MIDWEST CITY, OKLAHOMA

ON DECEMBER 6, 2016

REPORTED BY: SHELLEY MARBURGER, CSR

COLONEL MOORE: All right, it looks like everybody has found their seats.

I'd like to ask everyone to please make one check and make sure your cell phones are on silent at this point, and once that's done we'll go ahead and proceed with the Hearing. Please do keep in mind that the Air Force personnel will remain after the formal hearing to further discuss the proposals if anybody wishes to do so.

We are a little past 5:30, so it is now time to begin the hearing. I will start by calling the hearing to order. And thank you for attending this public hearing for the Draft Environmental Impact Statement or Draft EIS for the proposed Third Main Operating Base Beddown of the KC-46A Tanker Aircraft, which will herein and after be referred to as MOB 3.

I am Colonel Joe Moore and I will be your hearing officer tonight. I am an Air Force judge and will be acting as moderator tonight. As the moderator, my role is to ensure that the Air Force provides a fair, orderly, and impartial hearing where you have an opportunity to make comments on the proposal. I do not work for anyone at the Air Force Reserve Command, the Air Force Civil Engineer Center, the Air Mobility Command, or any of the Air Force bases under consideration for the proposed action. I am not involved in any way with the development of this draft Environmental Impact Statement, herein referred to as the EIS, and I do not act as a legal advisor to the Air Force representatives working on this proposal.

This hearing is held in accordance with the provisions of the National Environmental Policy Act, or NEPA, as implemented by the Council on Environmental Quality Regulations and the Air Force. We are here tonight to present information on the environmental impacts of the proposed KC-46A MOB 3 Beddown and to receive your comments on the draft EIS.

Tonight's hearing is one of several opportunities for public comments. This hearing is an opportunity for you to express your views and concerns about the adequacy of the environmental analysis contained in the draft EIS, as well as any issues related to the NEPA process. This hearing is not a debate or a vote on the Draft EIS and it is not a question and answer session. We welcome your input on the environmental analysis presented in the Draft EIS. Comments about other unrelated issues can certainly be made, but they will not assist in the decision making process or the Draft ERS -- EIS.

I would like to begin the hearing by introducing the NEPA team beginning with the team leader, Lieutenant Colonel Vinup, with the Air Force Reserve Command who will present details of the proposed action and alternatives. Next is Mr. Hamid Kamalpour, the EIS project manager at the Air Force NEPA Center, who will discuss results of the NEPA process. Representatives from Tinker Air Force Base led by Colonel Chris Amend are also present. Although not a part of the analysis team, they have provided detailed base information which is critical to a thorough analysis of impacts in this draft EIS. Lastly, representatives from Leidos are here supporting the Air Force as the contractor. Transcribing tonight's hearing is Ms. Shelley Marburger. I would also like to recognize the following individuals present this evening. Mayor Matt Dukes from Midwest City and Vice Mayor Kent Bartlett from Del City. Thank you for your attendance as well.

Lieutenant Colonel Vinup will first present information on the proposed action and the alternatives. Then, Mr. Kamalpour will provide an overview of the NEPA process and will summarize the potential environmental consequences of the proposal.

After their presentations, which should take about 20 minutes, we will begin our oral comment period, during which you can provide input on the proposed action, draft EIS analysis, and potential environmental impacts. Your comments will become part of the official record of the final EIS. Please note that informal discussions at our informational displays will not become a part of the EIS record, so if you have items of concern about the analysis in the draft EIS that you would like to bring to our attention, please do so during our formal comment opportunity or in writing.

If you do not choose to make an oral comment, you can submit written comments either by turning in a comment form this evening or by mailing it to the address shown on the screen. Comments may be also submitted online at www.KC-46A-beddown.com.

If you have not had a chance to review the draft EIS, it is available on the website, or at one of the public libraries listed here.

The Air Force welcomes public comments in writing at anytime during the Environmental Impact Analysis process. To receive timely consideration for the final EIS, please submit your comments by January 3rd, 2017. Your comments will provide the decision-maker, in this case the secretary of the Air Force, with information to assist in making a decision regarding where the MOB 3 will be located. Your comments during this process provide the benefit of your knowledge of the local area and your concerns about the environmental impacts or analysis.

We will now move into the briefing. During the briefing, our speakers will be reading from prepared scripts. The briefing is written to make certain each speaker covers all pertinent information and that it is consistent for all four hearings.

With that, I will now turn the

microphone over to Lieutenant Colonel Vinup from the Air Force Reserve Command.

LIEUTENANT COLONEL VINUP: Thank you. Good evening and welcome, I'm Lieutenant Colonel Vinup, representing Air Force Reserve Command. I am a previous tanker pilot and T1 pilot and serving on the staff of Air Force Reserve Command. Welcome to this evening's meeting.

As a team leader, I encourage you to assist the Air Force in meeting its requirements to comply with the NEPA process. Your attendance tonight indicates your interest in this proposed action, and I hope your comments will provide us with additional information or areas where further analysis is needed. All comments will be properly reviewed, analyzed, and addressed in the final EIS.

The purpose of the proposed action involves the KC-46A's role in the Air Force tanker fleet modernization effort. The goal of this effort is to ensure future tankers are the best available to support a high-threat, multi-role war fighting capability to commanders worldwide. To perform this mission, trained aircrews, maintenance, and support personnel must be

KC-46A MOB 3 Beddown Public Hearing

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available to meet KC-46A inventory delivery dates as older tanker aircraft are removed from the inventory.

While we continue to operate the Legacy tanker fleet of aircraft, the KC-46A provides several advantages including: The ability to refuel any certified fixed-wing aircraft on any mission. The ability to complete a mobility mission while at the same time conducting a refueling mission, also known as a force multiplier. The capability of refueling multiple aircraft at once. Increased airlift capability. The capability to receive fuel in flight, and the improved force protection and survivability of the aircraft.

The Air Force is proposing to establish the third main operating base for KC-46A aircraft along with required infrastructure and manpower at one Air Force installation in the Continental United States where the Air Force Reserve Command leads a mobility Air Force mission.

The third main operating base would utilize pilots, copilots, and boom operators and other support staff who operate and maintain the aircraft to provide worldwide refueling, cargo, and aeromad -- aeromedical evacuation support.

Implementation of this mission would require a variety of on-base development projects including demolition, new construction and renovation. Implementation of the MOB 3 mission would increase area populations and would result in an overall increase in total annual aircraft operations at Seymour Johnson Air Force Base, Tinker Air Force Base and Westover Air Reserve Base and a decrease in total annual aircraft operations at Grissom Air Reserve Base.

At each base, KC-46A aircrews would utilize existing aircraft flight tracks, air refueling tracks, and fuel jettison areas if necessary.

The no-action alternative is required by the National Environmental Policy Act and was evaluated at each proposed Beddown location to provide a baseline for the decision-maker. The no action alternative evaluates the environmental consequences of not basing the KC-46A aircraft at any base.

In the draft EIS, the Air Force analyzed the environmental consequences of basing the MOB 3 mission at Grissom Air Reserve Base in Indiana, Seymour Johnson Air Force Base in North Carolina, Tinker Air Force Base in Oklahoma, or Westover Air Reserve Base in Massachusetts.

In October 2015, the secretary of the Air Force announced Seymour Johnson Air Force Base as the preferred alternative for the KC-46A MOB 3 mission. Grissom Air Reserve Base, Tinker Air Force Base and Westover Air Reserve Base were announced as reasonable alternatives for the MOB 3 mission. This table summarizes the bases being considered and how the existing missions could be impacted. The following slides summarize the aircraft facilities and manpower changes anticipated to be required to support the KC-46A MOB 3 mission.

Grissom Air Reserve Base has been identified as a reasonable alternative for the MOB 3 mission. If Grissom is selected to host the MOB 3 mission, the existing 16 KC-135 aircraft would be replaced with 12 KC-46A aircraft.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction and renovation. This mission would increase the area population by approximately 530 people including estimated dependents and would result in a 9 percent decrease in annual aircraft operations.

Seymour Johnson Air Force Base has been identified as the preferred alternative for the MOB 3 mission. If Seymour Johnson is selected to host the MOB 3 mission, the 16 existing KC-135 aircraft will be replaced with 12 KC-46A aircraft. The F-15E mission would continue with no change.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction and renovation. This mission would increase the area population by approximately 100 people including estimated dependents and would result in a 3 percent increase in annual aircraft operations.

KC-46A aircrews associated with the Mob 3 mission at Seymour Johnson Air Force Base would also continue to use the Kinston Regional Jetport as an auxiliary field. The Kinston Regional Jetport is currently being used by KC-135 aircrews.

If Tinker Air Force Base is selected

to host the MOB 3 mission, the existing 8 KC-135 aircraft would be replaced by 12 KC-46A aircraft.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction and renovation. This mission would increase the area population by approximately 769 people including estimated dependents and would result in approximate 13 percent increase in annual aircraft operations.

If Westover is selected to host the MOB 3 mission, the KC-46A MOB 3 would be a new mission and the existing C-5 mission would remain in place.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction and renovation. This mission would increase the area population by approximately 1,040 people including estimated dependents and would result in an approximate 41 percent increase in annual aircraft operations.

We would like to emphasize that, although the preferred alternate -- alternative for the MOB 3 mission has been announced, no final decision has been made on basing the KC-46A MOB 3 mission currently under analysis in the draft EIS. We look forward to inputs provided by the public and the affected communities as we proceed through the Environmental Impact Analysis. Once the requirements of the Environmental Impact Analysis process are complete, the Air Force will make its final basing decision.

Thank you for your attention. I will now turn the presentation over to Mr. Hamid Kamalpour, the Air Force project manager for the EIS, to discuss the NEPA process and provide greater detail on potential impacts as described in the draft EIS.

MR. KAMALPOUR: Good evening, I am Hamid Kamalpour, the Air Force NEPA division project manager for the analysis of this proposed action. I am here tonight to discuss the results of the Environmental Impact Analysis for the proposal presented -- presented by Lieutenant Colonel Vinup.

The draft EIS has been prepared in accordance with the requirements of NEPA, which requires federal agencies to analyze the potential environmental consequences of a proposed action, and reasonable alternatives -- including a no action alternative -- before any action is taken. The goal of the conducting an EIS is to support sound decision through -- through the assessment of potential environmental consequences as well as involvement the public in the process. The result of this analysis and other relevant factors will be considered before a decision is made by the Air Force on the proposal. Your input during the past public scoping period and this public comment period will help the secretary of the Air Force to make the most informed decision possible on this proposal.

As you can see from this slide, there are -- there are several key steps to the Environmental Impact Analysis process. We are currently at the public and public agency draft EIS review stage. This period begin -- began with -- with federal register publication of the notice of availability for the draft EIS. At that time, the copies of the draft EIS were mailed to the local libraries, states and federal representative and individual who requested copies during the EIS scoping period.

The normal review period requires by

NEPA is 45 days. The draft EIS public comment period will end on January 2nd -- January 3rd, 2017. The public hearing are being held in the same communities as the previous scoping meetings in order to provide the affected communities with the opportunity to comment on the draft EIS.

All substantive comments received prior to the close of the public comments period will be considered during the prep -- preparation of the final EIS. The Air Force responds to substantive comments on a draft EIS in the final EIS.

The final EIS is scheduled to be released in May 2017. After the final EIS notice of availability is published in the federal register, the Air Force must observe a waiting period of at least 30 days before signing the final record of decision the ROD to document which alternative the Air Force selected for implementation.

The draft EIS presents information on potential environmental consequences associated with implementing the MOB 3 mission at each of the four bases. The potential environmental consequences are grouped into five categories shown on this slide and the subcon -- subcategories represented the eleven resources area evaluate -- areas evaluated at each bases.

The next set of slides describes the potential environmental consequences at each of the four bases. For the purpose of this presentation, the potential environmental consequences at each base have been summarized in broad terms. For a more detailed evaluation of the potential con -- consequences, please refer to the Chapter 4 of the draft EIS.

Implementation of the MOB 3 mission at Grissom Air Force -- Air Base would result in a decrease of 20 a -- 21 acre of land exposed to 65 decibel for greater noise level and no off-base resident would be exposed to these noise level. As shown on the noise contour map, nearly all of the land exposed to the noise is located to the north and south of the runway. No other resource area are anticipated to be impacted by the MOB 3 mission.

Implementation of MOB 3 mission would add up to 530 full -- 30 -- 530 full time military staff and dependents to this area resulting in a .7 percent increase in the area population.

A variety of demolition, construction, and renovation projects would be required for the MOB 3 mission resulting in positive economic impact to the Cass and Miami county and surrounding areas.

Implementation of the MOB 3 mission at Seymour Johnson Air Force Base would expose an additional 1 acre of off-base land and an estimated 1 additional off-base resident noise level of 65 decibel or greater over baseline condition. Implementation of the MOB3 mission would add up to 100 full time military staff and dependent to Wayne County resulting in a .08 percent increase in the Wayne County population. No other resource area are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission at Tinker Air Force Base would expose an additional 7 acre of off-base land and an estimated 6 off-base resident to noise level 65 decibel or greater.

Implementation of MOB 3 mission would add up to 769 full time military staff and dependents to Oklahoma County resulting in a .1 percent increase in the county populations.

As part of the MOB 3 mission, the 506 -- 507 Air Reserve Wing aircraft parking ramp requires expansion which would impact a jurisdictional water and floodplain. A nationwide wetland permit would be obtained for the impact to the jurisdictional water and a finding of no practical alternative would be -- would be prepared for impact to the floodplain. To minimize potential floodplain impacts, construction design would incorporate measures for construction in the floodplain. In addition, the Air Force prepared a biological evaluation to evaluate the potential for additional impact to the threatened and the endangered species results -- resulting from less than 13 percent increase in the aircraft operation. As a res -- as a result of the biological evaluation, the Air Force determined that the implementation of KC-46A MOB 3 mission at Tinker Air Force Base may affect but is not likely to adversely affect the interior lease tern, the whooping crane, and the piping plover and the red knot. To minimize the further impact to the birds, the Tinker Air Force Base will continue to contract with the USDA to provide daily wildlife control service to prevent birds from using the installation, managing vegetation on the installation to discourage bird use and during the time of the high -- during the times of high bird activities, if possible, aircraft pattern altitude and direction will be modified to avoid bird concentration. Lastly, the Oklahoma archaeological survey has requested that an archaeological field inspection of the construction area be conducted prior to commencing the con -- commencing construction.

No other consequences are anticipated to result from implementation of the MOB 3 mission at Tinker Air Force Base.

The C-5 is -- is the document -- is dominant noise source at West -- Westover Air Reserve Base and the independent planned conversion of the C-5 -- C -- C-5B to quieter C-5 aircraft, con -- coinciding with the proposed MOB 3 Bedding in 2019 would result in a 396-acre decrease in off-base land and a decrease of an estimated 38 off-base resident exposed to the noise level at 65 decibel or greater.

Implementation of the MOB 3 mission at Westover Air Reserve Base would result in adverse effect to historical properties. Hangar

7071 and building 2426 are contributing resources within the Westover Air Reserve Base historic district. Both of these structures would be demolished to make room for the new KC-46 hangar. As mitigation for these impact, the Air Force has proposed historical recordation of these building and mapping of the current and former boundaries of the installation as well as inviting the Massachusetts Historical Commission to participate in the design review process for new construction, should the MOB 3 mission be implemented at Westover Air Reserve Base. The Massachusetts Historical Commission concurred with the proposed mitigation measure on August 26, 2016.

No other consequences are anticipated for the MOB 3 mission at Westover Air Reserve Base. That concludes the environmental con -- consequence -- consequences portion of our briefing. I will now turn the microphone over to our hearing officer.

COLONEL MOORE: We will now move into the oral comment part of the hearing. For those wishing to speak, here is the format. Please fill out a white speaker form. If you did not get one of these and want to speak, please raise your hand

and one of the staff will give you a form.

We will now take a 10-minute recess in order for us to collect the forms and prepare for public comments. We are in recess at this time.

(A recess was taken.)

COLONEL MOORE: All right, I'll go ahead and call the hearing back to order. We do have one individual who would like to make a public comment. So the chair would recognize Mr. Glenn Goldschlager at this point. T02_I

The floor is yours. You have a 3-minute comment period, he'll give you a 30-minute (sic) warning and then a stop sign when you get to 30 minutes (sic).

MR. GOLDSCHLAGER: I'll just need 3 minutes.

COLONEL MOORE: All right, hold the mic down for him.

MR. GOLDSCHLAGER: Oh, okay. Can you hear me?

COLONEL MOORE: Yeah. Please spell your name, please.

MR. GOLDSCHLAGER: Spell my name? You can't spell Goldschlager?

G-o-l-d-s-c-h-l-a-g-e-r. There's a couple of things that I thought was wrong with your report. The one was the noise level, because we've got 135s coming in here now for maintenance all the time. So you can't separate out this one plane when we've got all these others coming in. If they replace them for maintenance, and Tinker's going to be doing all the maintenance, then all the planes' noise level has to be taken into account, not just the 12 you're putting here, but the entire fleet. Because at some time or another, the entire fleet will fly into Tinker. T02_I

The other thing that I don't think you're taking into account is that Tinker is doing the maintenance. If you've got 12 planes here, that's 12 planes you're not having to fly in here because they're already here. And as long as it took to get this weapons system built, it's probably going to be around for about the next 60 years. So at some time or another all of the planes are going to be flying into Tinker for maintenance. So if 12 of them are already here, you're not going to have to fly them anywhere, all you're have to going to do is drag them from one end of the base to the other.

T02_I

So as far as efficiency goes, the more you can put here on the ground, the more efficient it's going to be when you start maintaining them. That's all I have to say.

COLONEL MOORE: Thank you, Mr. Goldschlager, for your comments. And as we have no remaining speakers, Air Force representatives will continue to be available by the display boards to continue discussions. However, I remind you again, the discussions that take place at the boards will not be part of the official record.

We will keep the opportunity for comments open until we reach 8:00. So if anyone does decide that you would like to make further comments, that opportunity will be held open until 8:00 p.m. And we will recess the hearing at this time until 8:00 p.m.

(A recess was taken.)

COLONEL MOORE: There will be no more speakers. This hearing is adjourned.

(Hearing adjourned.)

C E R T I F I C A T E

STATE OF OKLAHOMA)
)SS:
COUNTY OF OKLAHOMA)

I, Shelley A. Marburger, a certified shorthand reporter within and for the State of Oklahoma, certify that the public hearing was taken by me in stenotype and thereafter transcribed by computer and is a true and correct transcript of the public hearing; that the public hearing was taken on December 6, 2016, at 5:33 p.m., at 5750 Will Rogers Road, Midwest City, Oklahoma; that I am not an attorney for or a relative of any party, or otherwise interested in this action.

Witness my hand and seal of office on December 14, 2016.

Shelley Marburger

Shelley A. Marburger, CSR
For the State of Oklahoma
CSR #1904

A.7.2.13 Westover ARB Draft EIS Comments

Verbal comments recorded by the court reporter are contained in the public hearing transcript in Section A.7.2.15.

W01_I

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT

Public Hearing Written Comment Form

For more information or to submit comments online, please go to: www.KC-46A-beddown.com

PLEASE PRINT LEGIBLY.

LOCATION: WESTOVER ARB CHICOPEE, MA DATE: 12-13-16

WENT TO HEARING TONIGHT, ONLY TWO MEN SPOKE, BOTH WERE X MILITARY MEN FROM WESTOVER. ONE SAID TANKERS WERE HERE WHEN B-52'S WERE. BACK THEN WE DID NOT HAVE ALL THE BUSINESS ON BASE AND AROUND BASE LIKE WE DO NOW. THESE PLANES LOADED WITH FUEL IS A SAFETY ISSUE TO THE PUBLIC AROUND THE BASE. IT IS NOT FAIR TO THE TAX PAYERS TO PAY THE EXPENSE TO HAVE THESE PLANES HERE WHEN IT WOULD COST LESS AT OTHER BASES. WE GET SNOW, ICE, AND COLD HERE. IT WOULD BE BETTER IN A WARMER STATE. ENCLOSED IS A LETTER TO TELL YOU WHAT WE THINK. THE CONTROL TOWER IS NOT OPEN 24 HRS. AT WESTOVER BECAUSE OF A LAW SUIT YEARS AGO.

**** CONTINUE ON BACK FOR MORE SPACE ****

Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act (FOIA), you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Name: VINCENT + CAROL Bachand

Organization:

Address: [redacted]

City/State/Zip: [redacted]

Please turn in this form at the registration desk or mail by January 2, 2017, to:

Mr. Hamid Kamalpour
United States Air Force, AFCEC/CZN
2261 Hughes Ave, Ste 155
JBSA Lackland AFB, Texas 78236-9853

W02_I

To Who it may concern:

We live in Granby on the flight path. The planes fly over the side of our house constantly especially every Tuesday and Thursday. We cannot have a conversation in the yard or in the house when the windows are open when they fly over always low.

Westover development bought houses in our area,because of the noise from the planes. Some of us did not sell because of various reasons. Most could not afford to move. They said at one point they would sound proof our houses,but this never happened.

We have enough noise from these planes, C5A's helicopters, jets C130's(I don't know when they got dumped here they did not tell us they were coming.) and commerical planes.

You claim it will bring jobs to chicopee and help the economy. I have no problem with these planes coming to chicopee if they take off and land over chicopee not Granby Not over my house .Granby lost a lot of tax dollars because Westover Development tore down a lot of houses. We need new schools and have no money because of lost tax dollars. All we get is noise from Westover.

These Tanker planes will be loaded with fuel when they take off and if they were to crash it would take out a large area. There are a lot of bussiness on Westover and a school close by. This is not a place for these tanker planes.

No more Noise Please. We do not want these planes.

The Bachand Family

[redacted]

1

A.7.2.14 Westover ARB Public Hearing Sign-In List

Sign-In List Attendee Name	Organization (Agency, Private Citizen, etc.)
Bachand, Carol	Private Citizen
Bachand, Vincent l	Private Citizen
Benson, Blaine	Westover ARB
Brennan, Tim	Pioneer Valley Planning Commission
Chaffee, Kevin	City of Springfield, Planning and Economic Development
Crombleholme, Hayley	WWLP-22 News
Dobrowski, Richard	Private Citizen
Dobbs, G. Michael	Reminder Publications
Marek, Richard	Private Citizen
Moran, John	Private Citizen
Moriorty, John (Jack)	Westover ARB
Recupero, Steven	Private Citizen

A.7.2.15 Westover ARB Public Hearing Transcript

(Transcript contained on the following pages.)

PUBLIC HEARING FOR WESTOVER AIR RESERVE BASE

In Re: Draft Environmental Impact Statement for the Proposed Third Main Operating Base Beddown of the KC-46A Tanker Aircraft.

Metropolitan Airport
Westover Airport Departure Lounge
255 Padgette Street
Chicopee, Massachusetts

Tuesday, December 13th, 2016 - 5:30 p.m.

PRESENT:

Colonel Joe Moore
Hearing Officer

Lieutenant Colonel Jim Vinup
NEPA Team Leader Air Force Reserve Command

Hamid Kamalpour, AFCEC
EIS Project Manager Air Force NEPA Division

Tom V. Daues, PMP
Leidos Senior Project Manager
Environmental Planning Division

Amy Spangler, Court Reporter

INDEX TO SPEAKERS

PUBLIC COMMENT

75 MARKET PLACE
SPRINGFIELD, MA 01103
www.philbin-associates.com
PHILBIN & ASSOCIATES, INC.
(413) 733-4078
Pittsfield: (413) 499-2231
FAX: (413) 734-4588
Serving the legal community of Massachusetts since 1947

COLONEL MOORE: All right. It looks like everybody has already taken your seat. Please make one last check to make sure your cells are silent. We will go ahead and get started here.

The time is approximately 5:30, and we will now start the hearing. Thank you for attending. This public hearing is for the draft environmental impact statement or draft EIS for the proposed third main operating base beddown of the KC-46A tanker aircraft, herein after referred to as MOB 3.

I am Colonel Joe Moore, and I will be your hearing officer tonight. I'm an Air Force Judge, and I will be acting as the moderator tonight. As the moderator, my role is to ensure that the Air Force provides a fair, orderly, and impartial hearing where you have an opportunity to make comments on the proposal.

I do not work for anyone at the Air Force Reserve Command, the Air Force Civil Engineer Center, the Air Mobility Command, or any of the Air Force bases under consideration for the proposed action. I am not involved in any way with the development of this draft environmental impact statement, herein after referred to as the EIS, and I do not act as a legal advisor to the Air Force representatives working on this proposal.

This hearing will be held in accordance with the provisions of the National Environmental Policy Act, or NEPA, as implemented by the Council on Environmental Quality Regulations and the Air Force.

We are here tonight to present information on the environmental impacts of the proposed KC-46A MOB 3 beddown and to receive your comments on the draft EIS.

Tonight's hearing is one of several opportunities for public comments. This hearing is an opportunity for you to express your views and concerns about the adequacy of the environmental analysis contained in the draft EIS, as well as any issues related to the NEPA process. This hearing is not a debate or vote on the draft EIS, and it is not a question-and-answer session. We welcome your input on the environmental analysis presented in the draft EIS. Comments about other unrelated issues can certainly be made, but they will not assist in the decision-making process for the draft EIS.

I would like to begin this hearing by introducing the NEPA team, beginning with the team leader, Lieutenant Colonel Jim Vinup immediately to my left, with the Air Force Reserve Command, who will present details of the proposed action and alternatives.

Next is Mr. Hamid Kamalpour, the EIS project manager at the Air Force NEPA division, who will discuss results of the NEPA process. Representatives from Westover Air Reserve Base are also present. Although not a part of the analysis team, they have provided detailed base information which is critical to a thorough analysis of impacts in the draft EIS.

Lastly, representatives from Leidos are here supporting the Air Force as the contractor. Transcribing tonight's hearing is Amy Spangler.

I would also like to recognize -- actually, we don't have any elected representatives here to recognize, so I'll move on.

Lieutenant Colonel Vinup will first present information on the proposed action and the alternatives. Then, Mr. Kamalpour will provide an overview of the NEPA process and will summarize the potential environmental consequences of the proposal.

After their presentations, which should take about 20 minutes, we will begin our oral comment period, during which you can provide input on the proposed action, draft EIS analysis, and potential environmental impacts. Your comments will become part of the official record of the final EIS. Please note that informal discussions at our informational displays will not become part of the EIS record, so if you have items of concern about the analysis in the draft EIS you would like to bring to our attention, please do so during our formal comment opportunity or in writing.

If you do not choose to make an oral comment, you can submit written comments either by turning in a comment form this evening or by mailing a comment card to the address shown on the screen. Comments may also be submitted online at www.kc-46a-beddown.com.

If you have not had an opportunity to

review the draft EIS, it is available on the website or at one of the public libraries listed here.

The Air Force welcomes public comments in writing at any time during the environmental impact analysis process. To receive timely consideration for the final EIS, please submit your comments by January 3rd, 2017. Your comments will provide the decision-maker, in this case the Secretary of the Air Force, with information to assist in making a decision regarding where the MOB 3 will be located. Your comments during this process provide the benefit of your knowledge of the local area and your concerns about the environmental impacts or analysis.

We will now move into the briefing. During the briefing, our speakers will be reading from prepared scripts. The briefing is written to make certain each speaker covers all pertinent information and that it is consistent for all four hearings.

With that, I will now turn the microphone over to Lieutenant Colonel Vinup from the Air Force Reserve Command.

LIEUTENANT COLONEL VINUP: Good evening and welcome. I am Lieutenant Colonel Vinup representing the Air Force Reserve Command. I am a tanker pilot serving on staff here. Welcome to this evening's meeting.

As the team leader, I encourage you to assist the Air Force in meeting its requirements to comply with the NEPA process. Your attendance tonight indicates your interest in this proposed action, and I hope your comments will provide us with additional information or areas where further analysis is needed. All comments will be properly reviewed, analyzed, and addressed in the final EIS.

The purpose of the proposed action involves the KC-46A's role in the Air Force tanker fleet modernization effort. The goal of this effort is to ensure future tankers are the best available to support a high-threat, multi-role war fighting capability to commanders worldwide. To perform this mission, trained aircrews, maintenance, and support personnel must be available to meet KC-46A inventory delivery dates as older tanker aircraft are removed from the inventory.

While we will continue to operate the legacy tanker fleet of aircraft, the KC-46A provides several advantages including the ability to refuel any certified fixed-wing aircraft on any mission; the ability to complete a mobility mission while at the same time conducting an air refueling mission, which is also known as a force multiplier. It also has the capability of refueling multiple aircraft at once; increased airlift capability. It has the capability to receive fuel in flight; and it has improved force protection and survivability.

The Air Force is proposing to establish the third main operating base for the KC-46A aircraft along with required infrastructure and manpower at one Air Force installation in the continental United States where the Air Force Reserve Command leads a mobility Air Force mission.

The third main operating base would utilize pilots, copilots, boom operators, and other support staff who operate and maintain the aircraft to provide worldwide refueling, cargo, and aeromedical evacuation support.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. Implementation of the MOB 3 mission would increase area populations and would result in an overall increase in total annual aircraft operations at Seymour Johnson Air Force Base, Tinker Air Force Base, and Westover Air Reserve Base and a decrease in total annual aircraft operations at Grissom Air Reserve Base.

At each base, the KC-46A aircrews would utilize existing aircraft flight tracks, air refueling tracks, and fuel jettison areas, if necessary.

The no-action alternative is required by the National Environmental Policy Act and was evaluated at each proposed beddown location to provide a baseline for the decision-maker. The no-action alternative evaluates the environmental consequences of not basing the KC-46A aircraft at any base.

In the draft EIS, the Air Force analyzed the environmental consequences of basing the MOB 3 mission at Grissom Air Reserve Base in Indiana, Seymour Johnson Air Force Base in North Carolina, Tinker Air Force Base in Oklahoma, or Westover Air Reserve Base in Massachusetts.

In October of 2015, the Secretary of the Air Force announced Seymour Johnson Air Force Base as the preferred alternative for the KC-46A MOB 3 mission. Grissom Air Reserve Base, Tinker Air Force Base, and Westover Air Reserve Base were announced as reasonable alternatives for the MOB 3 mission. This table summarizes the bases being considered and how the existing missions could be impacted. The following slide summarizes the aircraft facilities and manpower changes anticipated to be required to support the KC-46A MOB 3 mission.

Grissom Air Reserve Base has been identified as a reasonable alternative for the MOB 3 mission. If Grissom is selected to host the MOB 3 mission, the existing 16 KC-135 aircraft would be replaced with 12 KC-46A aircraft.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately 530 people including estimated dependents and would result in a 9 percent decrease in annual aircraft operations.

Seymour Johnson Air Force Base has been identified as the preferred alternative for the MOB 3 mission. If Seymour Johnson is selected to host the MOB 3 mission, the 16 existing KC-135 aircraft would be replaced with 12 KC-46A aircraft. The F-15E mission would continue with no change.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately 100 people including estimated dependents and would result in a 3 percent increase in annual aircraft operations.

KC-46A aircrews associated with the MOB 3 mission at Seymour Johnson Air Force Base would also continue to use the Kinston Regional Jetport as an auxiliary airfield. The Kinston Regional Jetport is currently being used by KC-135 aircrews.

If Tinker Air Force Base is selected to host the MOB 3 mission, the existing eight KC-135 aircraft would be replaced by 12 KC-46A aircraft.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately 769 people including estimated dependents and would result in an approximate 13 percent increase in annual aircraft operations.

If Westover is selected to host the MOB 3 mission, the KC-46A MOB 3 would be a new mission and the existing C-5 mission would remain in place.

Implementation of the MOB 3 mission would require a variety of on-base development projects including demolition, new construction, and renovation. This mission would increase the area population by approximately 1,040 people including estimated dependents and would result in an approximate 41 percent increase in annual aircraft operations.

We would like to emphasize that, although the preferred alternative for the MOB 3 mission has been announced, no final decision has been made on basing the KC-46A MOB 3 mission currently under analysis in the draft EIS. We look forward to inputs provided from the public and the affected communities as we proceed through the environmental impact analysis. Once the requirements of the environmental impact analysis process are complete, the Air Force will make its final basing decision.

Thank you for your attention. I will now turn the presentation over to Mr. Hamid Kamalpour, the Air Force project manager for the EIS to discuss the NEPA process and provide greater detail on potential impacts as described in the draft EIS.

MR. KAMALPOUR: Good evening. I am Hamid Kamalpour, the Air Force NEPA division project manager for the analysis of this proposed action. I am here tonight to discuss the results of the environmental impact analysis for the proposal presented by Lieutenant Colonel Vinup.

The draft EIS has been prepared in accordance with the requirements of NEPA, which requires federal agencies to analyze the potential environmental consequences of a proposed action, and reasonable alternatives including a no-action alternative, before any action is taken.

The goal of conducting an EIS is to support sound decisions through the assessment of potential environmental consequences as well as involving the public in the process. The results of this analysis and other relevant factors will be considered before a decision is made by the Air Force on this proposal. Your input during the past public scoping period and this public comment period will help the Secretary of the Air Force make the most informed decision possible on this proposal.

As you can see on this slide, there are several key steps to the environmental impact analysis process. We are currently at the public and agency draft EIS review stage. This period began with the federal register publication of the notice of availability for the draft EIS. At that time, copies of the draft EIS were mailed to local libraries, state and federal representatives, and individuals who requested copies during the EIS scoping period.

The normal review period required by NEPA is 45 days. The draft EIS public comment period will end on January 3rd, 2017. The public hearings are being held in the same communities as the previous scoping meetings in order to provide the affected communities with the opportunity to comment on the draft EIS.

All substantive comments received prior to the close of the public comment period will be considered during preparation of the final EIS. The Air Force responds to substantive comments on a draft EIS in the final EIS.

The final EIS is scheduled to be released sometime in May 2017. After the final EIS notice of availability is published in the Federal Register, the Air Force must observe a waiting period of at least 30 days before signing the final record of decision to document which alternative the Air Force selects for implementation.

The draft EIS presents information on potential environmental consequences associated with implementing the MOB 3 mission at each of the four bases. The potential environmental consequences are grouped into the five categories shown on this slide and the subcategories represent the eleven resource areas evaluated at each base.

The next set of slides describes the potential environmental consequences at each of the four bases. For the purposes of this presentation, the potential environmental consequences at each base have been summarized in broad terms. For a more detailed evaluation of the potential consequences, please refer to Chapter 4 of the draft EIS.

Implementation of the MOB 3 mission at Grissom Air Reserve Base would result in a decrease of 21 acres of land exposed to 65 decibels or greater noise levels and no off-base residents would be exposed to these noise levels. As shown on the noise contour map, nearly all of the land exposed to noise is located to the north and south of the runway. No other resource areas are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission would add up to 530 full-time military staff and dependents to this area resulting in a 0.7 percent increase in the area population.

A variety of demolition, construction, and renovation projects would be required for the MOB 3 mission resulting in positive economic impacts to Cass and Miami counties and surrounding areas.

Implementation of the MOB 3 mission at Seymour Johnson Air Force Base would expose an additional one acre of off-base land and an estimated one additional off-base resident to noise levels of 65 decibels or greater over baseline conditions. Implementation of the MOB 3 mission would add up to 100 full-time military staff and dependents to Wayne County resulting in a 0.08 percent increase in the Wayne County population. No other resource areas are anticipated to be impacted by the MOB 3 mission.

Implementation of the MOB 3 mission at Tinker Air Force Base would expose an additional seven acres of off-base land and an estimated six off-base residents to noise levels 65 decibels or greater.

Implementation of the MOB 3 mission would add up to 769 full-time military staff and dependents to Oklahoma County resulting in a 0.1 percent increase in the county population.

As part of the MOB 3 mission, the 507 Air Reserve Wing aircraft parking ramp requires expansion which would impact a jurisdictional water and floodplains. A nationwide wetland permit would be obtained for the impacts to the jurisdictional water and a finding of no practical alternative would be prepared for impacts to the floodplain. To minimize potential floodplain impacts, construction designs would incorporate measures for construction in the floodplain.

In addition, the Air Force prepared a biological evaluation to evaluate the potential for additional impacts to threatened and endangered species resulting from the less than 13 percent increase in aircraft operations. As a result of the biological evaluation, the Air Force determined that implementation of the KC-46A MOB 3 mission at Tinker Air Force Base may affect but is not likely to adversely affect the Interior Least Tern, the Whooping Crane, the Piping Plover, and the Red Knot. To minimize further impacts to birds, Tinker Air Force Base will continue to contract with the USDA to provide daily wildlife control services to prevent birds from using the installation. They will manage vegetation on the installation to discourage bird use. In addition, during times of high bird activity, if possible, aircraft pattern altitudes and directions will be modified to avoid bird concentrations.

Lastly, the Oklahoma archaeological survey has requested that an archaeological field inspection of the construction area be conducted prior to commencing construction.

No other consequences are anticipated to result from the implementation of the MOB 3 mission at Tinker Air Force Base.

The C-5 is the dominant noise source at Westover Air Reserve Base and the independent planned conversion of the C-5B to quieter C-5M aircraft, coinciding with the proposed MOB 3 beddown in 2019 would result in a 396-acre decrease in off-base land and a decrease of an estimated 38 off-base residents exposed to noise levels of 65 decibels or greater.

Implementation of the MOB 3 mission at Westover Air Reserve Base would result in adverse effects to historic properties. Hangar 7071 and building 2426 are contributing resources within the Westover Air Reserve Base historic district.

Both of these structures would be demolished to make room for the new KC-46A hangar. As mitigation for these impacts, the Air Force has proposed historical recordation of these buildings and mapping of the current and former boundaries of the installation as well as inviting the Massachusetts Historical Commission to participate in the design review process for new construction, should the MOB 3 mission be implemented at Westover Air Reserve Base. The Massachusetts Historical Commission concurred with the proposed mitigation measures on August 26, 2016.

No other consequences are anticipated for the MOB 3 mission at Westover Air Reserve Base. That concludes the environmental consequences portion of our briefing. I will now turn the microphone over to our hearing officer.

COLONEL MOORE: Thank you, Mr. Kamalpour. We will now move into the oral comment part of the hearing. For those wishing to speak, here is the format. Please fill out a white speaker form. If you did not get one of these and want to speak, please raise your hand and one of the staff will give you a form. We will now take a ten-minute recess in order for us to collect the forms and prepare for comment.

So again, if anyone wants to make a comment, please fill out a form and you also have the opportunity to submit comment in writing if you would like to do that. With that, the hearing is in recess for ten minutes.

(A short recess was taken).

COLONEL MOORE: The hearing is called back to order. When I call your name, you may approach the microphone, and stand up here at the podium. To help our stenographer, if you would please start by stating your name and the name of the organization, if any, that you represent. It will also help if you spell your last name. Please do not provide any other personal information such as your home address or phone number.

Again, your comments are recorded verbatim. They will be used to develop a transcript and permanent record of this hearing, and will be published in the final EIS. Your name will be included along with your comments. Personal home addresses and phone numbers will not be published in the final EIS.

Each speaker will have three minutes to provide his or her oral comments on the proposed action and alternatives.

We have a timekeeper to help keep track of the time. This person will hold up a yellow card when you have about 30 seconds left and a red card when it is time to stop. At that time, please conclude your comments so I can call on the next person. Of course, there is no obligation to use the entire three minutes. You do not need to yield any additional time to someone else. I will just move on to the next speaker when you've finished.

Also, in the interest of time, we ask that you submit any individual electronic presentations as written comments.

Tonight's hearing is set to end at 8 p.m. If everyone who signed up to speak has had a chance to do so before that time, I will ask if any speaker would like another three minutes to expand on your comments. If you want to do that, just let me know and we'll put another three minutes back on the clock for you.

If you want to add something later to your oral comments or if you would rather not speak here tonight, you can submit written comments. There is no page limit on written comments, and the Air Force gives equal weight to oral and written comments. Both become part of the official record and are included in the final EIS.

Just a few reminders before we get started. First, please limit your comments to the analysis in the draft EIS. That is the purpose of this public comment period. As I mentioned earlier, this is not a Q-and-A session. It is an opportunity for you to put on the record your views and concerns about the proposal that you want the decision-makers to consider. Questions that you pose during your verbal testimony will become part of the record and will be considered. After we've completed the formal part of the hearing, Air Force representatives will continue to be available for discussion.

I have been provided with a list of individuals who would like to speak. We will begin with W03_I Mr. Richard Dobrowski.

MR. DOBROWSKI: Richard Dobrowski, last name is D-O-B-R-O-W-S-K-I. I was stationed here at Westover back in 1972 and '73 when it was an active installation. And at that time, we had the KC-135s and the B-52s. Where we are standing right now or being seated is what they call the mole hole, and the Christmas tree where the B-52s were right outside here.

Since then there's been a lot of changes at this base. Probably my guess is about 90 percent of the old buildings have been gone. There's all new buildings here and a lot of good back up. My feelings are that we've had tankers here before and B-52s, and we all lived with them. When the B-52s sometimes left, the windows rattled a little bit, but I see no reason why the Air Force should think twice about not putting the KC-46 here. I welcome them. It's something that we could use, the people and the personnel and everything to go with it.

That's it.

COLONEL MOORE: Thank you, Mr. Dobrowski.

W04_I Next we'll hear from Mr. John Moran. Mr. Moran.

MR. MORAN: John Moran, M-O-R-A-N, civilian retired reservist. Just a question probably if the tankers were based here, would it result in a change in the operating hours? From what I understand the base has limited hours. They do not operate at night. Would the stationing of those planes here require 24-hour availability of the runways?

And I do support the stationing of the planes here.

COLONEL MOORE: And thank you for your comments. And again, if you would discuss that further with the Air Force representatives after we conclude, certainly feel free to do so.

Is there anyone else that wishes to be heard about the KC-46A MOB 3 beddown environmental impact statement?

(No comment).

COLONEL MOORE: Very well. As I mentioned earlier, this hearing is scheduled to end at 8 p.m., and so we will keep the hearing open until that

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time. If anyone does decide that you have any further comments to make, we will reopen the hearing and entertain those additional comments. Otherwise, we will be in recess until 8 p.m. Thank you. We are in recess.

(A recess was taken.)

COLONEL MOORE: There being no more speakers, the hearing is adjourned.

(The hearing adjourned at 8:00 p.m.)

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REPORTER'S CERTIFICATE

I HEREBY CERTIFY that I was present upon the hearing of the above-entitled matter and there reported stenographically the proceedings had and the testimony produced; and I further certify that the foregoing is a true and correct transcript of my said stenographic notes.

In testimony whereof, I have hereunto subscribed my hand this 23rd day of December 2016.

Amy J. Spangler

Amy J. Spangler, CSR
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APPENDIX B

DEFINITION OF RESOURCE AND METHODOLOGY FOR ANALYSIS

APPENDIX B DEFINITION OF RESOURCE AND METHODOLOGY FOR ANALYSIS

This appendix directly corresponds to the environmental resource areas described in Volume I, Chapter 3, as the baseline conditions, and the analysis of consequences, as described in Volume I, Chapter 4, for each of the four bases under consideration. The environmental resource areas are ordered according to the order in Volume I, Chapters 3 and 4. For each environmental resource area, this appendix provides a definition of the resource, the regulatory setting, if applicable, and a description of the methodology used to evaluate the environmental resource area.

Because the same resource areas were analyzed for each of the four bases, the definition, regulatory setting, and methodology are the same for all four bases. The analysis methodology addresses both the context of the environmental resource and the intensity of potential consequences to the resource resulting from implementation of the KC-46A missions.

B.1 ACOUSTIC ENVIRONMENT

B.1.1 RESOURCE DEFINITION

The acoustic environment is the combination of useful or desirable sounds and noise. Sound is tiny vibrations in a medium (e.g., air or water) that are detected by the ear, and noise is specifically unwanted sound. Sound intensity is typically expressed in decibels (dB), a logarithmic system of denotation. Sounds are often ‘A-weighted’, a process by which sound energy at frequencies heard best by the human ear are emphasized while other frequencies are de-emphasized. Several metrics are used to describe sounds that vary through time. The highest A-weighted sound level measured during a single event is called the maximum A-weighted sound level (L_{Amax}). The 24-hour equivalent sound level (L_{eq24}) is a cumulative metric that decibel-averages all noise events in a 24-hour period. The Day-Night Average Sound Level (L_{Adn}) is the same as L_{eq24}, except that L_{Adn} applies a 10 dB penalty to events between 10:00 P.M. and 7:00 A.M (i.e., acoustic night). Although L_{Adn} does not reflect the sound level heard at any given moment, it does provide a single-number description of the overall noise level. Social surveys have found a strong correlation between L_{Adn} and the percent of the population that is highly annoyed by the noise (Schultz 1978; Finegold et al. 1994). Reactions to noises depend not only on the qualities of the noise (e.g., intensity, pitch, duration, or time of day), but also on the characteristics of the listener (e.g., sensitivity of the individual and attitude toward the noise source) and the activity in which the listener is engaged at the time the noise occurs. While the reaction of an individual to noise cannot be predicted accurately, the cumulative tendencies of large numbers of people can be predicted with a reasonable degree of confidence. The Region of Influence (ROI) for noise includes areas on and near each installation that experience aircraft noise levels greater than 65 dB L_{Adn} during aircraft operations, and the areas proposed for infrastructure development where construction noise could occur.

B.1.2 REGULATORY SETTING

Because legal limits on allowable noise levels could, in some cases, reduce the combat effectiveness of military equipment, military equipment has been exempted from regulations that impose noise limitations. However, several policies and regulations are in place to limit the effects of military noise.

The U.S. Air Force (USAF) recognizes that noise-sensitive land uses are not compatible with elevated aircraft noise levels and has implemented the Air Installations Compatible Use

Zones (AICUZ) program, as described in Air Force Instruction (AFI) 32-7063 and Department of Defense Instruction (DoDI) 4165.57, to minimize incompatible land use. In 1992, the Federal Interagency Committee on Noise (FICON) established a set of guidelines detailing which land uses are compatible at which noise levels; these guidelines have been adopted as part of the AICUZ program.

In June 1980, an *ad hoc* Federal Interagency Committee on Urban Noise (FICUN) published guidelines (FICUN 1980) relating L_{Adn} to compatible land uses. The FICUN guidelines consider areas with noise levels of 75 dB L_{Adn} or greater as unacceptable living environments. Areas between 65–74 dB L_{Adn} are considered "generally unacceptable" for noise-sensitive land uses (e.g., residences, schools, hospitals, and public services). Houses located in areas between 65–74 dB L_{Adn} may not qualify for Federal mortgage insurance without additional costs associated with installing noise attenuation. In the outdoor noise environment, levels greater than 65 dB L_{Adn} may be annoying to some people during communications. Generally, residential development is not recommended in areas experiencing noise levels of 65 dB L_{Adn} or greater. Although discouraged, residential development is compatible within the 65–69 and 70–74 dB L_{Adn} contours, provided noise reduction levels of 25 dB and 30 dB, respectively, are achieved. Commercial/retail businesses are compatible without restrictions up to 69 dB, and up to 79 dB L_{Adn}, provided that noise reduction levels of 25 dB and 30 dB, respectively, are achieved for public areas. Industrial/manufacturing, transportation, and utility companies have a high noise level compatibility, and, therefore, can be located within the higher noise zones.

On-base noise exposure to workers may exceed 80 dB L_{Adn}. Workers in known high noise exposure locations may be required to wear hearing protection devices including, but not limited to, earplugs and earmuffs. The hearing conservation programs at each base are conducted in accordance with Air Force Occupational Safety and Health Standard 48-20, "Occupational Noise and Hearing Conservation Program," DoDI 6055.12, "DoD Hearing Conservation Program," and Title 29 of the *Code of Federal Regulations (CFR)* Section 1910.95, "Occupational Noise Exposure." The Bioenvironmental Engineering Office administers the Hearing Conservation Program at each of the alternative bases. Representatives from the Bioenvironmental Engineering Office visit facilities in which workers could potentially be exposed to noise levels exceeding noise exposure thresholds. A health risk assessment is conducted involving dosimeter testing of a representative sample of employees. An audiometric monitoring program is initiated if noise exposure exceeds established thresholds.

Per U.S. Department of Defense (DoD) policy, the 80 dB L_{Adn} noise contour is used to identify populations most at risk of potential hearing loss (USD 2009). In cases in which people are exposed to noise levels greater than 80 dB L_{Adn} on a regular basis, the policy directs that methodology defined in U.S. Environmental Protection Agency (USEPA) report number 550/9-82-105 be used to quantify the risk (see Section B.1.3).

B.1.3 METHODOLOGY

B.1.3.1 Base Vicinity

Noise levels in the vicinity of the bases were modeled using NOISEMAP (Version 7.2). In accordance with current USAF policy, NOISEMAP runs were conducted using the topographic effects module. This module accounts for the effects of local terrain and ground surface type on the propagation of sound. In accordance with current USAF and DoD policies, noise levels were calculated for an Annual Average Day, which is defined as a day with 1/365th of total annual operations.

The areas exposed to elevated noise levels are shown using L_{Adn} noise contours at 5 dB increments from 65 dB to 85 dB. Elevated L_{Adn} implies that overflight noise is particularly frequent and intense. In general, noise levels are highest on and near the airfield itself and decrease with distance from the airfield. However, in a few instances, the overlapping of two or more flight paths generates a geographically separated area in which noise exceeds 65 dB L_{Adn}. These instances appear as small noise contour polygons separated from the larger noise contour set.

The number of off-base persons exposed to noise level increments was estimated using U.S. Census 2014 American Community Survey (ACS) data at the block group level. Noise contours were overlaid on census blocks to determine the fraction of each census block that lies within each noise level increment. Census block population was apportioned to inside or outside of the noise level increment based on the fraction of the census block affected. Population estimates were refined by excluding areas not classified in land use data provided by local governments as being used for residential purposes. This method assumes even distribution of population with the residential portions of census blocks. The U.S. Census counts permanent residents; non-permanent residents are not counted using this method.

Among populations exposed to 80 dB L_{Adn} or greater, long-term hearing loss cannot be ruled out (see Section B.1.2). The noise metric L_{eq24}, rather than $L_{Adn,}$ is recommended for use in assessing hearing impairment risk (DNWG 2013). The L_{eq24} metric is equivalent to L_{Adn}, but does not add a decibel weighting factor to late-night noise events. The decibel weighting factor is relevant to estimating annoyance, but is not relevant to the physical mechanisms that can result in hearing impairment. The USEPA's Guidelines for Noise Impact Analysis (report #550/9-82-105) were used to quantify hearing loss risk in terms of noise-induced permanent threshold shift (NIPTS), a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise during a normal working lifetime of 40 years, with the exposure beginning at the age of 20 years and lasting 8 hours per day for 5 days per week. The actual value of NIPTS for any given person depends on that individual's physical sensitivity to noise during a 40-year working lifetime; some people will experience more loss of hearing than others. Another factor that affects the risk of NIPTS is that many people would be inside their homes and would, therefore, be exposed to lower noise levels due to noise attenuation provided by the house structure. A 2-year, USEPA-sponsored telephone survey of more than 9,000 persons found that the average American spends approximately 87 percent of his or her time indoors (Klepeis et al. 2001). Table B-1 shows the "average NIPTS" (10th to 90th percentiles of the exposed population) and the "10th percentile" NIPTS (NIPTS for the most sensitive 10 percent of the population) as a function of L_{Adn} if the person is fully exposed to the noise level at his or her residence (i.e., outdoors 100 percent of the time) or if he or she is outdoors for the national average 13 percent of the day. The actual exposure of any given individual to noise depends on unknown factors, such as whether a person is at home during the daytime hours (when most flying occurs). For the purposes of this study, it was assumed that persons would be at their residences during these hours.

According to the USEPA documents Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety and Public Health and Welfare Criteria for Noise, changes in hearing levels of less than 5 dB are generally not considered noticeable (USEPA 1974). There is no known evidence that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual. Furthermore, the variability in audiometric testing (testing of hearing ability) is generally assumed to be ± 5 dB.

Table B-1. Estimated Average NIPTS and 10th Percentile NIPTS as a Function of L_{Adn}

L_{eq24}[a]	100 Percent of Time Outdoors		National Average Percent Time Indoors	
	Average NIPTS (dB)[b]	10th Percentile NIPTS (dB)[b]	Average NIPTS (dB)[b]	10th Percentile NIPTS (dB)[b]
80–81	3	7	n/a[c]	n/a[c]
81–82	3.5	8	n/a[c]	n/a[c]
82–83	4	9	1	3.5
83–84	4.5	10	1	4
84–85	5.5	11	1.5	4.5
85–86	6	12	2	5.5
86–87	7	13.5	2.5	6.5
87–88	7.5	15	3	7
88–89	8.5	16.5	3.5	8
89–90	9.5	18	4	9

[a] Relationships between L_{eq24} and NIPTS were derived from CHABA 1977.
[b] NIPTS values rounded to the nearest 0.5 dB.
[c] Equivalent exposure noise level is less than 75 dB L_{Adn}, below the threshold at which NIPTS has been demonstrated to occur.

The preponderance of available information on risk of hearing loss for the adult working population is from the workplace with continuous exposure throughout the day for many years. According to a report by Ludlow and Sixsmith, there were no significant differences in audiometric test results between military personnel who as children had lived in or near stations where jet operations were based and a similar group who had no such exposure as children (Ludlow and Sixsmith 1999). Thus, for the purposes of hearing loss analysis, it could be assumed that the limited data on hearing loss are applicable to the general population, including children, and provide a conservative estimate of hearing loss.

Noise levels generated by construction equipment were taken from the Federal Highway Administration Roadway Construction Noise Model Noise Emission Reference Level database (FHA 2006). Construction noise is generally localized and temporary.

B.1.3.2 Auxiliary Airfields

KC-46A Third Main Operating Base (MOB 3) aircrews would sometimes conduct practice approaches at airfields other than home-station. KC-135 aircraft assigned to the 916 Air Refueling Wing (ARW) at Seymour Johnson Air Force Base (AFB) conduct practice approaches at nearby Kinston Regional Jetport on a regular basis (966 airfield operations annually), because the traffic pattern at Seymour Johnson AFB is often full. KC-46A aircraft would conduct an estimated 1,623 airfield operations at Kinston Regional Jetport should Seymour Johnson AFB be selected for the proposed MOB 3 mission. This section describes the method used to estimate potential noise level increases associated with the proposed net annual increase of 657 airfield operations. The same method is used to assess potential increase at other airfields used less frequently than the Kinston Regional Jetport by the 916 ARW.

FAA records indicate that the Kinston Regional Jetport accommodated 21,112 airfield operations in 2015, and 9,758 of these operations were military aircraft (FAA 2016). Military operations consist of propeller-driven aircraft (10 percent of military), large cargo aircraft (70 percent of military), and fighter aircraft (20 percent of military) (Barkes 2016). For the purposes of this analysis, aircraft were categorized as either generating L_{Amax} equal to or greater than that of a KC-46A/KC-135 or, alternatively, as generating L_{Amax} less than that of a KC-46A/KC-135. To simplify the analysis and to ensure that impacts are not underestimated, all aircraft other than large military cargo and fighter aircraft were assumed to be aircraft that generate L_{Amax} less than the KC-46A/KC-135, and were not counted in decibel scaling calculations. Not including these operations ensures that the relative importance of the KC-46A contribution to overall noise levels is not understated. Even though some of the aircraft types that use the Kinston Regional Jetport generate L_{Amax} substantially higher than that generated by the KC-46A/KC-135, all large military cargo and fighter aircraft were treated as generating the same noise level for the purposes of this analysis.

Operations at the Kinston Regional Jetport during acoustic night are currently rare, and would continue to be rare in the future (Barkes 2016). Therefore, operations during acoustic night were not considered mathematically in calculation of potential L_{Adn} change. KC-46A aircrews would follow the same flight procedures currently followed by KC-135 aircrews. KC-46A aircrews would be expected to overfly the same ground areas, use the same pattern altitudes, and conform to the same runway usage patterns as current KC-135 aircrews. Under these assumptions, the potential change in L_{Adn} can be calculated using Equation 1.

Equation 1:

$$\mathbf{L_{Adn\_change} = 10\ LOG\ (N_{KC46A}) - 10\ LOG\ (N_{KC135})}$$

where:

L_{Adn_change} is the potential change in L_{Adn}
N_{KC46} is the number of operations that would occur with the proposed MOB 3 mission
N_{KC135} is the number of operations occurring under baseline conditions

Potential increases of 0.5 dB L_{Adn} or greater would be an indicator of a need to conduct more detailed noise analysis. At Kinston Regional Jetport, the potential increase in L_{Adn} associated with proposed MOB 3 operations was calculated as 0.3 dB (Table B-2).

Table B-2. Potential L_{Adn} Increase

Airport	Proposed	Existing		Conclusion	
	Net Increase in Airfield Operations	Existing Annual Operations According to FAA Database	Percent of Existing Operations As Loud or Louder than KC-46A	L_{Adn} Change	Requires Further Analysis?
Kinston Regional Jetport	657	21,112	42%	0.3	No
Piedmont Triad International	12	76,215	50%	0.001	No
Raleigh Durham International	12	182,308	50%	0.001	No
Wilmington International	16	48,874	50%	0.003	No

A similar process was followed at Piedmont Triad International, Raleigh Durham International, and Wilmington International. Aircraft from the 916 ARW at Seymour Johnson AFB would use these airports for practice approaches much less frequently than they would use the Kinston Regional Jetport. The net proposed increase in annual aircraft operations at these airports is 16 operations or less. If it is assumed that 50 percent of the aircraft that use these airfields are as loud or louder than the KC-135/KC-46, then the L_{Adn} increase at these airfields would not exceed 0.003 dB (Table B-2).

As shown in the Table B-2, the potential L_{Adn} increase would not exceed 0.3 dB L_{Adn} at any of the airports studied. Increases of less than 0.5 dB L_{Adn} would not be expected to be noticed by people near the airfield. Noise impacts would be minimal.

B.2 AIR QUALITY

B.2.1 RESOURCE DEFINITION

Air quality in a given location is defined by the size and topography of an air basin, the air emissions that occur within and outside of the air basin, local and regional meteorological influences, and the resulting types and concentrations of pollutants in the atmosphere. The significance of a pollutant concentration often is determined by comparing its concentration to an appropriate national or state ambient air quality standard. These standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and include a reasonable margin of safety to protect the more sensitive individuals in the population. The USEPA established the National Ambient Air Quality Standards (NAAQS) to regulate the following criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 micrometers in diameter (PM_{10}), particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$), and lead. The short-term NAAQS generally may not be exceeded more than once per year, except for annual standards, which may never be exceeded. Units of concentration for these standards are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Table B-3 presents the NAAQS.

Table B-3. National Ambient Air Quality Standards

Pollutant	Averaging Time	National Standards[a]	
		Primary[b]	Secondary[c]
Ozone	8-hour	0.070 ppm ($137 \mu g/m^3$)	Same as primary
Carbon monoxide	8-hour	9 ppm ($10 mg/m^3$)	–
	1-hour	35 ppm ($40 mg/m^3$)	–
Nitrogen dioxide	Annual	0.053 ppm ($100 \mu g/m^3$)	Same as primary
	1-hour	0.10 ppm ($188 \mu g/m^3$)	–
Sulfur dioxide	3-hour	–	0.5 ppm ($1,300 \mu g/m^3$)
	1-hour	0.075 ppm ($105 \mu g/m^3$)	–
PM_{10}	24-hour	$150 \mu g/m^3$	Same as primary
$PM_{2.5}$	Annual	$12 \mu g/m^3$	$15 \mu g/m^3$
	24-hour	$35 \mu g/m^3$	Same as primary
Lead	Rolling 3-month period	$0.15 \mu g/m^3$	Same as primary

[a] Concentrations are expressed first in units in which they were promulgated. Equivalent units are included in parenthesis.
[b] Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
[c] Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

The NAAQS 8-hour O_3 standard is attained when the measured average of the annual fourth-highest daily maximum 8-hour average concentration is less than or equal to 0.070 ppm. For CO and PM_{10}, the NAAQS are not to be exceeded more than once per year. The NAAQS annual NO_2 standard is attained when the annual arithmetic mean concentration in a calendar year is less than or equal to 0.053 ppm. The 1-hour NO_2 standard is attained when the 3-year average of the 98th percentile of the daily maximum 1-hour average concentration does not exceed 0.10 ppm. For SO_2, the primary NAAQS is attained if the 1-hour concentration is less than or equal to 0.075 $\mu g/m^3$. The NAAQS $PM_{2.5}$ standards are attained when the annual arithmetic mean concentration is less than or equal to 12 $\mu g/m^3$ and when the 98th percentile of the 24-hour concentration is less than or equal to 35 $\mu g/m^3$.

O_3 concentrations are highest during the warmer months of the year and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be homogeneously spread throughout a region, as it often takes several hours to convert precursor emissions to O_3 (mainly nitrogen oxides [NO_x] and photochemically reactive volatile organic compounds [VOCs]) in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

B.2.1.1 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. GHG emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the earth's temperature. The U.S. Global Change Research Program report, *Climate Change Impacts in the United States - The Third National Climate Assessment*, states the following:

- Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with important contributions from the clearing of forests, agricultural practices, and other activities.
- Warming over this century is projected to be considerably greater than over the previous century. The global average temperature since 1900 has risen by about 1.5 degrees Fahrenheit (°F). The U.S. average temperature has increased by 1.3°F to 1.9°F since record keeping began in 1895; most of this increase has occurred since about 1970. By 2100, the global average temperature is projected to increase another 2°F to 11.5°F. Several factors will determine future temperature increases. Increases at the lower end of this range are more likely if global heat-trapping gas emissions are cut substantially. If emissions continue to rise at or near current rates, temperature increases are more likely to be near the upper end of the range. Volcanic eruptions or other natural variations could temporarily counteract some of the human-induced warming, slowing the rise in global temperature; however, these effects would only last a few years.
- Reducing emissions of carbon dioxide (CO_2) would lessen warming over this century and beyond. Sizable early cuts in emissions would significantly reduce the pace and the overall amount of climate change. Earlier cuts in emissions would have a greater effect in reducing climate change than comparable reductions made later. In addition, reducing emissions of some shorter-lived heat-trapping gases (e.g., methane [CH_4]) and some types of particles (e.g., black carbon) would begin to reduce warming within weeks to decades.
- Climate-related changes have already been observed globally and in the United States. These include increases in air and water temperatures, reduced frost days, increased frequency and intensity of heavy downpours, a rise in sea level, and reduced snow cover,

glaciers, permafrost, and sea ice. A longer ice-free period on lakes and rivers, lengthening of the growing season, and increased water vapor in the atmosphere have also been observed. Over the past 30 years, temperatures have risen faster in winter than in any other season, with average winter temperatures in the Midwest and northern Great Plains increasing more than 7°F. Some of the changes have occurred faster than previous assessments had suggested.

- These climate-related changes are expected to continue while new ones develop. Likely future changes for the United States and surrounding coastal waters include more intense hurricanes with related increases in wind, rain, and storm surges (but not necessarily an increase in the number of these storms that make landfall), as well as drier conditions in the Southwest and Caribbean. These changes will affect human health, water supply, agriculture, coastal areas, and many other aspects of society and the natural environment. (USGCRP 2014).

GHGs include water vapor, CO_2, CH_4, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and ability to absorb and radiate infrared energy emitted from the earth's surface relative to CO_2. The GWP of CO_2 is 1, and is therefore the standard by which all other GHGs are measured. GHGs are often reported as carbon dioxide equivalent (CO_2e), which is used to express emissions of a GHG relative to emissions of CO_2.

The potential effects of GHG emissions from the proposed MOB 3 mission are by nature global. Given the global nature of climate change and the current state of the science, it is not useful at this time to attempt to link the emissions quantified for local actions to any specific climatological change or resulting environmental impact. Nonetheless, GHG emissions from the proposed MOB 3 basing alternatives have been quantified to the extent feasible in this Draft Environmental Impact Statement (EIS) for information and comparison purposes.

B.2.1.2 Ozone Depleting Substances

The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer prohibited production of all Class I ozone depleting substances (ODSs) in signatory countries by 1996. The Clean Air Act (CAA) amendments of 1990 govern the consumption, transportation, use, and disposal of ODSs. Section 326 of the fiscal year 1993 National Defense Authorization Act requires Senior Acquisition Official approval for contracts requiring use of ODSs. The KC-46A is the first Air Mobility Command (AMC) aircraft to be completely free of ODSs. The USAF-approved halon alternative is HSC-125. Handheld extinguishers used in the KC-46A are also ODS-free, whereas commercial aircraft use ODSs for all fire suppression systems.

B.2.2 REGULATORY SETTING

The CAA and its subsequent amendments establish air quality regulations and the NAAQS, and delegate the enforcement of these standards to the states. The CAA establishes air quality planning processes and requires areas in nonattainment of an NAAQS to develop a State Implementation Plan (SIP) that details how the state will attain the standard within mandated timeframes. The requirements and compliance dates for attainment are based on the severity of the nonattainment classification of the area. The following summarizes the air quality rules and regulations that apply to the proposed MOB 3 mission.

B.2.2.1 Federal Regulations

CAA Section 176(c) and USEPA's General Conformity Rule generally prohibit Federal agencies from engaging in, supporting, permitting, or approving any activity that does not conform to the most recent USEPA-approved SIP in nonattainment or maintenance areas. This means that Federal projects in such areas or other activities using Federal funds or requiring Federal approval (1) will not cause or contribute to any new violation of an NAAQS; (2) will not increase the frequency or severity of any existing violation; or (3) will not delay the timely attainment of any standard, interim emission reduction, or other milestone. CAA Section 176(c) (42 *United States Code [USC]* 7506(c)) and 40 *CFR* 93, Subpart B, implement the USEPA General Conformity Rule.

The General Conformity Rule applies to Federal actions affecting areas that are in nonattainment of an NAAQS, and to designated maintenance areas (attainment areas that have been reclassified from a previous nonattainment status and are required to prepare an air quality maintenance plan). Conformity requirements only apply to nonattainment and maintenance pollutants and their precursor emissions. Conformity determinations are required when the annual direct and indirect emissions from a proposed Federal action equal or exceed an applicable *de minimis* threshold. These thresholds vary by pollutant and the severity of nonattainment conditions in the region affected by the proposed action. The General Conformity Rule does not apply to any basing facility proposed for the KC-46A MOB 3 mission, as these locations attain all NAAQS. However, with regard to the Westover Air Reserve Base (ARB) location, the urban area of Springfield, Massachusetts, is a CO maintenance area. Westover ARB is north of this CO maintenance area by approximately 2 miles. Any increase in commuter vehicular emissions generated within this area by the proposed MOB 3 mission would conform to the applicable SIP if their annual emissions remain below 100 tons per year of CO.

Under the CAA, state and local agencies may establish ambient air quality standards and regulations of their own, provided these are at least as stringent as the Federal requirements. These state and local standards and regulations are described in the affected environment sections for each base (see Volume I, Chapter 3, Sections 3.1.2, 3.2.2, 3.3.2, and 3.4.2).

B.2.2.2 Greenhouse Gases

The USEPA has promulgated several final regulations involving GHGs, either under the authority of the CAA, or as directed by Congress, but none of them apply directly to the proposed MOB 3 mission. On 18 December 2014, the Council on Environmental Quality (CEQ) released for public comment revised draft guidance that describes how Federal departments and agencies should consider the effects of GHGs and climate change in their National Environmental Policy Act (NEPA) reviews (CEQ 2014). The revised draft guidance supersedes the draft GHG and climate change guidance released by the CEQ in February 2010 (CEQ 2010). The revised draft guidance explains that agencies should consider the potential effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the implications of environmental effects that climate change would have on a proposed action. The guidance also emphasizes that agency analyses should be commensurate with projected GHG emissions and climate impacts and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is developed to adequately distinguish between alternatives and mitigations. The guidance recommends that agencies consider 25,000 metric tons per year of CO_2e emissions as a reference point, below which a quantitative analysis of GHGs is not recommended unless it is easily accomplished based on available tools and data. Similar to the 2010 guidance, the revised guidance does not propose a reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment. The purpose of quantitative analysis of CO_2e emissions in this EIS is for its potential usefulness in making reasoned choices among alternatives.

B.2.3 METHODOLOGY

The air quality analysis estimated the magnitude of emissions that would occur from proposed KC-46A MOB 3 mission construction and operational activities at each proposed base location. The estimation of operational impacts is based on (1) the increase in emissions due to the addition of the proposed MOB 3 mission or (2) the net change in emissions due to the replacement of existing KC-135 operations with operations from the proposed KC-46A MOB 3 mission.

Potential impacts on 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 *CFR* 1508.27. This requires that the significance of an action be analyzed in respect to the setting of the action and based relative to the severity of the impact. The CEQ NEPA regulations (40 *CFR* 1508.27(b)) provide 10 key factors to consider in determining the intensity of an impact.

In the case of criteria pollutants for which the proposed project region is in attainment of a NAAQS, the analysis compared the net increase in annual air pollutant emissions estimated for each project alternative to the USEPA Prevention of Significant Deterioration (PSD) threshold for new major sources of 250 tons per year of a pollutant as an indicator of significance or non-significance of projected air quality impacts. In the case of criteria pollutants for which the proposed project region does not attain a NAAQS, the analysis compared the net increase in proposed annual emissions to the applicable pollutant threshold that requires a conformity determination for that region. It should be noted that these criteria are used only to determine if an impact occurs, as the proposed alternatives would not require formal PSD analyses or conformity determinations.

If proposed emissions exceed a PSD or conformity threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if proposed emissions (1) do not contribute to an exceedance of an ambient air quality standard or (2) conform to the approved SIP, then impacts would be less than significant.

B.2.3.1 Construction

The KC-46A MOB 3 mission at each proposed location would require construction and/or renovation of airfield facilities, including training facilities, hangars, taxiways, and maintenance and fueling facilities. Air quality impacts due to proposed construction activities would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) due to the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions for each proposed basing location.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES2014a model for on-road vehicles (USEPA 2015).

Inclusion of standard construction practices and Leadership in Energy and Environmental Design (LEED) Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by

50 percent from uncontrolled levels (Countess Environmental 2006). The standard construction practices for fugitive dust control include the following:

1. Use water trucks to keep areas of vehicle movement damp enough to minimize the generation of fugitive dust.
2. Minimize the amount of disturbed ground area at a given time.
3. Suspend all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site and stabilize all disturbed areas with water application.
4. Designate personnel to monitor the dust control program and to increase watering, as necessary, to minimize the generation of dust.

To be conservative, the air quality analysis assumed that all construction activities for the proposed MOB 3 mission would begin in calendar year (CY) 2017 and would finish in CY 2018.

B.2.3.2 Operations

Operational emissions due to existing KC-135 operations that would be replaced by the proposed MOB 3 mission at three of the four proposed basing locations occur from (1) KC-135 aircraft operations and engine maintenance/testing, (2) aerospace ground equipment (AGE), (3) onsite government motor vehicles (GMVs) and privately owned vehicles (POVs), (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. These data were developed in part from the air emissions inventory process conducted at each location and activity data collected for 2015 operations. Because data were not available, the usage of AGE by KC-135 aircraft at Seymour Johnson AFB was used as a surrogate to estimate emissions from the usage of AGE by KC-135 aircraft at Grissom ARB, Tinker AFB, and Westover ARB (Zapata Inc. and URS Group, Inc. 2015). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). The air quality analysis uses 2015 conditions to define baseline emissions that the proposed MOB 3 mission would replace at each basing location, as they represent the most recent calendar year of operational activities.

Operational emissions due to the proposed KC-46A MOB 3 mission at each basing location would include (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project noise analyses. Factors used to calculate combustive emissions for the KC-46A aircraft are based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine are based on those for the KC-135 aircraft (AFCEC 2014a). Emissions from non-aircraft sources generated by the proposed MOB 3 mission were estimated by the following methods:

1. Emissions from on-wing testing of KC-46A aircraft engines are based on maintenance activities proposed for the MOB 1 mission at Fairchild AFB (AFCEC 2014b).
2. Specific activity data needed to estimate emissions from the usage of AGE for the KC-46A are not available. Therefore, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).

3. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at each basing location for these sources by the ratio of the base employment population for the proposed MOB 3 mission to the total existing base employment population.
4. Emissions from mobile fuel transfer operations and stationary and area sources were estimated by multiplying existing emissions generated at each basing location for these sources by the ratio of the number of proposed KC-46A landings and take-offs to the total existing base landings and take-offs. To be consistent, the analysis uses this approach to estimate stationary and source emissions at each of the four bases. In general, landings and take-offs are a good indicator of operational tempo at an AFB. Because aircraft maintenance and non-aircraft operations dominate activities at Tinker AFB, it is expected that this approach overestimates proposed MOB 3 emissions at Tinker AFB.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019 after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually turnover in the future to newer equipment and vehicles with cleaner USEPA emission standards. Volume II, Appendix D, of this EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from existing and proposed sources for each MOB 3 mission basing location.

The analysis of proposed aircraft operations is limited to operations that occur within the lowest 3,000 feet (914 meters) of the atmosphere, as this is the typical depth of the atmospheric mixing layer where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

B.3 SAFETY

B.3.1 RESOURCE DEFINITION

Ground and flight safety involving aviation operations conducted by the USAF are addressed in this section. Because of the proposal to construct within portions of the airfield environment, the focus of this section is on safety-of-flight issues associated with airfield operations. Within the ground safety section, issues involving operations and maintenance (O&M) activities that support operation of the airfield are addressed. Also considered in this section is the safety of personnel and facilities on the ground that may be placed at risk from flight operations. Within the aircraft mishaps/flight safety section for each base, aircraft flight risks and safety issues associated with conducting aviation activities at the respective bases are addressed. Historic information on aircraft accidents for the primary aircraft at each base is also presented to give the reader perspective as to the frequency of major mishaps, which occurred during the lengthy service of the existing aircraft.

KC-46A flight risks and safety issues associated with conducting aviation activities at the base and in the near-base airspace are addressed. Any KC-46A accidents at the airfield would have direct impacts on the ground in the immediate vicinity of the mishap as a result of explosion/fire and debris spread.

The safety ROI includes activities and operations conducted on the base itself and aircraft operations conducted in the local airspace.

B.3.2 REGULATORY SETTING

Numerous Federal, civil, and military laws and regulations govern operations at bases and in the surrounding airspace. Individually and collectively, they prescribe measures, processes, and procedures required to ensure safe operations and to protect the public, military, and property.

B.3.3 METHODOLOGY

A variety of elements associated with implementation of the proposed KC-46A MOB 3 mission at any of the four bases that could potentially affect safety are evaluated relative to the degree to which the action increases or decreases safety risks to the public or private property. Flight and ground safety are assessed for the potential to increase risk and the capability to manage that risk by responding to emergencies.

Impacts to safety are assessed according to the potential to increase or decrease in safety risks to personnel, the public and property. The development activities associated with the proposed KC-46A missions are considered to determine whether additional or unique safety risks are associated with its undertaking. If any activity associated with the proposed KC-46A MOB 3 mission indicates a major variance from baseline conditions, it would be considered a significant safety impact.

B.3.3.1 Flight Safety

The primary public concern with regard to flight safety is the potential for aircraft accidents. Such mishaps may occur as a result of mid-air collisions, collisions with man-made structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird-aircraft collisions. Collisions with structures around the airfield are controlled through airfield setbacks and safety zones that restrict construction around the airfield so that both the ground surface is clear for ground maneuvering and the airspace is clear of obstructions such as groves of trees, poles and power lines, and tall structures. An AICUZ study defines the accident potential zones (APZs) around the airfield and prescribes restrictions on any construction in the clear zone (CZ) (see Figure B-1). Land use restrictions are recommended for APZs I and II, based mostly on the intensity of use. That is, activities where people congregate are not recommended, and uses where people spend a high percentage of time (such as residential) are also not recommended.

The USAF defines five major categories of aircraft mishaps: Classes A, B, C, D, and E, which includes high accident potential. Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between $500,000 and up to $2 million. Class C mishaps involve an injury resulting in any loss of time from work beyond the day or shift on which it occurred, an occupational illness that causes loss of time from work at any time, or an occupational injury or illness resulting in permanent change of job and/or reportable damage of between $50,000 and up to $500,000. High accident potential events are any hazardous occurrence that has a high potential for becoming a mishap. Class C mishaps and high accident potential, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damage and injuries, and rarely affect property or the public.

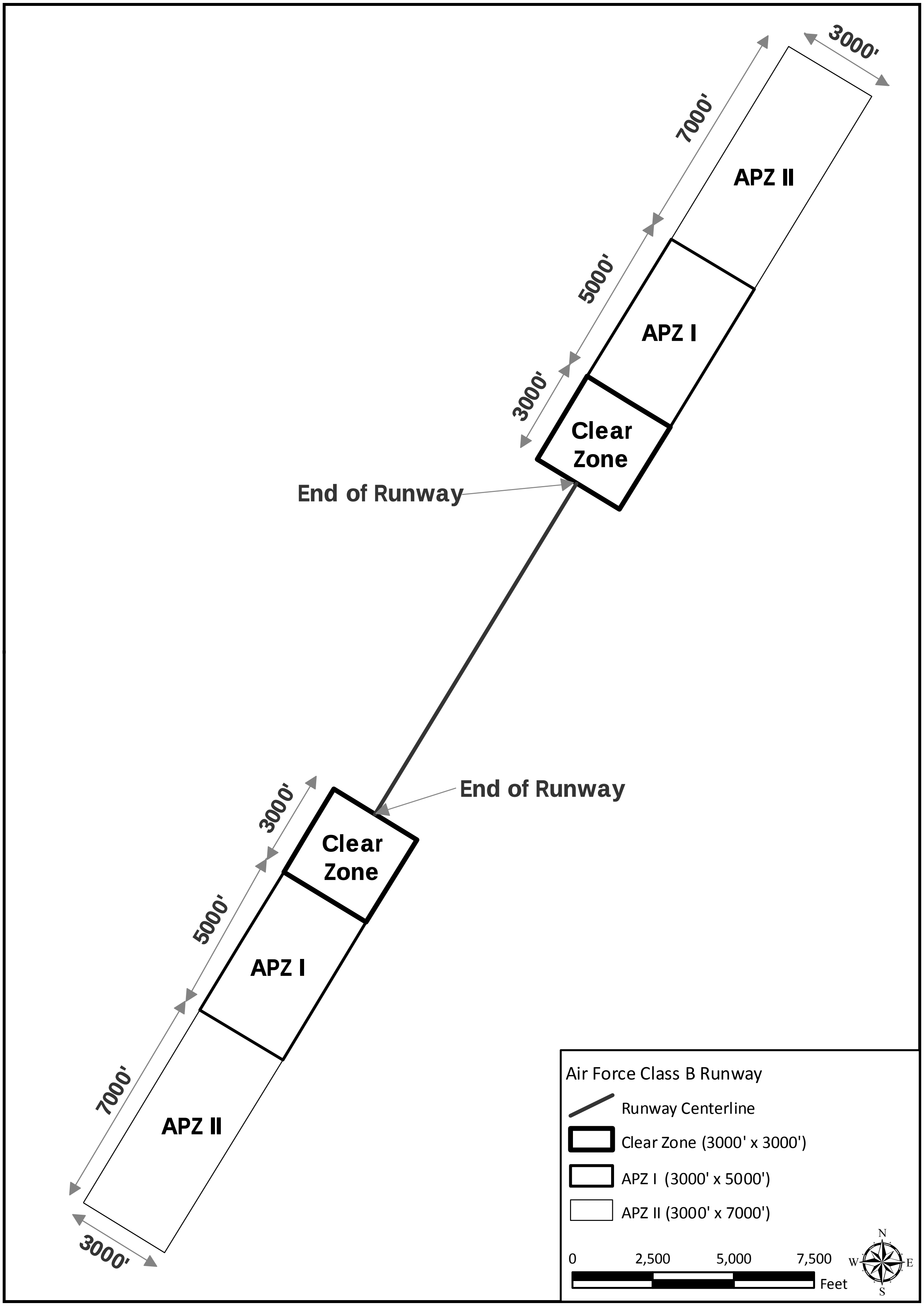

Figure B-1. Air Force Clear Zone and Accident Potential Zones for Class B Runways

Class D mishaps result in total cost of property damage of $20,000 or more, but less than $50,000; or a recordable injury or illness not otherwise classified as a Class A, B, or C mishap. Note that in 2010, the threshold for determining the class of mishaps was raised from $1 to $2 million for Class A mishaps, and the ceiling was raised for Class B from $1 million to $2 million.

Accident rates for commercial aircraft are determined using accidents per million departures (or flight cycles) since there is a stronger statistical correlation between accidents and departures than there is between accidents and flight hours, between accidents and the number of airplanes in service, or between accidents and passenger miles or freight miles.

This EIS focuses on USAF Class A mishaps because of their potentially catastrophic results. Based on historical data on mishaps at the four bases, and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Mishap rates do not consider combat losses due to enemy action. In evaluating this information, it should be emphasized that data presented are only statistically predictive. The actual causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft. Mishap rates are statistically assessed as an occurrence rate per 100,000 flying hours. For the purposes of this analysis, C-135 aircraft include the RC-135, EC-135, and the KC-135 since they share a common airframe based upon the Boeing 707, as modified for military use. Table B-4 reflects the cumulative average USAF Class A mishap rates of the C-135 for the periods for which accident records have been established. Cargo and Command and Control type aircraft were also included since their Mission-Design-Series are similar. The KC-135 entered service with the USAF in 1957; it is one of six military fixed-wing aircraft with over 50 years of continuous service with its original operator. Since the R model conversion of some of the fleet in the 1990s, the safety record of the KC-135 has been on par with that of any modern airliner.

Table B-4. Air Force Class A Mishap History for Selected Models of Transport Modified Mission Design/Code Aircraft

Aircraft	Reporting Period	Average Class A Mishap Rate per 100,000 Hours	Lifetime Hours Flown
C-135[a]	CY57-FY15	0.56	15,369,686
C-141	CY64-FY06	0.32	10,641,969
C-17	FY91-FY15	1.10	2,814,402
C-5	CY68-FY15	1.04	2,600,054
C-10	CY81-FY15	1.11	1,715,398

[a] Includes all variants such as EC and KC types, including EC-135, RC-135, and KC-135
Key: CY = calendar year; FY = fiscal year
Source: AFSEC 2016

An aircraft crash is what is known in the probability analysis world as a low probability, high consequence risk. Aircraft are designed to ensure that aircraft accidents are rare events. To minimize these accidents, factors causing or contributing to accidents must be understood and prevented. Previous research has studied accident data to determine these factors. The low rate of accidents, however, makes it difficult to discover repeating patterns of these factors.

Levels of safety for commercial airframes are typically measured by the number of accidents and incidents and their rates. An aircraft accident is defined as an occurrence associated with the operation of an aircraft in which people suffer death or injury, and/or in which the aircraft receives substantial damage.

Many scholarly papers have been written, and complex mathematical calculations developed, to try and predict where and when an aircraft or other low probability, high consequence risk might occur. However, none of these efforts have resulted in a consensus or an agreed upon methodology within the risk assessor community.

The methodology of using accident rates as a predictor of the likelihood of a crash is what is commonly used. For commercial aircraft, in general, this expression is a measure of accidents per million departures.

The accident rates for the KC-46A were determined using the accident rate for the B-767 jetliner, which is currently in service. The accident rate for commercial airliners is based upon departures (flight cycles). With takeoffs assumed to be one-half of the total projected departure airfield operations (see operational data contained in Volume I, Chapter 2), the formula $C_r x A_o = 1/X$ (where C_r = crash rate and A_o = departure airfield operations) shows that the frequency of an accident, even with increased operations, is not likely to occur in the foreseeable future.

While it is counterintuitive, an increase in operation tempo (OPTEMPO) may not result in higher accident rates, and no correlation has been proved or disproved. In a 2002 report to Congress on military aviation safety, the Congressional Research Service concluded, "While no correlation between high OPTEMPO and increased mishaps has been proved, it also hasn't been disproved. A great degree of uncertainty remains. Little is known, for example, of the OPTEMPO effects on maintenance, ammunition, training in country, living conditions, or personnel tempo" (CRS 2002). In other words, there are numerous unpredictable factors that may or may not contribute to an accident.

Bird/Wildlife-Aircraft Strike Hazard (BASH). Bird/wildlife-aircraft strikes constitute a safety concern for the USAF because they can result in damage to aircraft or injury to aircrews or local human populations if an aircraft crashes. Aircraft may encounter birds at altitudes up to 30,000 feet above mean sea level (AMSL) or higher. However, most birds fly close to the ground. More than 96 percent of reported bird strikes occur below 3,000 feet above ground level (AGL). Approximately 30 percent of bird strikes happen in the airport environment (takeoff/approaches/landing), and almost 47 percent occur during low-altitude flight training (AFSEC 2016).

To address the issues of aircraft bird strikes, the USAF has developed the Avian Hazard Advisory System to monitor bird activity and forecast bird strike risks. Using Next Generation Radar (NEXRAD) weather radars and models developed to predict bird movement, the Avian Hazard Advisory System is an online, near real time, geographic information system (GIS) used for bird strike risk flight planning across the continental United States and Alaska. Additionally, as part of an overall strategy to reduce BASH risks, the USAF has developed a Bird Avoidance Model using GIS technology as a key tool for analysis and correlation of bird habitat, migration, and breeding characteristics and is combined with key environmental and man-made geospatial data. The model was created to provide USAF pilots and flight schedulers/planners with a tool for making informed decisions when selecting flight routes. The model was created in an effort to protect human lives, wildlife, and equipment during air operations. This information is integrated into required pilot briefings that take place prior to any sortie.

Fuel Jettison. The KC-46A, like the KC-135 aircraft, has the ability to jettison fuel in cases of emergency and non-emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (USAF 2013).

The main environmental concern from fuel released from an aircraft is fuel deposition onto the ground and/or surface waters and any possible negative impacts on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (such as the KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for the KC-46A would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from the KC-46A would not produce substantial or significant impacts on human or natural resources.

It is the policy of the USAF Major Commands to follow AFIs or supplement those established AFIs. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that any fuel released from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). Similar policy from AFRC covers aircrews during training (AFI 11-2KC-135V3). These policies are designed to minimize potential impacts of fuel jettison events. In view of this, no further analysis is included in this section.

B.3.3.2 Ground Safety

Day-to-day O&M activities conducted at USAF installations are performed in accordance with applicable USAF safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements. These are intended to standardize procedures and practices in all activities on USAF property to reduce occupational risks to government personnel and contractors and to protect other persons that reside on or visit the base or the vicinity of the base.

Anti-Terrorism/Force Protection. Anti-Terrorism/Force Protection (AT/FP) is a security program designed to protect USAF active-duty personnel, civilian employees, family members, and facilities and equipment in all locations and situations. The program is accomplished through the planned and integrated application of anti-terrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks, several regulations have been promulgated to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of Military Construction-funded facilities. Unified Facilities Criteria (UFC) 04-010-01, *DoD Minimum Antiterrorism Standards for Buildings* (published in 2003 and updated in 2013) (DoD 2013) establishes minimum standoff distances that must be maintained between several categories of structures and areas that are relatively accessible to terrorists.

The intent of AT/FP and design guidance is to improve security, minimize fatalities, and limit damage to facilities in the event of a terrorist attack. Many military bases, including those under consideration for beddown of the KC-46A, were developed before such considerations became a critical concern. Thus, under current conditions, many units are not able to completely comply with all present AT/FP standards. However, as new construction and modification of facilities occurs, AT/FP standards would be incorporated to the maximum extent practicable.

Construction/Demolition Safety. Short-term safety risks are associated with any demolition and construction activity, including those activities proposed as part of this action. However, adherence to standard safety practices would minimize any potential risks.

Airfield Safety. Accident potential relies on identifying where most accidents have occurred in the past at military airfields (USAF 2002). This approach does not produce accident probability statistics since the question of probability involves too many variables for an accurate prediction model to be developed. The analysis of the history of military aircraft accidents focuses on determining where (within the airfield environments) an accident is likely to occur and estimates the size of the impact area that is likely to result from any single accident. As per DoDI 4165.57, "AICUZ," all structures on the ground have the potential to create hazards to flight. The Federal Aviation Administration (FAA) provides detailed instructions for the marking of obstructions (i.e., paint schemes and lighting) to warn pilots of their presence. Any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200 feet AGL or exceeds any obstruction standard contained in 14 *CFR* 77 should normally be marked and/or lighted. The FAA may also recommend marking and/or lighting a structure that does not exceed 200 feet AGL or 14 *CFR* 77 standards because of its particular location. The obstruction standards in 14 *CFR* 77 are primarily focused on structures in the immediate vicinity of airports and approach and departure corridors from airports (14 *CFR* 77).

B.4 SOILS AND WATER

B.4.1 RESOURCE DEFINITION

The ROI for soils and water includes the areas proposed for infrastructure upgrades and construction along with areas immediately downstream of base outfalls that could be impacted during construction. The term "soils" refers to unconsolidated materials formed from the underlying bedrock or other parent material. Soils play a critical role in both the natural and human environment.

Water resources include surface water, groundwater, and floodplains. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health factors. Groundwater includes the subsurface hydrologic resources of the physical environment; its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

B.4.2 REGULATORY SETTING

The Clean Water Act (CWA) of 1977 (33 *USC* 1251 et seq.) and the USEPA Storm Water General Permit regulate pollutant discharges. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants, such as biochemical oxygen demand, total suspended solids, fecal coliform, oil and grease, and pH. Wetlands are discussed in the Biological Resources section below.

Section 438 of the Energy Independence and Security Act (EISA) (42 *USC* §17094) establishes into law stormwater design requirements for federal construction projects that disturb a footprint of greater than 5,000 square feet of land. EISA Section 438 requirements are independent of stormwater requirements under the CWA. The project footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Pre-development hydrology shall be calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible.

Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built storm water reduction features (DoD 2010). These regulations were incorporated into applicable DoD Unified Facilities Criteria (UFC) in April 2010, which stated that low-impact design (LID) features need to be incorporated into new construction activities to comply with the restrictions on storm water management promulgated by EISA Section 438. LID is a storm water management strategy designed to maintain site hydrology and mitigate the adverse impacts of storm water runoff and non-point source pollution. LIDs can management the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, and evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of the methods that could reduce the potential impacts of a proposed action include bioretention, permeable pavements, cisterns/recycling, and green roofs (DoD 2010). Additional guidance is provided in USEPA's Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act (USEPA 2009).

With respect to soil erosion, Section 402(p) of the CWA regulates non-point source discharges of pollutants, under the National Pollutant Discharge Elimination System (NPDES) program, or state equivalent program. This section of the CWA was amended to require the USEPA to establish regulations for discharges from active construction sites. NPDES General Construction Permits require preparation of a Storm Water Pollution Prevention Plan for projects greater than 1 acre.

Executive Orders (EOs) that apply to Soils and Water are listed below:

- EO 11990, *Protection of Wetlands.*
- EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input.*

Indiana Flood Control Act

Indiana's Flood Control Act [Indiana Code (IC) 14-28-1] makes it unlawful to build any structure, place any obstruction, or make any deposit or excavation in any floodway with a drainage area greater than one square mile without a permit from IDNR.

B.4.3 METHODOLOGY

Impacts on soils and surface water can result from earth disturbance that would expose soil to wind or water erosion. Analysis of impacts on soils and surface water examines the potential for such erosion at each base and describes typical measures employed to minimize erosion. In addition, soil limitations and associated typical engineering remedial measures are evaluated with respect to proposed construction.

Criteria for evaluating impacts related to soil resources associated with implementation of the proposed KC-46A MOB 3 mission are impacts on unique soil resources, minimization of soil erosion, and the siting of facilities relative to potential soil limitations. If development proposed in the EIS were to substantially affect any of these features, impacts would be considered significant.

Soil disturbance at each base was calculated by summing the square footages of the new construction.

Criteria for evaluating impacts related to water resources associated with implementation of the proposed KC-46A MOB 3 mission are water availability, water quality, adherence to applicable regulations, and existence of floodplains. Impacts are measured by the potential to reduce water availability to existing users; to endanger public health or safety by creating or worsening health hazards or safety conditions; or to violate laws or regulations adopted to protect or manage water resources.

Flooding impacts are evaluated by determining whether proposed construction is located within a designated floodplain. Groundwater impacts are evaluated by determining whether groundwater beneath the project site would be used for implementing the proposed KC-46A MOB 3 mission, and if so, by determining the potential to adversely affect those groundwater resources. Soils and water resource impacts are not evaluated for the areas below where the proposed KC-46A MOB 3 operations would be conducted because no ground-disturbing activities or use of water resources would occur at these locations.

B.5 BIOLOGICAL RESOURCES

B.5.1 RESOURCE DEFINITION

Biological resources include the native and introduced terrestrial and aquatic plants and animals found within the ROI. The ROI for biological resources is defined as the land area (habitats) and airspace that could potentially be affected by infrastructure and construction projects, as well as airspace operations. The ROI generally includes the developed cantonment and airfield areas of the respective bases, but may also include areas near but outside the base boundary. Examples of off-base areas include managed wildlife areas and surface waters that could be indirectly affected by noise or water quality alteration, respectively. Habitat types are based on floral, faunal, and geophysical characteristics.

Sensitive habitats include areas that the Federal government, state governments, or the DoD have designated as worthy of special protection due to certain characteristics such as high species diversity, special habitat conditions for rare species, or other unique features.

For purposes of analysis, biological resources were organized into four categories: vegetation, wildlife, special-status species, and wetlands. Vegetation includes existing terrestrial plant communities but does not include special-status plants, which are discussed below. Plant species composition within an area generally defines ecological communities and indicates the type of wildlife that may be present.

Wildlife includes all vertebrate animal species, with the exception of special-status species, which are discussed below. Typical wildlife includes animal groups such as large and small mammals, songbirds, waterfowl, reptiles, amphibians, and fish. The attributes and quality of available habitats influences the composition, diversity, and abundance of wildlife communities.

Special-status species are defined as those plant and animal species protected by various regulations established by Federal and state agencies. These regulations, and the species addressed by them, are described in the Regulatory Setting section below.

Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water (Mitsch and Gosselink 2000).

B.5.2 REGULATORY SETTING

AFI 32-7064, "Integrated Natural Resources Management," explains how to manage natural resources on USAF property in compliance with Federal, state, and local standards. The chief tool for managing base ecosystems is the Integrated Natural Resources Management Plan (INRMP). Based on an interdisciplinary approach to ecosystem management, the INRMP ensures the successful accomplishment of the military mission by integrating all aspects of natural resources management with each other and the rest of the base's mission.

Special-status plant and wildlife species are subject to regulations under the authority of Federal and state agencies. Special-status species include species designated as threatened, endangered, or candidate species by state or Federal agencies. Under the Endangered Species Act (ESA) (16 *USC* 1536), an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future. Candidate species are those species for which the U.S. Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher-priority listing activities. Although candidate species receive no statutory protection under the ESA, the USFWS believes it is important to advise government agencies, industry, and the public that these species are at risk and could warrant protection under the ESA.

The Migratory Bird Treaty Act (MBTA) of 1918 (16 *USC* 703-712) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., species occur in both countries at some point during their annual life cycle). The act protects all migratory birds and their parts (including eggs, nests, and feathers).

The Bald and Golden Eagle Protection Act (BGEPA) (16 *USC* 668-668d) is legislation in the United States that protects two species of eagles. The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from "taking" bald eagles. Taking involves molesting or disturbing birds, their parts, nests, or eggs. The BGEPA provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald or golden eagles... [or any golden eagle], alive or dead, or any part, nest, or egg thereof."

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. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. The U.S. Army Corps of Engineers (USACE) is the lead agency in protecting wetland resources. This agency maintains jurisdiction over Federal wetlands (33 *CFR* 328.3) under Section 404 of the CWA (33 *CFR* 323.3) and Section 10 of the Rivers and Harbors Act (30 *CFR* 329). The USEPA assists the USACE (in an administrative capacity) in the protection of wetlands (40 *CFR* 225.1 to 233.71). In addition, the USFWS and the National Marine Fisheries Service provide support with important advisory roles.

Furthermore, EO 11990, *Protection of Wetlands*, requires Federal agencies, including the USAF, to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. EO 11990 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; if construction in wetlands cannot be avoided, the USAF will issue a Finding of No Practicable Alternative (FONPA).

Under CWA Section 401, applicants 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 obtain certification from the state in which the discharge would originate or, if appropriate, from interstate water pollution control agency with jurisdiction over 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 CWA Section 401.

B.5.3 METHODOLOGY

The first step in the analysis of potential impacts on biological resources was to determine the locations of sensitive habitats and species in relation to the proposed action. Maps were examined to locate sensitive habitats and species, and where necessary, site visits and additional surveys were conducted to confirm locations. Next, areas of overlap for the proposed development and sensitive habitats and species were identified. Scientific literature was reviewed for studies that examined similar types of impacts on biological resources. The literature review included a review of basic characteristics and habitat requirements of each sensitive species. Where available, information was also gathered relative to management considerations, incompatible resource management activities, and threats to each sensitive species. Impact analyses were then conducted based on the information gathered from the literature review. The analyses included an assessment of the impacts on biological resources resulting from both construction activities and daily operations. Measures to avoid and/or minimize adverse impacts on biological resources are also presented. The following criteria were evaluated when determining the significance of an effect on biological resources resulting from implementation of actions described in Volume I, Chapter 2:

- The direct impact or taking of a protected special-status species, including habitat alteration.
- The importance (legal, commercial, ecological, or scientific) of the resource.
- The relative sensitivity of biological resources to potential effects of the actions.
- The quantity or percentage of biological resources affected by the actions relative to overall abundance in the ROI.
- The expected duration of potential impacts resulting from implementation of the actions.

Determination of the significance of wetland impacts is based on (1) loss of wetland acreage, (2) the function and value of the wetland, (3) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (4) the sensitivity of the wetland to proposed activities, and (5) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected or if wetland acreage is lost.

B.6 CULTURAL RESOURCES

B.6.1 RESOURCE DEFINITION

Cultural resources are districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Only significant cultural resources are considered for potential adverse impacts from an action. Significant cultural resources are historic properties as defined by the National Register of Historic Places (NRHP) (36 *CFR* 60.4,) or resources identified as important to tribes or other traditional groups, as outlined in the American Indian Religious Freedom Act; the Native American Graves Protection and Repatriation Act; and EO 13007, *Indian Sacred Sites*. Historic properties are any prehistoric, historic or traditional resource included in or eligible for inclusion in the NRHP 36 *CFR* 800.16(l).

For a cultural resource to be considered eligible for the NRHP, it must possess integrity of location, design, setting, materials, workmanship, feeling, or association, and it must meet one or more of the following criteria (36 *CFR* 60.4):

- Association with events that have made a significant contribution to the broad patterns of our history (criterion a).
- Association with the lives or persons significant in our past (criterion b).
- Embodiment of distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction (criterion c).
- Have yielded, or may be likely to yield, information important in prehistory or history (criterion d).

In general, these resources must be more than 50 years old; however, younger resources may be eligible if they are exceptionally significant or date to a defined period of historic significance, such as the Cold War.

Section 101(d)(6)(A) of the National Historic Preservation Act (NHPA) states that properties of traditional religious and cultural importance to a tribe or Native Hawaiian organization may be determined to be eligible for inclusion in the NRHP. NRHP Bulletin 38 (NPS 1998) defines a traditional cultural property (TCP), as a resource that is eligible for inclusion in the NRHP. Reasons for eligibility could be because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. TCPs can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, landscapes, and minerals that tribes and other groups consider essential for the continuance of traditional cultures.

Properties of traditional religious and cultural importance need not be determined eligible for the NRHP to be a significant cultural resource considered for potential adverse impacts from an action. On 21 November 1999, the DoD promulgated its American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis (DoD 1999). The policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and tribal and Alaska Native lands, before decisions are made by the services. DoDI 4710.02, "DoD Interactions with Federally-Recognized Tribes," implements DoD policy, assigns responsibilities, and provides procedures for DoD interactions with federally recognized tribes in accordance with its American Indian and Alaska Native Policy and other DoD directives and policies. The USAF implements DoDI 4710.02 through AFI 90-2002, "Air Force Interactions with Federally-Recognized Tribes."

EO 13007 defines sacred sites as any specific, discrete, narrowly delineated location on Federal land that is identified by a tribe or individual as sacred by virtue of its established religious significance to or ceremonial use by a tribal religion and identified as such to the land managing agency. EO 13007 also requires agencies to accommodate access to, and ceremonial use of, sacred sites by tribal religious practitioners and to avoid adversely affecting their physical integrity.

B.6.2 REGULATORY SETTING

DoDI 4715.16, "Cultural Resources Management" (DoD 2008), and AFI 32-7065, "Cultural Resources Management" (USAF 2014), outline and specify proper procedures for cultural resource management on USAF bases.

Laws pertinent to the proposed action include the NHPA of 1966, as amended; the Antiquities Act of 1906; the Historic Sites Act of 1935; NEPA; the Archaeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; and the American Indian Religious Freedom Act of 1978.

Under Section 106 of the NHPA, the USAF is required to consider the effects of its undertakings at each location on historic properties listed, or eligible for listing, in the NRHP and to consult with the State Historic Preservation Office (SHPO), Tribal Historic Preservation Office, and others regarding potential effects as per 36 *CFR* 800. Under AFI 32-7065, recorded cultural resources not evaluated for NRHP eligibility must be managed as eligible. Under Section 110 of the NHPA, each location is mandated to maintain an active historic preservation program and provide stewardship of cultural resources "consistent with the preservation of such properties and the mission of the agency (Section 470 h-2(a))."

Federal regulations governing cultural resource activities include the following: 36 *CFR* 800, *Protection of Historic Properties* (incorporating amendments effective 5 August 2004); 36 *CFR* 79, *Curation of Federally Owned and Administered Archaeological Collections*; 43 *CFR* 7, *Protection of Archaeological Resources*; 36 *CFR* 60, *National Register of Historic Places*; and 36 *CFR* 63, *Determinations of Eligibility for Inclusion in the National Register*. Cultural resource-related EOs that may affect the locations include: EO 11593, *Protection and Enhancement of the Cultural Environment*; EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; and EO 13287, *Preserve America*.

B.6.3 METHODOLOGY

Impact analysis for cultural resources focuses on assessing whether the proposed KC-46A MOB 3 mission would have the potential to affect cultural resources that are eligible for listing in the NRHP or have traditional significance for tribes. For this EIS, impact analysis for cultural resources focuses on, but is not limited to, guidelines and standards set forth in NHPA Section 106's implementing regulations (36 *CFR* 800). Under Section 106 of the NHPA, the proponent of the action is responsible for determining whether any historic properties are located in the area, assessing whether the proposed undertaking would adversely affect the resources, and notifying the SHPO of any adverse effects. An adverse effect is any action that may directly or indirectly change the characteristics that make the historic property eligible for listing in the NRHP. If an adverse effect is identified, the Federal agency consults with the SHPO and federally recognized tribes to develop measures to avoid, minimize, or mitigate the adverse effects of the undertaking.

Analysis of potential impacts on cultural resources considers both direct and indirect impacts.

Impacts may occur through the following:

- Physically altering, damaging, or destroying all or part of a resource.
- Altering characteristics of the surrounding environment that contribute to the resource's significance.
- Introducing visual or audible elements that are out of character with the property or alter its setting.
- Neglecting the resource to the extent that it deteriorates or is destroyed.

Direct impacts are assessed by (1) identifying the nature and location of all elements of the proposed action and alternatives; (2) comparing those locations with identified historic properties, sensitive areas, and surveyed locations; (3) determining the known or potential significance of historic properties that could be affected; and (4) assessing the extent and intensity of the effects. Indirect impacts occur later in time or farther from the proposed action. Indirect impacts on cultural resources generally result from the effects of project-induced population increases, such as the need to develop new housing areas, utility services, and other support functions to accommodate population growth, or increased visitation of a remote area due to improved vehicle access. These activities and the subsequent use of the facilities can impact cultural resources.

A key component of this analysis is defining the area of potential effect, defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 *CFR* 800.16(d)). For the proposed MOB 3 beddown, the area of potential effect is defined as the viewshed for historic facilities and the areas of ground disturbance associated with construction, demolition and renovation at each base.

Archaeological and historic architectural resources at the bases were characterized using existing survey and analysis information from Integrated Cultural Resources Management Plans (ICRMPs), archaeological survey reports, historic buildings survey reports, local histories, and the records of the NRHP and National Historic Landmarks. These documents provided information on known locations of significant resources. In compliance with Section 106 of the NHPA, the USAF consulted with the relevant SHPOs regarding the area of potential effect and potential cultural resource concerns for the proposed action. NRHP-eligible or -listed properties at each base are identified in the base-specific sections.

The potential for traditional resources at the bases was identified using ICRMPs and information provided by base cultural resource management staff. Potentially interested tribes were contacted to request information on potential concerns about the proposed action.

In this analysis, demolition, construction, and other base-specific actions needed to support the KC-46A basing are part of the alternatives. The assessment of adverse effects takes into account both the potential for physical damage or destruction of historic properties at the bases and the potential adverse effects of visual intrusions, noise, and vibration on historic properties at the bases. Impacts on properties of traditional religious and cultural importance (hereafter referred to as "traditional cultural resources") can result from noise and visual effects of aircraft overflights on rituals and ceremonies and on wildlife resources.

B.7 LAND USE

B.7.1 RESOURCE DEFINITION

Land use describes the way the natural landscape has been modified or managed to provide for human needs. In developed and urbanized areas, land uses typically include residential, commercial, industrial, utilities and transportation, recreation, open space, and mixes of these basic types. Other uses such as mining, extractive activities, agriculture, forestry, and specially protected areas (such as larger monuments, parks, and preserves) are usually found on the fringes or outside of urbanized areas. Plans and policies guide how land resources are allocated and managed to best serve multiple needs and interests. Ordinances and regulations define specific limitations on uses.

The attributes of land use addressed in this analysis include general land use patterns within and surrounding each military base and the land use regulatory setting. The regulatory setting is the framework for managing land use and approving new development. It pertains to Federal, state, and local statutes, regulations, plans, programs, and ordinances.

The following is a list of the typical land use categories that are found on most USAF bases:

- Airfield (Primary Surface and Clear Zones)
- Airfield (Runways, Taxiways and Aprons)
- Aircraft Operations and Maintenance
- Industrial
- Administrative
- Community Commercial
- Community Service
- Housing (Accompanied)
- Housing (Unaccompanied)
- Medical
- Outdoor Recreation
- Open Space
- Water

The ROI for the land use analyses in this EIS includes the land within and surrounding each base. The analysis considers an area that encompasses the full extent of airfield accident zones, and areas exposed to noise levels of concern, plus a reasonable buffer of a few miles. This ROI provides for a wider context of jurisdictional divisions that influence land use patterns around each base.

B.7.2 REGULATORY SETTING

The regulatory setting for land use includes the key Federal, state, and local statutes, regulations, plans, policies, and programs applicable to land use on and near each base. The land use discipline assumed the Federal noise compatibility requirements as identified below.

Airfield and Heliport Planning and Design – DoD UFC 3-260-01. Several siting criteria have been established specific to land development and use at commercial and military airfields. To maintain safety, the USAF adheres to guidelines set forth in UFC 3-260-01, *Airfield and Heliport Planning and Design* (UFC 3-260-01). These criteria include CZs, APZs, and other obstruction zones relative to airfield environments. These and other criteria related to safety, security, and other land use issues are used to assist planners and decision makers with appropriate siting of facilities affecting design and physical layout of USAF bases.

FICUN Land Use Guidelines (1980). In 1980, FICUN was formed to develop Federal policy and guidance on noise. The committee included the USEPA, FAA, Federal Highway Administration, DoD, Department of Housing and Urban Development, and the U.S. Department of Veterans Affairs. The designations contained in the FICUN compatibility table for land use do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities.

Air Installation Compatibility Use Zone (AICUZ) Program (DoDI 4165.57). Establishes the AICUZ program, which is similar to the FAA's Federal Aviation Regulations Part 150 program for civil airports. The AICUZ program is a DoD discretionary program designed to promote compatible land use around military airfields. The military services maintain an AICUZ program to protect the operational integrity of their flying mission.

Areas around airfields are exposed to the potential of aircraft accidents despite well-maintained aircraft with highly trained aircrews. DoD developed the AICUZ program to aid in the development of planning mechanisms that protect the safety and health of personnel on and near military airfields and to preserve operational capabilities. The AICUZ program consists of the following distinct parts: CZs, APZs, hazards to air navigation (height and obstruction criteria established by the FAA), and noise zones.

Bases use the AICUZ program to provide land use compatibility guidelines for areas exposed to increased safety risks and noise near the airfield. The noise compatibility guidelines recommended in the AICUZ program are similar to those used by the U.S. Department of Housing and Urban Development (HUD) and FAA to provide information to surrounding jurisdictions to guide planning and regulation of land use. When noise levels exceed an L_{Adn} of 65 dB, residential land uses are normally considered incompatible.

Off-base land uses are usually generalized in AICUZ studies into one of the following six categories:

- Residential: Includes all types of residential activity, such as single and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.
- Commercial: Offices, retail, restaurants, and other types of commercial establishments.
- Industrial: Includes manufacturing, warehousing, and other similar uses.

- Public/Quasi-Public: This category includes publicly owned lands and/or land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.
- Recreational: Land areas designated for recreational activity including parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc.
- Open/Agricultural/Low Density: Incudes undeveloped land areas, agricultural areas, grazing lands, and areas with residential activity at densities less than or equal to one dwelling unit per acre.

B.7.3 METHODOLOGY

Potential impacts on land use can result from actions that (1) change the suitability of a location for its current or planned use (e.g., noise exposure in residential areas); (2) cause conditions that are unsafe for the public welfare; (3) conflict with the current and planned use of the area based on current zoning, amendments, agreements, regulatory restrictions, management, and land use plans; or (4) displace a current use with a use that does not meet the goals, objectives, and desired use for an area based on public plans or resolutions. The degree of land use effects (negligible, minor, moderate, or significant) is based on the level of land use sensitivity in areas affected by a proposed action, the magnitude of change, and the compatibility of a proposed action with existing or planned land uses. The assessment considers multiple contextual factors that are both quantified and qualitative.

The evaluation primarily focuses on changes resulting from the action that may affect off-base areas. Also considered are potential effects on community amenities within the base such as schools, child care facilities, and housing areas. For each base, the following land use impact drivers are considered:

- Construction and demolition on base (effects such as temporary dust, noise and traffic and longer-term noise or visual changes affecting community areas and nearby off-base locations). The assessment considers the extent of redevelopment, duration, and proximity to sensitive locations of on-base and off-base areas.
- O&M activities for the new mission (generating noise, odors, or traffic). The assessment considers whether the action involves any unusual or new activities, and proximity to sensitive locations of on-base and off-base areas.
- Aircraft operations at the base and in the surrounding area, including engine run ups, takeoffs and landings, and closed pattern work. The assessment evaluates changes in noise exposure levels and the location of noise relative to existing land use, planned uses, and zoning, focusing on land use compatibility with projected noise levels and accident potential following DoD guidelines.
- Change in base population (causing indirect impacts such as congestion in nearby neighborhoods).

The following steps are used to evaluate the impacts on land use from the proposed alternatives:

1. Characterize and describe existing land use and conditions (Volume I, Chapter 3).
    a. Describe general context for the base in the local area (whether urbanized, rural, or natural) and describe jurisdictional boundaries within the area around the airfield.

b. Describe the overall organization of functions on the base (using site plans, Installation Development Plans, other NEPA documents).

c. Describe the land use setting surrounding the base, using aerial photography (National Agriculture Imagery Program [NAIP] 1-meter aerial imagery), notes from site visits, land use plans by local jurisdictions, current zoning.

d. Describe current compatibility planning efforts for the base and status of compatibility around the airfield (based on AICUZ studies, Joint Land Use Studies, airfield zoning districts, airfield noise complaint logs).

e. Identify current noise exposure for land uses surrounding the airfield (using maps with baseline noise contours superimposed on aerial photography), describe noise levels affecting current uses and compatibility of the current exposure levels, and identify specific sensitive receptors affected by incompatible noise levels (such as schools and child development centers [CDCs]) based on the DoD noise compatibility guidelines.

1. Evaluate effects on land use of new construction and demolition. The analysis considers direct and indirect effects of redevelopment based on size of construction effort, location of projects relative to sensitive uses (for example, new industrial-type functions relative to family housing areas), and duration of construction.

2. Evaluate effects on land use of new O&M activities. Qualitatively consider if changes in O&M activities can have indirect effects on the suitability of areas outside the base for their current or planned uses. These effects may include dust, noise, traffic, visual modifications.

3. Assess whether any induced changes such as new housing demands in the local area pose any particular concerns for land use.

4. Quantify and locate changes in noise exposure from aircraft operations.

   a. Estimate change in acreage of land on and off the base exposed to noise levels of 65 dB L_{Adn} and greater at 5 dB intervals. Consider the relative degree of change in exposure in the surrounding area.

   b. Overlay projected and baseline noise contours on aerial photographs to locate where changes in noise exposure would occur. Identify projected noise exposure for land uses surrounding the airfield (using maps with baseline noise contours superimposed on aerial photography). Describe where the changes occur, what land use is affected, degree of change (decibel increase), and compatibility of the land use with the change.

   c. Where changes in exposure interact with incompatible land use, a more careful evaluation of the zoning and potential future development of the affected area is included. This considers potential for future changes in land use or infill that could heighten an existing incompatible condition. Where residential land is impacted, review of aerial photography and zoning ordinances is used to determine the relative density of homes and potential for future infill. The analysis also identifies how and if current noise compatibility planning is adequate to protect airfield and community interests.

5. The impact assessment considers the degree or intensity of projected accident risk at the airfield in combination with current or possible future incompatible uses in the APZs (context). The analysis rates the degree of existing land use compatibility in the CZs and APZs based on DoD's land use compatibility guidelines using levels of incompatible land uses and occupied structures within the APZs and CZs. Because accident risk is extremely low, the current condition of land use compatibility in the APZs and CZs is the dominant criteria in assessing impacts on land use.

B.8 INFRASTRUCTURE

B.8.1 RESOURCE DEFINITION

Infrastructure consists of the systems and physical structures that enable the population of a USAF base to function. Infrastructure is primarily human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as urban, or developed built environment. The availability of infrastructure and its capacity for expansion are essential to the ability of the base to carry out a specific mission, operations, and provide for the needs of the employees and residents.

Utilities analyzed for each of the four bases in this EIS include water supply and distribution, sanitary sewer and wastewater systems, stormwater drainage, electrical system, natural gas, solid waste, and transportation. Solid waste management primarily relates to the availability of systems and landfills to support a population's residential, commercial, and industrial needs. AFI 32-7042, "Waste Management," incorporates the requirements of Subtitle D, 40 *CFR* 240 through 244, 257, and 258, applicable Federal regulations, AFIs, and DoD directives. It also establishes the requirement for bases to have a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and pollution prevention (USAF 2009). The infrastructure information contained in this section provides a brief overview of each infrastructure component and describes its capacities, effectiveness, deficiencies, and existing general condition.

Transportation infrastructure includes the public roadway network, public transportation systems, airports, railroads, pedestrian/bicycle facilities, and waterborne transportation required for the movement of people, materials, and goods. The proposed action has the potential to impact the public roadways that provide access to the bases, base access control points or gates, and the internal roadway systems of the bases. Roadways are typically assigned a functional classification by state departments of transportation. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. The three main functional classifications for roadways include:

- Arterial – These roadways provided mobility so traffic can move from one place to another quickly and safely.
- Collector – These roadways link arterials and local roads and perform some of the duties of each.
- Local – These roadways provide access to homes, businesses, and other property.

The ROI for the infrastructure analyses in this EIS includes the areas proposed for infrastructure upgrades on each base and areas surrounding each base where traffic from implementation of the proposed MOB 3 mission could affect.

B.8.2 REGULATORY SETTING

There is no applicable regulatory setting for infrastructure and transportation resources.

B.8.3 METHODOLOGY

Effects on infrastructure were evaluated for the proposed KC-46A MOB 3 mission based on the potential for disruption or improvement of existing levels of service and additional needs for water, energy and natural gas consumption, wastewater and stormwater drainage systems, and solid waste system availability. Changes in population and proposed development were used to determine impact on infrastructure. At each installation, the maximum demand or impact to capacity was calculated for the potable water, wastewater, electric and natural gas systems based on the change in population. For the transportation analysis, any change in population was assumed to reside off base.

The impact analysis consisted of a quantitative assessment, based on available information for average and peak use and demand data for each on-base utility and the ability of a utility provider to absorb a given level of demand increase for its service area, and a qualitative assessment of the physical condition of each on-base system. Impacts might arise from physical changes to utility supply and distribution systems over their design life cycle and energy needs created by either direct or indirect workforce and population changes related to base activities. An effect would be considered adverse if the proposed MOB 3 mission requirements caused any of the following:

- A violation of a permit condition or contract with a utility provider.
- A capacity exceedance of a utility or solid waste facility.
- If a system could not sustain a mission increase due to poor condition, inefficient function, or operation.
- If a mission increase would require costly upgrades.
- A long-term interruption of a utility.

To assess the potential environmental consequences associated with transportation resources, increased utilization of the existing roadway system and base access gates due to the potential increase of personnel is analyzed, as well as potential effects of construction activities. Impacts could arise from physical changes to circulation, construction-related traffic delays, and changes in traffic volumes. 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 implementation of the proposed KC-46A MOB 3 mission.

B.9 HAZARDOUS MATERIALS AND WASTE

B.9.1 RESOURCE DEFINITION

The terms “hazardous materials” and “hazardous waste” refer to substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristic, may present substantial danger to public health or the environment when released into the environment.

Products containing hazardous materials that may result in the generation of hazardous waste include aviation fuel, adhesives, sealants, conversion coatings, corrosion preventative compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, and cleaners.

The ROI for hazardous materials and waste encompasses areas that could be impacted by the proposed KC-46A MOB 3 beddown and mission related changes to hazardous materials usage and management, hazardous waste generation and management, and hazardous waste disposal at each installation. Therefore, the ROI for the hazardous materials and waste analysis are defined as the boundary of each base.

The ROI for environmental restoration sites is the footprint of the proposed construction projects described in Chapter 2 of the EIS.

B.9.2 REGULATORY SETTING

The key Federal regulatory requirements related to hazardous materials and waste include:

- Resource Conservation and Recovery Act of 1976 (42 *USC* 6901 et seq.)
- Emergency Planning and Community Right-to-Know Act of 1986 (42 *USC* 11001-11050)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 *USC* 9601-9675)
- Community Environmental Response Facilitation Act of 1992 (42 *USC* 9620)
- Asbestos Hazard Emergency Response Act (15 *USC* 2651)
- Spill Prevention, Control and Countermeasure Rule (40 *CFR* 112)
- USEPA Regulation on Identification and Listing of Hazardous Waste (40 *CFR* 261)
- USEPA Regulation on Standards for the Management of Used Oil (40 *CFR* 279)
- USEPA Regulation on Designation, Reportable Quantities, and Notification (40 *CFR* 302)
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
- Toxic Substances Control Act of 1976 (40 *CFR* 700–766)
- Clean Air Act of 1970, including the 1990 Clean Air Act Amendments (40 *CFR* 61)

Several USAF regulations address the management and safe handling of hazardous materials and wastes in accordance with applicable Federal and state regulations. These include:

- AFI 32-7086, “Hazardous Material Management”
- AFI 32-7042, “Solid and Hazardous Waste Compliance”
- AFI 32-1052, “Facility Asbestos Management”

B.9.3 METHODOLOGY

The exact amounts of hazardous waste that would be generated under each alternative are unknown at this time. The qualitative and quantitative assessment of impacts from hazardous materials and waste management focuses on how (context) and to what degree (intensity) each location could affect hazardous materials usage and management, hazardous waste generation and management, and hazardous waste disposal. Potential impacts related to hazardous materials and wastes were analyzed for the following five effects:

1. Generation of hazardous material/waste types or quantities could not be accommodated by the current management system.

2. Increased likelihood of an uncontrolled release of hazardous materials that could contaminate the soil, surface water, groundwater, or air.
3. Non-compliance with applicable Federal and state regulations as a result of the proposed action.
4. Disturbance or creation of contaminated sites, resulting in adverse effects on human health and/or the environment.
5. Established management policies, procedures, and handling capacities could not accommodate the proposed action.

B.10 SOCIOECONOMICS

B.10.1 RESOURCE DEFINITION

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel associated with the proposed KC-46A MOB 3 mission that could potentially impact population, employment, earnings, housing, education, and public services. The ROI for this analysis is different for each of the four bases but generally includes the county area or areas where the installation is located.

B.10.2 REGULATORY SETTING

There is no applicable regulatory setting for socioeconomics.

B.10.3 METHODOLOGY

The socioeconomic analysis focuses on the effects resulting from the personnel changes, as well as construction and/or operation and maintenance under each alternative. To estimate the changes in population to the ROI, the total number of non-contractor, full time personnel, and dependents and family members as indicated in Sections 2.5.1.2.2, 2.5.2.2.2, 2.5.3.2.2 and 2.5.4.2.2 were added together and assumed to be migrating to the area. For this analysis, any contractors identified in Volume I, Chapter 2, associated with the proposed KC-46A MOB 3 mission, or the existing missions were assumed to be from the local population and were not considered to be incoming personnel. Therefore, under these assumptions, the changes to the number of part-time drill status Reservists, and contractors would not impact population, housing, education, or public services.

To determine the change in on-base jobs, the total change in full-time military personnel, students (if any), DoD civilians, and contractors was added to the existing on-base total work force. Part-time Reservists were not considered to be part of the work force, because individuals in the AFRC typically only serve one weekend per month, in any areas they choose to live, and are on temporary duty assignment two weeks a year. For this reason, any change in the number of part-time Reservists were also not considered as part of the incoming population that would impact housing, economic activity, education, public services, and base services.

The economic impact analysis used to determine the effect of construction and operation and maintenance costs (if any) was conducted using the Impact Analysis for Planning (IMPLAN) economic forecasting model. The IMPLAN model uses data from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis to construct a mathematical representation of the local economics using the region-specific spending patterns, economic multipliers, and industries (MIG 2012). In this analysis, the IMPLAN model provided representations of the county-wide economy at each location. Economic impacts are analyzed by introducing a change to a specific industry in the form of increased or decreased employment or spending; the IMPLAN model mathematically calculates the resulting changes in the local economy. In this analysis, the IMPLAN model estimates the economic effects of the incoming personnel on spending and employment in the established ROI. The economic impacts analysis separates effects into three components: direct, indirect, and induced. Direct effects are the change in employment and income generated directly by the expenditures of the incoming or outgoing personnel. To produce the goods and services demanded by the incoming personnel, businesses, in turn, may need to purchase additional goods and services from other businesses. The employment and incomes generated by these secondary purchases would result in the indirect effects. Induced effects are the increased household spending generated by the direct and indirect effects. The overall effect from the economic impact analysis is the total number of jobs created throughout the ROI by the direct, indirect, and induced effects. The construction and O&M costs used in the economic activity section were provided by the USAF during the site survey reports.

To determine whether the local housing market could support the personnel associated with the proposed MOB 3 mission, several assumptions were made. The first assumption was that part-time Reservists and contractors were already residing in the local population and any change to the number of these personnel would not influence the local housing market. The second assumption was that the total number of homes required off base was equal to the total number of incoming full-time military personnel. This number was compared against the number of vacant housing units as defined by the American Community Survey 5 year estimate for years 2010-2014. If the number of incoming full-time military personnel did not exceed the number of vacant housing units as defined by the American Community Survey estimates, the housing market in the ROI was anticipated to be able to support the incoming population.

To determine the total dependents for each base associated with the proposed MOB 3 mission, 65 percent of all non-contractor, full-time military personnel, as identified in the personnel tables in Volume I, Chapter 2 (See Tables 2-4, 2-8, 2-12, 2-13, and 2-16), were assumed to be accompanied. Each accompanied military member was assumed to be accompanied by 2.5 dependents, or 1 spouse and approximately 1.5 children. All children were assumed to be of school age. Therefore, to determine the total number of school-aged children, a multiplier of 1.5 was applied to 65 percent of the non-contractor, full-time military personnel.

Public services were analyzed by considering the overall percentage change to the county population. Base services were analyzed by considering the capacity, staffing, and infrastructure available to support the incoming personnel.

The magnitude of potential impacts can vary greatly, depending on the location of the proposed action. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, those effects would be considered adverse. A proposed action could have an effect with respect to socioeconomic conditions in the surrounding ROI if the following were to occur:

- Change in the local business volume, employment, or population that exceeds the ROI's historical annual change
- Adverse change on social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates

B.11 ENVIRONMENTAL JUSTICE AND OTHER SENSITIVE RECEPTORS

B.11.1 RESOURCE DEFINITION

The resource considered for environmental justice is potentially affected populations that meet certain characteristics based on race, income, and age. The resource is defined relatively, in order to understand if impacts from an action are occurring in areas that are disproportionately composed of minorities and low-income persons. While not specifically part of environmental justice analysis, this section also considers similar impacts to youth and elderly populations. This concern arises because large impact projects have historically used sites where real estate values are lower and/or more industrialized. Locations with low property values have tended to attract development of affordable and marginal housing. This dynamic tends to perpetuate and often pre-dates the enactment of community land use ordinances. The intent of environmental justice is to reduce the burden of impacts on socially and economically vulnerable populations.

B.11.2 REGULATORY SETTING

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* directs Federal agencies to address environmental and human health conditions in minority and low-income communities. In addition to environmental justice issues are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which directs Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

USAF guidance for implementation of the EO is contained in the *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP),* dated November 2014 (USAF 2014). That guidance also explains the need to address impacts which may adversely impact elderly (65 and over) populations.

The terms “minority” and low income” are defined below for purposes of this analysis.

- Minority: The term “minority” for purposes of environmental justice analysis includes those individuals who have identified themselves as having one of the following origins: “Hispanic,” “Asian-American,” “Native Hawaiian and other Pacific Islander,” “Black or African-American” “American Indian or Alaskan Native,” or “Some Other Race” (which does not include “White,” “Black or African-American,” “American Indian or Alaska Native,” “Asian,” and “Native Hawaiian or Other Pacific Islander” race categories) (USAF 2014).
- Low Income: the U.S. Census Bureau defines the term “poverty” (also referred to as “low income” as “a set of money income threshold that vary by family size and composition to determine who is in poverty” (U.S. Census Bureau 2015). A family and each individual in the family is considered in poverty if the total family income is less than the family’s threshold or the dollar amount calculated by the U.S. Census to determine poverty status.

Although youth (under 18) and the elderly (65 and over) are not specifically included as environmental justice populations, they are identified as sensitive receptors in the guidelines (USAF 2014). Children are vulnerable to environmental exposure and potential health and safety effects to children are considered in this EIS under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. For purposes of this analysis, the term “children” refers to any person under 18. The USEPA and the USAF

Environmental Impact Analysis Process (EIAP) guidance identify the importance of considering an elderly person as a sensitive receptor to potential environmental impacts. The term “elderly” refers to any person age 65 or over.

B.11.3 METHODOLOGY

Analysis of environmental justice is conducted pursuant to EO 12898 and EO 13045 and follows the guidelines outlined in the 2014 USAF EIAP (USAF 2014). Environmental justice analysis focuses on the off-base populations in the affected area defined as those areas off-base that are exposed to noise levels of 65 dB L_{Adn} or greater. Since the proposed construction activities would occur within the base boundaries, the only action with the potential to cause adverse impacts is related to the new noise levels generated in the vicinity of each of the bases under consideration for the proposed MOB 3 mission.

In accordance with USAF EIAP guidelines, the community of comparison (COC) in environmental justice analysis is the “smallest set of Census data encompassing the ROI for each resource and is used to establish appropriate threshold for comparison analysis” (USAF 2014). The county data that encompass the affected area is the COC. For environmental justice minority and low-income populations, and for the youth and elderly populations, the most recent American Community Survey (ACS) 2010-2014 data for census block groups were used to calculate the populations in each ROI. The affected area used to define the COC and each ROI was calculated by Environmental Research Systems Incorporated (ESRI) ArcMap version 10.2 geographic information system (GIS) to overlap the noise contours onto the census block group data, where the population was assumed to be within only those areas of residential land use. The proportion of the area covered in each census block group was then applied to the total population in the entire block group to determine the population within the affected area. The percentages for minority, low-income, youth, and elderly provided in the ACS 2010-2014 5-year estimate, were then applied to the population in the affected area for each census block group (ROI) to determine the number of people in the ROI that would comprise those environmental justice, minority and low-income population categories. The same methodology was used to calculate comparable numbers for youth and elderly populations.

The potential for disproportionate impacts to minority or low-income populations was determined by comparing the percent of each population in the respective ROI with the percent of each population in the respective COC. If the ROI percent is less than the COC percent, then there would be no disproportionate impacts. If, however, the ROI percent is greater than or equal to the COC percent, disproportionate effects could be present and require mitigation (USAF 2014).

For all youth and elderly populations, disproportionate impact is inherent. The extent to which youth and the elderly will be impacted is disproportionate due to their inherent vulnerabilities. Pursuant to EO 13045, due to age-related physiological differences in types and levels of exposure, the evaluation of environmental impacts to children (youth under 18) is different from the evaluation of environmental impacts to adults (e.g., because children breathe more rapidly than adults and their bodies are not yet fully developed, they have different responses to environmental impacts).

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AFI 90-2002 – Air Force Interactions with Federally Recognized Tribes

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29 *CFR* 1910.95 – Occupational Noise Exposure

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33 *CFR* 323.3 – Discharges Requiring Permits

33 *CFR* 328.3 – Definition of Waters of the United States

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APPENDIX C

BACKGROUND INFORMATION FOR THE ACOUSTIC ENVIRONMENT ANALYSIS

APPENDIX C BACKGROUND INFORMATION FOR THE NOISE ANALYSIS

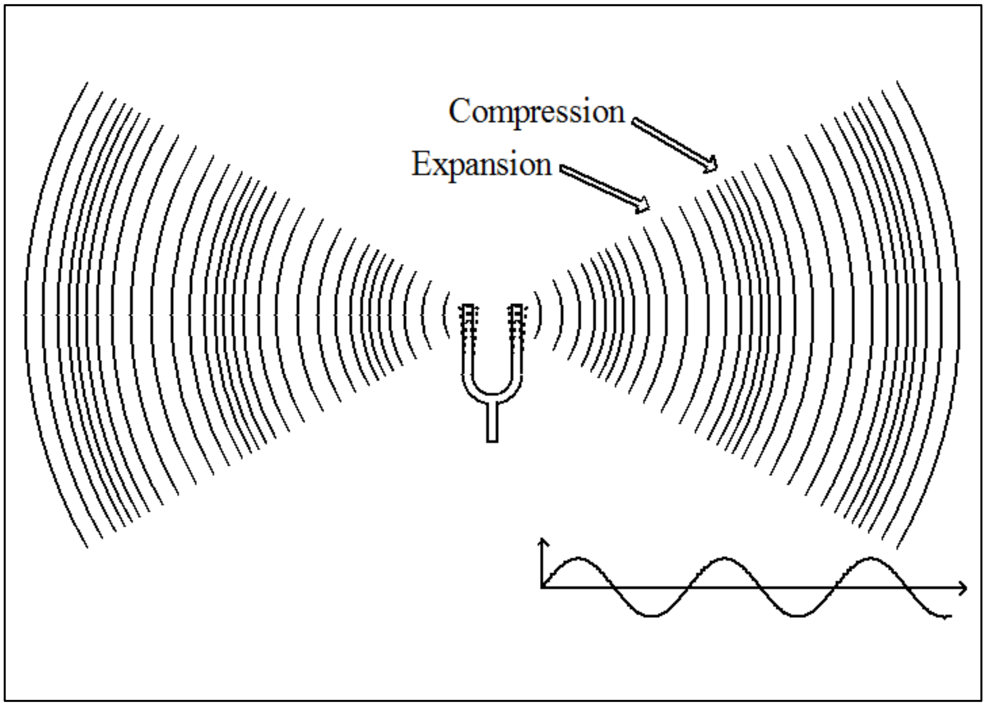
This appendix describes sound and noise potential effects on the human and natural environment. This appendix also reviews the potential effects of noise, focusing on effects on humans but also addressing effects on property values, terrain, structures, and animals. Representative flight profiles used in the noise modeling for the proposed KC-46A MOB 3 mission at each alternative base are contained in Attachment C-1.

C.1 BASICS OF SOUND

The following four subsections describe sound waves, sounds levels and types of sounds, and workplace noise.

C.1.1 SOUND WAVES AND DECIBELS

Sound consists of minute vibrations in the air that travel through the air and are sensed by the human ear. Figure C-1 is a sketch of sound waves from a tuning fork. The waves move outward as a series of crests where the air is compressed and troughs where the air is expanded. The height of the crests and the depth of the troughs are the amplitude or sound pressure of the wave. The pressure determines its energy or intensity. The number of crests or troughs that pass a given point each second is called the frequency of the sound wave.



Source: Wyle Laboratories

Figure C-1. Sound Waves from a Vibrating Tuning Fork

The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration.

- Intensity is a measure of the acoustic energy of the sound and is related to sound pressure. The greater the sound pressure, the more energy carried by the sound and the louder the perception of that sound.

- Frequency determines how the pitch of the sound is perceived. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.
- Duration or the length of time the sound can be detected.

As shown in Figure C-1, the sound from a tuning fork spreads out uniformly as it travels from the source. The spreading causes the sound's intensity to decrease with increasing distance from the source. For a source such as an aircraft in flight, the sound level will decrease by about 6 dB for every doubling of the distance. For a busy highway, the sound level will decrease by 3 to 4.5 dB for every doubling of distance.

As sound travels from the source it also gets absorbed by the air. The amount of absorption depends on the frequency composition of the sound, the temperature, and the humidity conditions. Sound with high frequency content gets absorbed by the air more than sound with low frequency content. More sound is absorbed in colder and drier conditions than in hot and wet conditions. Sound is also affected by wind and temperature gradients, terrain (elevation and ground cover) and structures.

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall 1995).

Because of the logarithmic nature of the decibel unit, sound levels cannot simply be added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB.}$$

Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB.}$$

Because the addition of sound levels is different than that of ordinary numbers, this process is often referred to as "decibel addition."

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness. This relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because the human ear does not respond linearly.

Sound frequency is measured in terms of cycles per second or hertz (Hz). The normal ear of a young person can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. As humans get older, humans lose the ability to hear high frequency sounds. Not all sounds in this wide range of frequencies are heard equally. Human hearing is most sensitive to frequencies in the 1,000 to 4,000 Hz range. The notes on a piano range from over 27 Hz to 4,186 Hz, with middle C equal to 261.6 Hz. Most sounds (including a single note on a piano) are not simple pure tones like the tuning fork in Figure C-1, but contain a mix, or spectrum, of many frequencies.

Sounds with different spectra are perceived differently even if the sound levels are the same. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. A-weighting puts emphasis on the 1,000 to 4,000 Hz range.

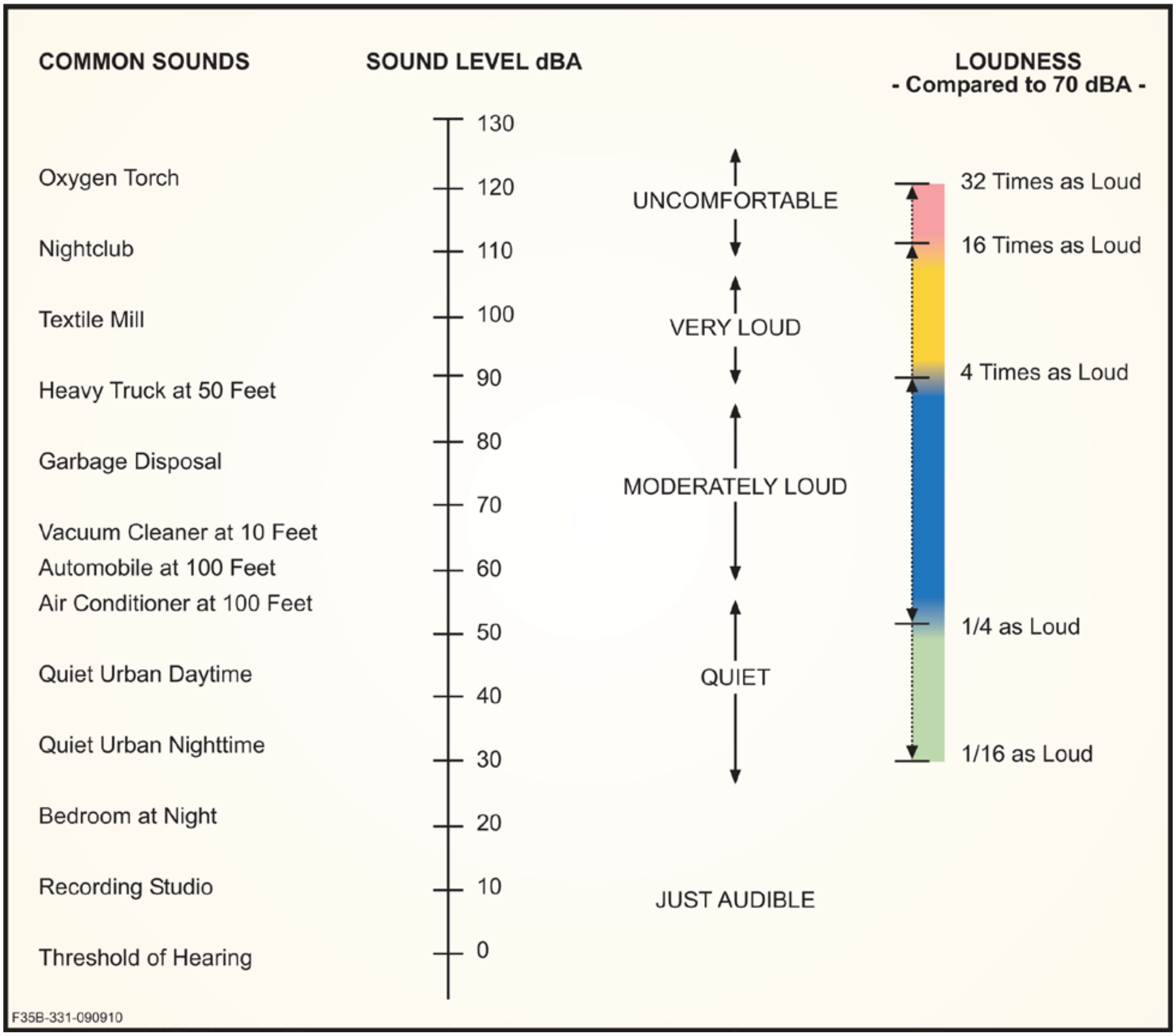
C.1.2 SOUND LEVELS AND TYPES OF SOUNDS

Most environmental sounds are measured using A-weighting. They are called A-weighted sound levels, and sometimes use the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the term “A-weighted” is often omitted and the unit dB is used. Unless otherwise stated, dB units refer to A-weighted sound levels.

Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is unwanted sound. Noise can become an issue when its level exceeds the ambient or background sound level. Ambient noise in urban areas typically varies from 60 to 70 dB, but can be as high as 80 dB in the center of a large city. Quiet suburban neighborhoods experience ambient noise levels around 45-50 dB (USEPA 1978).

Figure C-2 is a chart of A-weighted sound levels from common sources. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like “urban daytime” and “urban nighttime” are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods.

Aircraft noise consists of two major types of sound events: flight (including takeoffs, landings and flyovers), and stationary, such as engine maintenance run-ups. The former are intermittent and the latter primarily continuous. Noise from aircraft overflights typically occurs beneath main approach and departure paths, in local air traffic patterns around the airfield, and in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.



Sources: Harris 1979; FICAN 1997

Figure C-2. Typical A-weighted Sound Levels of Common Sound

C.1.3 WORKSPACE NOISE

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dB as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss (NIOSH 1998). Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998 which reaffirmed the 85 dB recommended exposure limit (NIOSH 1998). Active-duty and reserve components of the Air Force (including the ANG), as well as civilian employees and contracted personnel working on Air Force bases and Air Guard stations must comply with Occupational Safety and Health Administration (OSHA) regulations (29 CFR § 1910.95 Occupational Noise Exposure), DoD Instruction 6055.12, Hearing Conservation Program; Air Force Occupational Safety and Health (AFOSH) Standard 48-20 (June 2006), and Occupational Noise and Hearing Conservation Program (including material derived from the International Standards Organization 1999.2 Acoustics-Determination of Occupational Noise Exposure and Estimation of Noise Induced

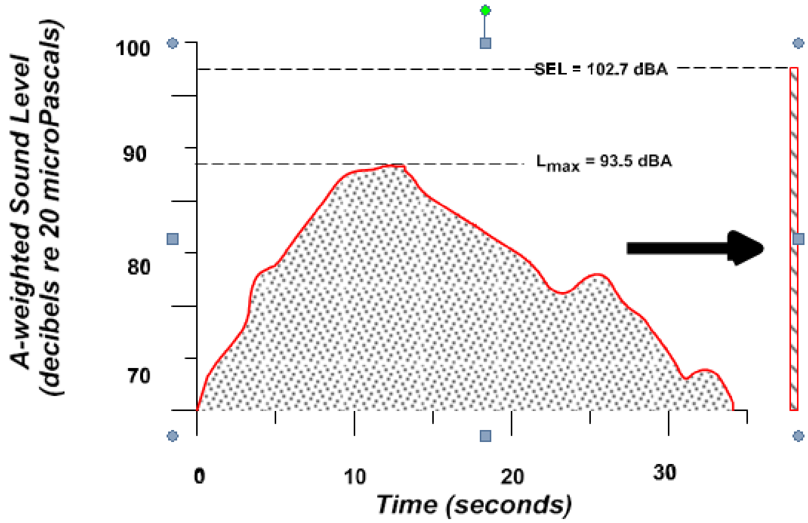
Impairment). Per AFOSH Standard 48-20, the Hearing Conservation Program is designed to protect workers from the harmful effects of hazardous noise by identifying all areas where workers are exposed to hazardous noise. The following are main components of the program:

- Identify noise hazardous areas or sources and ensure these areas are clearly marked.
- Use engineering controls as the primary means of eliminating personnel exposure to potentially hazardous noise. All practical design approaches to reduce noise levels to below hazardous levels by engineering principles shall be explored. Priorities for noise control resources shall be assigned based on the applicable risk assessment code. Where engineering controls are undertaken, the design objective shall be to reduce steady-state levels to below 85 dBA, regardless of personnel exposure time, and to reduce impulse noise levels to below 140 dB peak sound pressure level.
- Ensure workers with an occupational exposure to hazardous noise complete an initial/reference audiogram within 30 days from the date of the workers' initial exposure to hazardous noise.
- Ensure new equipment being considered for purchase has the lowest sound emission levels that are technologically and economically possible and compatible with performance and environmental requirements. 42 USC § 4914, Public Health and Welfare, Noise Control, Development of Low-Noise Emission Products, applies.
- Education and training regarding potentially noise hazardous areas and sources, use and care of hearing protective devices, the effects of noise on hearing, and the Hearing Conservation Program.

C.2 NOISE METRICS

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. The simplest metric is the A-weighted level, which is appropriate by itself for constant noise such as an air conditioner. Aircraft noise varies with time. During an aircraft overflight, noise starts at the background level, rises to a maximum level as the aircraft flies close to the observer, then returns to the background as the aircraft recedes into the distance. Over time there can be a number of events, not all the same.

There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section describes the metrics relevant to environmental noise analysis.



Source: Wyle Laboratories

Figure C-3. Example Time History of Aircraft Noise Flyover

C.2.1 SINGLE-EVENTS

C.2.1.1 Sound Level (L_{max})

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event in Figure C-3.

L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the “fraction of a second” is one-eighth of a second, denoted as “fast” response on a sound level measuring meter (ANSI 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted “slow” response. L_{max} is important in judging if a noise event will interfere with conversation, TV or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise, because it does not account for how long the sound is heard.

Table C-1 reflects L_{max} values for typical aircraft associated with this assessment operating at the indicated flight profiles and power settings. On takeoff through 1,000 feet AGL, the F-22 has the highest L_{max} of 112 dB with the F-35A ranked a close second with 111 dB L_{max}. On approach through 1,000 feet AGL, the F-22 has the highest L_{max} of 104 dB with the B-1 and F-15 tied for second with 97 dB L_{max}.

Table C-1. Representative Instantaneous Maximum Sound Levels (L_{max})[a]

Aircraft (engine type)	Power Setting	Power Unit[b]	Lmax (dBA) At Varying Altitudes (feet)				
			500	1,000	2,000	5,000	10,000
Takeoff/Departure Operations[c]							
A-10A	6,200	NF	100	92	82	68	58
B-13	97.5%	RPM	113	105	97	84	72
F-15 (PW220)	90%	NC	111	104	97	85	75
F-16 (PW229)	93%	NC	114	106	98	86	76
F-22	100%	ETR	120	112	105	93	83
F-35A	100%	ETR	119	111	103	91	81
Landing/Arrival Operations[d]							
A-10A	5,225	NF	97	89	79	60	46
B-1	90%	RPM	104	97	89	76	65
F-15 (PW220)	75%	NC	104	97	89	77	66
F-16 (PW229)	83.5%	NC	93	86	78	66	56
F-22	43%	ETR	111	104	96	84	73
F-35A[e]	40%	ETR	100	93	85	73	62

Source: NOISEMAP OPX file using standard weather conditions of 59 degrees Fahrenheit and 70 percent relative humidity.

a. Power settings indicated may not be comparable across aircraft that all numbers are rounded, and power settings are typical but not constant for departure/arrival operations.
b. RPM—Revolutions Per Minute; ETR—Engine Thrust Request; NC—Engine Core RPM; and NF—Engine Fan RPM.
c. B-1 Takeoff/Departure modeled with Afterburner, all other departure aircraft modeled without afterburner (if available).
d. All Landing/Arrival aircraft modeled with "parallel-interpolation" power setting for gear down configuration (except if noted).
e. Based on 2013 Edwards measurements.

C.2.1.2 Sound Exposure Level (SEL)

Sound Exposure Level combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event.

Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time, but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

Table C-2 shows SEL values corresponding to the aircraft and power settings reflected in Table C-1. At 1,000 feet AGL on takeoff, the F-22 has the highest SEL of 121 dB, with the F-35A closed behind with 119 dB SEL. At 1,000 feet AGL on approach, the F-22 has the highest SEL of 109 dB, with the B-1 ranked second with 105 dB SEL.

C-weighted SEL can be computed for impulsive sounds, and the results denoted CSEL or LCE. SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A-weighted sounds and CSEL for C-weighted.

C.2.2 CUMULATIVE EVENTS

C.2.2.1 Equivalent Sound Level (L_{eq})

Equivalent Sound Level is a “cumulative” metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity, and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). The L_{eq} from 7 a.m. to 3 p.m. may give exposure of noise for a school day.

Figure C-4 gives an example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. The $L_{eq(24)}$ for this example is 61 dB.

Table C-2. Representative Sound Exposure Levels (SEL)[a]

Aircraft (engine type)	Power Setting	Power Unit[b]	SEL (dBA) At Varying Altitudes (feet)				
			500	1,000	2,000	5,000	10,000
Takeoff/Departure Operations[c, d]							
A-10A	6,200	NF	105	99	91	80	71
B-14	97.5%	RPM	119	113	106	96	86
F-15 (PW220)	90%	NC	120	115	109	100	91
F-16 (PW229)	93%	NC	119	114	107	98	89
F-22	100%	ETR	127	121	115	106	98
F-35A	100%	ETR	125	119	113	103	95
Landing/Arrival Operation[e]							
A-10A	5,225	NF	98	92	83	67	55
B-1	90%	RPM	111	105	98	88	79
F-15 (PW220)	75%	NC	99	94	88	79	71
F-16 (PW229)	83.5%	NC	97	92	86	77	68
F-22	43%	ETR	115	109	103	94	85
F-35A[f]	40%	ETR	107	102	95	86	76

Source: NOISEMAP OPX file using standard weather conditions of 59 degrees Fahrenheit and 70 percent relative humidity.

a. Power settings indicated may not be comparable across aircraft, that all numbers are rounded, and power settings are typical but not constant for departure/arrival operations.

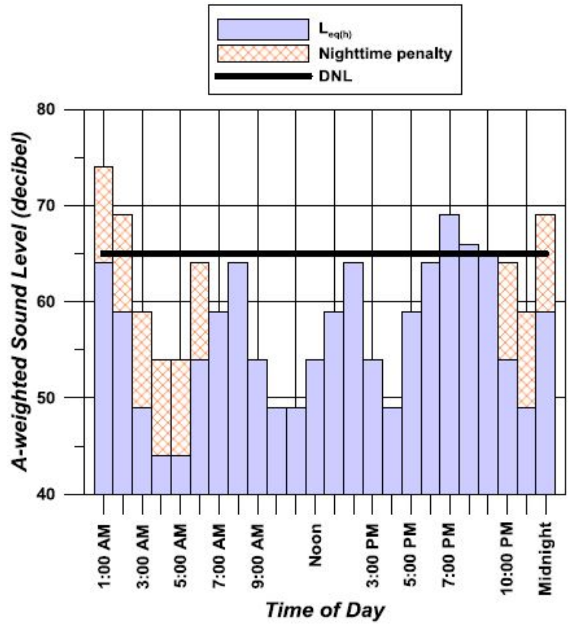
b. RPM—Revolutions Per Minute; ETR—Engine Thrust Request; NC—Engine Core RPM; and NF—Engine Fan RPM.

c. Takeoff/Departure modeled at 160 knots airspeed for SEL purposes.

d. B-1 Takeoff/Departure modeled with Afterburner, all other departure aircraft modeled without afterburner (if available).

e. All Landing/Arrival aircraft modeled at 160 knots airspeed for SEL purposes.

f. Based on 2013 Edwards measurements.



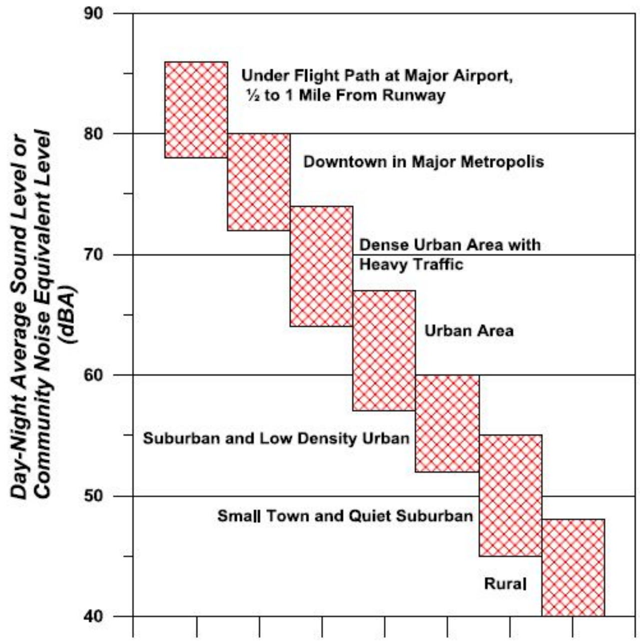
Source: Wyle Laboratories

Figure C-2. Example of $L_{eq(24)}$, DNL Computed from Hourly Equivalent Sound Levels

C.2.2.2 Day-Night Average Sound Level (DNL or L_{dn})

Day-Night Average Sound Level is a cumulative metric that accounts for all noise events in a 24-hour period. However, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10 dB penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent.

For airports and military airfields outside of California, DNL represents the average sound level for annual average daily aircraft events. Figure C-4 gives an example of DNL using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. Note the $L_{eq(h)}$ for the hours between 10 p.m. and 7 a.m. have a 10 dB penalty assigned. The DNL for this example is 65 dB. Figure C-5 shows the ranges of DNL that occur in various types of communities. Under a flight path at a major airport the DNL may exceed 80 dB, while rural areas may experience DNL less than 45 dB.



Source: DoD 1978

Figure C-3. Typical DNL Ranges in Various Types of Communities

The decibel summation nature of these metrics causes the noise levels of the loudest events to control the 24-hour average. As a simple example, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example that 10 such 30- second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24- hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

A feature of the DNL metric is that a given DNL value could result from a very few noisy events or a large number of quieter events. For example, 1 overflight at 90 dB creates the same DNL as 10 overflights at 80 dB.

DNL does not represent a level heard at any given time, but represent long term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz 1978; USEPA 1978).

C.2.3 SUPPLEMENTAL METRICS

C.2.3.1 Number-of-Events Above (NA) a Threshold Level (L)

The Number-of-Events Above (NA) metric gives the total number of events that exceed a noise level threshold (L) during a specified period of time. Combined with the selected threshold, the metric is denoted NAL. The threshold can be either SEL or L_{max}, and it is important that this selection is shown in the nomenclature. When labeling a contour line or point of interest (POI), NAL is followed by the number of events in parentheses. For example, where 10 events exceed an SEL of 90 dB over a given period of time, the nomenclature would be NA90SEL(10). Similarly, for L_{max} it would be NA90$L_{max(10)}$. The period of time can be an average 24-hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA is a supplemental metric. It is not supported by the amount of science behind DNL/CNEL, but it is valuable in helping to describe noise to the community. A threshold level and metric are selected that best meet the need for each situation. An L_{max} threshold is normally selected to analyze speech interference, while an SEL threshold is normally selected for analysis of sleep disturbance.

The NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

C.2.3.2 Time Above (TA) a Specified Level (L)

The Time Above (TA) metric is the total time, in minutes, that the A-weighted noise level is at or above a threshold. Combined with the threshold level (L), it is denoted TAL. TA can be calculated over a full 24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any other time period of interest, provided there is operational data for that time.

TA is a supplemental metric, used to help understand noise exposure. It is useful for describing the noise environment in schools, particularly when assessing classroom or other noise sensitive areas for various scenarios. TA can be shown as contours on a map similar to the way DNL contours are drawn.

TA helps describe the noise exposure of an individual event or many events occurring over a given time period. When computed for a full day, the TA can be compared alongside the DNL in order to determine the sound levels and total duration of events that contribute to the DNL. TA analysis is usually conducted along with NA analysis so the results show not only how many events occur, but also the total duration of those events above the threshold.

C.3 ACOUSTIC ENVIRONMENT EFFECTS

Noise is of concern because of potential adverse effects. The following subsections describe how noise can affect communities and the environment, and how those effects are quantified. The specific topics discussed are:

- Annoyance;
- Land Use Compatibility
- Speech interference;
- Sleep disturbance;
- Noise-induced hearing impairment;
- Non-auditory health effects;
- Performance effects;
- Noise effects on children;
- Property values;
- Noise-induced vibration effects on structures and humans;
- Noise effects on terrain;
- Noise effects on historical and archaeological sites;
- Effects on domestic animals and wildlife; and

C.3.1 ANNOYANCE

With the introduction of jet aircraft in the 1950s, it became clear that aircraft noise annoyed people and was a significant problem around airports. Early studies, such as those of Rosenblith *et al.* (1953) and Stevens *et al.* (1953) showed that effects depended on the quality of the sound, its level, and the number of flights. Over the next 20 years considerable research was performed refining this understanding and setting guidelines for noise exposure. In the early 1970s, the USEPA published its "Levels Document" (USEPA 1974) that reviewed the factors that affected communities. DNL (still known as L_{dn} at the time) was identified as an appropriate noise metric, and threshold criteria were recommended.

Threshold criteria for annoyance were identified from social surveys, where people exposed to noise were asked how noise affects them. Surveys provide direct real-world data on how noise affects actual residents.

Surveys in the early years had a range of designs and formats, and needed some interpretation to find common ground. In 1978, Schultz showed that the common ground was the number of people "highly annoyed," defined as the upper 28 percent range of whatever response scale a survey used (Schultz 1978). With that definition, he was able to show a remarkable consistency among the majority of the surveys for which data were available. Figure C-6 shows the result of his study relating DNL to individual annoyance measured by percent highly annoyed (%HA).

Schultz's original synthesis included 161 data points. Figure C-7 compares revised fits of the Schultz data set with an expanded set of 400 data points collected through 1989 (Finegold *et al.* 1994). The new form is the preferred form in the US, endorsed by the FICAN (FICAN 1997). Other forms have been proposed, such as that of Fidell and Silvati (2004), but have not gained widespread acceptance.

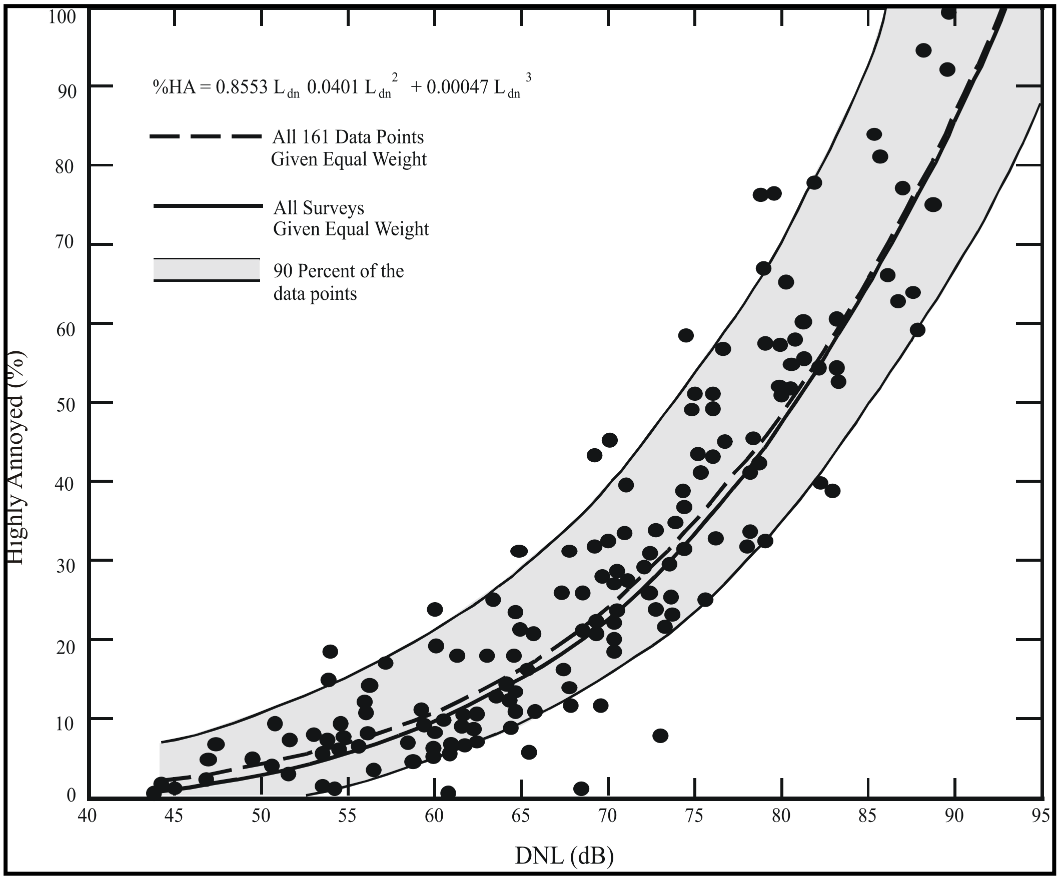


Figure C-6. Schultz Curve Relating Noise Annoyance to DNL (Schultz 1978)

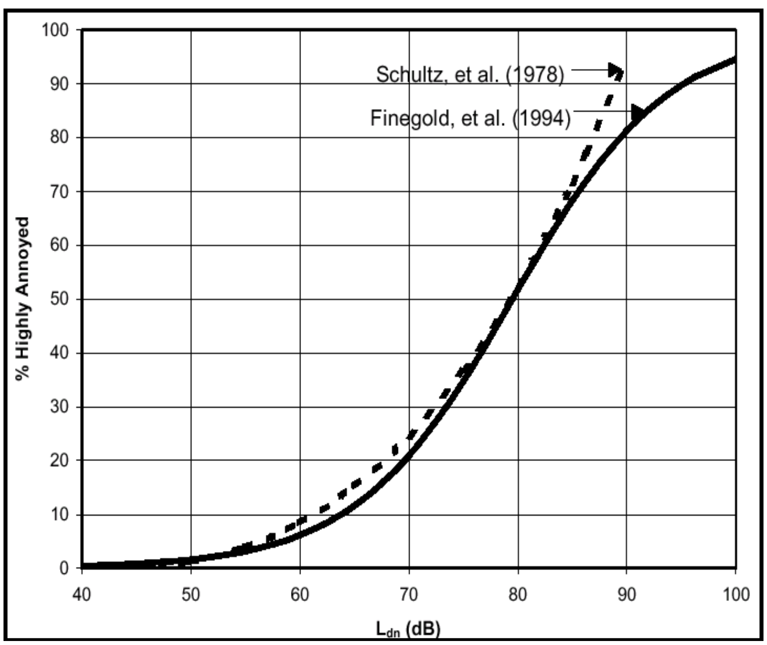


Figure C-7. Response of Communities to Noise; Comparison of Original Schultz (1978) with Finegold *et al.* (1994)

When the goodness of fit of the Schultz curve is examined, the correlation between groups of people is high, in the range of 85-90 percent. The correlation between individuals is lower, 50 percent or less. This is not surprising, given the personal differences between individuals. The surveys underlying the Schultz curve include results that show that annoyance to noise is also affected by non-acoustical factors. Newman and Beattie (1985) divided the non-acoustic factors into the emotional and physical variables shown in Table C-3.

Table C-3. Non-Acoustic Variables Influencing Aircraft Noise Annoyance

Emotional Variables	Physical Variables
Feeling about the necessity or preventability of the noise	Type of neighborhood
Judgment of the importance and value of the activity that is producing the noise	Time of day
Activity at the time an individual hears the noise	Season
Attitude about the environment	Predictability of noise
General sensitivity to noise	Control over the noise source
Belief about the effect of noise on health	Length of time individual is exposed to a noise
Feeling of fear associated with the noise	

Schreckenberg and Schuemer (2010) recently examined the importance of some of these factors on short term annoyance. Attitudinal factors were identified as having an effect on annoyance. In formal regression analysis, however, sound level (L_{eq}) was found to be more important than attitude.

A recent study by Plotkin *et al.* (2011) examined updating DNL to account for these factors. It was concluded that the data requirements for a general analysis were much greater than most existing studies. It was noted that the most significant issue with DNL is that it is not readily understood by the public, and that supplemental metrics such as TA and NA were valuable in addressing attitude when communicating noise analysis to communities (DoD 2009a).

A factor that is partially non-acoustical is the source of the noise. Miedema and Vos (1998) presented synthesis curves for the relationship between DNL and percentage "Annoyed" and percentage "Highly Annoyed" for three transportation noise sources. Different curves were found for aircraft, road traffic, and railway noise. Table C-4 summarizes their results. Comparing the updated Schultz curve suggests that the percentage of people highly annoyed by aircraft noise may be higher than previously thought.

Table C-4. Percent Highly Annoyed for Different Transportation Noise Sources

(dB)	Percent Highly Annoyed (%HA)			
	Miedema and Vos			Schultz Combined
	Air	Road	Rail	
55	12	7	4	3
60	19	12	7	6
65	28	18	11	12
70	37	29	16	22
75	48	40	22	36

Source: Miedema and Vos 1998.

As noted by the World Health Organization (WHO), however, even though aircraft noise seems to produce a stronger annoyance response than road traffic, caution should be exercised when interpreting synthesized data from different studies (WHO 1999).

Consistent with WHO's recommendations, the Federal Interagency Committee on Noise (FICON 1992) considered the Schultz curve to be the best source of dose information to predict community response to noise, but recommended further research to investigate the differences in perception of noise from different sources.

C.3.2 LAND USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL or L_{dnmr} for military overflights. Impulsive noise can be assessed by relating CDNL to an "equivalent annoyance" DNL.

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

Following the lead of the committee, the DoD adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. Air Force guidelines are presented in Table C-5, along with the explanatory notes included in the regulation. These guidelines are not mandatory (note the footnote "*" in the table), rather they are recommendations to provide the best means for determining noise impact for communities adjacent to bases. Again, these are recommendations only; it is up to the city/county zoning and planning entities to determine what land uses are compatible and how they will deal with incompatibilities (e.g., what type of development is allowed, instituting residential buyouts, or whether noise attenuation efforts will be done in residential units). In general, residential land uses normally are not compatible with outdoor DNL values above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases a change in noise level, rather than an absolute threshold, may be a more appropriate measure of impact.

Table C-5. Air Force Land Use Compatibility Recommendations

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
10	**Residential**							
11	**Household units**							
11.11	Single units; detached	N	N	Y[1]	A[11]	B[11]	N	N
11.12	Single units; semidetached	N	N	N	A[11]	B[11]	N	N
11.13	Singe units; attached row	N	N	N	A[11]	B[11]	N	N
11.21	Two units; side-by-side	N	N	N	A[11]	B[11]	N	N
11.22	Two units; one above the other	N	N	N	A[11]	B[11]	N	N
11.31	Apartments; walk up	N	N	N	A[11]	B[11]	N	N
11.32	Apartments; elevator	N	N	N	A[11]	B[11]	N	N
12	Group quarters	N	N	N	A[11]	B[11]	N	N
13	Residential hotels	N	N	N	A[11]	B[11]	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N

Table C-5. Air Force Land Use Compatibility Recommendations (Continued)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
15	Transient lodgings	N	N	N	A[11]	B[11]	C[11]	N
16	Other residential	N	N	N[1]	A[11]	B[11]	N	N
20	Manufacturing							
21	Food and kindred products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
22	Textile mill products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N[2]	Y	Y[12]	Y[13]	Y[14]
24	Lumber and wood products (except furniture); manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
25	Furniture and fixtures; manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
26	Paper and allied products; manufacturing	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
27	Printing, publishing, and allied industries	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
28	Chemicals and allied products; manufacturing	N	N	N[2]	Y	Y[12]	Y[13]	Y[14]
29	Petroleum refining and related industries	N	N	N	Y	Y[12]	Y[13]	Y[14]
30	**Manufacturing**							
31	Rubber and misc. plastic products, manufacturing	N	N[2]	N[2]	Y	Y[12]	Y[13]	Y[14]
32	Stone, clay and glass products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
33	Primary metal industries	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
34	Fabricated metal products; manufacturing	N	N[2]	Y	Y	Y[12]	Y[13]	Y[14]
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks; manufacturing	N	N	N[2]	Y	A	B	N
39	Miscellaneous manufacturing	N	Y[2]	Y[2]	Y	Y[12]	Y[13]	Y[14]
40	**Transportation, communications, and utilities**							
41	Railroad, rapid rail transit, and street railroad transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
42	Motor vehicle transportation	N[3]	Y	Y	Y	Y[12]	Y[13]	Y[14]
43	Aircraft transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
44	Marine craft transportation	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
45	Highway and street right-of-way	N[3]	Y	Y	Y	Y[12]	Y[13]	Y[14]
46	Automobile parking	N[3]	Y[4]	Y	Y	Y[12]	Y[13]	Y[14]
47	Communications	N[3]	Y[4]	Y	Y	A[15]	B[15]	N
48	Utilities	N[3]	Y[4]	Y	Y	Y	Y[12]	Y[13]
49	Other transportation communications and utilities	N[3]	Y[4]	Y	Y	A[15]	B[15]	N

Table C-5. Air Force Land Use Compatibility Recommendations (Continued)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	**Name**	**Clear Zone**	**APZ I**	**APZ II**	**65-69 dB**	**70-74 dB**	**75-79 dB**	**80+ dB**
50	**Trade**							
51	Wholesale trade	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
52	Retail trade-building materials, hardware and farm equipment	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
53	Retail trade-general merchandise	N[2]	N[2]	Y[2]	Y	A	B	N
54	Retail trade-food	N[2]	N[2]	Y[2]	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N[2]	N[2]	Y[2]	Y	A	B	N
56	Retail trade-apparel and accessories	N[2]	N[2]	Y[2]	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N[2]	N[2]	Y[2]	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N[2]	Y	A	B	N
59	Other retail trade	N	N[2]	Y[2]	Y	A	B	N
60	**Services**							
61	Finance, insurance, and real estate services	N	N	Y[6]	Y	A	B	N
62	Personal services	N	N	Y[6]	Y	A	B	N
62.4	Cemeteries	N	Y[7]	Y[7]	Y	Y[12]	Y[13]	Y[14,2,1]
63	Business services	N	Y[8]	Y[8]	Y	A	B	N
64	Repair services	N	Y[2]	Y	Y	Y[12]	Y[13]	Y[14]
65	Professional services	N	N	Y[6]	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y[6]	Y	Y	A	B	N
67	Governmental services	N[6]	N	Y[6]	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N[2]	Y[2]	Y	A	B	N
70	**Cultural, entertainment and recreational**							
71	Cultural activities (including churches)	N	N	N[2]	A*	B*	N	N
71.2	Nature exhibits	N	Y[2]	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N
72.11	Outdoor music shell, amphitheaters	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y[17]	Y[17]	N	N
73	Amusements	N	N	Y[8]	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N Y	Y[8,9,10]	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y[8]	Y[8]	Y*	Y*	N	N
79	Other cultural, entertainment, and recreation	N[9]	Y[9]	Y[9]	Y*	Y*	N	N

Table C-5. Air Force Land Use Compatibility Recommendations (Continued)

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69 dB	70-74 dB	75-79 dB	80+ dB
80	**Resources production and extraction**							
81	Agriculture (except livestock)	Y[16]	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
82	Agricultural related activities	N	Y[5]	Y	Y[18]	Y[19]	N	N
83	Forestry activities and related services	N[5]	Y	Y	Y[18]	Y[19]	Y[20]	Y[20,21]
84	Fishing activities and related services	N[5]	Y[5]	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y[5]	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y[5]	Y	Y	Y	Y	Y

1 Suggested maximum density of 1-2 dwelling units per acre possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.

2 Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible in any APZ.

3 The placing of structures, buildings, or above ground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See AFI 32-7063 and AFI 32-1026 for specific guidance.

4 No passenger terminals and no major above ground transmission lines in APZ I.

5 Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.

6 Low-intensity office uses only. Meeting places, auditoriums, etc., are not recommended.

7 Excludes chapels.

8 Facilities must be low intensity.

9 Clubhouse not recommended.

10 Areas for gatherings of people are not recommended.

11a Although local conditions may require residential use, it is discouraged in DNL 65-69 dB and strongly discouraged in DNL 70-74 dB. An evaluation should be conducted prior to approvals, indicating that a demonstrated community need for residential use would not be met if development were prohibited in these zones, and that there are no viable alternative locations.

11b Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for DNL 65-69 dB and DNL 70-74 dB should be incorporated into building codes and considered in individual approvals.

11c NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near ground level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures which only protect interior spaces.

12 Measures to achieve the same NLR as required for facilities in the DNL 65-69 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where normal noise level is low.

13 Measures to achieve the same NLR as required for facilities in the DNL 70-74 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

14 Measures to achieve the same NLR as required for facilities in the DNL 75-79 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

15 If noise sensitive, use indicated NLR; if not, the use is compatible.

16 No buildings.

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

18 Residential buildings require the same NLR required for facilities in the DNL 65-69 dB range.

19 Residential buildings require the same NLR required for facilities in the DNL 70-74 dB range.

20 Residential buildings are not permitted.

21 Land use is not recommended. If the community decides the use is necessary, hearing protection devices should be worn by personnel.

Key:

SLUCM = Standard Land Use Coding Manual, U.S. Department of Transportation

Y = Yes; land use and related structures are compatible without restriction.

N = No; land use and related structures are not compatible and should be prohibited.

A, B, or C = Land use and related structures generally compatible; measures to achieve Noise Level Reduction of A (25 dB), B (30 dB), or C (35 dB) should be incorporated into the design and construction of structures.

A*, B*, or C* = Land use generally compatible with Noise Level Reduction. However, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate footnotes.

* = The designation of these uses as “compatible” in this zone reflects individual federal agency and program consideration of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.

C.3.3 SPEECH INTERFERENCE

Speech interference from noise is a primary cause of annoyance for communities. Disruption of routine activities such as radio or television listening, telephone use, or conversation leads to frustration and annoyance. The quality of speech communication is important in classrooms and offices. In the workplace, speech interference from noise can cause fatigue and vocal strain in those who attempt to talk over the noise. In schools it can impair learning.

There are two measures of speech comprehension:

1. *Word Intelligibility* – the percent of words spoken and understood. This might be important for students in the lower grades who are learning the English language, and particularly for students who have English as a Second Language.
2. *Sentence Intelligibility* – the percent of sentences spoken and understood. This might be important for high-school students and adults who are familiar with the language, and who do not necessarily have to understand each word in order to understand sentences.

C.3.3.1 U.S. Federal Criteria for Interior Noise

In 1974, the USEPA identified a goal of an indoor $L_{eq(24)}$ of 45 dB to minimize speech interference based on sentence intelligibility and the presence of steady noise (USEPA 1974). Figure C-8 shows the effect of steady indoor background sound levels on sentence intelligibility. For an average adult with normal hearing and fluency in the language, steady background indoor sound levels of less than 45 dB L_{eq} are expected to allow 100 percent sentence intelligibility.

The curve in Figure C-8 shows 99 percent intelligibility at L_{eq} below 54 dB, and less than 10 percent above 73 dB. Recalling that L_{eq} is dominated by louder noise events, the USEPA $L_{eq(24)}$ goal of 45 dB generally ensures that sentence intelligibility will be high most of the time.

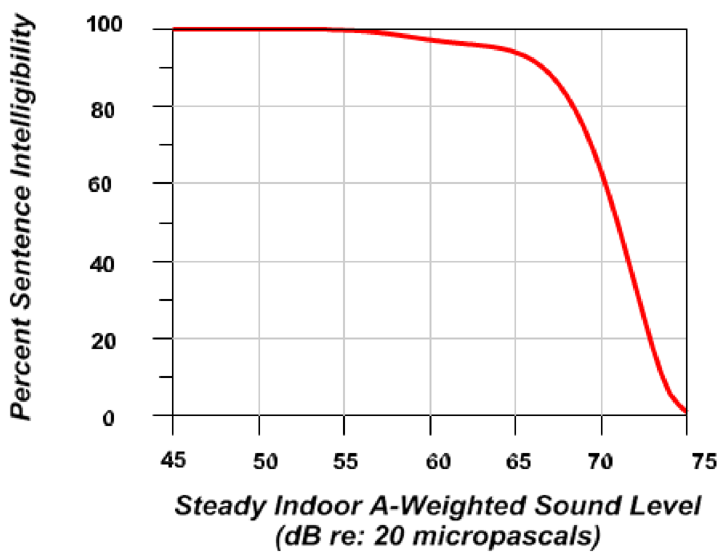


Figure C-8. Speech Intelligibility Curve (digitized from USEPA 1974)

C.3.3.2 Classroom Criteria

For teachers to be understood, their regular voice must be clear and uninterrupted. Background noise has to be below the teacher's voice level. Intermittent noise events that momentarily drown out the teacher's voice need to be kept to a minimum. It is therefore important to evaluate the steady background level, the level of voice communication, and the single-event level due to aircraft overflights that might interfere with speech.

Lazarus (1990) found that for listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., a comparison of the level of the sound to the level of background noise) is in the range of 15 to 18 dB. The initial ANSI classroom noise standard (ANSI 2002) and American Speech-Language-Hearing Association (ASLHA 1995) guidelines concur, recommending at least a 15 dB signal-to-noise ratio in classrooms. If the teacher's voice level is at least 50 dB, the background noise level must not exceed an average of 35 dB. The National Research Council of Canada (Bradley 1993) and WHO (1999) agree with this criterion for background noise.

For eligibility for noise insulation funding, the Federal Aviation Administration (FAA) guidelines state that the design objective for a classroom environment is 45 dB L_{eq} during normal school hours (FAA 1985).

Most aircraft noise is not continuous. It consists of individual events. Since speech interference in the presence of aircraft noise is caused by individual aircraft flyover events, a time-averaged metric alone, such as L_{eq}, is not necessarily appropriate. In addition to the background level criteria described above, single-event criteria that account for those noisy events are also needed.

A 1984 study by Wyle for the Port Authority of New York and New Jersey recommended using Speech Interference Level (SIL) for classroom noise criteria (Sharp and Plotkin 1984). SIL is based on the maximum sound levels in the frequency range that most affects speech communication (500-2,000 Hz). The study identified an SIL of 45 dB as the goal. This would provide 90 percent word intelligibility for the short time periods during aircraft overflights. While SIL is technically the best metric for speech interference, it can be approximated by an L_{max} value. An SIL of 45 dB is equivalent to an A-weighted L_{max} of 50 dB for aircraft noise (Wesler 1986).

Lind *et al*. (1998) also concluded that an L_{max} criterion of 50 dB would result in 90 percent word intelligibility. Bradley (1985) recommends SEL as a better indicator. His work indicates that 95 percent word intelligibility would be achieved when indoor SEL did not exceed 60 dB. For typical flyover noise this corresponds to an L_{max} of 50 dB. While WHO (1999) only specifies a background L_{max} criterion, they also note the SIL frequencies and that interference can begin at around 50 dB.

The United Kingdom Department for Education and Skills (UKDfES) established in its classroom acoustics guide a 30-minute time-averaged metric of $L_{eq(30min)}$ for background levels and the metric of $L_{A1,30min}$ for intermittent noises, at thresholds of 30-35 dB and 55 dB, respectively. LA1,30min represents the A-weighted sound level that is exceeded 1 percent of the time (in this case, during a 30-minute teaching session) and is generally equivalent to the L_{max} metric (UKDfES 2003).

Table C-6 summarizes the criteria discussed. Other than the FAA (1985) 45 dB L_{max} criterion, they are consistent with a limit on indoor background noise of 35-40 dB L_{eq} and a single event limit of 50 dB L_{max}. It should be noted that these limits were set based on students with normal hearing and no special needs. At-risk students may be adversely affected at lower sound levels.

Table C-6. Indoor Noise Level Criteria Based on Speech Intelligibility

Source	Metric/Level (dB)	Effects and Notes
U.S. FAA (1985)	$L_{eq(during\ school\ hours)}$=45 dB	Federal assistance criteria for school sound insulation; supplemental single-event criteria may be used.
Lind *et al.* (1998), Sharp and Plotkin (1984) Wesler (1986)	L_{max}=50 dB/SIL 45	Single-event level permissible in the classroom.
WHO (1999)	L_{eq}=35 dB L_{max}=50 dB	Assumes average speech level of 50 dB and recommends signal to noise ratio of 15 dB.
U.S. ANSI (2010)	L_{eq}=35 dB, based on room volume (e.g., cubic feet)	Acceptable background level for continuous and intermittent noise.
U.K. DFES (2003)	$L_{eq(30\ min)}$=30-35 dB L_{max}=55 dB	Minimum acceptable in classroom and most other learning environs.

C.3.4 SLEEP DISTURBANCE

Sleep disturbance is a major concern for communities exposed to aircraft noise at night. A number of studies have attempted to quantify the effects of noise on sleep. This section provides an overview of the major noise-induced sleep disturbance studies. Emphasis is on studies that have influenced U.S. federal noise policy. The studies have been separated into two groups:

1. Initial studies performed in the 1960s and 1970s, where the research was focused on sleep observations performed under laboratory conditions.
2. Later studies performed in the 1990s up to the present, where the research was focused onfield observations.

C.3.4.1 Initial Studies

The relation between noise and sleep disturbance is complex and not fully understood. The disturbance depends not only on the depth of sleep and the noise level, but also on the non-acoustic factors cited for annoyance. The easiest effect to measure is the number of arousals or awakenings from noise events. Much of the literature has therefore focused on predicting the percentage of the population that will be awakened at various noise levels.

FICON’s 1992 review of airport noise issues (FICON 1992) included an overview of relevant research conducted through the 1970s. Literature reviews and analyses were conducted from 1978 through 1989 using existing data (Griefahn 1978; Lukas 1978; Pearsons *et al*. 1989). Because of large variability in the data, FICON did not endorse the reliability of those results.

FICON did recommend, however, an interim dose-response curve, awaiting future research. That curve predicted the percent of the population expected to be awakened as a function of the exposure to SEL. This curve was based on research conducted for the U.S. Air Force (USAF) (Finegold 1994). The data included most of the research performed up to that point, and predicted a 10 percent probability of awakening when exposed to an interior SEL of 58 dB. The data used to derive this curve were primarily from controlled laboratory studies.

C.3.4.2 Recent Sleep Disturbance Research – Field and Laboratory Studies

It was noted that early sleep laboratory studies did not account for some important factors. These included habituation to the laboratory, previous exposure to noise, and awakenings from noise other than aircraft. In the early 1990s, field studies in people’s homes were conducted to validate the earlier laboratory work conducted in the 1960s and 1970s. The field studies of the 1990s found that 80-90 percent of sleep disturbances were not related to outdoor noise events, but rather to indoor noises and non-noise factors. The results showed that, in real life conditions, there was less of an effect of noise on sleep than had been previously reported from laboratory studies. Laboratory sleep studies tend to show more sleep disturbance than field studies because people who sleep in their own homes are used to their environment and, therefore, do not wake up as easily (FICAN 1997).

C.3.4.3 Federal Interagency Committee on Aviation Noise

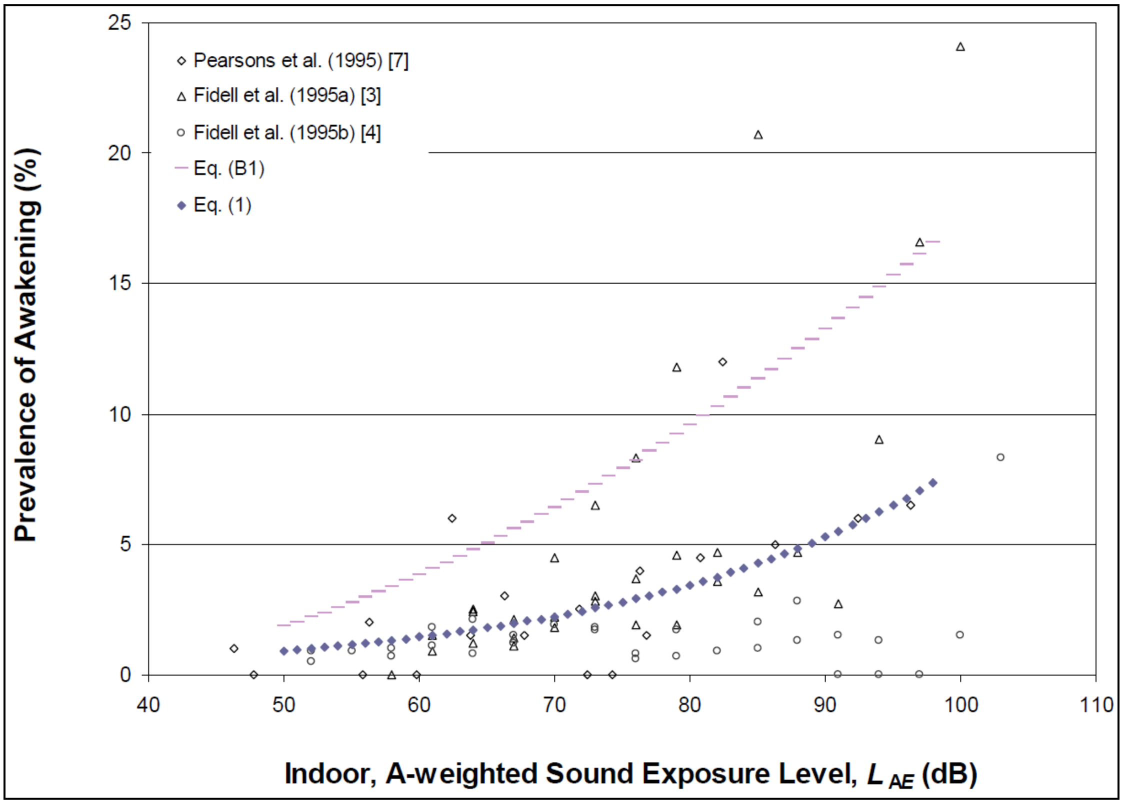
Based on this new information, in 1997 Federal Interagency Committee on Aviation Noise (FICAN) recommended a dose-response curve to use instead of the earlier 1992 FICON curve (FICAN 1997). Figure C-13 shows FICAN’s curve, the red dashed line, which is based on the results of three field studies shown in the figure (Ollerhead *et al*. 1992; Fidell *et al*. 1994; Fidell *et al*. 1995a, 1995b), along with the data from six previous field studies.

The 1997 FICAN curve represents the upper envelope of the latest field data. It predicts the maximum percent awakened for a given residential population. According to this curve, a maximum of 3 percent of people would be awakened at an indoor SEL of 58 dB. An indoor SEL of 58 dB is equivalent to an outdoor SEL of 83 dB, with the windows closed (73 dB with windows open).

C.3.4.4 Number of Events and Awakenings

It is reasonable to expect that sleep disturbance is affected by the number of events. The German Aerospace Center (DLR Laboratory) conducted an extensive study focused on the effects of nighttime aircraft noise on sleep and related factors (Basner 2004). The DLR study was one of the largest studies to examine the link between aircraft noise and sleep disturbance. It involved both laboratory and in-home field research phases. The DLR investigators developed a dose-response curve that predicts the number of aircraft events at various values of L_{max} expected to produce one additional awakening over the course of a night. The dose-effect curve was based on the relationships found in the field studies.

A different approach was taken by an ANSI standards committee (ANSI 2008). The committee used the average of the data shown in Figure C-9 (i.e., the blue dashed line) rather than the upper envelope, to predict average awakening from one event. Probability theory is then used to project the awakening from multiple noise events.



Source: DoD 2009

Figure C-9. Sleep Disturbance Dose-Response Relationships

Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise, although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open. According to the ANSI (2008) standard, the probability of awakening from a single aircraft event at this level is between 1 and 2 percent for people habituated to the noise sleeping in bedrooms with windows closed, and 2-3 percent with windows open. The probability of the exposed population awakening at least once from multiple aircraft events at noise levels of 90 dB SEL is shown in Table C-7.

Table C-7. Probability of Awakening from NA90SEL

Number of Aircraft Events at 90 Db SEL for Average 9-Hour Night	Minimum Probability of Awakening at Least Once	
	Windows Closed	Windows Open
1	1%	2%
3	4%	6%
5	7%	10%
9 (1 per hour)	12%	18%
18 (2 per hour)	22%	33%
27 (3 per hour)	32%	45%

Source: DoD 2009.

In December 2008, FICAN recommended the use of this new standard. FICAN also recognized that more research is underway by various organizations, and that work may result in changes to

FICAN's position. Until that time, FICAN recommends the use of the ANSI (2008) standard (FICAN 2008).

C.3.4.5 Summary

Sleep disturbance research still lacks the details to accurately estimate the population awakened for a given noise exposure. The procedure described in the ANSI (2008) Standard and endorsed by FICAN is based on probability calculations that have not yet been scientifically validated. While this procedure certainly provides a much better method for evaluating sleep awakenings from multiple aircraft noise events, the estimated probability of awakenings can only be considered approximate.

C.3.5 NOISE-INDUCED HEARING IMPAIRMENT

Residents in surrounding communities express concerns regarding the effects of aircraft noise on hearing. This section provides a brief overview of hearing loss caused by noise exposure. The goal is to provide a sense of perspective as to how aircraft noise (as experienced on the ground) compares to other activities that are often linked with hearing loss.

C.3.5.1 Hearing Threshold Shifts

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound (i.e., a shift in the hearing threshold to a higher level). This change can either be a Temporary Threshold Shift (TTS) or a Permanent Threshold Shift (PTS) (Berger *et al*. 1995).

TTS can result from exposure to loud noise over a given amount of time. An example of TTS might be a person attending a loud music concert. After the concert is over, there can be a threshold shift that may last several hours. While experiencing TTS, the person becomes less sensitive to low-level sounds, particularly at certain frequencies in the speech range (typically near 4,000 Hz). Normal hearing eventually returns, as long as the person has enough time to recover within a relatively quiet environment.

PTS usually results from repeated exposure to high noise levels, where the ears are not given adequate time to recover. A common example of PTS is the result of regularly working in a loud factory. A TTS can eventually become a PTS over time with repeated exposure to high noise levels. Even if the ear is given time to recover from TTS, repeated occurrence of TTS may eventually lead to permanent hearing loss. The point at which a TTS results in a PTS is difficult to identify and varies with a person's sensitivity.

C.3.5.2 Criteria for Permanent Hearing Loss

It has been well established that continuous exposure to high noise levels will damage human hearing (USEPA 1978). A large amount of data on hearing loss have been collected, largely for workers in manufacturing industries, and analyzed by the scientific/medical community. The Occupational Safety and Health Administration (OSHA) regulation of 1971 places the limit on workplace noise exposure at an average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period (U.S. Department of Labor 1971). Some hearing loss is still expected at those levels. The most protective criterion, with no measurable hearing loss after 40 years of exposure, is an average sound level of 70 dB over a 24-hour period.

The USEPA established 75 dB $L_{eq(8)}$ and 70 dB $L_{eq(24)}$ as the average noise level standard needed to protect 96 percent of the population from greater than a 5 dB PTS (USEPA 1978). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) identified

75 dB as the lowest level at which hearing loss may occur (CHABA 1977). WHO concluded that environmental and leisure-time noise below an $L_{eq(24)}$ value of 70 dB "will not cause hearing loss in the large majority of the population, even after a lifetime of exposure" (WHO 1999).

C.3.5.3 Hearing Loss and Aircraft Noise

The 1982 USEPA Guidelines report (USEPA 1982) addresses noise-induced hearing loss in terms of the "Noise-Induced Permanent Threshold Shift" (NIPTS). This defines the permanent change in hearing caused by exposure to noise. Numerically, the NIPTS is the change in threshold that can be expected from daily exposure to noise over a normal working lifetime of 40 years. A grand average of the NIPTS over time and hearing sensitivity is termed the Average NIPTS, or Ave. NIPTS for short. The Ave. NIPTS that can be expected for noise measured by the $L_{eq(24)}$ metric is given in Table C-8 and assumes exposure to the full outdoor noise throughout the 24 hours. When inside a building, the exposure will be less (Eldred and von Gierke 1993).

Table C-8. Average NIPTS and 10th Percentile NIPTS as a Function of DNL

DNL	Ave. NIPTS dB*	10th Percentile NIPTS dB*
75-76	1.0	4.0
76-77	1.0	4.5
77-78	1.6	5.0
78-79	2.0	5.5
79-80	2.5	6.0
80-81	3.0	7.0
81-82	3.5	8.0
82-83	4.0	9.0
83-84	4.5	10.0
84-85	5.5	11.0
85-86	6.0	12.0
86-87	7.0	13.5
87-88	7.5	15.0
88-89	8.5	16.5
89-90	9.5	18.0

Source: DoD 2012
* = Rounded to the nearest 0.5 dB

The Ave. NIPTS is estimated as an average over all people exposed to the noise. The actual value of NIPTS for any given person will depend on their physical sensitivity to noise – some will experience more hearing loss than others. The USEPA Guidelines provide information on this variation in sensitivity in the form of the NIPTS exceeded by 10 percent of the population, which is included in the Table C-9 in the "10th Percentile NIPTS" column (USEPA 1982). For individuals exposed to $L_{eq(24)}$ of 80 dB, the most sensitive of the population would be expected to show degradation to their hearing of 7 dB over time.

To put these numbers in perspective, changes in hearing level of less than 5 dB are generally not considered noticeable or significant. Furthermore, there is no known evidence that a NIPTS of 5 dB is perceptible or has any practical significance for the individual. Lastly, the variability in audiometric testing is generally assumed to be ±5 dB (USEPA 1974).

The scientific community has concluded that noise exposure from civil airports has little chance of causing permanent hearing loss (Newman and Beattie 1985). For military airbases, DoD policy requires that hearing risk loss be estimated for population exposed to L_{dn} of 80 dB or higher (DoD 2009c), including residents of on-base housing. Exposure of workers inside the base boundary is assessed using DoD regulations for occupational noise exposure.

Noise in low-altitude military airspace, especially along MTRs where L_{max} can exceed 115 dB, is of concern. That is the upper limit used for occupational noise exposure (e.g., U.S. Department of Labor 1971). One laboratory study (Ising *et al*. 1999) concluded that events with L_{max} above 114 dB have the potential to cause hearing loss. Another laboratory study of participants exposed to levels between 115 and 130 dB (Nixon *et al*. 1993), however, showed conflicting results. For an exposure to four events across that range, half the subjects showed no change in hearing, a quarter showed a temporary 5 dB decrease in sensitivity, and a quarter showed a temporary 5 dB increase in sensitivity. For exposure to eight events of 130 dB, subjects showed an increase in sensitivity of up to 10 dB (Nixon *et al*. 1993).

C.3.5.4 Summary

Aviation noise levels are not comparable to the occupational noise levels associated with hearing loss of workers in manufacturing industries. There is little chance of hearing loss at levels less than 75 dB DNL. Noise levels equal to or greater than 75 dB DNL can occur near military airbases, and DoD policy specifies that NIPTS be evaluated when exposure exceeds 80 dB L_{dn} (DoD 2009c). There is some concern about L_{max} exceeding 115 dB in low altitude military airspace, but no research results to date have definitely related permanent hearing impairment to aviation noise.

C.3.6 NON-AUDITORY HEALTH EFFECTS

Studies have been performed to see whether noise can cause health effects other than hearing loss. The premise is that annoyance causes stress. Prolonged stress is known to be a contributor to a number of health disorders. Cantrell (1974) confirmed that noise can provoke stress, but noted that results on cardiovascular health have been contradictory. Some studies have found a connection between aircraft noise and blood pressure (e.g., Michalak *et al*. 1990; Rosenlund *et al*. 2001), while others have not (e.g., Pulles *et al*. 1990).

Kryter and Poza (1980) noted, “It is more likely that noise related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body.”

The connection from annoyance to stress to health issues requires careful experimental design. Some highly publicized reports on health effects have, in fact, been rooted in poorly done science. Meecham and Shaw (1979) apparently found a relation between noise levels and mortality rates in neighborhoods under the approach path to Los Angeles International Airport. When the same data were analyzed by others (Frerichs *et al.* 1980) no relationship was found. Jones and Tauscher (1978) found a high rate of birth defects for the same neighborhood. But when the Centers For Disease Control performed a more thorough study near Atlanta’s Hartsfield International Airport, no relationships were found for levels above 65 dB (Edmonds *et al.* 1979).

A carefully designed study, Hypertension and Exposure to Noise near Airports (HYENA), was conducted around six European airports from 2002 through 2006 (Jarup *et al.* 2005, 2008). There were 4,861 subjects, aged between 45 and 70. Blood pressure was measured, and questionnaires administered for health, socioeconomic and lifestyle factors, including diet and physical exercise. Hypertension was defined by WHO blood pressure thresholds (WHO 2003). Noise from aircraft and highways was predicted from models.

HYENA results were presented as an odds ratio (OR). An OR of 1 means there is no added risk, while an OR of 2 would mean risk doubles. An OR of 1.14 was found for nighttime aircraft noise, measured by L_{night}, the L_{eq} for nighttime hours. For daytime aircraft noise, measured by $L_{eq(16)}$, the OR was 0.93. For road traffic noise, measured by the full day $L_{eq(24)}$, the OR was 1.1.

Note that OR is a statistical measure of change, not the actual risk. Risk itself and the measured effects were small, and not necessarily distinct from other events. Haralabidis *et al*. (2008) reported an increase in systolic blood pressure of 6.2 millimeters of mercury (mmHg) for aircraft noise, and an increase of 7.4 mmHg for other indoor noises such as snoring.

It is interesting that aircraft noise was a factor only at night, while traffic noise is a factor for the full day. Aircraft noise results varied among the six countries so that result is pooled across all data. Traffic noise results were consistent across the six countries.

One interesting conclusion from a 2013 study of the HYENA data (Babisch *et al*. 2013) states there is some indication that noise level is a stronger predictor of hypertension than annoyance. That is not consistent with the idea that annoyance is a link in the connection between noise and stress. Babisch *et al*. (2012) present interesting insights on the relationship of the results to various modifiers.

Two recent studies examined the correlation of aircraft noise with hospital admissions for cardiovascular disease. Hansell *et al*. (2013) examined neighborhoods around London's Heathrow airport. Correia *et al*. (2013) examined neighborhoods around 89 airports in the United States. Both studies included areas of various noise levels. They found associations that were consistent with the HYENA results. The authors of these studies noted that further research is needed to refine the associations and the causal interpretation with noise or possible alternative explanations.

C.3.6.1 Summary

The current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between aircraft noise exposure and non-auditory health consequences for exposed residents. The large scale HYENA study, and the recent studies by Hansell *et al.* (2013) and Correia *et al.* (2013) offer indications, but it is not yet possible to establish a quantitative cause and effect based on the currently available scientific evidence.

C.3.7 PERFORMANCE EFFECTS

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have found links between continuous high noise levels and performance loss.

Noise-induced performance losses are most frequently reported in studies where noise levels are above 85 dB. Little change has been found in low-noise cases. Moderate noise levels appear to act as a stressor for more sensitive individuals performing a difficult psychomotor task.

While the results of research on the general effect of periodic aircraft noise on performance have yet to yield definitive criteria, several general trends have been noted including:

- A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- Noise is more inclined to affect the quality than the quantity of work.
- Noise is more likely to impair the performance of tasks that place extreme demands on workers.

C.3.8 NOISE EFFECTS ON CHILDREN

Recent studies on school children indicate a potential link between aircraft noise and both reading comprehension and learning motivation. The effects may be small but may be of particular concern for children who are already scholastically challenged.

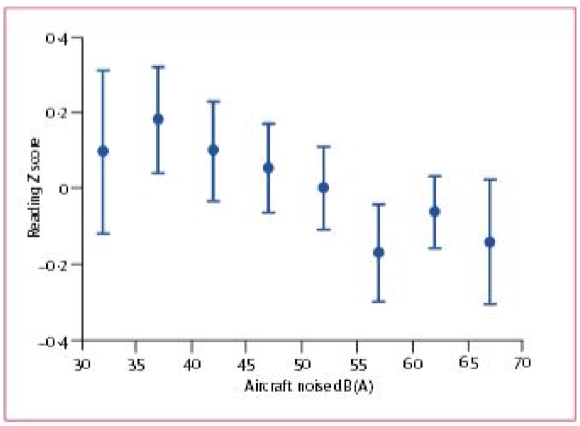
C.3.8.1 Effects on Learning and Cognitive Abilities

Early studies in several countries (Cohen *et al*. 1973, 1980, 1981; Bronzaft and McCarthy 1975; Green *et al*. 1982; Evans *et al*. 1998; Haines *et al*. 2002; Lercher *et al*. 2003) showed lower reading scores for children living or attending school in noisy areas than for children away from those areas. In some studies noise exposed children were less likely to solve difficult puzzles or more likely to give up.

More recently, the Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health (RANCH) study (Stansfeld *et al*. 2005; Clark *et al*. 2005) compared the effect of aircraft and road traffic noise on over 2,000 children in three countries. This was the first study to derive exposure-effect associations for a range of cognitive and health effects, and was the first to compare effects across countries.

The study found a linear relation between chronic aircraft noise exposure and impaired reading comprehension and recognition memory. No associations were found between chronic road traffic noise exposure and cognition. Conceptual recall and information recall surprisingly showed better performance in high road traffic noise areas. Neither aircraft noise nor road traffic noise affected attention or working memory (Stansfeld *et al*. 2005; Clark *et al*. 2006).

Figure C-10 shows RANCH's result relating noise to reading comprehension. It shows that reading falls below average (a z-score of 0) at L_{eq} greater than 55 dB. Because the relationship is linear, reducing exposure at any level should lead to improvements in reading comprehension.



Sources: Stansfeld *et al.* 2005; Clark *et al.* 2006

Figure C-10. RANCH Study Reading Scores Varying with L_{eq}

An observation of the RANCH study was that children may be exposed to aircraft noise for many of their childhood years and the consequences of long-term noise exposure were unknown. A follow-up study of the children in the RANCH project is being analyzed to examine the long-term effects on children's reading comprehension (Clark *et al*. 2009). Preliminary analysis indicated a trend for reading comprehension to be poorer at 15-16 years of age for children who attended noise-exposed primary schools. There was also a trend for reading comprehension to be poorer in aircraft noise exposed secondary schools. Further analysis adjusting for confounding factors is ongoing, and is needed to confirm these initial conclusions.

FICAN funded a pilot study to assess the relationship between aircraft noise reduction and standardized test scores (Eagan *et al*. 2004; FICAN 2007). The study evaluated whether abrupt aircraft noise reduction within classrooms, from either airport closure or sound insulation, was associated with improvements in test scores. Data were collected in 35 public schools near three airports in Illinois and Texas. The study used several noise metrics. These were, however, all computed indoor levels, which makes it hard to compare with the outdoor levels used in most other studies.

The FICAN study found a significant association between noise reduction and a decrease in failure rates for high school students, but not middle or elementary school students. There were some weaker associations between noise reduction and an increase in failure rates for middle and elementary schools. Overall the study found that the associations observed were similar for children with or without learning difficulties, and between verbal and math/science tests. As a pilot study, it was not expected to obtain final answers, but provided useful indications (FICAN 2007).

While there are many factors that can contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led WHO and a North Atlantic Treaty Organization (NATO) working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (NATO 2000; WHO 1999). The awareness has also led to the classroom noise standard discussed earlier (ANSI 2002).

C.3.8.2 Health Effects

A number of studies, including some of the cognitive studies discussed above, have examined the potential for effects on children's health. Health effects include annoyance, psychological health, coronary risk, stress hormones, sleep disturbance and hearing loss.

Annoyance. Chronic noise exposure causes annoyance in children (Bronzaft and McCarthy 1975; Evans *et al.* 1995). Annoyance among children tends to be higher than for adults, and there is little habituation (Haines *et al.* 2001a). The RANCH study found annoyance may play a role in how noise affects reading comprehension (Clark *et al.* 2005).

Psychological Health. Lercher *et al.* (2002) found an association between noise and teacher ratings of psychological health, but only for children with biological risk defined by low birth weight and/or premature birth. Haines *et al.* (2001b) found that children exposed to aircraft noise had higher levels of psychological distress and hyperactivity. Stansfeld *et al.* (2009) replicated the hyperactivity result, but not distress.

As with studies of adults, the evidence suggests that chronic noise exposure is probably not associated with serious psychological illness, but there may be effects on well-being and quality of life. Further research is needed, particularly on whether hyperactive children are more susceptible to stressors such as aircraft noise.

Coronary Risk. The HYENA study discussed earlier indicated a possible relation between noiseand hypertension in older adults. Cohen *et al.* (1980, 1981) found some increase in blood pressure among school children, but within the normal range and not indicating hypertension. Hygge *et al.* (2002) found mixed effects. The RANCH study found some effect for children at home and at night, but not at school. Overall the evidence for noise effects on children's blood pressure is mixed, and less certain than for older adults.

Stress Hormones. Some studies investigated hormonal levels between groups of children exposed to aircraft noise compared to those in a control group. Two studies analyzed cortisol and urinary catecholamine levels in school children as measurements of stress response to aircraft noise (Haines *et al.* 2001a, 2001b). In both instances, there were no differences between the aircraft-noise-exposed children and the control groups.

Sleep Disturbance. A sub-study of RANCH in a Swedish sample used sleep logs and the monitoring of rest/activity cycles to compare the effect of road traffic noise on child and parent sleep (Ohrstrom *et al.* 2006). An exposure-response relationship was found for sleep quality and daytime sleepiness for children. While this suggests effects of noise on children's sleep disturbance, it is difficult to generalize from one study.

Hearing loss. A few studies have examined hearing loss from exposure to aircraft noise. Noise-induced hearing loss for children who attended a school located under a flight path near a Taiwan airport was greater than for children at another school far away (Chen *et al.* 1997). Another study reported that hearing ability was reduced significantly in individuals who lived near an airport and were frequently exposed to aircraft noise (Chen and Chen 1993). In that study, noise exposure near the airport was greater than 75 dB DNL and L_{max} were about 87 dB during overflights. Conversely, several other studies reported no difference in hearing ability between children exposed to high levels of airport noise and children located in quieter areas (Andrus *et al.* 1975; Fisch 1977; Wu *et al.* 1995). It is not clear from those results whether children are at higher risk than adults, but the levels involved are higher than those desirable for learning and quality of life.

Ludlow and Sixsmith (1999) conducted a cross-sectional pilot study to examine the hypothesis that military jet noise exposure early in life is associated with raised hearing thresholds. The authors concluded that there were no significant differences in audiometric test results between military personnel who as children had lived in or near stations where fast jet operations were based, and a similar group who had no such exposure as children.

C.3.9 PROPERTY VALUES

Noise can affect the value of homes. Economic studies of property values based on selling prices and noise have been conducted to find a direct relation.

The value-noise relation is usually presented as the Noise Depreciation Index (NDI) or Noise Sensitivity Depreciation Index (NSDI), the percent loss of value per dB (measured by the DNL metric). An early study by Nelson (1978) at three airports found an NDI of 1.8-2.3 percent per dB. Nelson also noted a decline in NDI over time which he theorized could be due to either a change in population or the increase in commercial value of the property near airports. Crowley (1978) reached a similar conclusion. A larger study by Nelson (1980) looking at 18 airports found an NDI from 0.5 to 0.6 percent per dB.

In a review of property value studies, Newman and Beattie (1985) found a range of NDI from 0.2 to 2 percent per dB. They noted that many factors other than noise affected values.

Fidell *et al.* (1996) studied the influence of aircraft noise on actual sale prices of residential properties in the vicinity of a military base in Virginia and one in Arizona. They found no meaningful effect on home values. Their results may have been due to non-noise factors, especially the wide differences in homes between the two study areas.

Recent studies of noise effects on property values have recognized the need to account for non-noise factors. Nelson (2004) analyzed data from 33 airports, and discussed the need to account for those factors and the need for careful statistics. His analysis showed NDI from 0.3 to 1.5 percent per dB, with an average of about 0.65 percent per dB. Nelson (2007) and Andersson et al. (2013) discuss statistical modeling in more detail.

Enough data is available to conclude that aircraft noise has a real effect on property values. This effect falls in the range of 0.2 to 2.0 percent per dB, with the average on the order of 0.5 percent per dB. The actual value varies from location to location, and is very often small compared to non-noise factors.

C.3.10 NOISE-INDUCED VIBRATION EFFECTS ON STRUCTURES AND HUMANS

High noise levels can cause buildings to vibrate. If high enough, building components can be damaged. The most sensitive components of a building are the windows, followed by plaster walls and ceilings. Possibility of damage depends on the peak sound pressures and the resonances of the building. In general, damage is possible only for sounds lasting more than one second above an unweighted sound level of 130 dB (CHABA 1977). That is higher than expected from normal aircraft operations. Even low altitude flyovers of heavy aircraft do not reach the potential for damage (Sutherland 1990a).

Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle", of objects within the dwelling – hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, rattling occurs at peak unweighted sound levels that last for several seconds at levels above 110 dB, which is well above that considered normally compatible with residential land use Thus, assessments of noise exposure levels for compatible land use will also be protective of noise-induced rattle.

The sound from an aircraft overflight travels from the exterior to the interior of the house in one of two ways: through the solid structural elements and directly through the air. Sound transmission through walls starts with noise impinging on the wall exterior. Some of this sound energy will be reflected away and some will make the wall vibrate. The vibrating wall radiates sound into the airspace, which in turn sets the interior finish surface vibrating, with some energy lost in the airspace. This surface then radiates sound into the dwelling interior. Vibrational energy also bypasses the air cavity by traveling through the studs and edge connections.

Normally, the most sensitive components of a structure to airborne noise are the windows, followed by plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at unweighted sound levels above 130 dB, there is the possibility of structural damage. While certain frequencies (such as 30 Hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a unweighted sound level of 130 dB are potentially damaging to structural components (von Gierke and Ward 1991).

In the assessment of vibration on humans, the following factors determine if a person will perceive and possibly react to building vibrations:

1. Type of excitation: steady state, intermittent, or impulsive vibration.

2. Frequency of the excitation. International Organization for Standardization (ISO) standard 2631-2 (ISO 1989) recommends a frequency range of 1 to 80 Hz for the assessment of vibration on humans.
3. Orientation of the body with respect to the vibration.
4. The use of the occupied space (i.e., residential, workshop, hospital).
5. Time of day.

Table C-9 lists the whole-body vibration criteria from ISO 2631-2 for one-third octave frequency bands from 1 to 80 Hz.

Table C-9. Vibration Criteria for the Evaluation of Human Exposure to Whole-Body Vibration

(Hz)	RMS Acceleration (m/s/s)		
	Combined Criteria Base Curve	Residential Night	Residential Day
1.00	0.0036	0.0050	0.0072
1.25	0.0036	0.0050	0.0072
1.60	0.0036	0.0050	0.0072
2.00	0.0036	0.0050	0.0072
2.50	0.0037	0.0052	0.0074
3.15	0.0039	0.0054	0.0077
4.00	0.0041	0.0057	0.0081
5.00	0.0043	0.0060	0.0086
6.30	0.0046	0.0064	0.0092
8.00	0.0050	0.0070	0.0100
10.00	0.0063	0.0088	0.0126
12.50	0.0078	0.0109	0.0156
16.00	0.0100	0.0140	0.0200
20.00	0.0125	0.0175	0.0250
25.00	0.0156	0.0218	0.0312
31.50	0.0197	0.0276	0.0394
40.00	0.0250	0.0350	0.0500
50.00	0.0313	0.0438	0.0626
63.00	0.0394	0.0552	0.0788
80.00	0.0500	0.0700	0.1000

Source: ISO 1989.

C.3.11 NOISE EFFECTS ON TERRAIN

It has been suggested that noise levels associated with low-flying aircraft may affect the terrain under the flight path by disturbing fragile soil or snow, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such events. It is improbable that such effects would result from routine subsonic aircraft operations.

C.3.12 NOISE EFFECTS ON HISTORICAL AND ARCHAEOLOGICAL SITES

Historical buildings and sites can have elements that are more fragile than conventional structures. Aircraft noise may affect such sites more severely than newer, modern structures. In older structures, seemingly insignificant surface cracks caused by vibrations from aircraft noise may lead to greater damage from natural forces (Hanson *et al*. 1991). There are few scientific studies of such effects to provide guidance for their assessment.

For example, one study involved measurements of noise and vibration in a restored plantation house, originally built in 1795. It is located 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. The aircraft measured was the Concorde. There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning (Wesler 1977).

As for conventional structures, noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites. Unique sites should, of course, be analyzed for specific exposure.

C.3.13 EFFECTS ON DOMESTIC ANIMALS AND WILDLIFE

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues, and the potential for drawing conclusions regarding effects on populations, has not been well developed.

The relationships between potential auditory/physiological effects and species interactions with their environments are not well understood. Manci *et al.* (1988), assert that the consequences that physiological effects may have on behavioral patterns are vital to understanding the long-term effects of noise on wildlife. Questions regarding the effects (if any) on predator-prey interactions, reproductive success, and intra-inter specific behavior patterns remain.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed here involves those studies that have focused on the observations of the behavioral effects that jet aircraft have on animals.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness.

Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns (Manci *et al*. 1988). Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate with, and attract, other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights.

Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects, and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of normal variation (Bowles 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects, and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith *et al*. 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci *et al*. 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith *et al*. 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

One result of the Manci *et al*. (1988) literature review was the conclusion that, while behavioral observation studies were relatively limited, a general behavioral reaction in animals from exposure to aircraft noise is the startle response. The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been some previous exposures. Responses range from flight, trampling, stampeding, jumping, or running, to movement of the head in the apparent direction of the noise source. Manci *et al.* (1988) reported that the literature indicated that avian species may be more sensitive to aircraft noise than mammals.

C.3.13.1 Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including the startle response, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci *et al.* 1988). Some studies have reported such primary and secondary effects as reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies, and claims by farmers linking adverse effects of aircraft noise on livestock, did not necessarily provide clear-cut evidence of cause and effect (Cottereau 1978). In contrast, many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals.

C.3.13.1.1 *Cattle*

In response to concerns about overflight effects on pregnant cattle, milk production, and cattle safety, the USAF prepared a handbook for environmental protection that summarized the literature on the impacts of low-altitude flights on livestock (and poultry) and includes specific case studies conducted in numerous airspaces across the country. Adverse effects have been found in a few studies but have not been reproduced in other similar studies. One such study, conducted in 1983, suggested that 2 of 10 cows in late pregnancy aborted after showing rising estrogen and falling progesterone levels. These increased hormonal levels were reported as being linked to 59 aircraft overflights. The remaining eight cows showed no changes in their blood concentrations and calved normally. A similar study reported abortions occurred in three out of five pregnant cattle after exposing them to flyovers by six different aircraft. Another study suggested that feedlot cattle could stampede and injure themselves when exposed to low-level overflights (USAF 1994a).

A majority of the studies reviewed suggests that there is little or no effect of aircraft noise on cattle. Studies presenting adverse effects to domestic animals have been limited. A number of studies (Parker and Bayley 1960; Casady and Lehmann 1967; Kovalcik and Sottnik 1971) investigated the effects of jet aircraft noise on the milk production of dairy cows. Through the compilation and examination of milk production data from areas exposed to jet aircraft noise, it was determined that milk yields were not affected. This was particularly evident in those cows that had been previously exposed to jet aircraft noise.

A study examined the causes of 1,763 abortions in Wisconsin dairy cattle over a 1-year time period and none were associated with aircraft disturbances (USAF 1993). In 1987, researchers contacted seven livestock operators for production data, and no effects of low-altitude flights were noted. Of the 43 cattle previously exposed to low-altitude flights, 3 showed a startle response to an F/A-18 aircraft flying overhead at 500 feet above ground level (AGL) and 400 knots by running less than 10 meters (m). They resumed normal activity within 1 minute (USAF 1994a). Beyer (1983) found that helicopters caused more reaction than other low-aircraft overflights, and that the helicopters at 30-60 feet overhead did not affect milk production and pregnancies of 44 cows in a 1964 study (USAF 1994a).

Additionally, Beyer (1983) reported that five pregnant dairy cows in a pasture did not exhibit fright flight tendencies or disturb their pregnancies after being overflown by 79 low-altitude helicopter flights and 4 low-altitude, subsonic jet aircraft flights. A 1956 study found that the reactions of dairy and beef cattle to noise from low-altitude, subsonic aircraft were similar to those caused by paper blowing about, strange persons, or other moving objects (USAF 1994a).

In a report to Congress, the U. S. Forest Service concluded that "evidence both from field studies of wild ungulates and laboratory studies of domestic stock indicate that the risks of damage are small (from aircraft approaches of 50-100 m), as animals take care not to damage themselves (U.S. Forest Service 1992). If animals are overflown by aircraft at altitudes of 50-100 m, there is no evidence that mothers and young are separated, that animals collide with obstructions (unless confined) or that they traverse dangerous ground at too high a rate." These varied study results suggest that, although the confining of cattle could magnify animal response to aircraft overflight, there is no proven cause-and-effect link between startling cattle from aircraft overflights and abortion rates or lower milk production.

C.3.13.1.2 *Horses*

Horses have also been observed to react to overflights of jet aircraft. Several of the studies reviewed reported a varied response of horses to low-altitude aircraft overflights. Observations made in 1966 and 1968 noted that horses galloped in response to jet flyovers (USAF 1993). Bowles (1995) cites Kruger and Erath as observing horses exhibiting intensive flight reactions, random movements, and biting/kicking behavior. However, no injuries or abortions occurred, and there was evidence that the mares adapted somewhat to the flyovers over the course of a month (USAF 1994a). Although horses were observed noticing the overflights, it did not appear to affect either survivability or reproductive success. There was also some indication that habituation to these types of disturbances was occurring.

LeBlanc *et al.* (1991) studied the effects of F-14 jet aircraft noise on pregnant mares. They specifically focused on any changes in pregnancy success, behavior, cardiac function, hormonal production, and rate of habituation. Their findings reported observations of "flight-fright" reactions, which caused increases in heart rates and serum cortisol concentrations. The mares, however, did habituate to the noise. Levels of anxiety and mass body movements were the highest after initial exposure, with intensities of responses decreasing thereafter. There were no differences in pregnancy success when compared to a control group.

C.3.13.1.3 *Swine*

Generally, the literature findings for swine appear to be similar to those reported for cows and horses.

While there are some effects from aircraft noise reported in the literature, these effects are minor. Studies of continuous noise exposure (i.e., 6 hours, 72 hours of constant exposure) reported influences on short-term hormonal production and release. Additional constant exposure studies indicated the observation of stress reactions, hypertension, and electrolyte imbalances (Dufour 1980). A study by Bond *et al.* (1963), demonstrated no adverse effects on the feeding efficiency, weight gain, ear physiology, or thyroid and adrenal gland condition of pigs subjected to observed aircraft noise. Observations of heart rate increase were recorded; noting that cessation of the noise resulted in the return to normal heart rates. Conception rates and offspring survivorship did not appear to be influenced by exposure to aircraft noise.

Similarly, simulated aircraft noise at levels of 100-135 dB had only minor effects on the rate of feed utilization, weight gain, food intake, or reproduction rates of boars and sows exposed, and there were no injuries or inner ear changes observed (Gladwin *et al.* 1988; Manci *et al.* 1988).

C.3.13.1.4 *Domestic Fowl*

According to a 1994 position paper by the USAF on effects of low-altitude overflights (below 1,000 feet) on domestic fowl, overflight activity has negligible effects (USAF 1994b). The paper did recognize that given certain circumstances, adverse effects can be serious. Some of the effects can be panic reactions, reduced productivity, and effects on marketability (e.g., bruising of the meat caused during "pile-up" situations).

The typical reaction of domestic fowl after exposure to sudden, intense noise is a short-term startle response. The reaction ceases as soon as the stimulus is ended, and within a few minutes all activity returns to normal. More severe responses are possible depending on the number of birds, the frequency of exposure, and environmental conditions. Large crowds of birds, and birds not previously exposed, are more likely to pile up in response to a noise stimulus (USAF 1994b). According to studies and interviews with growers, it is typically the previously unexposed birds that incite panic crowding, and the tendency to do so is markedly reduced within five exposures to the stimulus (USAF 1994b). This suggests that the birds habituate relatively quickly. Egg productivity was not adversely affected by infrequent noise bursts, even at exposure levels as high as 120-130 dB.

Between 1956 and 1988, there were 100 recorded claims against the Navy for alleged damage to domestic fowl. The number of claims averaged three per year, with peak numbers of claims following publications of studies on the topic in the early 1960s. Many of the claims were disproved or did not have sufficient supporting evidence. The claims were filed for the following alleged damages: 55 percent for panic reactions, 31 percent for decreased production, 6 percent for reduced hatchability, 6 percent for weight loss, and less than 1 percent for reduced fertility (USAF 1994b).

C.3.13.2 Wildlife

Studies on the effects of overflights on wildlife have been focused mostly on avian species and ungulates such as caribou and bighorn sheep. Few studies have been conducted on marine mammals, small terrestrial mammals, reptiles, amphibians, and carnivorous mammals. Generally, species that live entirely below the surface of the water have also been ignored due to the fact they do not experience the same level of sound as terrestrial species (National Park Service 1994). Wild ungulates appear to be much more sensitive to noise disturbance than domestic livestock. This may be due to previous exposure to disturbances. One common factor appears to be that low-altitude flyovers seem to be more disruptive in terrain where there is little cover (Manci *et al.* 1988).

C.3.13.3 Mammals

C.3.13.3.1 Terrestrial Mammals

Studies of terrestrial mammals have shown that noise levels of 120 dB can damage mammals' ears, and levels at 95 dB can cause temporary loss of hearing acuity. Noise from aircraft has affected other large carnivores by causing changes in home ranges, foraging patterns, and breeding behavior. One study recommended that aircraft not be allowed to fly at altitudes below 2,000 feet AGL over important grizzly and polar bear habitat. Wolves have been frightened by low-altitude flights that were 25-1,000 feet AGL. However, wolves have been found to adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980).

Wild ungulates (American bison, caribou, bighorn sheep) appear to be much more sensitive to noise disturbance than domestic livestock (Weisenberger et al. 1996). Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Common reactions of reindeer kept in an enclosure exposed to aircraft noise disturbance were a slight startle response, rising of the head, pricking ears, and scenting of the air. Panic reactions and extensive changes in behavior of individual animals were not observed. Observations of caribou in Alaska exposed to fixed-wing aircraft and helicopters showed running and panic reactions occurred when overflights were at an altitude of 200 feet or less. The reactions decreased with increased altitude of overflights, and, with more than 500 feet in altitude, the panic reactions stopped. Also, smaller groups reacted less strongly than larger groups. One negative effect of the running and avoidance behavior is increased expenditure of energy. For a 90-kilogram animal, the calculated expenditure due to aircraft harassment is 64 kilocalories per minute when running and 20 kilocalories per minute when walking. When conditions are favorable, this expenditure can be counteracted with increased feeding; however, during harsh winter conditions, this may not be possible. Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters in the northern regions suggested that wolves are less disturbed than wild ungulates, while grizzly bears showed the greatest response of any animal species observed (Weisenberger et al. 1996).

It has been proven that low-altitude overflights do induce stress in animals. Increased heart rates, an indicator of excitement or stress, have been found in pronghorn antelope, elk, and bighorn sheep. As such reactions occur naturally as a response to predation, infrequent overflights may not, in and of themselves, be detrimental. However, flights at high frequencies over a long period of time may cause harmful effects. The consequences of this disturbance, while cumulative, are not additive. It may be that aircraft disturbance may not cause obvious and serious health effects, but coupled with a harsh winter, it may have an adverse impact. Research has shown that stress induced by other types of disturbances produces long-term decreases in metabolism and hormone balances in wild ungulates.

Behavioral responses can range from mild to severe. Mild responses include head raising, body shifting, or turning to orient toward the aircraft. Moderate disturbance may be nervous behaviors, such as trotting a short distance. Escape is the typical severe response.

C.3.13.3.2 Marine Mammals

Many marine mammals, including beluga whales, use sound rather than sight for many important functions (e.g., communication, location of prey, and navigation). The effects of human-caused noise on beluga whales and associated increased background noises may be similar to reduced visibilities when humans are confronted with heavy fog or darkness. These effects depend on several factors including the intensity, frequency, and duration of the noise, the location and behavior of the whale, and the nature of the acoustic environment. High frequency noise diminishes more rapidly than low frequency noises. Sound also dissipates more rapidly in shallow waters and over soft bottoms (sand and mud). Beluga whales in the Beaufort Sea have been observed to dive or swim away when low-flying (less than 500 meters) aircraft passed directly over them Richardson et al. (1995). Visual cues, including the sight of the aircraft or its shadow, have been hypothesized to contribute to the reaction of belugas to low-level overflight by survey aircraft. However, beluga survey aircraft flying at approximately 244 meters in Cook Inlet observed little or no change in beluga swim directions (Rugh et al. 2005). This is likely because belugas in Cook Inlet have habituated to routine small aircraft overflights. Belugas may be less sensitive to aircraft noise than vessel noise, but individual responses may be highly variable and may depend on previous experiences, beluga activity at the time of the noise, and characteristics of the noise. A large portion of the acoustic energy generated by an aircraft overflight is reflected from the air-water interface during transmission of sound from air to water. For an overhead sound source such as an aircraft much of the sound at angles greater than 13 degrees from the vertical is reflected and does not penetrate the water (Richardson et al. 1995).

C.3.13.4 Birds

Auditory research conducted on birds indicates that they fall between the reptiles and the mammals relative to hearing sensitivity. According to Dooling (1978), within the range of 1,000 to 5,000 Hz, birds show a level of hearing sensitivity similar to that of the more sensitive mammals. In contrast to mammals, bird sensitivity falls off at a greater rate to increasing and decreasing frequencies. Passive observations and studies examining aircraft bird strikes indicate that birds nest and forage near airports. Aircraft noise in the vicinity of commercial airports apparently does not inhibit bird presence and use.

High-noise events (like a low-altitude aircraft overflight) may cause birds to engage in escape or avoidance behaviors, such as flushing from perches or nests (Ellis *et al*. 1991). These activities impose an energy cost on the birds that, over the long term, may affect survival or growth. In addition, the birds may spend less time engaged in necessary activities like feeding, preening, or caring for their young because they spend time in noise-avoidance activity. However, the long-term significance of noise-related impacts is less clear. Several studies on nesting raptors have indicated that birds become habituated to aircraft overflights and that long-term reproductive success is not affected (Ellis *et al*. 1991; Grubb and King 1991). Threshold noise levels for significant responses range from 62 dB for Pacific black brant to 85 dB for crested tern (Brown 1990; Ward and Stehn 1990).

Manci *et al*. (1988), reported a reduction in reproductive success in some small territorial passerines (i.e., perching birds or songbirds) after exposure to low-altitude overflights. However, it has been observed that passerines are not driven any great distance from a favored food source by a nonspecific disturbance, such as aircraft overflights (USFS 1992). Further study may be warranted.

A cooperative study between the DoD and the U.S. Fish and Wildlife Service (USFWS), assessed the response of the red-cockaded woodpecker to a range of military training noise events, including artillery, small arms, helicopter, and maneuver noise (Pater *et al.* 1999). The project findings show that the red-cockaded woodpecker successfully acclimates to military noise events. Depending on the noise level that ranged from innocuous to very loud, the birds responded by flushing from their nest cavities. When the noise source was closer and the noise level was higher, the number of flushes increased proportionately. In all cases, however, the birds returned to their nests within a relatively short period of time (usually within 12 minutes). Additionally, the noise exposure did not result in any mortality or statistically detectable changes in reproductive success (Pater *et al.* 1999). Red-cockaded woodpeckers did not flush when artillery simulators were more than 122 m away and SELs were 70 dB.

C.3.13.4.1 Raptors

In a literature review of raptor responses to aircraft noise, Manci *et al*. (1988) found that most raptors did not show a negative response to overflights. When negative responses were observed they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 mile of a nest.

Ellis *et al*. (1991), performed a study to estimate the effects of low-level military jet aircraft on nesting peregrine falcons and seven other raptors (common black-hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, bald eagle). They observed responses to test stimuli, determined nest success for the year of the testing, and evaluated site occupancy the following year. Both long- and short-term effects were noted in the study. The results reported the successful fledging of young in 34 of 38 nest sites (all eight species) subjected to low-level flight. Twenty-two of the test sites were revisited in the following year, and observations of pairs or lone birds were made at all but one nest. Nesting attempts were underway at 19 of 20 sites that were observed long enough to be certain of breeding activity. Re-occupancy and productivity rates were within or above expected values for self-sustaining populations.

Short-term behavior responses were also noted. Overflights at a distance of 150 m or less produced few significant responses and no severe responses. Typical responses consisted of crouching or very rarely, flushing from the perch site. Significant responses were most evident before egg laying and after young were "well grown." Incubating or brooding adults never burst from the nest, thus preventing egg breaking or knocking chicks out of the nest. Jet passes often caused noticeable alarm; however, significant negative responses were rare and did not appear to limit productivity or re-occupancy. Due to the locations of some of the nests, some birds may have been habituated to aircraft noise. There were some test sites located at distances far from zones of frequent military aircraft usage, and the test stimuli were often closer, louder, and more frequent than would be likely for a normal training situation (Ellis *et al.* 1991).

Manci *et al.* (1988) noted that a female northern harrier was observed hunting on a bombing range in Mississippi during bombing exercises. The harrier was apparently unfazed by the exercises, even when a bomb exploded within 200 feet. In a similar case of habituation/non-disturbance, a study on the Florida snail-kite stated the greatest reaction to overflights (approximately 98 dB) was "watching the aircraft fly by." No detrimental impacts to distribution, breeding success, or behavior were noted.

Bald Eagle. A study by Grubb and King (1991) on the reactions of the bald eagle to human disturbances showed that terrestrial disturbances elicited the greatest response, followed by aquatic (i.e., boats) and aerial disturbances. The disturbance regime of the area where the study occurred was predominantly characterized by aircraft noise. The study found that pedestrians consistently caused responses that were greater in both frequency and duration. Helicopters elicited the highest level of aircraft-related responses. Aircraft disturbances, although the most common form of disturbance, resulted in the lowest levels of response. This low response level may have been due to habituation; however, flights less than 170 m away caused reactions similar to other disturbance types. Ellis *et al.* (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 100 m, rather than the noise level. Fleischner and Weisberg (1986) stated that reactions of bald eagles to commercial jet flights, although minor (e.g., looking), were twice as likely to occur when the jets passed at a distance of 0.5 mile or less. They also noted that helicopters were four times more likely to cause a reaction than a commercial jet and 20 times more likely to cause a reaction than a propeller plane.

The USFWS advised Cannon AFB that flights at or below 2,000 feet AGL from 1 October through 1 March could result in adverse impacts to wintering bald eagles (USFWS 1998). However, Fraser et al. (1985) suggested that raptors habituate to overflights rapidly, sometimes tolerating aircraft approaches of 65 feet or less.

Golden Eagle. In their guidelines for aerial surveys, USFWS (Pagel *et al.* 2010) summarized past studies by stating that most golden eagles respond to survey aircraft (fixed- and rotary-wing) by remaining on their nests, and continuing to incubate or roost. Surveys take place generally as close as 10 to 20 meters from cliffs (including hovering less than 30 seconds if necessary to count eggs) and no farther than 200 meters from cliffs depending on safety (Pagel *et al.* 2010).

Grubb *et al.* (2007) experimented with multiple exposure to two helicopter types and concluded that flights with a variety of approach distances (800, 400, 200, and 100 meters) had no effect on golden eagle nesting success or productivity rates within the same year or on rates of renewed nesting activity the following year when compared to the corresponding figures for the larger population of non-manipulated nest sites (Grubb *et al*. 2007). They found no significant, detrimental, or disruptive responses in 303 helicopter passes near eagles. In 227 AH-64 Apache helicopter experimental passes (considered twice as loud as a civilian helicopter also tested) at test distances of 0–800 meters from nesting golden eagles, 96 percent resulted in no more response than watching the helicopter pass. No greater reactions occurred until after hatching when individual golden eagles exhibited five flatten and three fly behaviors at three nest sites. The flight responses occurred at approach distances of 200 meters or less. No evidence was found of an effect on subsequent nesting activity or success, despite many of the helicopter flights occurring during early courtship and nest repair. None of these responding pairs failed to successfully fledge young, except for one nest that fell later in the season. Excited, startled, avoidance reactions were never observed. Non-attending eagles or those perched away from the nests were more likely to fly than attending eagles, but also with less potential consequence to nesting success (Grubb *et al.* 2007). Golden eagles appeared to become less responsive with successive exposures. Much of helicopter sound energy may be at a lower frequency than golden eagles can hear, thus reducing expected impacts. Grubb *et al.* (2007) found no relationship between helicopter sound levels and corresponding eagle ambient behaviors or limited responses, which occurred throughout recorded test levels (76.7–108.8 dB, unweighted). The authors thought that the lower than expected behavioral responses may be partially due to the fact that the golden eagles in the area appear acclimated to the current high levels of outdoor recreational, including aviation, activities. Based on the results of this study, the authors recommended reduction of existing buffers around nest sites to 100 meters (325 feet) for helicopter activity.

Richardson and Miller (1997) reviewed buffers as protection for raptors against disturbance from ground-based human activities. No consideration of aircraft activity was included. They stressed a clear line of sight as an important factor in a raptor's response to a particular disturbance, with visual screening allowing a closer approach of humans without disturbing a raptor. A GIS-assisted viewshed approach combined with a designated buffer zone distance was found to be an effective tool for reducing potential disturbance to golden eagles from ground-based activities (Richardson and Miller 1997). They summarized recommendations that included a median 0.5-mile (800-meter) buffer (range = 200-1,600 m, n = 3) to reduce human disturbances (from ground-based activities such as rock climbing, shooting, vehicular activity) around active golden eagle nests from February 1 to August 1 based on an extensive review of other studies (Richardson and Miller 1997). Physical characteristics (i.e., screening by topography or vegetation) are important variables to consider when establishing buffer zones based on raptors' visual- and auditory-detection distances (Richardson and Miller 1997).

Osprey. A study by Trimper *et al.* (1998), in Goose Bay, Labrador, Canada, focused on the reactions of nesting osprey to military overflights by CF-18 Hornets. Reactions varied from increased alertness and focused observation of planes to adjustments in incubation posture. No overt reactions (e.g., startle response, rapid nest departure) were observed as a result of an overflight. Young nestlings crouched as a result of any disturbance until 1 to 2 weeks prior to fledging. Helicopters, human presence, float planes, and other ospreys elicited the strongest reactions from nesting ospreys. These responses included flushing, agitation, and aggressive displays. Adult osprey showed high nest occupancy rates during incubation regardless of external influences. The osprey observed occasionally stared in the direction of the flight before it was audible to the observers. The birds may have been habituated to the noise of the flights; however, overflights were strictly controlled during the experimental period. Strong reactions to float planes and helicopter may have been due to the slower flight and therefore longer duration of visual stimuli rather than noise-related stimuli.

Red-tailed Hawk. Anderson *et al.* (1989), conducted a study that investigated the effects of low-level helicopter overflights on 35 red-tailed hawk nests. Some of the nests had not been flown over prior to the study. The hawks that were naïve (i.e., not previously exposed) to helicopter flights exhibited stronger avoidance behavior (9 of 17 birds flushed from their nests) than those that had experienced prior overflights. The overflights did not appear to affect nesting success in either study group. These findings were consistent with the belief that red-tailed hawks habituate to low-level air traffic, even during the nesting period.

C.3.13.4.2 Upland Game Birds

Greater Sage-grouse. The greater sage-grouse was recently designated as a candidate species for protection under the Endangered Species Act after many years of scrutiny and research

(USFWS 2010). This species is a widespread and characteristic species of the sagebrush ecosystems in the Intermountain West. Greater sage-grouse, like most bird species, rely on auditory signals as part of mating. Sage-grouse are known to select their leks based on acoustic properties and depend on auditory communication for mating behavior (Braun 2006).

Booth *et al.* (2009) found, while attempting to count sage-grouse at leks (breeding grounds) using light sport aircraft at 150 meters (492 feet) to 200 meters (650 feet) AGL, that sage-grouse flushed from leks on 12 of 14 approaches when the airplane was within 656 to 984 feet (200–300 meters) of the lek. In the other two instances, male grouse stopped exhibiting breeding behavior and crouched but stayed on the lek. The time to resumption of normal behavior after disturbance was not provided in this study. Strutting ceased around the time when observers on the ground heard the aircraft. The light sport aircraft could be safely operated at very low speed (68 kilometers per hour or 37 nautical miles per hour) and was powered by either a two-stroke or a four-stroke engine. It is unclear how the response to the slow-flying light sport aircraft used in the study would compare to overflight by military jets, operating at speeds 10 to 12 times as great as the aircraft used in the study. It is possible that response of the birds was related to the slow speed of the light sport aircraft causing it to resemble an aerial predator.

Other studies have found disturbance from energy operations and other nearby development have adversely affected breeding behavior of greater sage-grouse (Holloran 2005; Doherty 2008; Walker *et al.* 2007; Harju *et al.* 2010). These studies do not specifically address overflight and do not isolate noise disturbance from other types (e.g., visual, human presence) nor do they generally provide noise levels or qualification of the noise source (e.g., continuous or intermittent, frequency, duration).

C.3.13.4.3 Migratory Waterfowl

Fleming *et al.* (1996) conducted a study of caged American black ducks found that noise had negligible energetic and physiologic effects on adult waterfowl. Measurements included body weight, behavior, heart rate, and enzymatic activity. Experiments also showed that adult ducks exposed to high noise events acclimated rapidly and showed no effects.

The study also investigated the reproductive success of captive ducks, which indicated that duckling growth and survival rates at Piney Island, North Carolina, were lower than those at a background location. In contrast, observations of several other reproductive indices (i.e., pair formation, nesting, egg production, and hatching success) showed no difference between Piney Island and the background location. Potential effects on wild duck populations may vary, as wild ducks at Piney Island have presumably acclimated to aircraft overflights. It was not demonstrated that noise was the cause of adverse impacts. A variety of other factors, such as weather conditions, drinking water and food availability and variability, disease, and natural variability in reproduction, could explain the observed effects. Fleming noted that drinking water conditions (particularly at Piney Island) deteriorated during the study, which could have affected the growth of young ducks. Further research would be necessary to determine the cause of any reproductive effects (Fleming *et al.* 1996).

Another study by Conomy *et al*. (1998) exposed previously unexposed ducks to 71 noise events per day that equaled or exceeded 80 dB. It was determined that the proportion of time black ducks reacted to aircraft activity and noise decreased from 38 percent to 6 percent in 17 days and remained stable at 5.8 percent thereafter. In the same study, the wood duck did not appear to habituate to aircraft disturbance. This supports the notion that animal response to aircraft noise is species-specific. Because a startle response to aircraft noise can result in flushing from nests, migrants and animals living in areas with high concentrations of predators would be the most vulnerable to experiencing effects of lowered birth rates and recruitment over time. Species that are subjected to infrequent overflights do not appear to habituate to overflight disturbance as readily.

Black brant studied in the Alaska Peninsula were exposed to jets and propeller aircraft, helicopters, gunshots, people, boats, and various raptors. Jets accounted for 65 percent of all the disturbances. Humans, eagles, and boats caused a greater percentage of brant to take flight. There was markedly greater reaction to Bell-206-B helicopter flights than fixed wing, single-engine aircraft (Ward *et al.* 1986).

The presence of humans and low-flying helicopters in the Mackenzie Valley North Slope area did not appear to affect the population density of Lapland longspurs, but the experimental group was shown to have reduced hatching and fledging success and higher nest abandonment. Human presence appeared to have a greater impact on the incubating behavior of the black brant, common eider, and Arctic tern than fixed-wing aircraft (Gunn and Livingston 1974).

Gunn and Livingston (1974) found that waterfowl and seabirds in the Mackenzie Valley and North Slope of Alaska and Canada became acclimated to float plane disturbance over the course of three days. Additionally, it was observed that potential predators (bald eagle) caused a number of birds to leave their nests. Non-breeding birds were observed to be more reactive than breeding birds. Waterfowl were affected by helicopter flights, while snow geese were disturbed by Cessna 185 flights. The geese flushed when the planes were less than 1,000 feet, compared to higher flight elevations. An overall reduction in flock sizes was observed. It was recommended that aircraft flights be reduced in the vicinity of pre-migratory staging areas.

Manci *et al*. 1988, reported that waterfowl were particularly disturbed by aircraft noise. The most sensitive appeared to be snow geese. Canada geese and snow geese were thought to be more sensitive than other animals such as turkey vultures, coyotes, and raptors (Edwards *et al.* 1979).

C.3.13.4.4 Wading and Shorebirds

Black *et al*. (1984), studied the effects of low-altitude (less than 500 feet AGL) military training flights with sound levels from 55 to 100 dB on wading bird colonies (i.e., great egret, snowy egret, tricolored heron, and little blue heron). The training flights involved three or four aircraft, which occurred once or twice per day. This study concluded that the reproductive activity—including nest success, nestling survival, and nestling chronology—was independent of F-16 overflights. Dependent variables were more strongly related to ecological factors, including location and physical characteristics of the colony and climatology.

Another study on the effects of circling fixed-wing aircraft and helicopter overflights on wading bird colonies found that at altitudes of 195 to 390 feet, there was no reaction in nearly 75 percent of the 220 observations. Approximately 90 percent displayed no reaction or merely looked toward the direction of the noise source. Another 6 percent stood up, 3 percent walked from the nest, and 2 percent flushed (but were without active nests) and returned within 5 minutes (Kushlan 1978). Apparently, non-nesting wading birds had a slightly higher incidence of reacting to overflights than nesting birds. Seagulls observed roosting near a colony of wading birds in another study remained at their roosts when subsonic aircraft flew overhead (Burger 1981). Colony distribution appeared to be most directly correlated to available wetland community types and was found to be distributed randomly with respect to military training routes. These results suggest that wading bird species presence was most closely linked to habitat availability and that they were not affected by low-level military overflights (USAF 2000).

Burger (1986) studied the response of migrating shorebirds to human disturbance and found that shorebirds did not fly in response to aircraft overflights, but did flush in response to more localized intrusions (i.e., humans and dogs on the beach). Burger (1981) studied the effects of noise from JFK Airport in New York on herring gulls that nested less than 1 kilometer from the airport. Noise levels over the nesting colony were 85-100 dB on approach and 94-105 dB on takeoff. Generally, there did not appear to be any prominent adverse effects of subsonic aircraft on nesting, although some birds flushed when the Concorde flew overhead and, when they returned, engaged in aggressive behavior. Groups of gulls tended to loaf in the area of the nesting colony, and these birds remained at the roost when the Concorde flew overhead. In addition, laboratory tests of exposure of eggs to impulsive noises (Cottereau 1972; Cogger and Zegarra 1980; Bowles *et al.* 1991, 1994) failed to show adverse effects on hatching of eggs.

Burger (1981) observed no effects of subsonic aircraft on herring gulls in the vicinity of JFK International Airport. The Concorde aircraft did cause more nesting gulls to leave their nests (especially in areas of higher density of nests), causing the breakage of eggs and the scavenging of eggs by intruder prey. Clutch sizes were observed to be smaller in areas of higher-density nesting (presumably due to the greater tendency for panic flight) than in areas where there were fewer nests.

C.3.13.5 Fish and Amphibians

The effects of overflight noise on fish and amphibians have not been well studied, but conclusions regarding their expected responses have involved speculation based upon known physiologies and behavioral traits of these taxa (Gladwin et al. 1988). Although fish do startle in response to low- flying aircraft noise, and probably to the shadows of aircraft, they have been found to habituate to the sound and overflights. Amphibians that respond to low frequencies and those that respond to ground vibration, such as spadefoot toads, may be affected by noise.

C.3.13.6 Summary

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects. The relationships between physiological effects and how species interact with their environments have not been thoroughly studied. Therefore, the larger ecological context issues regarding physiological effects of jet aircraft noise (if any) and resulting behavioral pattern changes are not well understood.

Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance, wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese in one study. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the “startle” or “fright” response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

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ATTACHMENT C-1 REPRESENTATIVE FLIGHT PROFILES

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C-1.1 REPRESENTATIVE FLIGHT PROFILES FOR GRISSOM ARB

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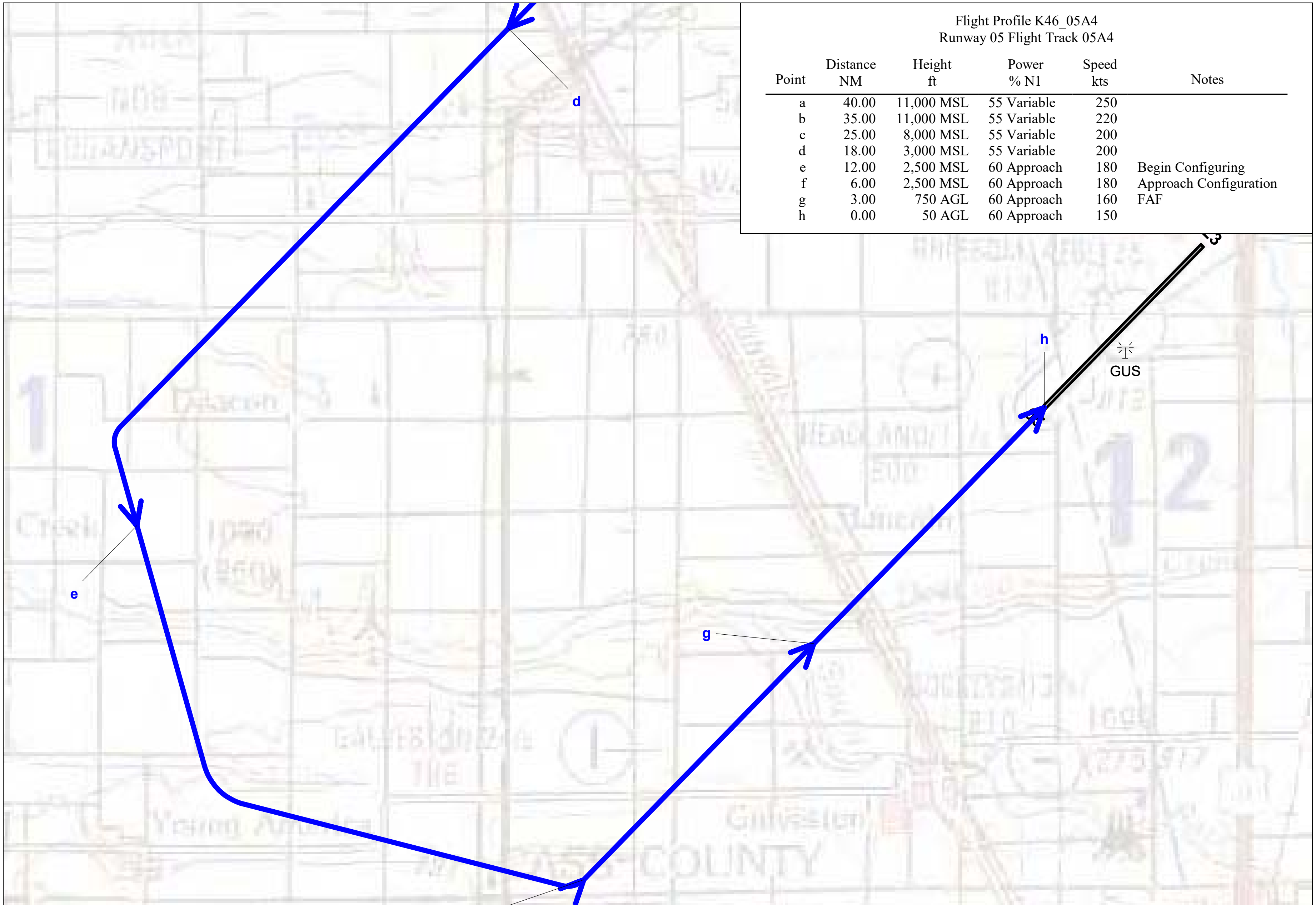
Flight Profile K46_05A4
Runway 05 Flight Track 05A4

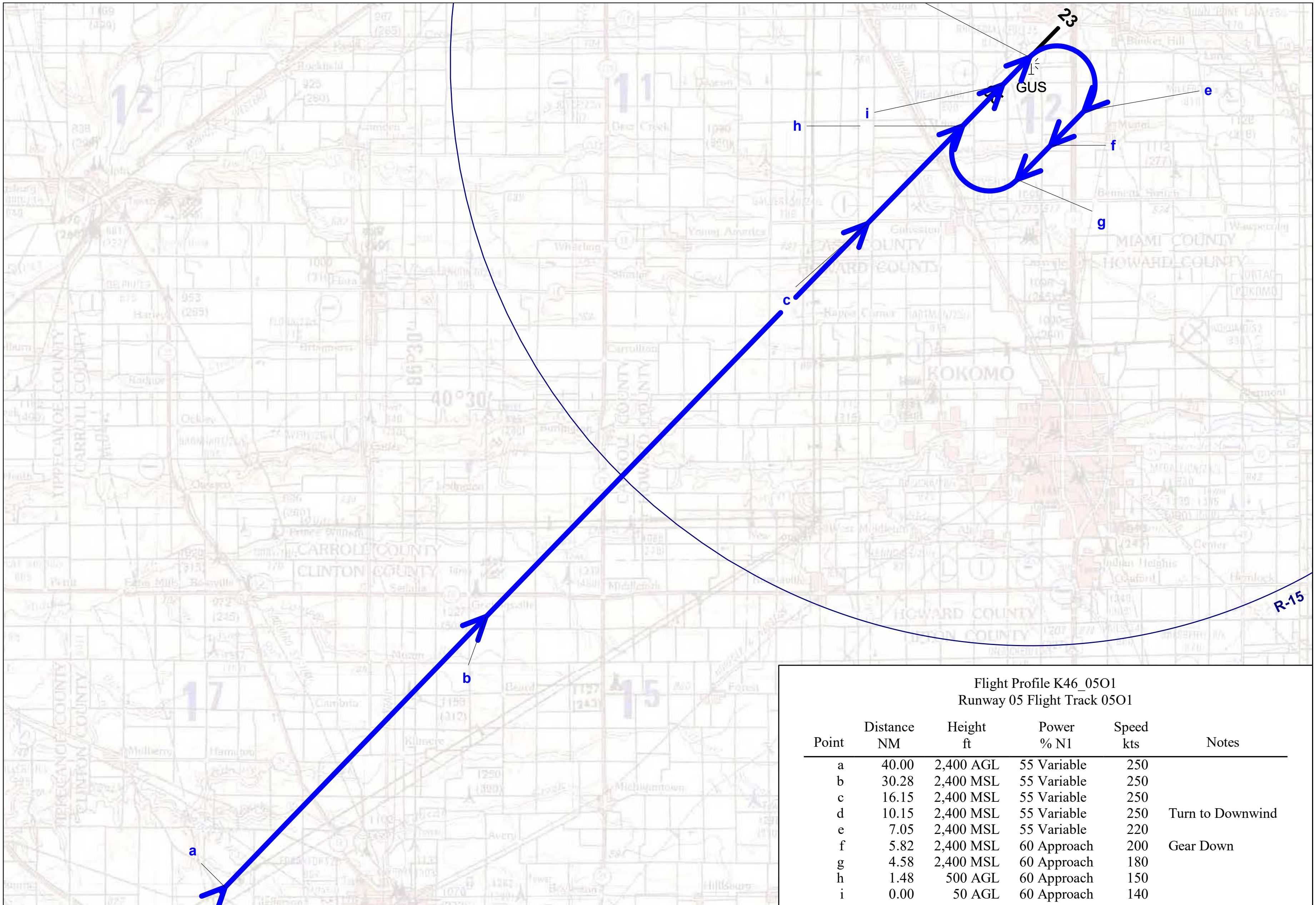
Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	40.00	11,000 MSL	55 Variable	250	
b	35.00	11,000 MSL	55 Variable	220	
c	25.00	8,000 MSL	55 Variable	200	
d	18.00	3,000 MSL	55 Variable	200	
e	12.00	2,500 MSL	60 Approach	180	Begin Configuring
f	6.00	2,500 MSL	60 Approach	180	Approach Configuration
g	3.00	750 AGL	60 Approach	160	FAF
h	0.00	50 AGL	60 Approach	150	



Flight Profile K46_05A4

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:84,700 (1 inch = 7,050 feet)



Flight Profile K46_05O1
Runway 05 Flight Track 05O1

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	40.00	2,400 AGL	55 Variable	250	
b	30.28	2,400 MSL	55 Variable	250	
c	16.15	2,400 MSL	55 Variable	250	
d	10.15	2,400 MSL	55 Variable	250	Turn to Downwind
e	7.05	2,400 MSL	55 Variable	220	
f	5.82	2,400 MSL	60 Approach	200	Gear Down
g	4.58	2,400 MSL	60 Approach	180	
h	1.48	500 AGL	60 Approach	150	
i	0.00	50 AGL	60 Approach	140	

Flight Profile K46_05O1

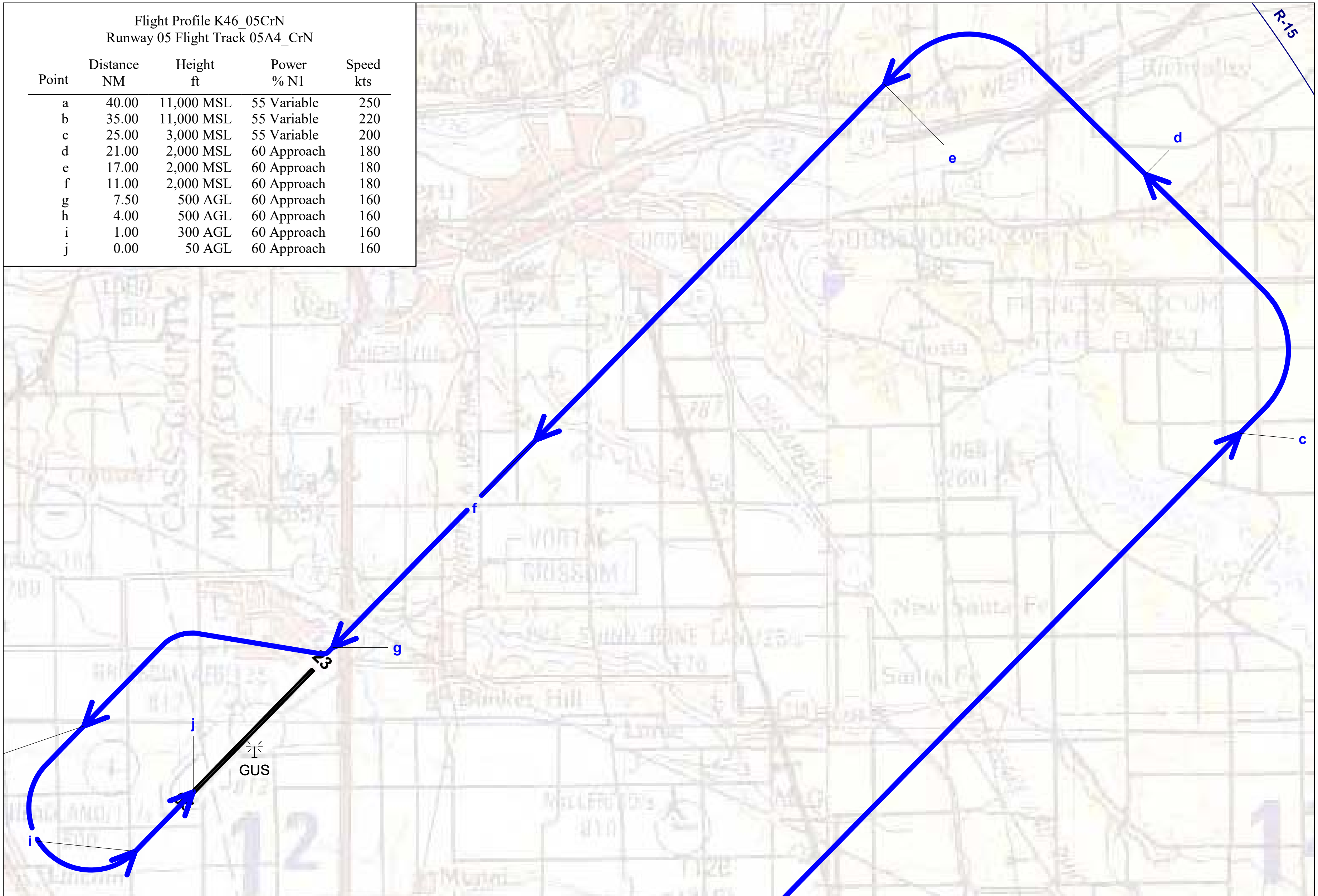
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:240,000 (1 inch = 20,000 feet)

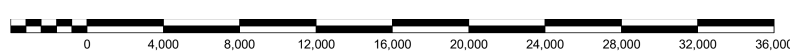
N

Flight Profile K46_05CrN
Runway 05 Flight Track 05A4_CrN

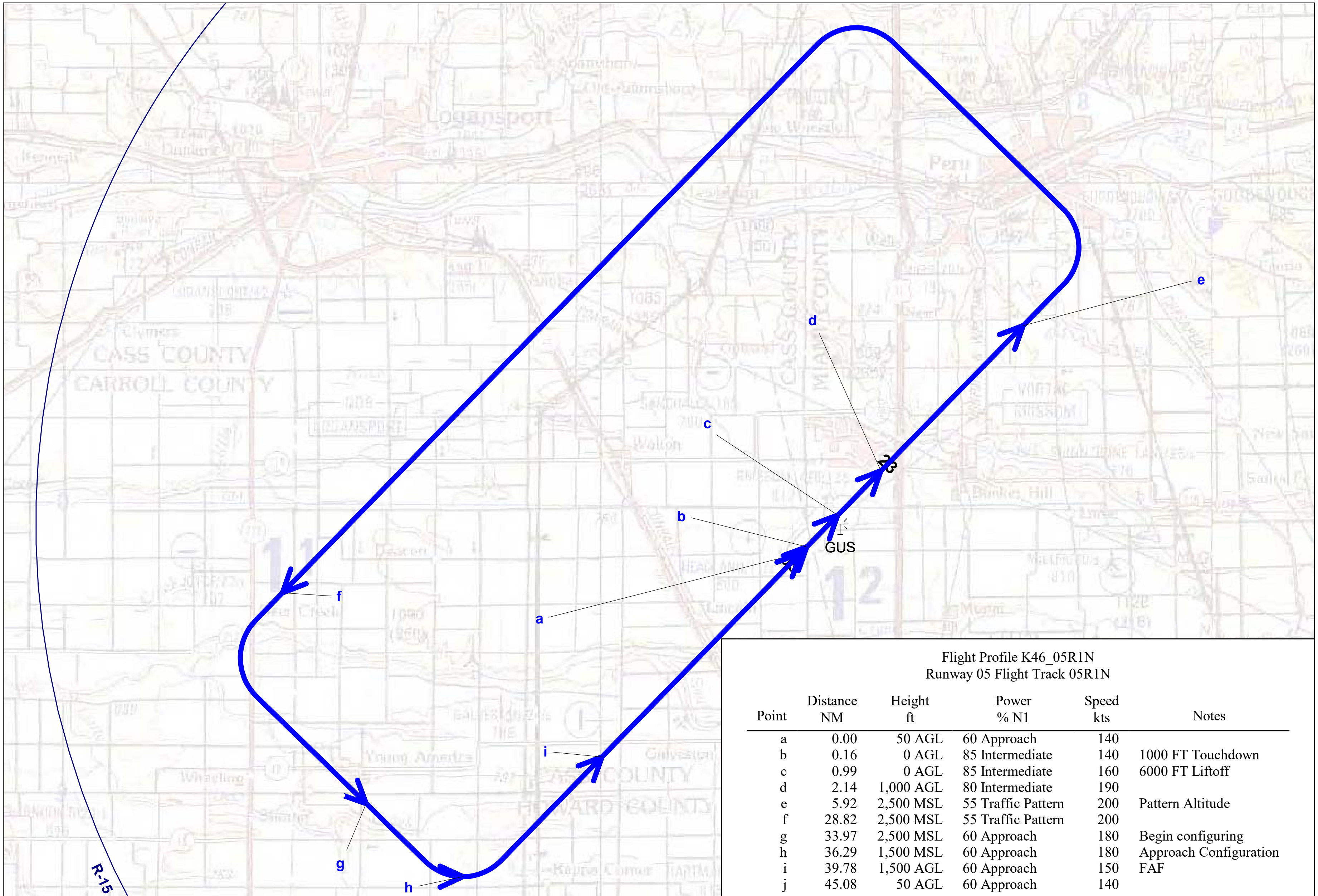
Point	Distance NM	Height ft	Power % N1	Speed kts
a	40.00	11,000 MSL	55 Variable	250
b	35.00	11,000 MSL	55 Variable	220
c	25.00	3,000 MSL	55 Variable	200
d	21.00	2,000 MSL	60 Approach	180
e	17.00	2,000 MSL	60 Approach	180
f	11.00	2,000 MSL	60 Approach	180
g	7.50	500 AGL	60 Approach	160
h	4.00	500 AGL	60 Approach	160
i	1.00	300 AGL	60 Approach	160
j	0.00	50 AGL	60 Approach	160



Flight Profile K46_05CrN
Circle



Scale in Feet 1:112,000 (1 inch = 9,370 feet)



Flight Profile K46_05R1N
Runway 05 Flight Track 05R1N

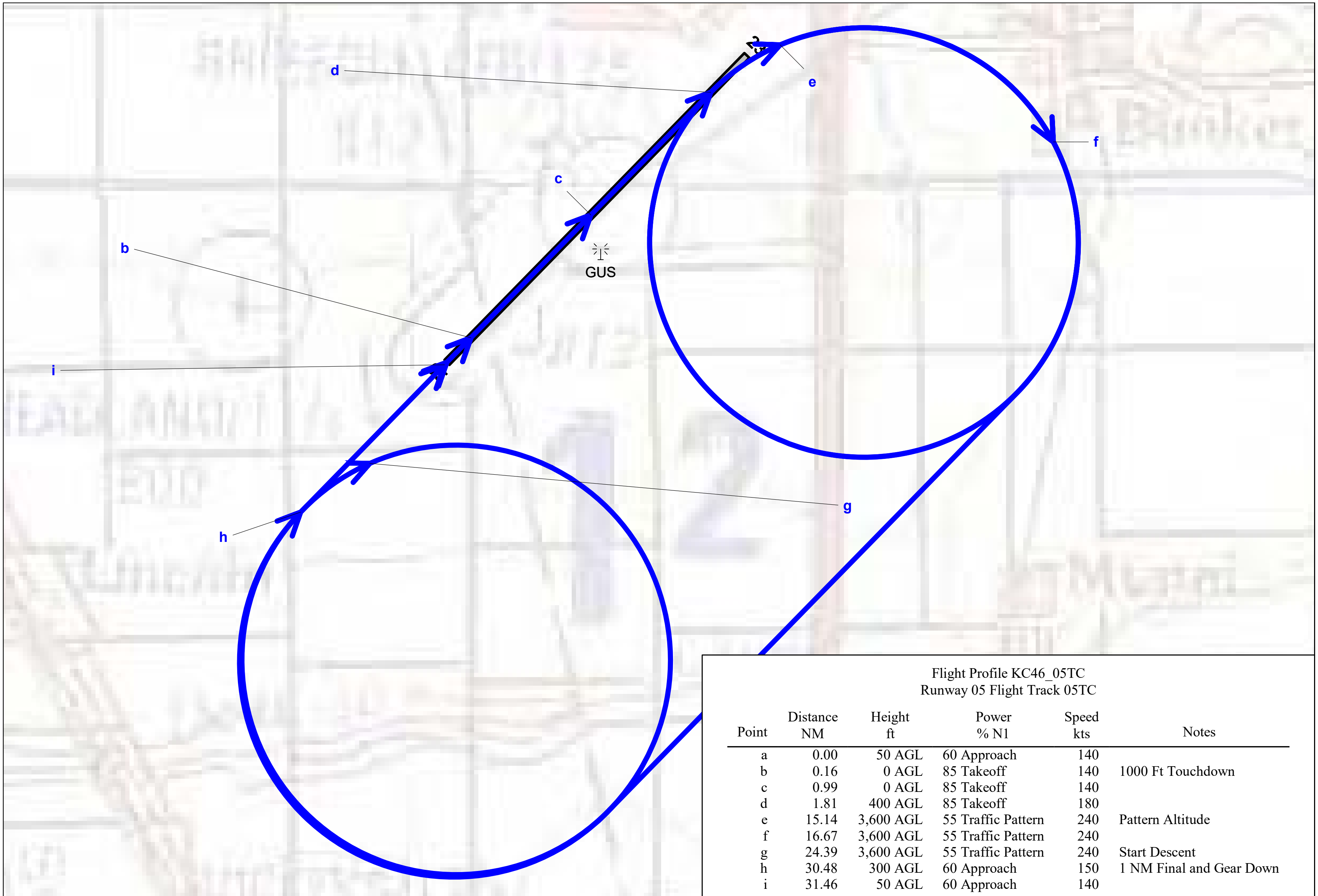
Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	0.99	0 AGL	85 Intermediate	160	6000 FT Liftoff
d	2.14	1,000 AGL	80 Intermediate	190	
e	5.92	2,500 MSL	55 Traffic Pattern	200	Pattern Altitude
f	28.82	2,500 MSL	55 Traffic Pattern	200	
g	33.97	2,500 MSL	60 Approach	180	Begin configuring
h	36.29	1,500 MSL	60 Approach	180	Approach Configuration
i	39.78	1,500 AGL	60 Approach	150	FAF
j	45.08	50 AGL	60 Approach	140	

Flight Profile K46_05R1N
RADAR - PRECISION North

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:174,000 (1 inch = 14,500 feet)

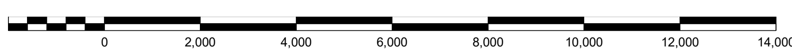
N



Flight Profile KC46_05TC
Runway 05 Flight Track 05TC

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Takeoff	140	1000 Ft Touchdown
c	0.99	0 AGL	85 Takeoff	140	
d	1.81	400 AGL	85 Takeoff	180	
e	15.14	3,600 AGL	55 Traffic Pattern	240	Pattern Altitude
f	16.67	3,600 AGL	55 Traffic Pattern	240	
g	24.39	3,600 AGL	55 Traffic Pattern	240	Start Descent
h	30.48	300 AGL	60 Approach	150	1 NM Final and Gear Down
i	31.46	50 AGL	60 Approach	140	

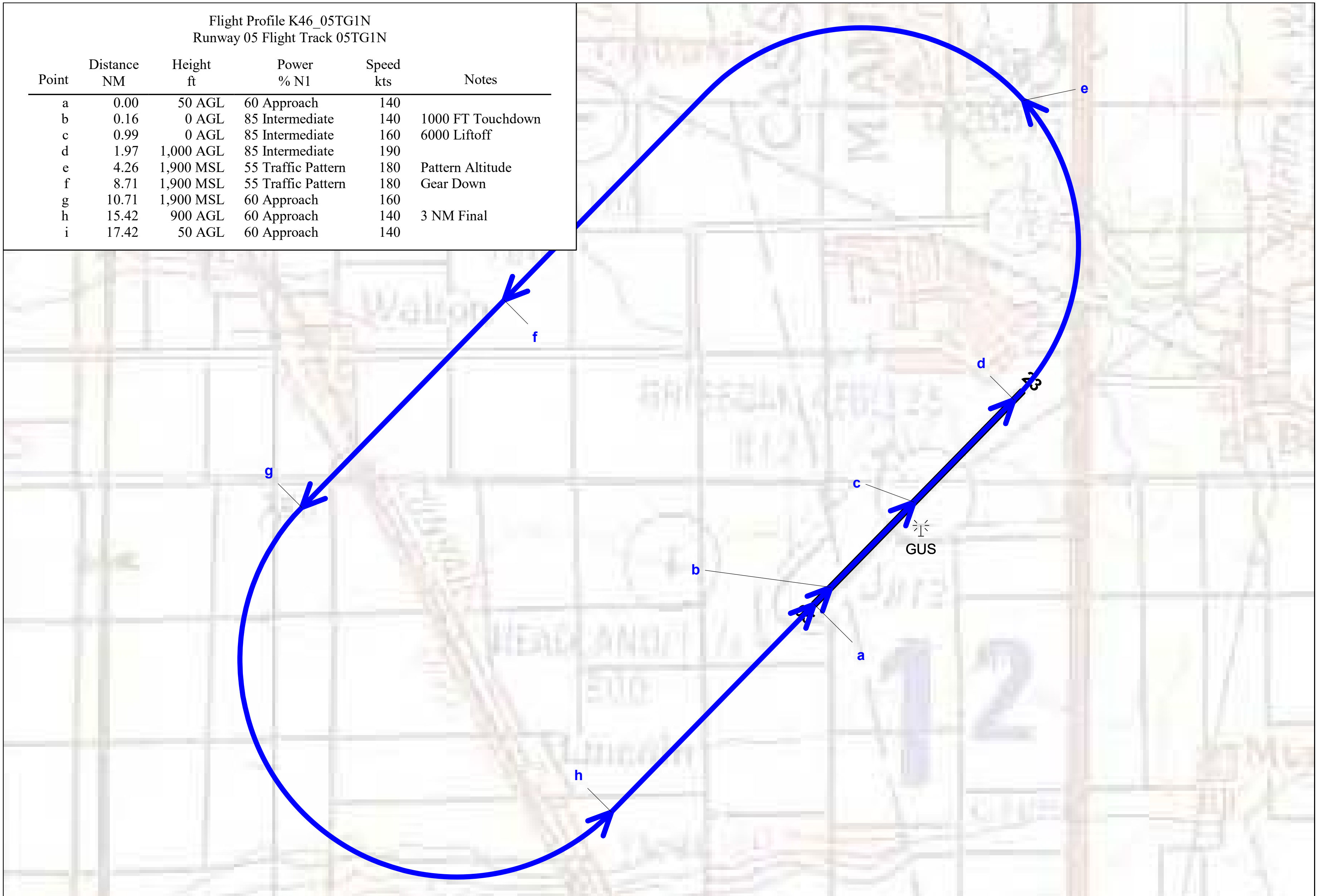
Flight Profile KC46_05TC
TAC SPIRALUP-----SPIRAL DOWN



Scale in Feet 1:44,700 (1 inch = 3,720 feet)

Flight Profile K46_05TG1N
Runway 05 Flight Track 05TG1N

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	0.99	0 AGL	85 Intermediate	160	6000 Liftoff
d	1.97	1,000 AGL	85 Intermediate	190	
e	4.26	1,900 MSL	55 Traffic Pattern	180	Pattern Altitude
f	8.71	1,900 MSL	55 Traffic Pattern	180	Gear Down
g	10.71	1,900 MSL	60 Approach	160	
h	15.42	900 AGL	60 Approach	140	3 NM Final
i	17.42	50 AGL	60 Approach	140	



Flight Profile K46_05TG1N
VISUAL CLOSED PATTERN North

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:64,400 (1 inch = 5,370 feet)

N

C-1.2 REPRESENTATIVE FLIGHT PROFILES FOR SEYMOUR JOHNSON AFB

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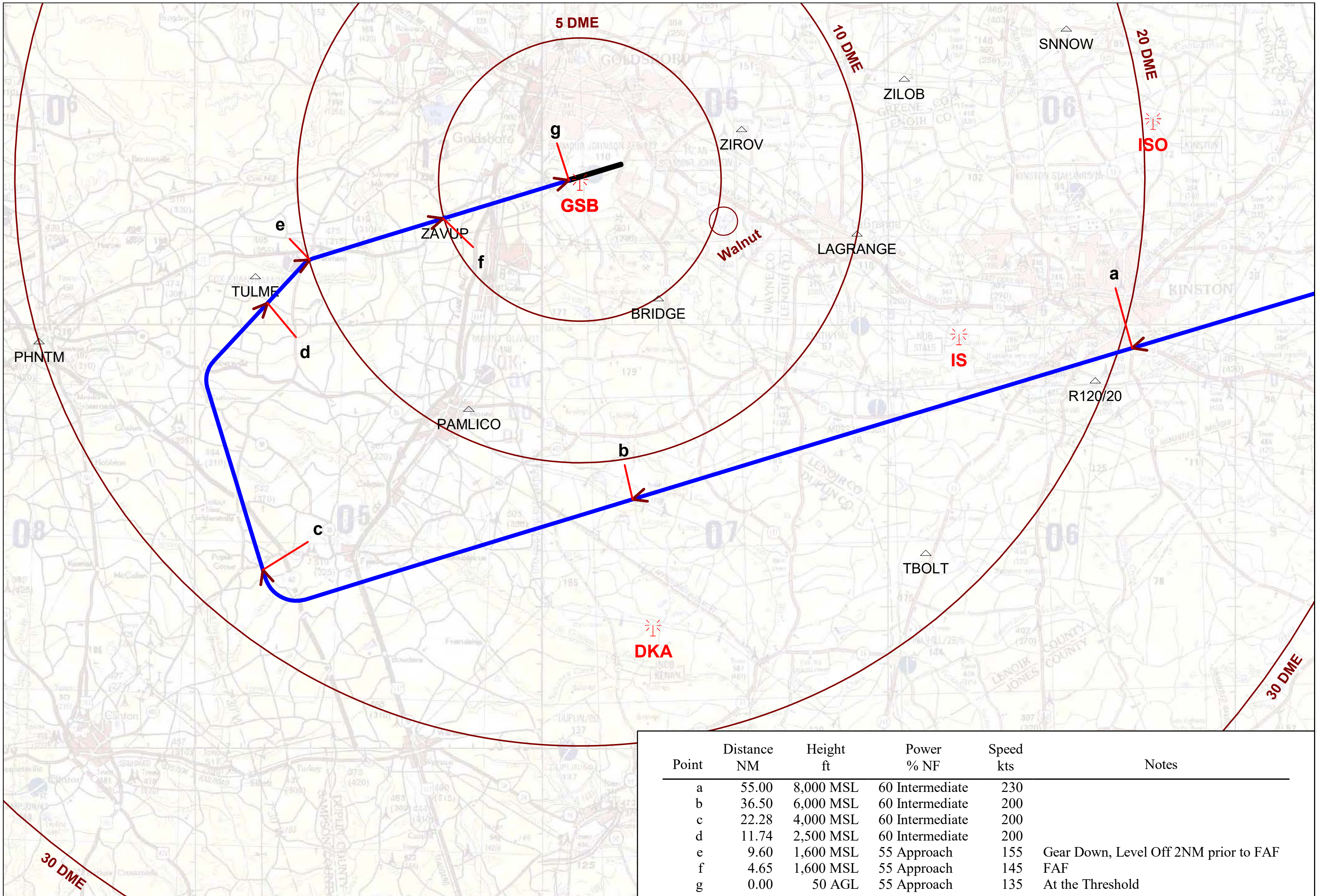


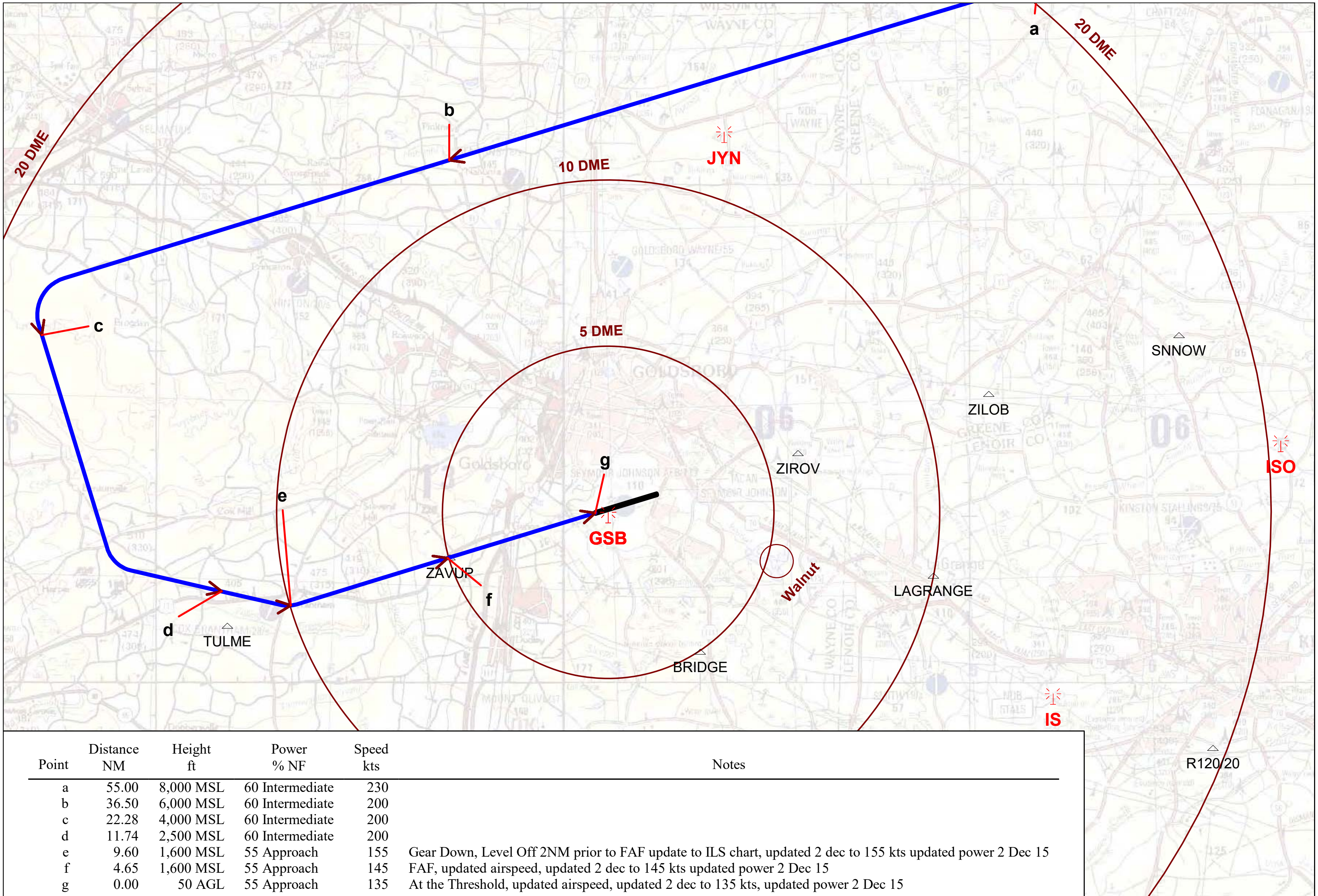
Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	55.00	8,000 MSL	60 Intermediate	230	
b	36.50	6,000 MSL	60 Intermediate	200	
c	22.28	4,000 MSL	60 Intermediate	200	
d	11.74	2,500 MSL	60 Intermediate	200	
e	9.60	1,600 MSL	55 Approach	155	Gear Down, Level Off 2NM prior to FAF
f	4.65	1,600 MSL	55 Approach	145	FAF
g	0.00	50 AGL	55 Approach	135	At the Threshold

Flight Profile KC135RA02 on Flight Track 08A13
916ARW - VECTORS FROM THE EAST (SOUTHEAST)

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:330,000 (1 inch = 27,500 feet)

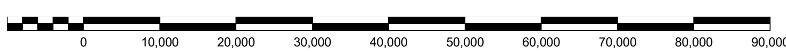
N



Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	55.00	8,000 MSL	60 Intermediate	230	
b	36.50	6,000 MSL	60 Intermediate	200	
c	22.28	4,000 MSL	60 Intermediate	200	
d	11.74	2,500 MSL	60 Intermediate	200	
e	9.60	1,600 MSL	55 Approach	155	Gear Down, Level Off 2NM prior to FAF update to ILS chart, updated 2 dec to 155 kts updated power 2 Dec 15
f	4.65	1,600 MSL	55 Approach	145	FAF, updated airspeed, updated 2 dec to 145 kts updated power 2 Dec 15
g	0.00	50 AGL	55 Approach	135	At the Threshold, updated airspeed, updated 2 dec to 135 kts, updated power 2 Dec 15

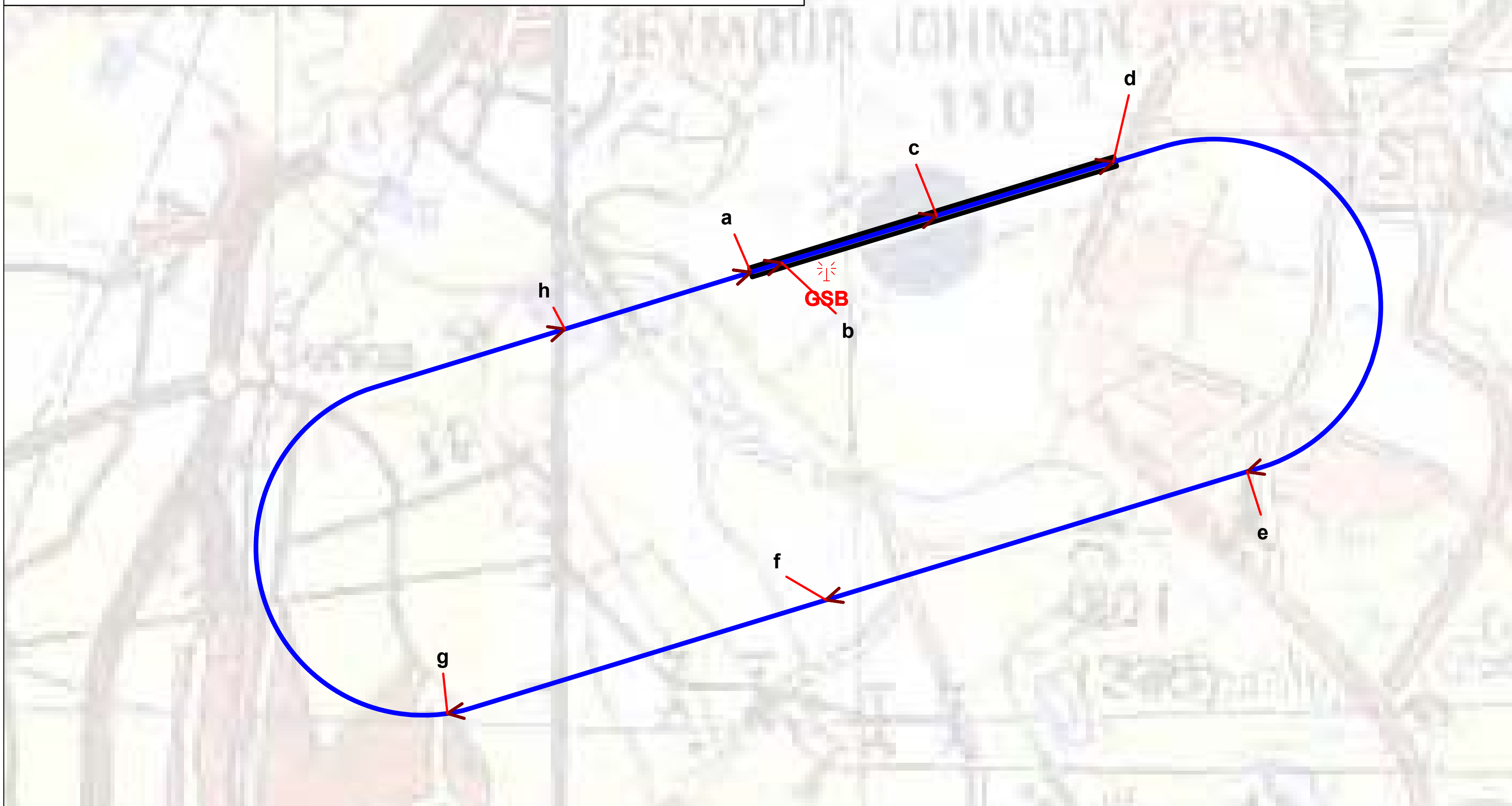
Flight Profile KC135RA01 on Flight Track 08A12

916ARW - VECTORS FROM THE NORTH !!!!! changed



Scale in Feet 1:281,000 (1 inch = 23,400 feet)

Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	0.00	50 AGL	50 Approach	150	At the Threshold upated
b	0.16	0 AGL	80 Intermediate	135	1000 FT TOUCHDOWN
c	0.99	0 AGL	80 Intermediate	147	6000 FT LIFTOFF
d	1.93	400 AGL	80 Intermediate	185	
e	4.95	1,300 AGL	55 Variable	180	updated power 2 Dec 15
f	7.19	1,300 AGL	60 Approach	180	GEAR DOWN, updated power 2 Dec 15
g	9.20	1,300 AGL	55 Approach	160	updated power 2 Dec 15
h	12.75	300 AGL	55 Approach	150	1 NM, updated as updated power 2 Dec 15
i	13.74	50 AGL	50 Approach	150	updated as updated power 2 Dec 15



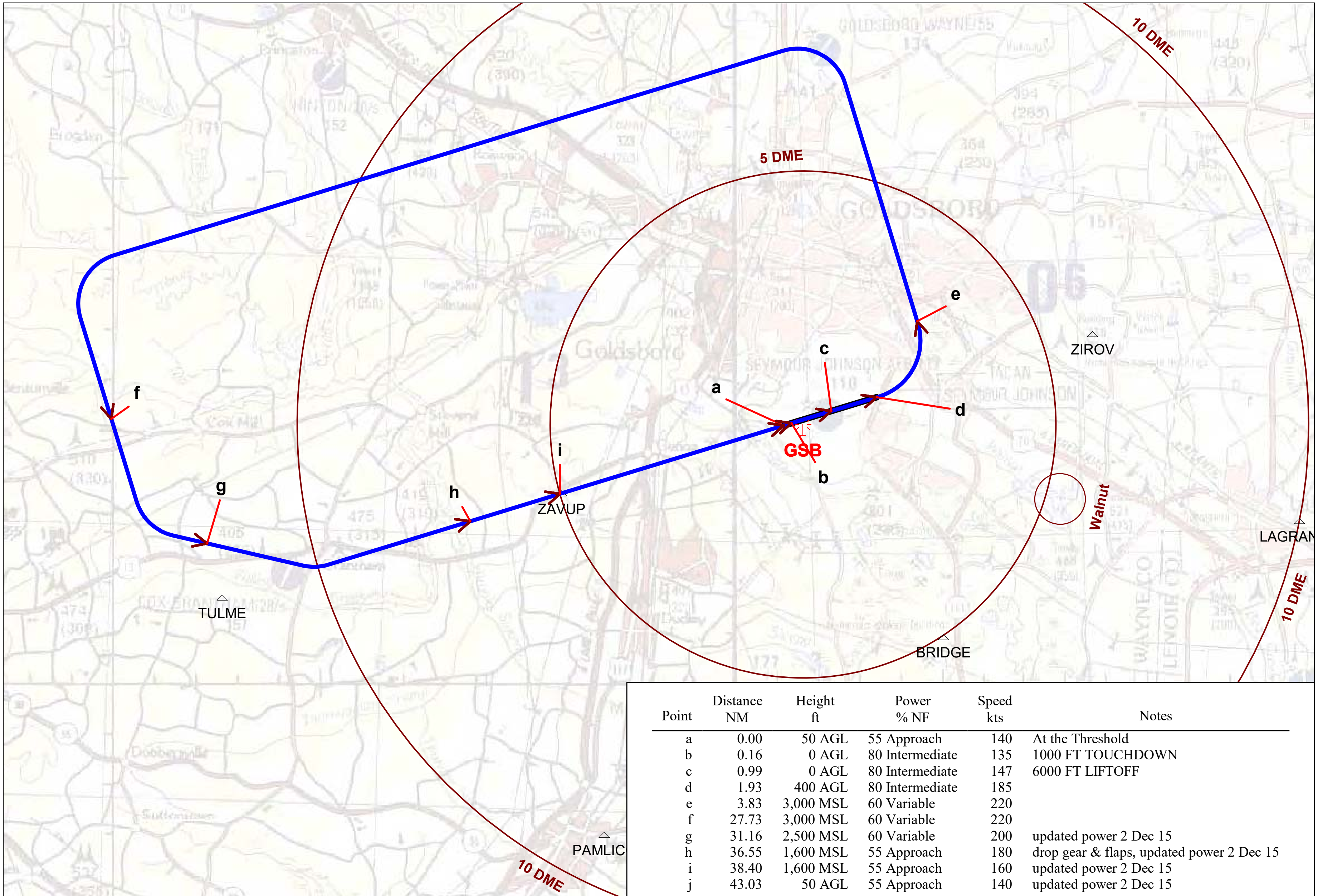
Flight Profile KC135RC05 on Flight Track 08C05

916ARW - VFR closed !!!!! Changed

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:55,000 (1 inch = 4,580 feet)

N



Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	0.00	50 AGL	55 Approach	140	At the Threshold
b	0.16	0 AGL	80 Intermediate	135	1000 FT TOUCHDOWN
c	0.99	0 AGL	80 Intermediate	147	6000 FT LIFTOFF
d	1.93	400 AGL	80 Intermediate	185	
e	3.83	3,000 MSL	60 Variable	220	
f	27.73	3,000 MSL	60 Variable	220	
g	31.16	2,500 MSL	60 Variable	200	updated power 2 Dec 15
h	36.55	1,600 MSL	55 Approach	180	drop gear & flaps, updated power 2 Dec 15
i	38.40	1,600 MSL	55 Approach	160	updated power 2 Dec 15
j	43.03	50 AGL	55 Approach	140	updated power 2 Dec 15

Flight Profile KC135RC01 on Flight Track 08C01

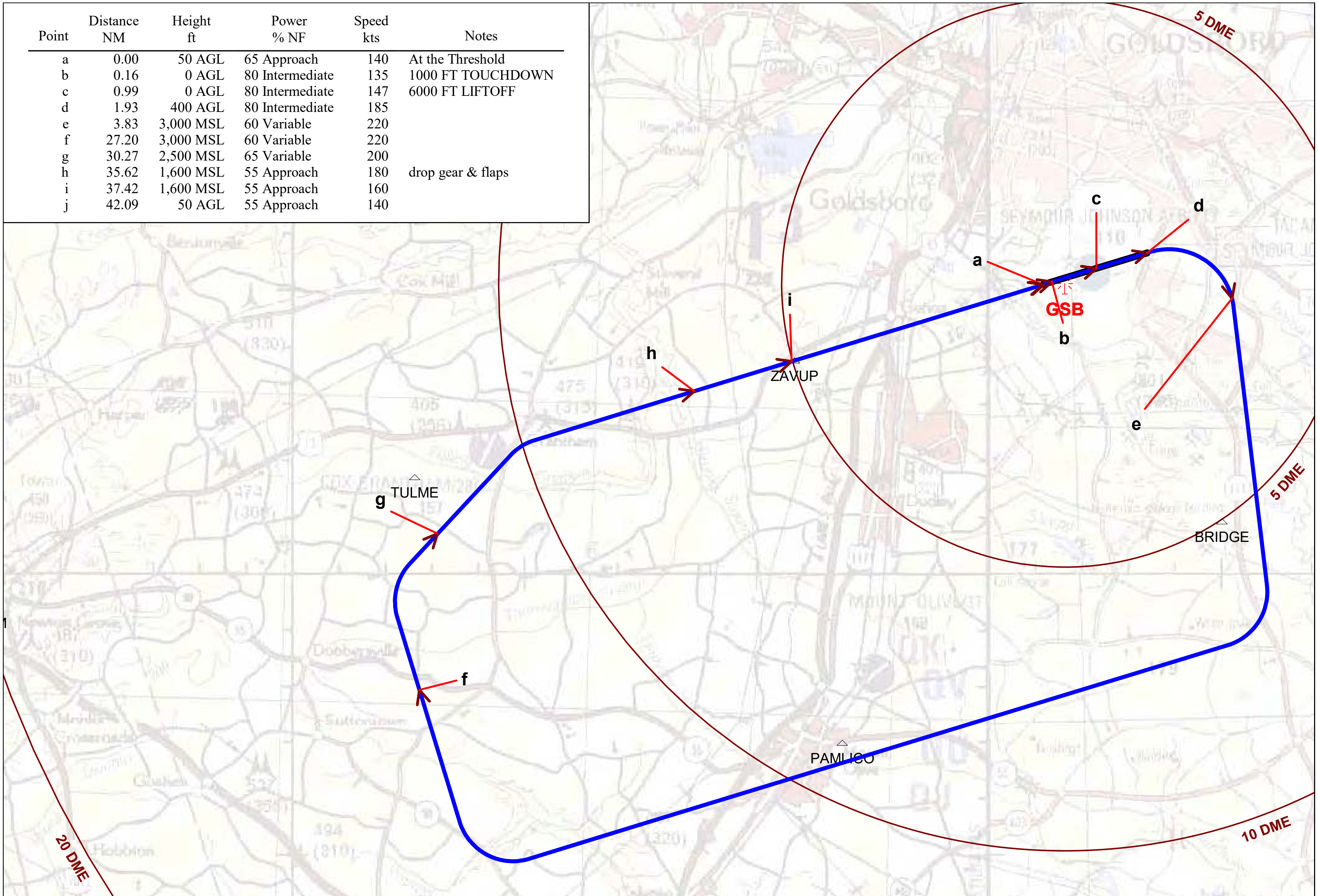
916ARW - IFR NORTH RADAR PATTERN !!!!! changed

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:184,000 (1 inch = 15,400 feet)

N

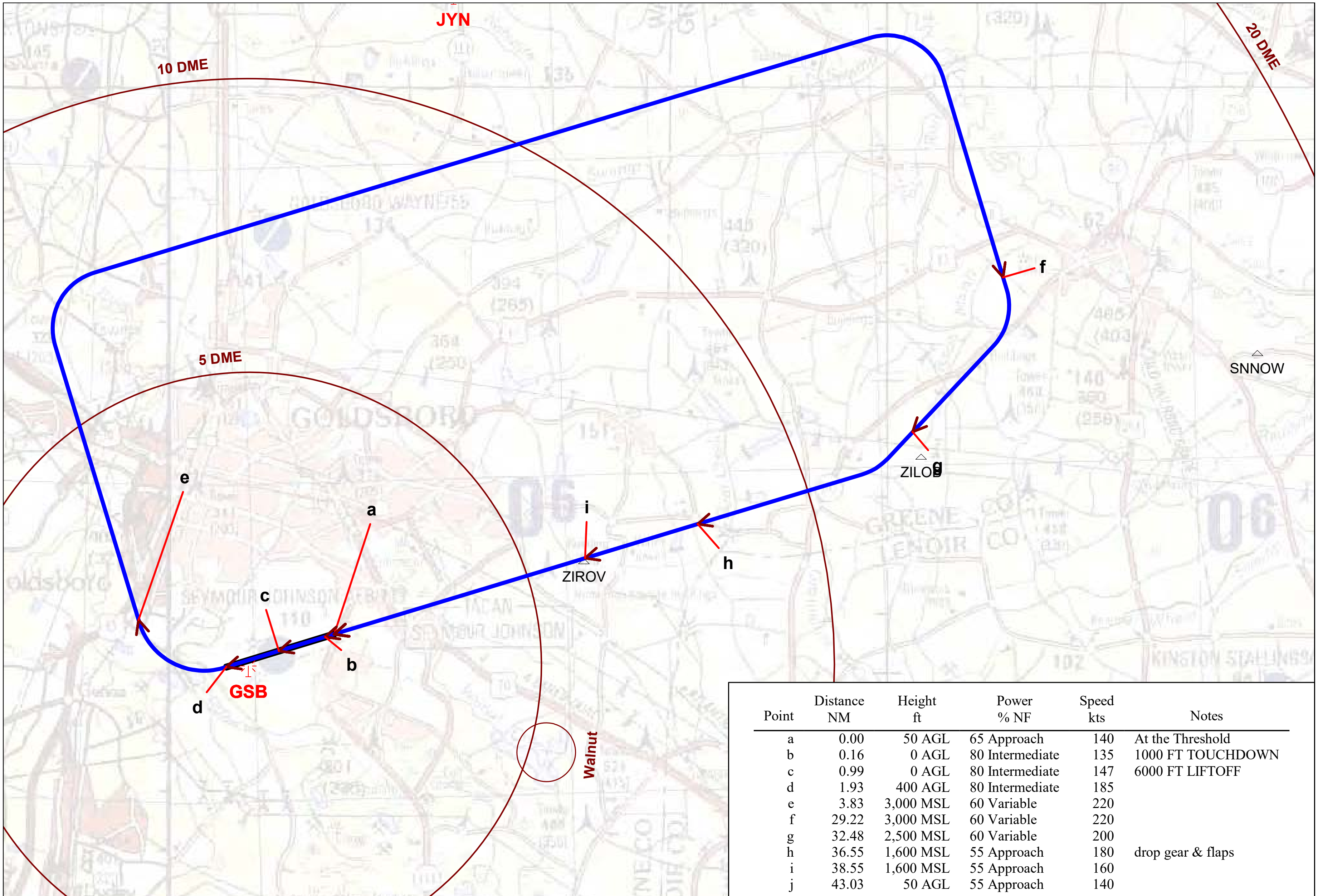
Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	0.00	50 AGL	65 Approach	140	At the Threshold
b	0.16	0 AGL	80 Intermediate	135	1000 FT TOUCHDOWN
c	0.99	0 AGL	80 Intermediate	147	6000 FT LIFTOFF
d	1.93	400 AGL	80 Intermediate	185	
e	3.83	3,000 MSL	60 Variable	220	
f	27.20	3,000 MSL	60 Variable	220	
g	30.27	2,500 MSL	65 Variable	200	
h	35.62	1,600 MSL	55 Approach	180	drop gear & flaps
i	37.42	1,600 MSL	55 Approach	160	
j	42.09	50 AGL	55 Approach	140	



Flight Profile KC135RC02 on Flight Track 08C02
916ARW - IFR SOUTH RADAR PATTERN

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:165,000 (1 inch = 13,700 feet)



Point	Distance NM	Height ft	Power % NF	Speed kts	Notes
a	0.00	50 AGL	65 Approach	140	At the Threshold
b	0.16	0 AGL	80 Intermediate	135	1000 FT TOUCHDOWN
c	0.99	0 AGL	80 Intermediate	147	6000 FT LIFTOFF
d	1.93	400 AGL	80 Intermediate	185	
e	3.83	3,000 MSL	60 Variable	220	
f	29.22	3,000 MSL	60 Variable	220	
g	32.48	2,500 MSL	60 Variable	200	
h	36.55	1,600 MSL	55 Approach	180	drop gear & flaps
i	38.55	1,600 MSL	55 Approach	160	
j	43.03	50 AGL	55 Approach	140	

Flight Profile KC135RC07 on Flight Track 26C01

916ARW - IFR NORTH RADAR PATTERN

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:159,000 (1 inch = 13,300 feet)

N

C-1.3 REPRESENTATIVE FLIGHT PROFILES FOR TINKER AFB

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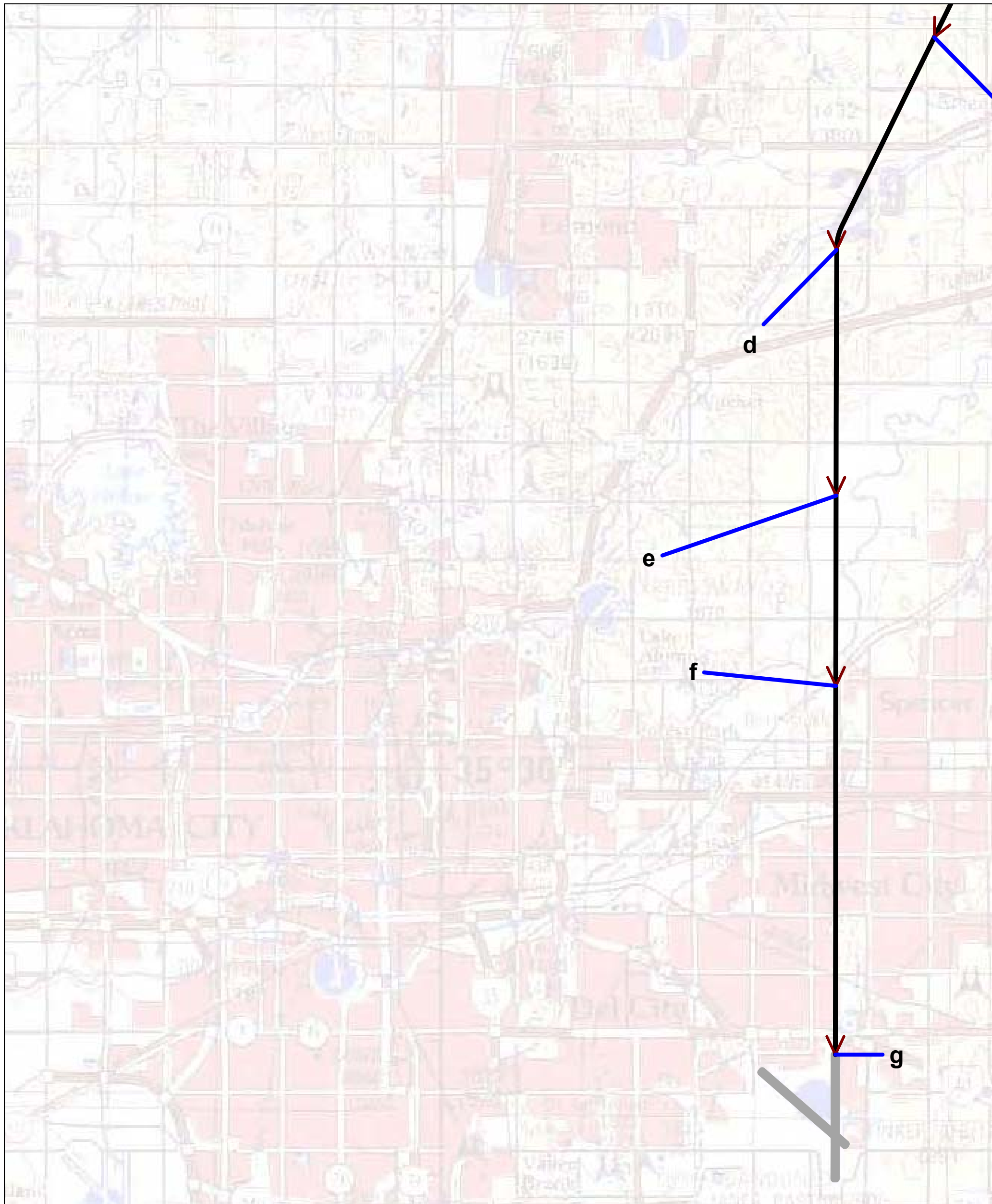


KC46_17A1 - From Pioneer (TRUMP)
18A1 - NORTH ARRIVAL VIA TRUMP TO A 12 NM FINAL

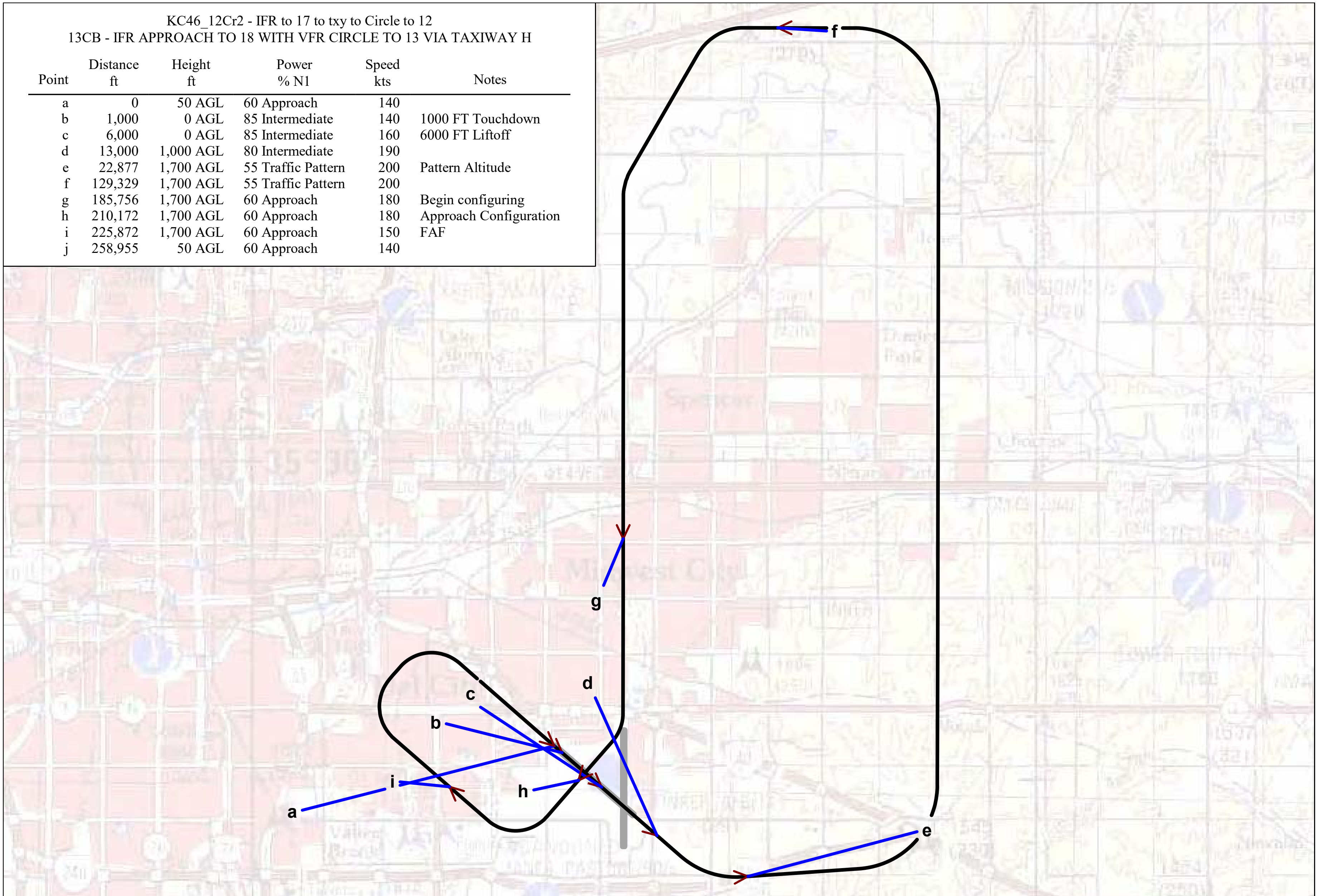
Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	200,000	10,700 AGL	55 Variable	250	
b	160,400	8,700 AGL	55 Variable	220	
c	93,000	2,700 AGL	55 Variable	200	
d	72,000	2,700 AGL	60 Approach	180	Begin Configuring
e	50,000	1,700 AGL	60 Approach	180	Approach Configuration
f	33,000	1,700 AGL	60 Approach	160	FAF
g	0	50 AGL	60 Approach	150	

Flight Profile KC46_17A1
From Pioneer (TRUMP)

Scale in Feet 1:185,000 (1 inch = 15,400 feet)

KC46_12Cr2 - IFR to 17 to txy to Circle to 12
13CB - IFR APPROACH TO 18 WITH VFR CIRCLE TO 13 VIA TAXIWAY H

Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	0	50 AGL	60 Approach	140	
b	1,000	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	6,000	0 AGL	85 Intermediate	160	6000 FT Liftoff
d	13,000	1,000 AGL	80 Intermediate	190	
e	22,877	1,700 AGL	55 Traffic Pattern	200	Pattern Altitude
f	129,329	1,700 AGL	55 Traffic Pattern	200	
g	185,756	1,700 AGL	60 Approach	180	Begin configuring
h	210,172	1,700 AGL	60 Approach	180	Approach Configuration
i	225,872	1,700 AGL	60 Approach	150	FAF
j	258,955	50 AGL	60 Approach	140	

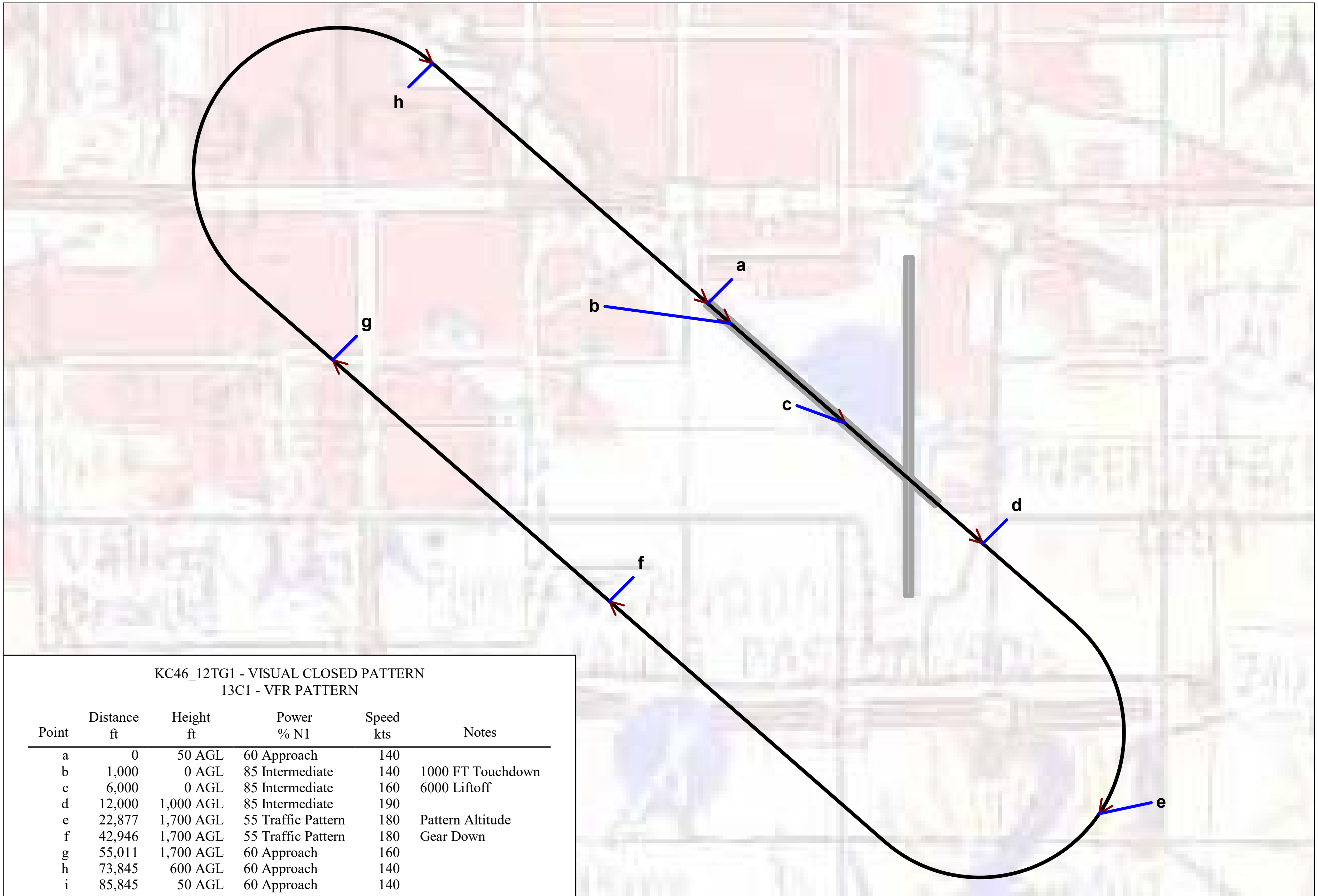


Flight Profile KC46_12Cr2
IFR to 17 to txy to Circle to 12

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000 52,000

Scale in Feet 1:146,000 (1 inch = 12,200 feet)

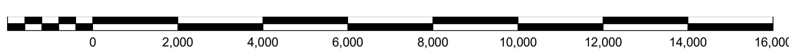
N



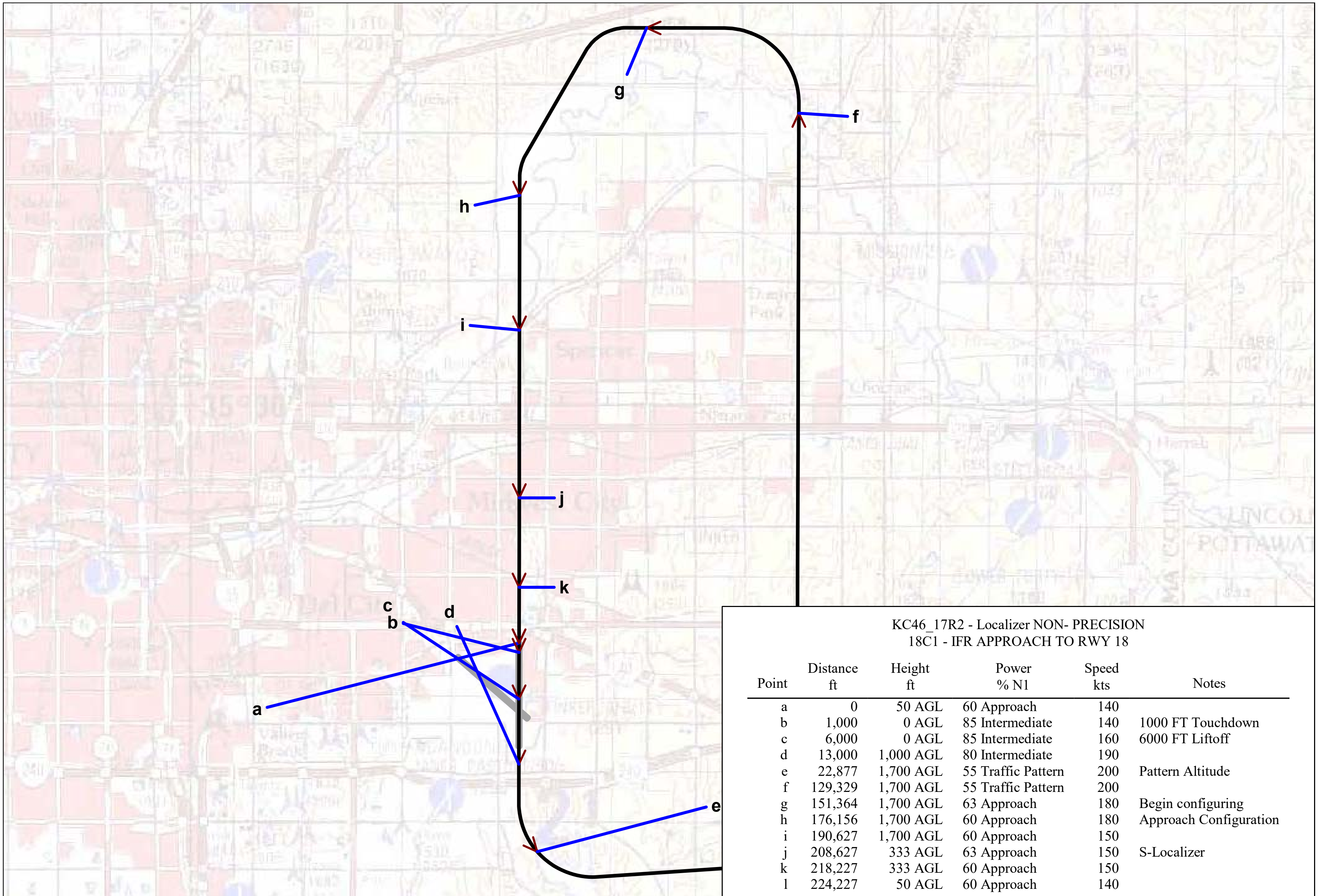
KC46_12TG1 - VISUAL CLOSED PATTERN
13C1 - VFR PATTERN

Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	0	50 AGL	60 Approach	140	
b	1,000	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	6,000	0 AGL	85 Intermediate	160	6000 Liftoff
d	12,000	1,000 AGL	85 Intermediate	190	
e	22,877	1,700 AGL	55 Traffic Pattern	180	Pattern Altitude
f	42,946	1,700 AGL	55 Traffic Pattern	180	Gear Down
g	55,011	1,700 AGL	60 Approach	160	
h	73,845	600 AGL	60 Approach	140	
i	85,845	50 AGL	60 Approach	140	

Flight Profile KC46_12TG1
VISUAL CLOSED PATTERN



Scale in Feet 1:50,500 (1 inch = 4,200 feet)



KC46_17R2 - Localizer NON- PRECISION
18C1 - IFR APPROACH TO RWY 18

Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	0	50 AGL	60 Approach	140	
b	1,000	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	6,000	0 AGL	85 Intermediate	160	6000 FT Liftoff
d	13,000	1,000 AGL	80 Intermediate	190	
e	22,877	1,700 AGL	55 Traffic Pattern	200	Pattern Altitude
f	129,329	1,700 AGL	55 Traffic Pattern	200	
g	151,364	1,700 AGL	63 Approach	180	Begin configuring
h	176,156	1,700 AGL	60 Approach	180	Approach Configuration
i	190,627	1,700 AGL	60 Approach	150	
j	208,627	333 AGL	63 Approach	150	S-Localizer
k	218,227	333 AGL	60 Approach	150	
l	224,227	50 AGL	60 Approach	140	

Flight Profile KC46_17R2
Localizer NON- PRECISION

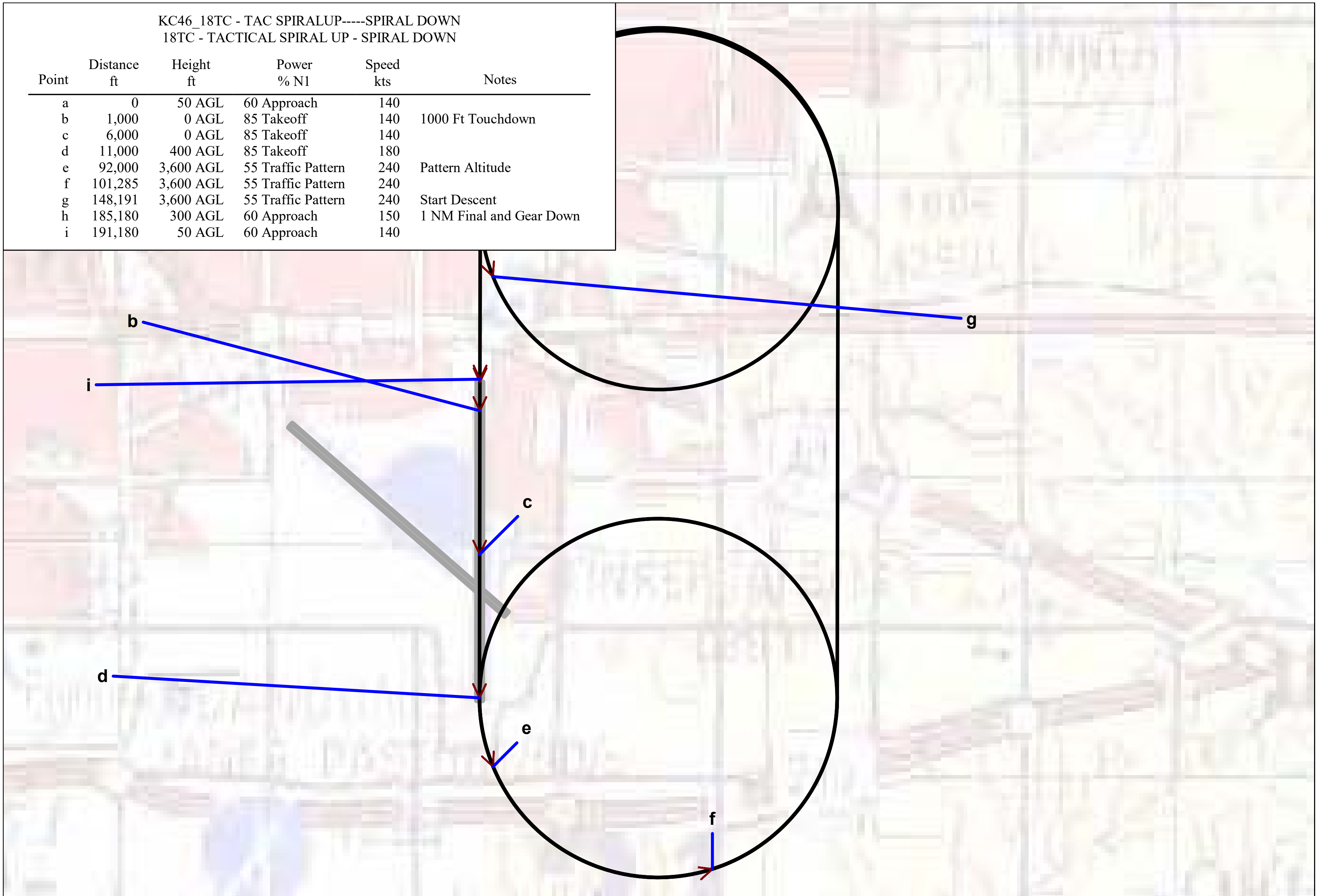
0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:165,000 (1 inch = 13,800 feet)

N

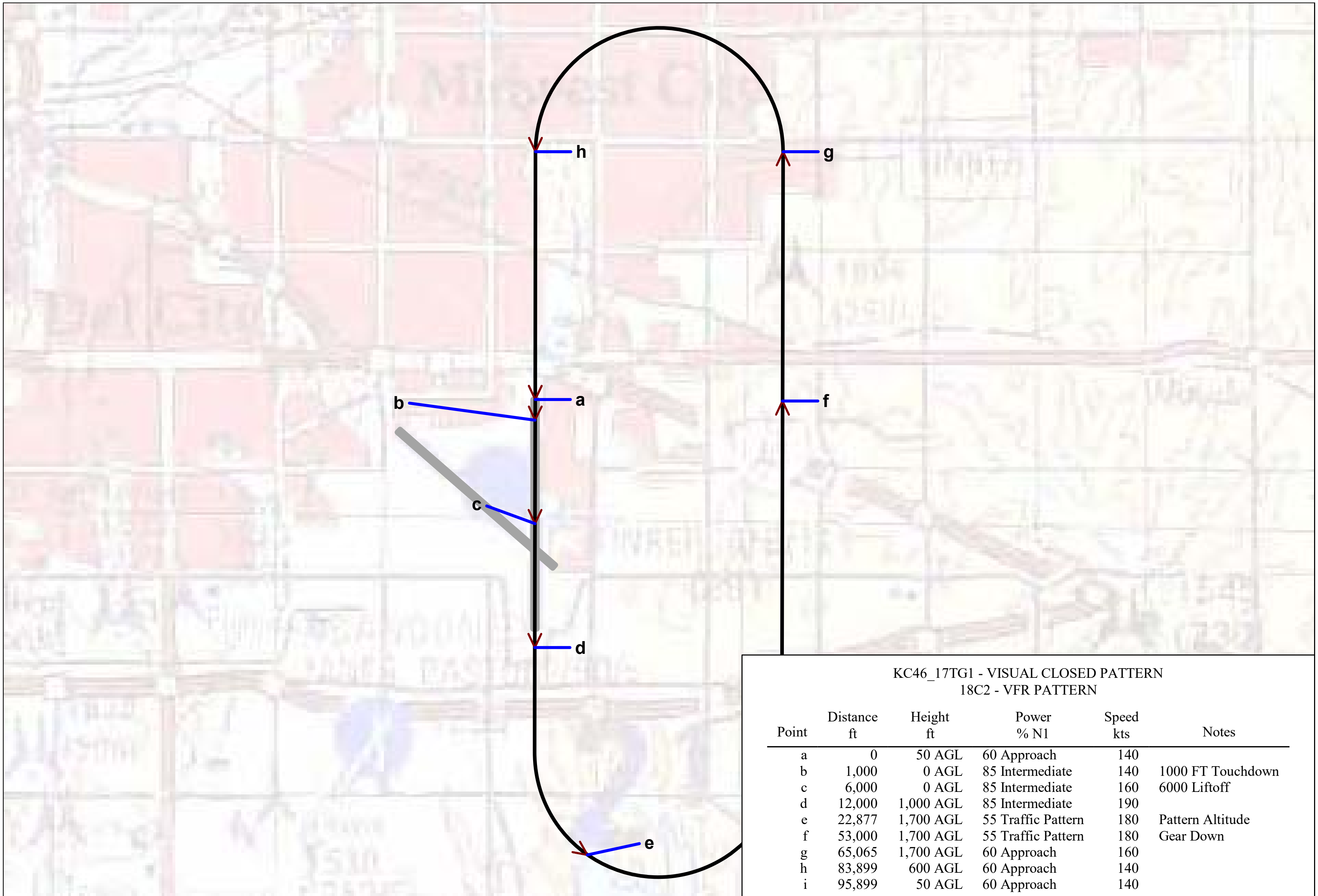
KC46_18TC - TAC SPIRALUP-----SPIRAL DOWN
18TC - TACTICAL SPIRAL UP - SPIRAL DOWN

Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	0	50 AGL	60 Approach	140	
b	1,000	0 AGL	85 Takeoff	140	1000 Ft Touchdown
c	6,000	0 AGL	85 Takeoff	140	
d	11,000	400 AGL	85 Takeoff	180	
e	92,000	3,600 AGL	55 Traffic Pattern	240	Pattern Altitude
f	101,285	3,600 AGL	55 Traffic Pattern	240	
g	148,191	3,600 AGL	55 Traffic Pattern	240	Start Descent
h	185,180	300 AGL	60 Approach	150	1 NM Final and Gear Down
i	191,180	50 AGL	60 Approach	140	



Flight Profile KC46_18TC
TAC SPIRALUP-----SPIRAL DOWN

Scale in Feet 1:53,600 (1 inch = 4,460 feet)



KC46_17TG1 - VISUAL CLOSED PATTERN
18C2 - VFR PATTERN

Point	Distance ft	Height ft	Power % N1	Speed kts	Notes
a	0	50 AGL	60 Approach	140	
b	1,000	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	6,000	0 AGL	85 Intermediate	160	6000 Liftoff
d	12,000	1,000 AGL	85 Intermediate	190	
e	22,877	1,700 AGL	55 Traffic Pattern	180	Pattern Altitude
f	53,000	1,700 AGL	55 Traffic Pattern	180	Gear Down
g	65,065	1,700 AGL	60 Approach	160	
h	83,899	600 AGL	60 Approach	140	
i	95,899	50 AGL	60 Approach	140	

Flight Profile KC46_17TG1
VISUAL CLOSED PATTERN

Scale in Feet 1:74,400 (1 inch = 6,200 feet)

C-1.4 REPRESENTATIVE FLIGHT PROFILES FOR WESTOVER ARB

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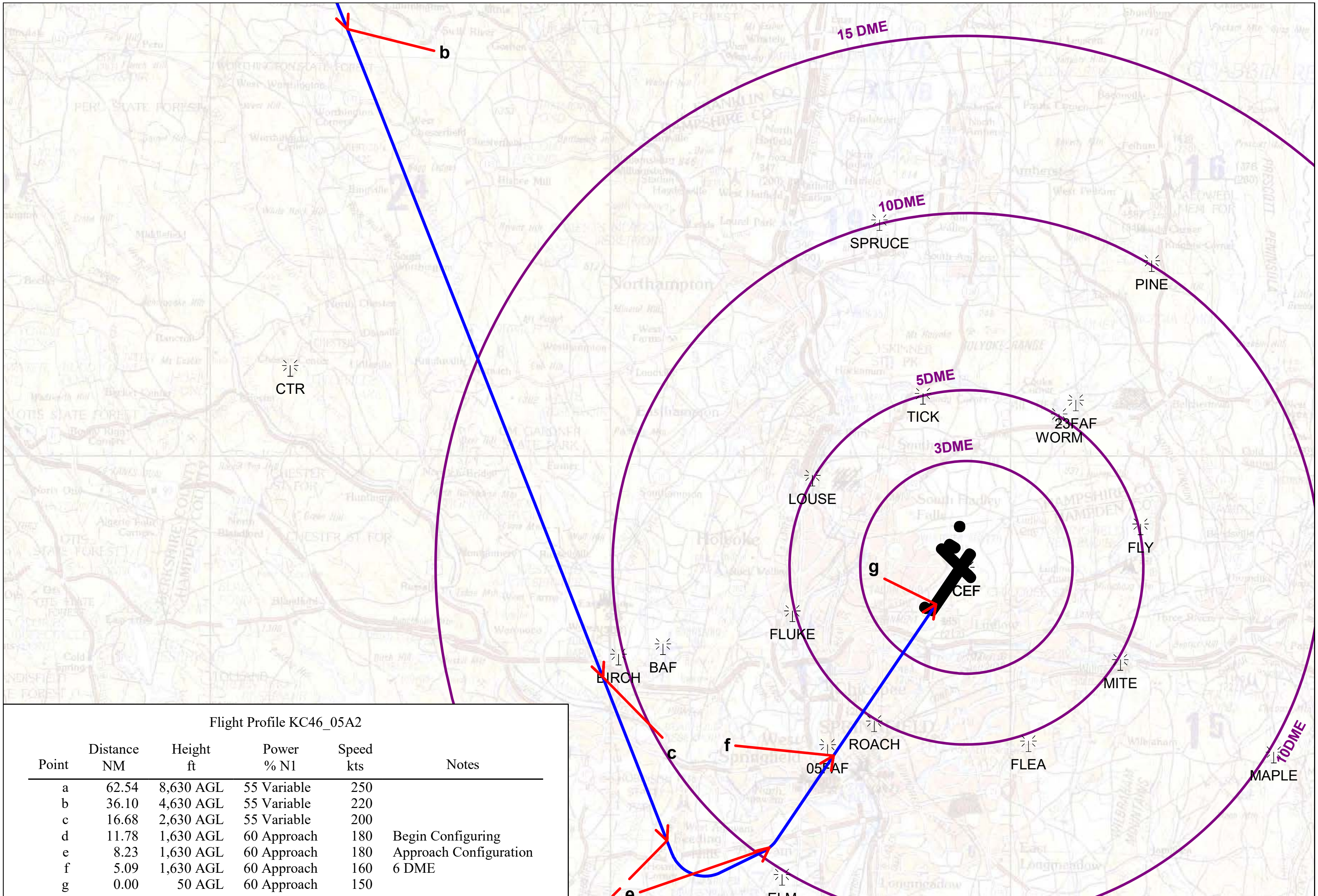


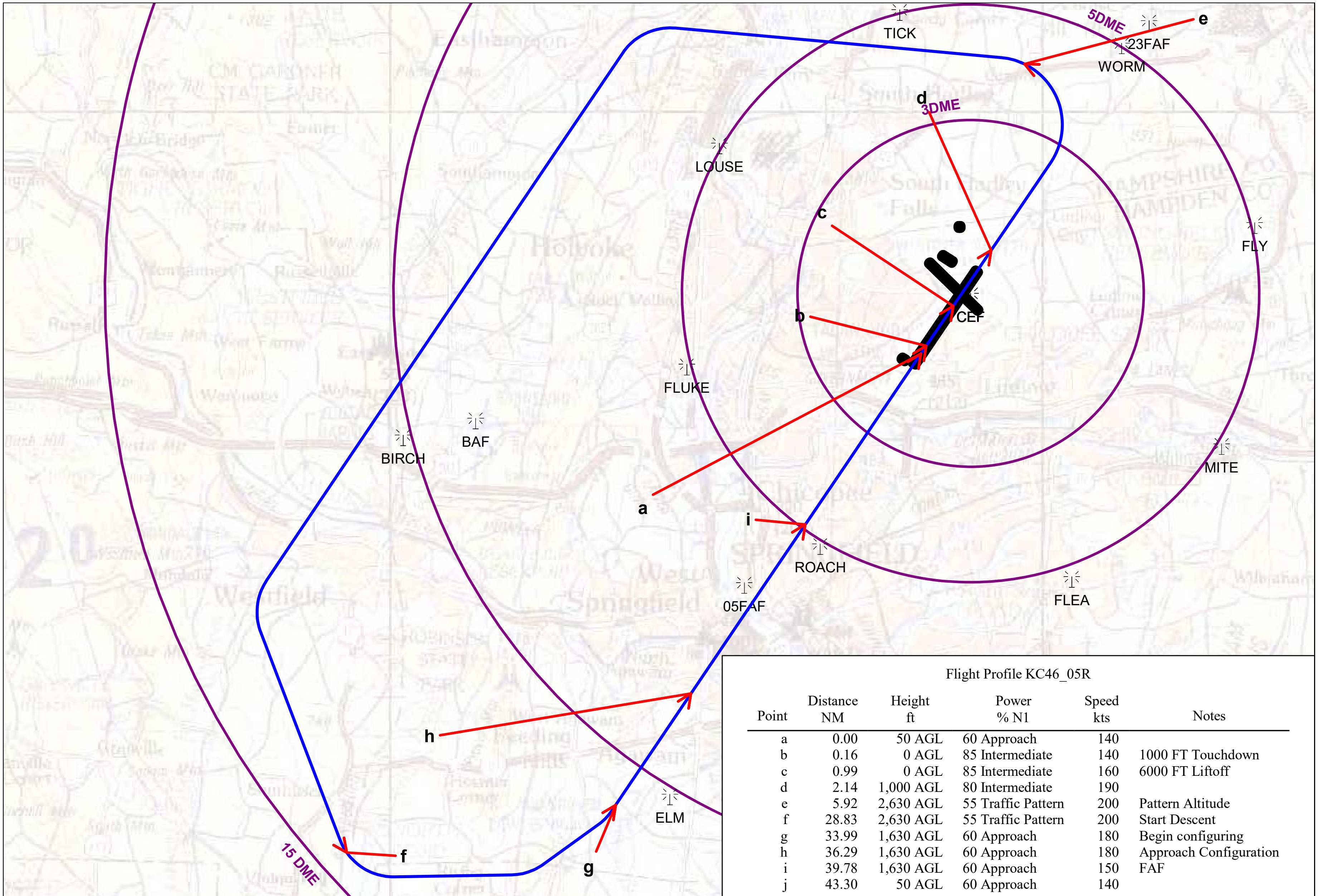
Flight Profile KC46_05A2

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	62.54	8,630 AGL	55 Variable	250	
b	36.10	4,630 AGL	55 Variable	220	
c	16.68	2,630 AGL	55 Variable	200	
d	11.78	1,630 AGL	60 Approach	180	Begin Configuring
e	8.23	1,630 AGL	60 Approach	180	Approach Configuration
f	5.09	1,630 AGL	60 Approach	160	6 DME
g	0.00	50 AGL	60 Approach	150	

05_A2 - NW: IFR & VFR

Flight Profile KC46_05A2

Scale in Feet 1:260,000 (1 inch = 21,700 feet)



Flight Profile KC46_05R

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	0.99	0 AGL	85 Intermediate	160	6000 FT Liftoff
d	2.14	1,000 AGL	80 Intermediate	190	
e	5.92	2,630 AGL	55 Traffic Pattern	200	Pattern Altitude
f	28.83	2,630 AGL	55 Traffic Pattern	200	Start Descent
g	33.99	1,630 AGL	60 Approach	180	Begin configuring
h	36.29	1,630 AGL	60 Approach	180	Approach Configuration
i	39.78	1,630 AGL	60 Approach	150	FAF
j	43.30	50 AGL	60 Approach	140	

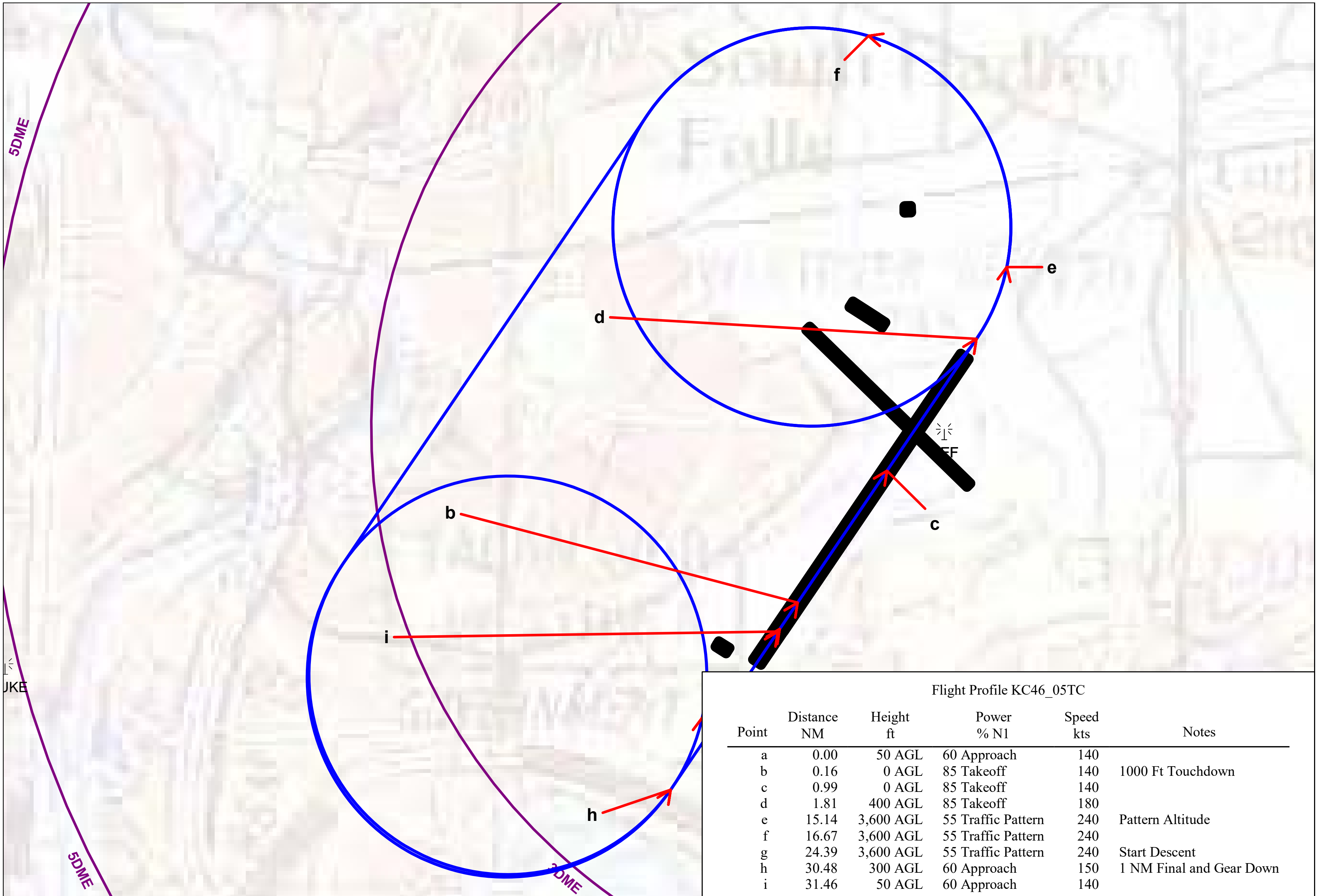
05_CR1 - IFR Pattern

Flight Profile KC46_05R

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:159,000 (1 inch = 13,300 feet)

N



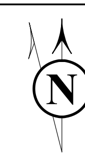
Flight Profile KC46_05TC

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Takeoff	140	1000 Ft Touchdown
c	0.99	0 AGL	85 Takeoff	140	
d	1.81	400 AGL	85 Takeoff	180	
e	15.14	3,600 AGL	55 Traffic Pattern	240	Pattern Altitude
f	16.67	3,600 AGL	55 Traffic Pattern	240	
g	24.39	3,600 AGL	55 Traffic Pattern	240	Start Descent
h	30.48	300 AGL	60 Approach	150	1 NM Final and Gear Down
i	31.46	50 AGL	60 Approach	140	

05_TC - TACTICAL SPIRAL UP - SPIRAL DOWN

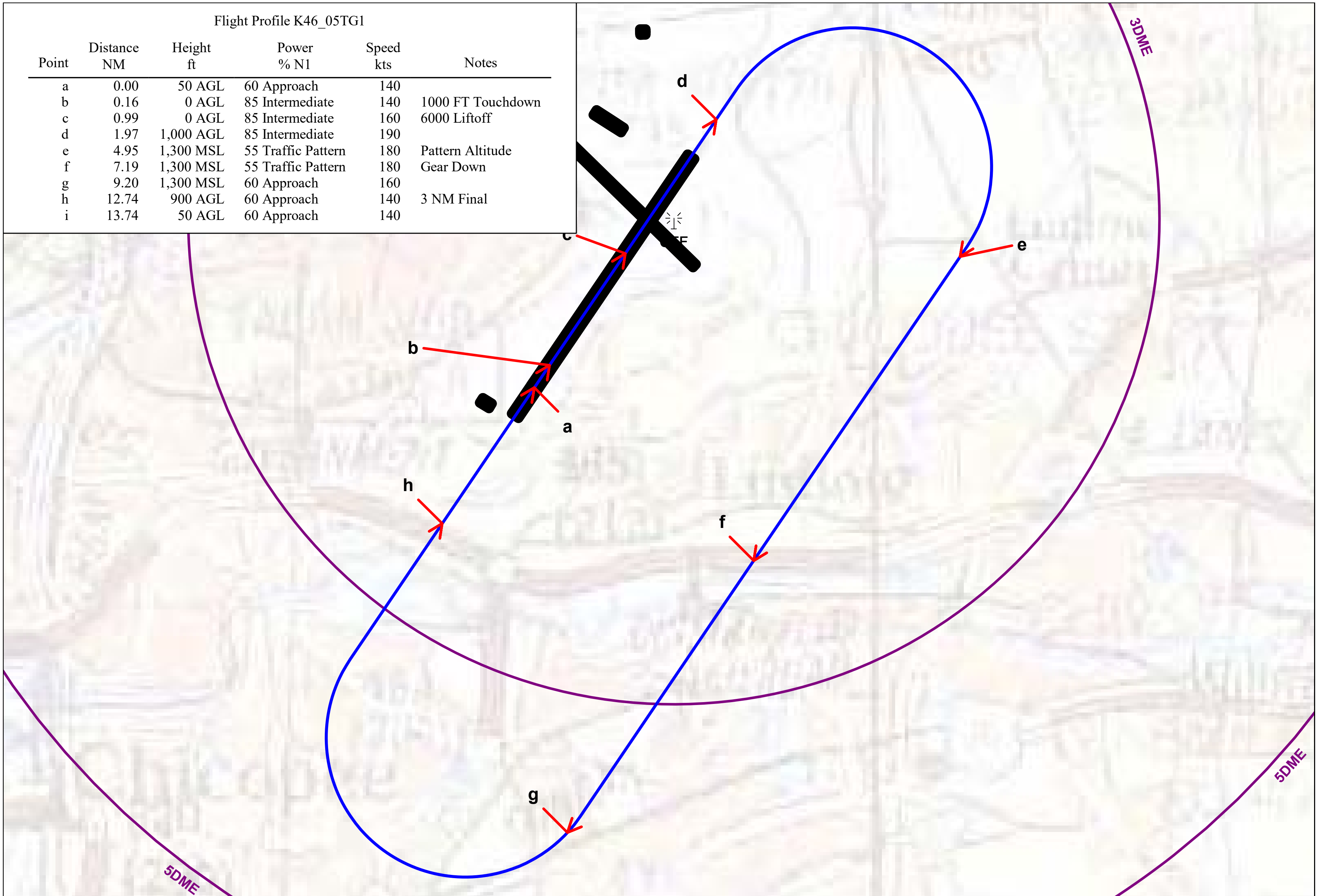
Flight Profile KC46_05TC

Scale in Feet 1:48,200 (1 inch = 4,010 feet)



Flight Profile K46_05TG1

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	50 AGL	60 Approach	140	
b	0.16	0 AGL	85 Intermediate	140	1000 FT Touchdown
c	0.99	0 AGL	85 Intermediate	160	6000 Liftoff
d	1.97	1,000 AGL	85 Intermediate	190	
e	4.95	1,300 MSL	55 Traffic Pattern	180	Pattern Altitude
f	7.19	1,300 MSL	55 Traffic Pattern	180	Gear Down
g	9.20	1,300 MSL	60 Approach	160	
h	12.74	900 AGL	60 Approach	140	3 NM Final
i	13.74	50 AGL	60 Approach	140	

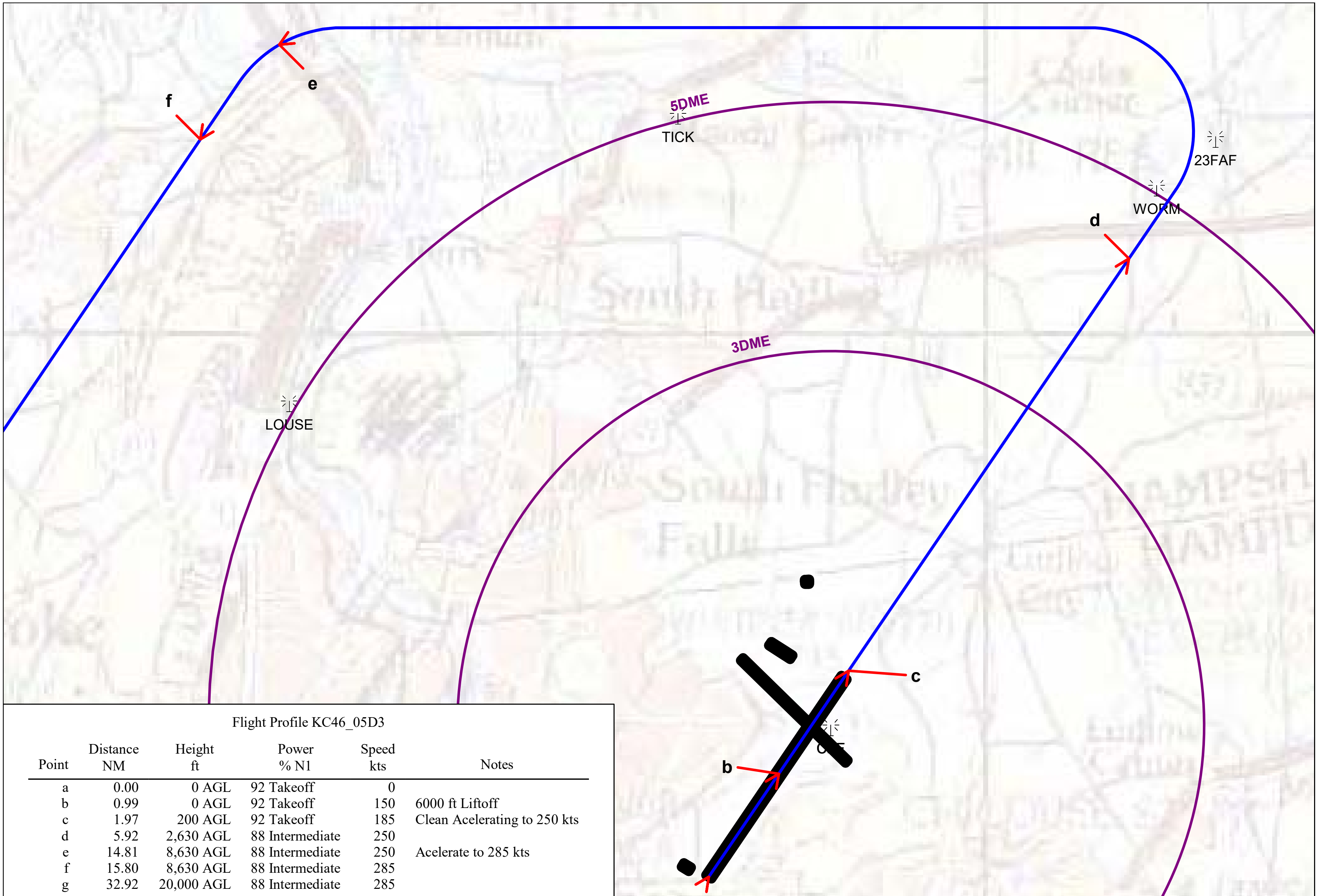


05_TG1 - KC-46A VFR PATTERN
Flight Profile K46_05TG1

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:56,800 (1 inch = 4,740 feet)

N



Flight Profile KC46_05D3

Point	Distance NM	Height ft	Power % N1	Speed kts	Notes
a	0.00	0 AGL	92 Takeoff	0	
b	0.99	0 AGL	92 Takeoff	150	6000 ft Liftoff
c	1.97	200 AGL	92 Takeoff	185	Clean Acelerating to 250 kts
d	5.92	2,630 AGL	88 Intermediate	250	
e	14.81	8,630 AGL	88 Intermediate	250	Acelerate to 285 kts
f	15.80	8,630 AGL	88 Intermediate	285	
g	32.92	20,000 AGL	88 Intermediate	285	

05_D4 - Southwest

Flight Profile KC46_05D3

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:73,900 (1 inch = 6,160 feet)

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APPENDIX D

AIR QUALITY BACKGROUND INFORMATION AND EMISSION CALCULATIONS

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APPENDIX D AIR QUALITY BACKGROUND INFORMATION AND EMISSION CALCULATIONS

This appendix includes air quality background information for each of the four bases under consideration for the KC-46A Third Main Operating Base (MOB 3) mission. This background information includes the regional climate information, along with the spreadsheets that were used to complete the air quality analysis contained in Volume I, Chapter 4 (see Sections 4.1.2, 4.2.2, 4.3.2, and 4.4.2).

The following provides example calculations to assist in understanding the operational emission derivations presented in tabular form for each proposed basing location in Appendix D Sections D.1.1 through D.4.1. The estimation of operational air emissions for the proposed KC-46A MOB 3 mission are based on two sets of general parameters: (1) operational or activity data (such as number of aircraft operations, fuel usage, or equipment expenditure of energy in horsepower-hours [hp-hr]) and (2) emission factors in units of mass of air pollutant per operational or activity data (such as pounds of a pollutant per 1,000 pounds [lb] of fuel consumed or grams [gm] per hp-hr). The following example emission calculations are for (1) KC-46A landing and take-offs (LTOs) and (2) on base travel for privately owned vehicles (POVs) at Grissom Air Reserve Base (ARB).

KC-46A Landing and Take-Offs. The following presents the calculation of annual volatile organic compound (VOC) emissions generated during idling mode for a proposed KC-46A LTO, as presented in Table D.1-14, Annual Air Emissions from Proposed KC-46A Aircraft Operations at Grissom ARB - MOB 3 Scenario Year 2019. All other air pollutant emissions presented in Table D.1-14 are calculated in a similar manner as the following example:

- Total annual hours of idling (Table D.1-12): 969 hr.
- Hourly fuel usage for one P&W 4062 engine in idle mode (Table D.1-1): 1,663 lb/hr.
- VOC emission factor for one P&W 4062 engine in idle mode (Table D.1-1): 12.49 lb of VOC/1,000 lb fuel consumption.
- Number of P&W 4062 engines in a KC-46A aircraft: 2.

Annual Volatile Organic Compound Emissions (Table D.1-14)

(969 hr x 1,633 lb/hr x 12.49 lb VOC/1000 lb fuel x 2 engines) / 2000 lb/ton = 20.13 tons of VOC.

On-Base Privately Owned Vehicles Travel. The following presents the calculation of annual NO_x emissions generated from POVs that travel on base under the existing conditions scenario (year 2015), as presented in Table D.1-25, Annual Emissions from On Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Scenarios. All other air pollutant emissions presented in Table D.1-25 are calculated in a similar manner as the following example:

- Total on base vehicle miles travelled (VMT) for Year 2015 (Table D.1-23): 276,753 miles (mi).
- NOx composite vehicle emission factor (Table D.1-24): 0.52 gm per mi.

Annual Nitrogen Oxide Emissions (Table D.1-25)

(276,753 mi x 0.52 gm/mi) / (453.6 gm/lb * 2000 lb/ton) = 0.16 tons of NO_x.

D.1 GRISSOM AIR RESERVE BASE REGIONAL CLIMATE

Grissom ARB has a continental climate, characterized by warm and wet summers and cold winters with ample precipitation. Meteorological data collected at Logansport in Cass County, Indiana, are used to describe the climatic conditions of the Grissom ARB project region (Indiana State Climate Office 2016).

Temperature. The average high and low temperatures during the summer months at Grissom ARB range from approximately 84 degrees Fahrenheit (°F) to 53 °F. The average high and low temperatures during the winter months range from 48 °F to 16 °F.

Precipitation. Average annual precipitation at Grissom ARB is 40 inches. Precipitation is greatest during the warmer months of the year, and the peak monthly average of 4.7 inches occurs in July. Precipitation is at a minimum during the winter, with the lowest monthly average of 2 inches occurring in February. Snow is common during the colder months of the year, and the average annual snowfall is 28 inches.

Prevailing Winds. The winds at Grissom ARB prevail from the south to southwest during the warmer months of the year and from the southwest to west during the winter (National Oceanic and Atmospheric Administration [NOAA] 1998). The annual average wind speed for Grissom ARB is 8 miles per hour. The months from December through March are generally the windiest of the year, and January has a peak average monthly value of 12 miles per hour.

D.1.1 OPERATIONS EMISSION CALCULATIONS FOR THE KC-46A MOB 3 MISSION AT GRISSOM ARB

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Table D.1-1. Engine Emission Factors by Throttle Setting - KC-135 and KC-46A Aircraft

Engine Type/ Throttle Setting	Fuel Flow (Pounds/ Hour)	Emission Factors (Pounds/1000 Pounds Fuel) [a b]									
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
CFM56-2B-1[c]											
Idle (7%)	1,014	2.10	30.70	4.00	1.06	0.06	0.06	3,216	0.09	0.10	3,249
Approach (30%)	2,463	0.09	4.20	8.20	1.06	0.06	0.06	3,216	0.09	0.10	3,249
Climbout (85%)	6,486	0.06	0.09	16.00	1.06	0.05	0.05	3,216	0.09	0.10	3,249
Take-off (100%)	7,801	0.05	0.09	18.50	1.06	0.07	0.07	3,216	0.09	0.10	3,249
55%	4,292	0.08	2.33	11.75	1.06	0.06	0.06	3,216	0.09	0.10	3,249
60%	4,658	0.07	1.96	12.45	1.06	0.05	0.05	3,216	0.09	0.10	3,249
P&W 4062[d]											
Idle (7%)	1,663	12.49	42.61	3.78	1.06	0.11	0.10	3,216	0.09	0.10	3,249
Approach (30%)	5,702	0.10	1.93	12.17	1.06	0.05	0.04	3,216	0.09	0.10	3,249
Climbout (85%)	16,870	0.08	0.50	25.98	1.06	0.07	0.06	3,216	0.09	0.10	3,249
Take-off (100%)	21,622	0.09	0.61	34.36	1.06	0.08	0.07	3,216	0.09	0.10	3,249
55%	10,778	0.09	1.28	18.45	1.06	0.06	0.05	3,216	0.09	0.10	3,249
60%	11,794	0.09	1.15	19.70	1.06	0.06	0.05	3,216	0.09	0.10	3,249
KC-46A APU [e]											
Pounds per Hour	–	0.04	0.33	6.72	0.56	0.05	0.04	1,373	0.04	0.04	1,387

Table D.1-1. Engine Emission Factors by Throttle Setting - KC-135 and KC-46A Aircraft (Continued)

Engine Type/ Throttle Setting	Fuel Flow (Pounds/ Hour)	Emission Factors (Pounds/1000 Pounds Fuel) [a b]									
		Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
CFM56-2B-1[c]											
Idle (7%)	1,014	0.0810	0.0537	0.2155	0.0311	0.0017	0.0015	0.0027	0.0025	0.0004	0.0019
Approach (30%)	2,463	0.0052	0.0019	0.0031	–	0.0000	0.0001	0.0004	0.0003	0.0001	0.0000
Climbout (85%)	6,486	0.0011	0.0003	0.0015	0.0001	0.0002	0.0002	0.0006	0.0005	0.0003	0.0001
Take-off (100%)	7,801	0.0010	0.0001	0.0008	–	0.0001	0.0001	0.0004	0.0008	0.0000	0.0000
55%	4,292	0.0033	0.0012	0.0024	0.0000	0.0001	0.0002	0.0005	0.0004	0.0002	0.0001
60%	4,658	0.0029	0.0010	0.0022	0.0001	0.0001	0.0002	0.0005	0.0004	0.0002	0.0001
P&W 4062[d]											
Idle (7%)	1,663	0.4808	0.3185	1.2789	0.1848	0.0100	0.0087	0.0162	0.0150	0.0025	0.0112
Approach (30%)	5,702	0.0058	0.0022	0.0035	–	0.0000	0.0001	0.0004	0.0004	0.0001	0.0001
Climbout (85%)	16,870	0.0015	0.0004	0.0021	0.0001	0.0003	0.0003	0.0009	0.0007	0.0005	0.0001
Take-off (100%)	21,622	0.0021	0.0002	0.0016	–	0.0002	0.0002	0.0008	0.0017	0.0001	0.0000
55%	10,778	0.0017	0.0005	0.0024	0.0002	0.0003	0.0003	0.0010	0.0008	0.0005	0.0001
60%	11,794	0.0017	0.0005	0.0024	0.0002	0.0003	0.0003	0.0010	0.0008	0.0005	0.0001
KC-46A APU [e]											
Pounds per Hour	–	0.0017	0.0011	0.0045	0.0006	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000

Table D.1-1. Engine Emission Factors by Throttle Setting - KC-135 and KC-46A Aircraft (Continued)

Engine Type/ Throttle Setting	Fuel Flow (Pounds/ Hour)	Emission Factors (Pounds/1000 Pounds Fuel) [a b]										
		2,4-Dinitro-phenol	Di(2-Ethylhexyl) Phthalate (DEHP)	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	Methyl tert-Butyl Ether (MTBE)	Methylethyl benzene	Naphth-alene	Phenol
CFM56-2B-1[c]												
Idle (7%)	1,014	0.0008	0.0061	0.0354	0.8330	–	–	0.0259	–	–	0.0867	0.0436
Approach (30%)	2,463	0.0002	0.0007	0.0002	0.0378	–	–	0.0066	–	–	0.0004	0.0189
Climbout (85%)	6,486	0.0002	0.0015	0.0002	0.0127	–	–	0.0136	–	–	0.0002	0.0001
Take-off (100%)	7,801	–	0.0010	0.0001	0.0045	–	–	0.0154	–	–	0.0001	0.0000
55%	4,292	0.0002	0.0011	0.0002	0.0264	–	–	0.0098	–	–	0.0003	0.0103
60%	4,658	0.0002	0.0011	0.0002	0.0241	–	–	0.0104	–	–	0.0003	0.0086
P&W 4062[d]												
Idle (7%)	1,663	0.0050	0.0362	0.2098	4.9431	–	–	0.1536	–	–	0.5145	0.2585
Approach (30%)	5,702	0.0002	0.0008	0.0003	0.0426	–	–	0.0074	–	–	0.0004	0.0212
Climbout (85%)	16,870	0.0003	0.0020	0.0002	0.0178	–	–	0.0191	–	–	0.0003	0.0001
Take-off (100%)	21,622	–	0.0021	0.0002	0.0090	–	–	0.0308	–	–	0.0001	0.0000
55%	10,778	0.0004	0.0024	0.0003	0.0205	–	–	0.0221	–	–	0.0003	0.0001
60%	11,794	0.0004	0.0023	0.0003	0.0201	–	–	0.0216	–	–	0.0003	0.0001
KC-46A APU [e]												
Pounds per Hour	–	0.0000	0.0001	0.0007	0.0173	–	–	0.0005	–	–	0.0018	0.0009

Table D.1-1. Engine Emission Factors by Throttle Setting - KC-135 and KC-46A Aircraft (Continued)

Engine Type/ Throttle Setting	Fuel Flow (Pounds/ Hour)	Emission Factors (Pounds/1000 Pounds Fuel) [a b]										
		Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
CFM56-2B-1[c]												
Idle (7%)	1,014	0.0362	0.0008	0.0459	0.0019	0.0021	0.1029	0.0015	–	0.0090	0.0673	0.0290
Approach (30%)	2,463	0.0023	–	0.0003	0.0001	0.0002	0.0011	0.0001	–	0.0002	0.0007	0.0002
Climbout (85%)	6,486	0.0044	–	0.0001	0.0001	0.0003	0.0009	0.0001	–	0.0004	0.0007	0.0001
Take-off (100%)	7,801	0.0079	–	0.0000	0.0000	0.0002	0.0004	0.0001	–	0.0007	0.0006	0.0001
55%	4,292	0.0032	–	0.0002	0.0001	0.0002	0.0010	0.0001	–	0.0003	0.0007	0.0002
60%	4,658	0.0034	–	0.0002	0.0001	0.0002	0.0010	0.0001	–	0.0003	0.0007	0.0002
P&W 4062[d]												
Idle (7%)	1,663	0.2148	0.0050	0.2723	0.0112	0.0125	0.6107	0.0087	–	0.0537	0.3996	0.1723
Approach (30%)	5,702	0.0025	–	0.0004	0.0001	0.0002	0.0012	0.0001	–	0.0002	0.0008	0.0003
Climbout (85%)	16,870	0.0061	–	0.0002	0.0002	0.0004	0.0013	0.0002	–	0.0006	0.0010	0.0002
Take-off (100%)	21,622	0.0158	–	0.0001	0.0001	0.0005	0.0008	0.0001	–	0.0014	0.0012	0.0003
55%	10,778	0.0071	–	0.0002	0.0002	0.0004	0.0015	0.0002	–	0.0007	0.0011	0.0002
60%	11,794	0.0069	–	0.0002	0.0002	0.0004	0.0015	0.0002	–	0.0007	0.0011	0.0002
KC-46A APU [e]												
Pounds per Hour	–	0.0008	0.0000	0.0010	0.0000	0.0000	0.0021	0.0000		0.0002	0.0014	0.0006

[a] Data are for 1 engine. The KC-135/KC-46A have 4/2 engines. VOC data estimated by multiplying THC source test data by 1.15 (USEPA and FAA 2009).

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 2-11 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Data are for the KC-135 aircraft. Criteria pollutant data from ICAO Engine Exhaust Emissions Data Bank - Subsonic Engines - ENGINE IDENTIFICATION: CFM56-2B-1 (ICAO 1987).

[d] ICAO Engine Exhaust Emissions Data Bank - Subsonic Engines - ENGINE IDENTIFICATION: PW4062 (ICAO 2013).

[e] The APU is a Honeywell 331-400C unit - Doug P. DuBois email of 4/26/13.

– = Source does not emit particular pollutant

Table D.1-2. Land and Take-off/Touch and Go Times in Modes and Fuel Usages - KC-135 and KC-46A Aircraft

Aircraft/Mode (Engine Throttle Setting)	Land and Take-Off			Touch and Go	
	Time in Mode (TIM)		Fuel Usage	TIM	Fuel Usage
	(Minutes)	(Hours)	(Pounds)[a]	(Hours)	(Pounds)[a]
KC-135[b]					
Taxi Out (Idle)	32.8	0.55	2,217	–	–
Take-off (Military)	0.7	0.01	364	0.01	364
Climbout (Intermediate)	1.6	0.03	692	0.03	692
Approach	5.2	0.09	854	0.09	854
Taxi In (Idle)	14.9	0.25	1,007	–	–
Totals	**55.2**	**0.92**	**5,134**	**0.13**	**1,910**
KC-46A[b]					
Taxi Out (Idle)	32.8	0.55	1,818	–	–
Take-off (Military)	0.7	0.01	505	0.01	505
Climbout (Intermediate)	1.6	0.03	900	0.03	900
Approach	5.2	0.09	988	0.09	988
Taxi In (Idle)	14.9	0.25	826	–	–
Totals	**55.2**	**0.92**	**5,037**	**0.13**	**2,393**

[a] Fuel usage per aircraft.

[b] TIM data from Table 2-4 (AFCEC 2014).

Table D.1-3. Land and Take-off/Touch and Go Total Fuel Usages and Emissions - KC-135 and KC-46A Aircraft

Aircraft/ Mode	Fuel Usage (Pounds)	Emissions (Pounds)									
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Land and Take-Off											
KC-135	5,134	6.92	102.65	37.70	5.44	0.30	0.30	16,510	0.46	0.51	16,678
KC-46A	5,037	33.25	115.35	62.73	5.34	0.44	0.39	16,199	0.45	0.50	16,365
Touch and Go											
KC-135	1,910	0.14	3.68	24.81	2.02	0.11	0.11	6,142	0.17	0.19	6,205
KC-46A	2,393	0.22	2.67	52.74	2.54	0.15	0.13	7,695	0.21	0.24	7,773

Table D.1-3. Land and Take-off/Touch and Go Total Fuel Usages and Emissions - KC-135 and KC-46A Aircraft (Continued)

Aircraft/ Mode	Fuel Usage (Pounds)	Emissions (Pounds)									
		Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Land and Take-Off											
KC-135	5,134	0.267	0.175	0.699	0.100	0.006	0.005	0.010	0.009	0.002	0.006
KC-46A	5,037	1.280	0.845	3.388	0.489	0.027	0.024	0.045	0.041	0.007	0.030
Touch and Go											
KC-135	1,910	0.006	0.002	0.004	0.000	0.000	0.000	0.001	0.001	0.000	0.000
KC-46A	2,393	0.008	0.003	0.006	0.000	0.000	0.000	0.002	0.002	0.001	0.000

Table D.1-3. Land and Take-off/Touch and Go Total Fuel Usages and Emissions - KC-135 and KC-46A Aircraft (Continued)

Aircraft/ Mode	Fuel Usage (Pounds)	Emissions (Pounds)										
		2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Land and Take-Off												
KC-135	5,134	0.003	0.022	0.114	2.728	–	–	0.104	–	–	0.280	0.157
KC-46A	5,037	0.014	0.099	0.555	13.135	–	–	0.446	–	–	1.361	0.705
Touch and Go												
KC-135	1,910	0.000	0.002	0.000	0.043	–	–	0.021	–	–	0.001	0.016
KC-46A	2,393	0.001	0.004	0.001	0.063	–	–	0.040	–	–	0.001	0.021

Table D.1-3. Land and Take-off/Touch and Go Total Fuel Usages and Emissions - KC-135 and KC-46A Aircraft (Continued)

Aircraft/ Mode	Fuel Usage (Pounds)	Emissions (Pounds)										
		Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Land and Take-Off												
KC-135	5,134	0.125	0.003	0.148	0.006	0.007	0.333	0.005	–	0.030	0.218	0.094
KC-46A	5,037	0.584	0.013	0.721	0.030	0.034	1.618	0.023	–	0.143	1.059	0.456
Touch and Go												
KC-135	1,909.829	0.008	–	0.000	0.000	0.000	0.002	0.000	–	0.001	0.001	0.000
KC-46A	2,393	0.016	–	0.001	0.000	0.001	0.003	0.000	–	0.001	0.002	0.001

– = Source does not emit particular pollutant

Table D.1-4. Annual Air Operations for Aircraft at Grissom ARB - KC-46A MOB 3 Mission Existing Conditions

Year/Aircraft	Number of Operations				
	LTO	TGO	LFB	LFP	Total
Year 2002 (1)					
KC-135	6,702	44,520	–	–	**95,742**
Transient	195	–	–	–	**195**
Totals	**3,403**	**768**	–	–	**4,171**
Year 2015 (2)					
KC-135	1,100	–	–	6,600	**7,700**
Transient	1,111	–	–	428	**1,539**
Civilian	2,309	–	–	–	**2,309**
Totals	**2,211**	–	–	**7,028**	**9,239**

Key: (1) Grissom AEI file page 112; (2) EIS Table 2-5.

Table D.1-5. 2015 Aircraft Closed Pattern Operations at Grissom ARB - KC-46A MOB 3 Mission Existing Conditions

Aircraft Type/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		55%	60%	Climbout	Takeoff	55%	60%	Climbout	Takeoff
KC-135									
Closed Pattern - Radar & Initial to Overhead	3,069	12.0	2.0	–	1.0	614	102	–	51
Closed Pattern - VFR	2,085	5.0	2.0	–	1.0	174	69	–	35
Closed Pattern - Tactical	1,446	8.0	2.0	2.0	1.0	193	48	48	24
Total TIMs - Hours						**980**	**220**	**48**	**110**

[a] Distribution of operations based on assumptions obtained during site survey 8 December 2015.

Table D.1-6. 2015 KC-135 Aircraft Existing Emissions for the 434 ARW at Grissom ARB - KC-46A MOB 3 Mission

Operation/Source	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
LTOs										
KC-135 Aircraft Operations	3.81	56.46	20.74	2.99	0.17	0.17	9,080	0.25	0.28	9,173
Subtotal - LTOs	**3.81**	**56.46**	**20.74**	**2.99**	**0.17**	**0.17**	**9,080**	**0.25**	**0.28**	**9,173**
Closed Patterns										
KC-135 - 55%	0.64	19.62	98.84	8.92	0.47	0.47	27,064	0.75	0.84	27,340
KC-135 - 60%	0.15	4.01	25.52	2.17	0.11	0.11	6,591	0.18	0.20	6,658
KC-135 - Climbout	0.04	0.06	10.01	0.66	0.03	0.03	2,011	0.06	0.06	2,032
KC-135 - Take-off	0.08	0.15	31.75	1.82	0.12	0.12	5,520	0.15	0.17	5,576
Subtotal - Closed Patterns	**0.91**	**23.85**	**166.12**	**13.57**	**0.73**	**0.73**	**41,185**	**1.14**	**1.28**	**41,606**
Total KC-135 Aircraft Operations	**4.71**	**80.30**	**186.86**	**16.57**	**0.90**	**0.90**	**50,266**	**1.39**	**1.56**	**50,779**

Table D.1-6. 2015 KC-135 Aircraft Existing Emissions for the 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Operation/Source	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
LTOs										
KC-135 Aircraft Operations	0.147	0.096	0.384	0.055	0.003	0.003	0.005	0.005	0.001	0.003
Subtotal - LTOs	**0.147**	**0.096**	**0.384**	**0.055**	**0.003**	**0.003**	**0.005**	**0.005**	**0.001**	**0.003**
Closed Patterns										
KC-135 - 55%	0.028	0.010	0.020	0.000	0.001	0.001	0.004	0.003	0.002	0.000
KC-135 - 60%	0.006	0.002	0.005	0.000	0.000	0.000	0.001	0.001	0.000	0.000
KC-135 - Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KC-135 - Take-off	0.002	0.000	0.001	–	0.000	0.000	0.001	0.001	0.000	0.000
Subtotal - Closed Patterns	**0.036**	**0.012**	**0.027**	**0.001**	**0.001**	**0.002**	**0.006**	**0.006**	**0.002**	**0.001**
Total KC-135 Aircraft Operations	**0.183**	**0.109**	**0.411**	**0.056**	**0.004**	**0.005**	**0.012**	**0.011**	**0.003**	**0.004**

Table D.1-6. 2015 KC-135 Aircraft Existing Emissions for the 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Operation/Source	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
LTOs											
KC-135 Aircraft Operations	0.002	0.012	0.063	1.500	–	–	0.057	–	–	0.154	0.086
Subtotal - LTOs	**0.002**	**0.012**	**0.063**	**1.500**	–	–	0.06	–	–	**0.154**	**0.086**
Closed Patterns											
KC-135 - 55%	0.002	0.009	0.002	0.222	–	–	0.082	–	–	0.003	0.087
KC-135 - 60%	0.000	0.002	0.000	0.049	–	–	0.021	–	–	0.001	0.018
KC-135 - Climbout	0.000	0.001	0.000	0.008	–	–	0.009	–	–	0.000	0.000
KC-135 - Take-off	–	0.002	0.000	0.008	–	–	0.026	–	–	0.000	0.000
Subtotal - Closed Patterns	**0.002**	**0.014**	**0.002**	**0.287**	–	–	**0.139**	–	–	**0.003**	**0.105**
Total KC-135 Aircraft Operations	**0.004**	**0.026**	**0.065**	**1.788**	–	–	**0.196**	–	–	**0.157**	**0.191**

Table D.1-6. 2015 KC-135 Aircraft Existing Emissions for the 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Operation/Source	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
LTOs											
KC-135 Aircraft Operations	0.068	0.001	0.082	0.003	0.004	0.183	0.003	–	0.016	0.120	0.052
Subtotal - LTOs	**0.068**	**0.001**	**0.082**	**0.003**	**0.004**	**0.183**	**0.003**	–	**0.016**	**0.120**	**0.052**
Closed Patterns											
KC-135 - 55%	0.027	–	0.002	0.001	0.002	0.009	0.001	–	0.003	0.006	0.002
KC-135 - 60%	0.007	–	0.000	0.000	0.000	0.002	0.000	–	0.001	0.001	0.000
KC-135 - Climbout	0.003	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.000	0.000
KC-135 - Take-off	0.014	–	0.000	0.000	0.000	0.001	0.000	–	0.001	0.001	0.000
Subtotal - Closed Patterns	**0.050**	–	**0.002**	**0.001**	**0.003**	**0.012**	**0.001**	–	**0.005**	**0.009**	**0.002**
Total KC-135 Aircraft Operations	**0.119**	**0.001**	**0.084**	**0.005**	**0.007**	**0.195**	**0.004**	–	**0.021**	**0.129**	**0.054**

– = Source does not emit particular pollutant

Table D.1-7. KC-135 Aircraft On-Wing Engine Testing Activity Data for the 434 ARW at Grissom ARB - KC-46A MOB 3 Mission - 2015

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-135 [a]							
60-HR INSPECTION	35	4	15	35.2	–	–	–
120-HR INSPECTION	35	4	15	35.2	–	–	–
Idle runs for maintenance	69	1	15	17.3	–	–	–
Idle runs for maintenance	55	2	15	27.7	–	–	–
Idle runs for maintenance	14	4	15	13.9	–	–	–
141 ARW EXPO SORTIE PREFLIGHT	237	4	10	158.1	–	–	–
141 ARW EXPO SORTIE POST-FLIGHT	237	4	6	94.8	–	–	–
DEFUELING	14	1	60	13.9	–	–	–
PREFLIGHT	548	4	10	365.2	–	–	–
P0STFLIGHT	548	2	5	91.3	–	–	–
HIGH POWER ENGINE RUNS	43	2	90	128.0	–	–	–
HIGH POWER ENGINE RUNS	43	2	15	–	21.3	–	–
HIGH POWER ENGINE RUNS	43	2	30	–	–	42.7	–
HIGH POWER ENGINE RUNS	43	2	15	–		–	21.3
Total TIMs - KC-135				**981**	**21**	**43**	**21**

[a] Fairchild baseline BaseOps-Aircraft Maintenance - Noise.pdf, then factored these data by 30 KC-135s stationed at FAFB by the 16 KC-135s at Grissom ARB.

Table D.1-8. Annual Air Emissions from KC-135 Aircraft On-Wing Engine Testing Activities for the 434 ARW at Grissom ARB - 2015

Aircraft/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-135										
Idle	1.05	15.26	1.99	0.53	0.03	0.03	1,598	0.044	0.050	1,615
Approach	0.00	0.11	0.22	0.03	0.00	0.00	84	0.002	0.003	85
Intermediate	0.01	0.01	2.21	0.15	0.01	0.01	445	0.012	0.014	450
Military	0.00	0.01	1.54	0.09	0.01	0.01	268	0.007	0.008	270
Total Emissions - 2015	**1.06**	**15.39**	**5.96**	**0.79**	**0.04**	**0.04**	**2,396**	**0.07**	**0.07**	**2,420**

Table D.1-8. Annual Air Emissions from KC-135 Aircraft On-Wing Engine Testing Activities for the 434 ARW at Grissom ARB - 2015 (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-135										
Idle	0.040	0.027	0.107	0.015	0.001	0.001	0.001	0.001	0.000	0.001
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Total Emissions - 2015	**0.041**	**0.027**	**0.107**	**0.015**	**0.001**	**0.001**	**0.001**	**0.001**	**0.000**	**0.001**

Table D.1-8. Annual Air Emissions from KC-135 Aircraft On-Wing Engine Testing Activities for the 434 ARW at Grissom ARB - 2015 (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitrophenol	DEHP	Ethylbenzene	Formaldehyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphthalene	Phenol
KC-135											
Idle	0.000	0.003	0.018	0.414	–	–	0.013	–	–	0.043	0.022
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.000
Intermediate	0.000	0.000	0.000	0.002	–	–	0.002	–	–	0.000	0.000
Military	–	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Total Emissions - 2015	**0.000**	**0.003**	**0.018**	**0.417**	–	–	**0.016**	–	–	**0.043**	**0.022**

Table D.1-8. Annual Air Emissions from KC-135 Aircraft On-Wing Engine Testing Activities for the 434 ARW at Grissom ARB - 2015 (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135											
Idle	0.018	0.000	0.023	0.001	0.001	0.051	0.001	–	0.004	0.033	0.014
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Total Emissions - 2015	**0.019**	**0.000**	**0.023**	**0.001**	**0.001**	**0.051**	**0.001**	–	**0.005**	**0.034**	**0.014**

– = Source does not emit particular pollutant

Table D.1-9. 2014 AGE Usages for the KC-135R Detachment at Seymour Johnson AFB

Source	Fuel Type	Hp	Load Factor	Hours/Year	Annual Hp-Hours
Air Compressor - MC-2A	JP-8	10.5	0.48	60	302
Floodlight (FL-1D & NF2D & lightcart)	JP-8	10.5	0.74	100	777
Next Generation Heater (NGH)	JP-8	7.0	0.95	50	333
Subtotal - 7-11 Hp					**1,412**
Jacking Manifold	JP-8	30.0	0.51	100	1,530
Subtotal - 26-40 Hp					**1,530**
Air Compressor - MC20	JP-8	50.0	1.00	120	6,000
Nitrogen Servicing Cart	JP-8	49.0	0.51	200	4,998
Subtotal - 41-50 Hp					**10,998**
Air Compressor - MC-7	JP-8	52.0	0.48	150	3,744
Generator Set - A/M32A-86D	JP-8	96.5	0.95	750	68,742
Subtotal - 76-100 Hp					**72,486**
Air Conditioners - MA-3D	JP-8	120.0	0.28	150	5,040
Hyd Test Stand - MJ-2	JP-8	125.0	0.51	75	4,781
Start Cart - A/M32A-95	JP-8	155.0	0.95	40	5,890
Subtotal - 101-175 Hp					**15,711**

Note: These data used as surrogates for AGE usages for KC-135 and KC-46A aircraft at all proposed basing locations.
Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx 'GSE', but some Hp ratings obtained from 5-2014 Seymour Johnson AFB Mobile AEI Process Calc Summary.pdf

Table D.1-10. Nonroad Diesel Equipment Emission Factors for 2015 - Grissom ARB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
Nonroad Equipment - 7-11 Hp	0.72	4.67	4.72	0.00	0.46	0.45	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.49	2.16	4.29	0.00	0.35	0.34	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.41	1.80	4.20	0.00	0.29	0.28	627	0.094	0.007	631
Nonroad Equipment - 76-100 Hp	0.69	4.23	3.82	0.00	0.61	0.59	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.32	1.24	2.67	0.00	0.27	0.26	565	0.094	0.007	569

Table D.1-10. Nonroad Diesel Equipment Emission Factors for 2015 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
Nonroad Equipment - 7-11 Hp	0.086	0.010	0.105	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.059	0.007	0.072	0.003	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.049	0.006	0.059	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.082	0.010	0.100	0.004	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.039	0.005	0.047	0.002	–	–	–	–	–	–

Table D.1-10. Nonroad Diesel Equipment Emission Factors for 2015 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015											
Nonroad Equipment - 7-11 Hp	–	–	–	0.132	–	–	–	–	–	0.009	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.091	–	–	–	–	–	0.006	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.075	–	–	–	–	–	0.005	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.126	–	–	–	–	–	0.009	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.059	–	–	–	–	–	0.004	–

Table D.1-10. Nonroad Diesel Equipment Emission Factors for 2015 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
Nonroad Equipment - 7-11 Hp	–	0.001	–	–	–	0.046	–	–	–	–	0.032
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.026	–	–	–	–	0.018
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.044	–	–	–	–	0.030
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.021	–	–	–	–	0.014

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Miami County, IN.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.1-11. Annual Air Emissions for AGE Usages from Existing KC-135 Aircraft at Grissom ARB - KC-46A MOB 3 Mission

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.01	0.01	0.00	0.00	0.00	0.92	0.00	0.00	0.93
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.01	0.00	0.00	0.00	1.07	0.00	0.00	1.08
Nonroad Equipment - 41-50 Hp	0.00	0.02	0.05	0.00	0.00	0.00	7.60	0.00	0.00	7.65
Nonroad Equipment - 76-100 Hp	0.05	0.34	0.31	0.00	0.05	0.05	51.42	0.01	0.00	51.75
Nonroad Equipment - 101-175 Hp	0.01	0.02	0.05	0.00	0.00	0.00	9.79	0.00	0.00	9.86
Total - Year 2015	**0.07**	**0.39**	**0.42**	**0.00**	**0.06**	**0.06**	**70.81**	**0.01**	**0.00**	**71.26**

Table D.1-11. Annual Air Emissions for AGE Usages from Existing KC-135 Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.001	0.000	0.001	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.007	0.001	0.008	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.001	0.000	0.001	0.000	–	–	–	–	–	–
Total - Year 2015	**0.008**	**0.001**	**0.010**	**0.000**	–	–	–	–	–	–

Table D.1-11. Annual Air Emissions for AGE Usages from Existing KC-135 Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.010	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2015	–	–	–	**0.012**	–	–	–	–	–	**0.001**	–

Table D.1-11. Annual Air Emissions for AGE Usages from Existing KC-135 Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.003	–	–	–	–	0.002
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2015	–	**0.000**	–	–	–	**0.004**	–	–	–	–	**0.003**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2015 Grissom ARB KC-135 LTOs [1,100] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2015 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.1-12. KC-46A Aircraft Operations at Grissom ARB - KC-46A MOB 3 Mission

Scenario/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		Idle	Approach	Climbout	Takeoff	Idle	Approach	Climbout	Takeoff
Landings and Take-offs									
Landings and Take-offs	1,219	47.7	5.2	1.6	0.7	969	106	33	14
Scenario/Operation	**Operations/ Year [b]**	**Engine Setting/Time in Mode per Operation (Minutes)**				**Engine Setting Annual Hours**			
		55%	**60%**	**Climbout**	**Takeoff**	**55%**	**60%**	**Climbout**	**Takeoff**
Closed Patterns									
Closed Pattern - Radar & Initial to Overhead	2,226	12.0	2.0	–	1.0	445	74	–	37
Closed Pattern - VFR	1,512	5.0	2.0	–	1.0	126	50	–	25
Closed Pattern - Tactical	1,049	8.0	2.0	2.0	1.0	140	35	35	17
Total TIMs - KC-46A MOB 3						**711**	**160**	**35**	**80**

[a] Source: EIS Table 2-13.

[b] EIS Table 2-13 and KC-46 MOB CP Ops Data for Emissions.xlsx. Closed Pattern - Tactical ops reduced by 7.5% to reflect amount of time above 3,000' AGL.

Table D.1-13. APU Usage per LTO for the KC-46A Aircraft

Equipment Type/Mode	Hours/Mode
APU	
Pre-Flight - OBIGGS + Electric + Maximum ECS	1.50
Pre-Flight - Main Engine Start + Electric	0.03
Post-Flight - Electric + Minimum ECS	0.58
Total Hours per LTO	**2.12**

Source: Doug P. DuBois email of 4/4/13 (in my 4/8 email)

Table D.1-14. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Grissom ARB - MOB 3 Mission 2019

Operation/Engine Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Landings and Take-offs										
Idle	20.13	68.68	6.09	1.71	0.18	0.16	5,184	0.14	0.16	5,237
Approach	0.06	1.16	7.33	0.64	0.03	0.02	1,937	0.05	0.06	1,957
Climbout	0.04	0.27	14.25	0.58	0.04	0.03	1,764	0.05	0.05	1,782
Take-off	0.03	0.19	10.57	0.33	0.02	0.02	989	0.03	0.03	999
APU	0.06	0.43	8.67	0.73	0.06	0.06	1,771	0.05	0.06	1,789
Subtotal MOB 3 LTOs	**20.32**	**70.73**	**46.91**	**3.98**	**0.33**	**0.30**	**11,645**	**0.32**	**0.36**	**11,764**
Closed Patterns										
55%	0.71	9.81	141.38	8.12	0.45	0.38	24,648	0.68	0.77	24,900
60%	0.17	2.16	37.08	1.99	0.11	0.10	6,052	0.17	0.19	6,114
Climbout	0.05	0.29	15.32	0.63	0.04	0.04	1,897	0.05	0.06	1,916
Take-off	0.16	1.05	59.27	1.83	0.14	0.12	5,548	0.15	0.17	5,604
Subtotal Closed Patterns	**1.09**	**13.32**	**253.06**	**12.57**	**0.75**	**0.63**	**38,145**	**1.06**	**1.19**	**38,534**
Total MOB 3 Operations	**21.41**	**84.06**	**299.96**	**16.55**	**1.08**	**0.92**	**49,789**	**1.38**	**1.55**	**50,298**

Table D.1-14. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Grissom ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Landings and Take-offs										
Idle	0.775	0.513	2.061	0.298	0.016	0.014	0.026	0.024	0.004	0.018
Approach	0.004	0.001	0.002	–	0.000	0.000	0.000	0.000	0.000	0.000
Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.001	0.000	0.000	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.002	0.001	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal MOB 3 LTOs	**0.782**	**0.516**	**2.071**	**0.299**	**0.016**	**0.014**	**0.027**	**0.025**	**0.004**	**0.018**
Closed Patterns										
55%	0.013	0.004	0.019	0.001	0.002	0.002	0.008	0.006	0.004	0.001
60%	0.003	0.001	0.004	0.000	0.001	0.001	0.002	0.001	0.001	0.000
Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Take-off	0.004	0.000	0.003	–	0.000	0.000	0.001	0.003	0.000	0.000
Subtotal Closed Patterns	**0.021**	**0.005**	**0.027**	**0.002**	**0.004**	**0.003**	**0.012**	**0.011**	**0.005**	**0.001**
Total MOB 3 Operations	**0.803**	**0.521**	**2.098**	**0.300**	**0.020**	**0.018**	**0.039**	**0.036**	**0.010**	**0.019**

Table D.1-14. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Grissom ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Landings and Take-offs											
Idle	0.008	0.058	0.338	7.967	–	–	0.248	–	–	0.829	0.417
Approach	0.000	0.000	0.000	0.026	–	–	0.004	–	–	0.000	0.013
Climbout	0.000	0.001	0.000	0.010	–	–	0.010	–	–	0.000	0.000
Take-off	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.001	0.022	–	–	0.001	–	–	0.002	0.001
Subtotal MOB 3 LTOs	**0.008**	**0.061**	**0.339**	**8.028**	–	–	**0.273**	–	–	**0.832**	**0.431**
Closed Patterns											
55%	0.003	0.018	0.002	0.157	–	–	0.169	–	–	0.003	0.001
60%	0.001	0.004	0.000	0.038	–	–	0.041	–	–	0.001	0.000
Climbout	0.000	0.001	0.000	0.010	–	–	0.011	–	–	0.000	0.000
Take-off	–	0.004	0.000	0.016	–	–	0.053	–	–	0.000	0.000
Subtotal Closed Patterns	**0.004**	**0.027**	**0.003**	**0.221**	–	–	**0.274**	–	–	**0.004**	**0.001**
Total MOB 3 Operations	**0.012**	**0.088**	**0.342**	**8.249**	–	–	**0.547**	–	–	**0.836**	**0.432**

Table D.1-14. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Grissom ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Landings and Take-offs											
Idle	0.346	0.008	0.439	0.018	0.020	0.984	0.014	–	0.087	0.644	0.278
Approach	0.002	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Climbout	0.003	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Take-off	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.001	0.000	0.001	0.000	0.000	0.003	0.000	–	0.000	0.002	0.001
Subtotal MOB 3 LTOs	**0.357**	**0.008**	**0.440**	**0.018**	**0.021**	**0.989**	**0.014**	**–**	**0.088**	**0.647**	**0.279**
Closed Patterns											
55%	0.054	–	0.001	0.002	0.003	0.011	0.002	–	0.005	0.009	0.002
60%	0.013	–	0.000	0.000	0.001	0.003	0.000	–	0.001	0.002	0.000
Climbout	0.004	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Take-off	0.027	–	0.000	0.000	0.001	0.001	0.000	–	0.002	0.002	0.000
Subtotal Closed Patterns	**0.098**	**–**	**0.002**	**0.002**	**0.005**	**0.016**	**0.003**	**–**	**0.009**	**0.013**	**0.003**
Total MOB 3 Operations	**0.455**	**0.008**	**0.442**	**0.020**	**0.026**	**1.005**	**0.017**	**–**	**0.097**	**0.661**	**0.282**

– = Source does not emit particular pollutant

Table D.1-15. KC-46A Aircraft On-Wing Engine Testing Activity Data for Grissom ARB - KC-46A MOB 3 Mission

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-46A - MOB 3[b]							
Leak Checks/Troubleshooting	208	2	45	312.0	–	–	–
Fuel Transfer	69	1	80	92.4	–	–	–
Troubleshooting - High Power	35	1	40	11.6	2.9	2.9	5.8
Troubleshooting - High Power	35	2	15	17.3	–	–	–
Engine Trims	4	1	40	1.3	0.3	0.3	0.7
Engine Trims	4	2	10	1.3	–	–	–
ISO Runs	12	2	35	14.0	–	–	–
Backline Runs	12	2	69	465.8	6.9		10.4
Post ISO Runs	12	2	55	192.5	–	–	11.0
Total TIMs - KC-46A MOB 3				**1,108**	**10**	**3**	**28**

[a] Altus FTU BaseOps-Aircraft Maintenance-Noise.pdf (April 16, 2013).

[b] Altus MOB BaseOps-Aircraft Maintenance-Noise.pdf (April 16, 2013).

[c] The APU operates for the same amount of time as the main engines during testing activities.

Table D.1-16. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Grissom ARB - KC-46A MOB 3 Mission

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A - MOB 3										
Idle	11.51	39.27	3.48	0.98	0.10	0.09	2,964	0.08	0.09	2,994
Approach	0.00	0.06	0.35	0.03	0.00	0.00	93	0.00	0.00	94
Intermediate	0.00	0.01	0.71	0.03	0.00	0.00	87	0.00	0.00	88
Military	0.03	0.18	10.32	0.32	0.02	0.02	966	0.03	0.03	976
APU	0.03	0.19	3.86	0.32	0.03	0.02	789	0.02	0.02	797
Total KC-46A MOB 3	**11.57**	**39.71**	**18.73**	**1.68**	**0.16**	**0.14**	**4,899**	**0.14**	**0.15**	**4,950**

Table D.1-16. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-46A - MOB 3										
Idle	0.443	0.294	1.179	0.170	0.009	0.008	0.015	0.014	0.002	0.010
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.001	0.000	0.000	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total KC-46A MOB 3	**0.445**	**0.294**	**1.182**	**0.171**	**0.009**	**0.008**	**0.015**	**0.014**	**0.002**	**0.010**

Table D.1-16. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
KC-46A - MOB 3											
Idle	0.005	0.033	0.193	4.556	–	–	0.142	–	–	0.474	0.238
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.001
Intermediate	0.000	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Military	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.000	0.010	–	–	0.000	–	–	0.001	0.001
Total KC-46A MOB 3	**0.005**	**0.034**	**0.194**	**4.570**	–	–	**0.152**	–	–	**0.475**	**0.239**

Table D.1-16. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A - MOB 3											
Idle	0.198	0.005	0.251	0.010	0.012	0.563	0.008	–	0.049	0.368	0.159
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.000	0.000	0.001	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Total KC-46A MOB 3	**0.203**	**0.005**	**0.252**	**0.010**	**0.012**	**0.564**	**0.008**	–	**0.050**	**0.370**	**0.159**

– = Source does not emit particular pollutant

Table D.1-17. Nonroad Diesel Equipment Emission Factors for 2019 - Grissom ARB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019										
Nonroad Equipment - 7-11 Hp	0.67	4.56	4.48	0.00	0.40	0.39	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.30	1.17	3.60	0.00	0.18	0.18	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.25	0.91	3.49	0.00	0.14	0.13	628	0.094	0.007	632
Nonroad Equipment - 76-100 Hp	0.49	2.94	2.52	0.00	0.40	0.39	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.25	0.70	1.48	0.00	0.15	0.14	566	0.094	0.007	570

Table D.1-17. Nonroad Diesel Equipment Emission Factors for 2019 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019										
Nonroad Equipment - 7-11 Hp	0.079	0.010	0.097	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.036	0.004	0.043	0.002	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.030	0.004	0.037	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.058	0.007	0.071	0.003	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.030	0.004	0.036	0.002	–	–	–	–	–	–

Table D.1-17. Nonroad Diesel Equipment Emission Factors for 2019 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2019											
Nonroad Equipment - 7-11 Hp	–	–	–	0.122	–	–	–	–	–	0.001	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.055	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.090	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–

Table D.1-17. Nonroad Diesel Equipment Emission Factors for 2019 - Grissom ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.042	–	–	–	–	0.030
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.019	–	–	–	–	0.013
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Miami County, IN.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.1-18. Annual Air Emissions for AGE Usages from KC-46A Aircraft at Grissom ARB - KC-46A MOB 3 Mission

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.01	0.01	0.00	0.00	0.00	1.02	0.00	0.00	1.03
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.01	0.00	0.00	0.00	1.19	0.00	0.00	1.19
Nonroad Equipment - 41-50 Hp	0.00	0.01	0.05	0.00	0.00	0.00	8.43	0.00	0.00	8.49
Nonroad Equipment - 76-100 Hp	0.04	0.26	0.22	0.00	0.04	0.03	57.04	0.01	0.00	57.40
Nonroad Equipment - 101-175 Hp	0.00	0.01	0.03	0.00	0.00	0.00	10.85	0.00	0.00	10.93
Total - Year 2019	**0.05**	**0.30**	**0.31**	**0.00**	**0.04**	**0.04**	**78.53**	**0.01**	**0.00**	**79.03**

Table D.1-18. Annual Air Emissions for AGE Usages from KC-46A Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.005	0.001	0.006	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.001	0.000	0.001	0.000	–	–	–	–	–	–
Total - Year 2019	**0.006**	**0.001**	**0.008**	**0.000**	–	–	–	–	–	–

Table D.1-18. Annual Air Emissions for AGE Usages from KC-46A Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.008	–	–	–	–	–	0.000	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2019	–	–	–	**0.010**	–	–	–	–	–	**0.000**	–

Table D.1-18. Annual Air Emissions for AGE Usages from KC-46A Aircraft at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.003	–	–	–	–	0.002
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2019	–	**0.000**	–	–	–	**0.003**	–	–	–	–	**0.002**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2019 Grissom ARB MOB 3 KC-46A LTOs [1,219] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2019 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.1-19. Annual Vehicle Miles Travelled (VMT) for GOVs - Grissom ARB 2002

Vehicle Class	Annual VMT
LDGV	85,593
LDGT1	55,346
LDGT2	107,836
LDDT	66,150
HDDV	47,060
Total VMT	**361,985**

Source: 2002 Grissom ARB AEI Table CC-7.

Table D.1-20. Annual Number of Workers at Grissom ARB - KC-46A MOB 3 Mission

Scenario	Total Base Workers	434 ARW Staff Year 2015	MOB 3 Staff
Year 2002 [a]	1,952	–	–
Year 2015 434 ARW [b]	–	1,715	–
Year 2019 MOB 3 [b]	–	–	1,770

[a] Source: 2002 Grissom ARB AEI.

[b] Source: # of Workers from EIS Table 2-4.

Table D.1-21. Annual Average On-Road Vehicle Emission Factors for GOVs - Grissom ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.06	2.12	0.28	0.01	0.05	0.01	283	–	–	283
LDGT1 - 25 mph	0.26	5.78	0.92	0.01	0.06	0.02	395	–	–	395
LDGT2 - 25 mph	0.23	5.49	0.89	0.01	0.06	0.01	393	–	–	393
LDDT - 25 mph	0.25	2.20	1.29	0.00	0.12	0.07	518	–	–	518
HDDV - 25 mph	0.41	1.79	6.29	0.01	0.52	0.29	1,546	–	–	1,546
Year 2019										
LDGV - 25 mph	0.03	2.24	0.14	0.00	0.07	0.01	347	–	–	347
LDGT1 - 25 mph	0.13	5.98	0.48	0.00	0.08	0.02	499	–	–	499
LDGT2 - 25 mph	0.12	5.83	0.45	0.00	0.08	0.02	496	–	–	496
LDDT - 25 mph	0.17	2.05	1.07	0.01	0.12	0.05	636	–	–	636
HDDV - 25 mph	0.27	1.31	4.52	0.02	0.49	0.20	2,020	–	–	2,020

Table D.1-21. Annual Average On-Road Vehicle Emission Factors for GOVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.036	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.004	0.001	0.144	0.002	–	–	–	–	–	–
LDGT2 - 25 mph	0.004	0.001	0.131	0.001	–	–	–	–	–	–
LDDT - 25 mph	–	–	0.072	0.004	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.017	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.002	0.001	0.072	0.001	–	–	–	–	–	–
LDGT2 - 25 mph	0.002	0.000	0.066	0.001	–	–	–	–	–	–
LDDT - 25 mph	–	–	0.048	0.002	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–

Table D.1-21. Annual Average On-Road Vehicle Emission Factors for GOVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.006	0.009	0.005	–	–	0.000	0.000	0.000	–
LDGT2 - 25 mph	–	–	0.005	0.008	0.004	–	–	0.000	0.000	0.000	–
LDDT - 25 mph	–	–	0.001	–	0.000	–	–	–	0.002	–	–
HDDV - 25 mph	–	–	0.005	–	0.010	–	–	–	0.010	–	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
LDGT2 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
LDDT - 25 mph	–	–	0.001	–	0.000	–	–	–	0.001	–	–
HDDV - 25 mph	–	–	0.004	–	0.007	–	–	–	0.007	–	–

Table D.1-21. Annual Average On-Road Vehicle Emission Factors for GOVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.007	–	0.001	–	–	0.006
LDGT1 - 25 mph	–	–	0.000	–	–	0.004	–	0.010	–	–	0.021
LDGT2 - 25 mph	–	–	0.000	–	–	0.004	–	0.009	–	–	0.019
LDDT - 25 mph	–	–	–	–	–	0.005	–	0.000	–	–	0.005
HDDV - 25 mph	–	–	0.008	–	–	–	–	0.000	–	–	–
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
LDGT2 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.010
LDDT - 25 mph	–	–	–	–	–	0.003	–	0.000	–	–	0.003
HDDV - 25 mph	–	–	0.006	–	–	–	–	0.000	–	–	–

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Miami County, IN.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.1-22. Annual Emissions from GOV Activities - Grissom ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 434 ARW [a]										
LDGV	0.01	0.18	0.02	0.00	0.00	0.00	23.43	–	–	23.43
LDGT	0.01	0.31	0.05	0.00	0.00	0.00	21.18	–	–	21.18
HDGV	0.02	0.57	0.09	0.00	0.01	0.00	41.01	–	–	41.01
HDDV	0.02	0.14	0.08	0.00	0.01	0.00	33.16	–	–	33.16
Total - Year 2015	**0.06**	**1.20**	**0.25**	**0.00**	**0.02**	**0.01**	**118.77**	**–**	**–**	**118.77**
Year 2019 MOB 3 [b]										
LDGV	0.00	0.19	0.01	0.00	0.01	0.00	29.71	–	–	29.71
LDGT	0.01	0.33	0.03	0.00	0.00	0.00	27.63	–	–	27.63
HDGV	0.01	0.63	0.05	0.00	0.01	0.00	53.48	–	–	53.48
HDDV	0.01	0.14	0.07	0.00	0.01	0.00	42.08	–	–	42.08
Total - Year 2019	**0.03**	**1.29**	**0.16**	**0.00**	**0.03**	**0.01**	**152.89**	**–**	**–**	**152.89**

Table D.1-22. Annual Emissions from GOV Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 434 ARW [a]										
LDGV	0.000	0.000	0.003	0.000	–	–	–	–	–	–
LDGT	0.000	0.000	0.008	0.000	–	–	–	–	–	–
HDGV	0.000	0.000	0.014	0.000	–	–	–	–	–	–
HDDV	–	–	0.005	0.000	–	–	–	–	–	–
Total - Year 2015	**0.001**	**0.000**	**0.029**	**0.000**	–	–	–	–	–	–
Year 2019 MOB 3 [b]										
LDGV	0.000	0.000	0.001	0.000	–	–	–	–	–	–
LDGT	0.000	0.000	0.004	0.000	–	–	–	–	–	–
HDGV	0.000	0.000	0.007	0.000	–	–	–	–	–	–
HDDV	–	–	0.003	0.000	–	–	–	–	–	–
Total - Year 2015	**0.000**	**0.000**	**0.016**	**0.000**	–	–	–	–	–	–

Table D.1-22. Annual Emissions from GOV Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
Year 2015 434 ARW [a]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.001	0.001	0.000	–	–	0.000	0.000	0.000	–
HDDV	–	–	0.000		0.000	–	–	–	0.000	–	–
Total - Year 2015	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
HDDV	–	–	0.000		0.000	–	–	–	0.000	–	–
Total - Year 2015	–	–	**0.001**	**0.001**	**0.000**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.1-22. Annual Emissions from GOV Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 434 ARW [a]											
LDGV	–	–	0.000	–	–	0.001	–	0.000	–	–	0.000
LDGT	–	–	0.000	–	–	0.000	–	0.001	–	–	0.001
HDGV	–	–	0.000	–	–	0.000	–	0.001	–	–	0.002
HDDV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
Total - Year 2015	**–**	**–**	**0.000**	**–**	**–**	**0.002**	**–**	**0.002**	**–**	**–**	**0.004**
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	–	–	0.000	–	0.000	–	–	0.000
LDGT	–	–	0.000	–	–	0.000	–	0.000	–	–	0.001
HDGV	–	–	0.000	–	–	0.000	–	0.001	–	–	0.001
HDDV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
Total - Year 2015	**–**	**–**	**0.000**	**–**	**–**	**0.001**	**–**	**0.001**	**–**	**–**	**0.002**

[a] 2015 emissions = 2002 GOV VMT * (2015 Grissom ARB worker population/2002 Grissom ARB worker population) * 2015 vehicle emission factors.

[b] 2019 emissions = 2002 GOV VMT * (2019 Grissom ARB worker population/2002 Grissom ARB worker population) * 2019 vehicle emission factors.

– = Source does not emit particular pollutant

Table D.1-23. Annual On-Base On-Road Vehicle Mileage Calculations - Grissom ARB KC-46A MOB 3 Mission

Scenario/ Staff Type	# of Workers [b]	Vehicle Occupancy Rate	On-Base Miles per Round Trip [a]	Days per Year [a]	On-Base Miles per year
Year 2002 [a]					
Onbase Personnel	511	1.0	2.0	250	255,500
Reservists Near	725	1.0	2.0	24	34,800
Reservists Far	598	1.0	2.0	12	14,352
Contractors and Vendors	50	1.0	3.0	247	37,050
Total Onbase VMT - Year 2002					**341,702**
Year 2015 434 ARW [a]					
Onbase Personnel	293	1.0	2.0	250	146,500
Reservists Near	719	1.0	2.0	24	34,511
Reservists Far	593	1.0	2.0	12	14,233
Contractors and Vendors	110	1.0	3.0	247	81,510
Total Onbase VMT - Year 2015					**276,753**
Year 2019 MOB 3 [a]					
Onbase Personnel	450	1.0	2.0	250	225,000
Reservists Near	655	1.0	2.0	24	31,433
Reservists Far	540	1.0	2.0	12	12,963
Contractors and Vendors	125	1.0	3.0	247	92,625
Total Onbase VMT - Year 2019					**362,022**

[a] Source: 2002 Grissom ARB AEI.

[b] Source: # of Workers from EIS Table 2-4.

Table D.1-24. Annual Average On-Road Vehicle Emission Factors for On-Base POVs - Grissom ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.06	2.12	0.28	0.01	0.05	0.01	283	–	–	283
LDGT1 - 25 mph	0.26	5.78	0.92	0.01	0.06	0.02	395	–	–	395
Composite [c]	**0.13**	**3.48**	**0.52**	**0.01**	**0.06**	**0.01**	**324**	–	–	**324**
Year 2019										
LDGV - 25 mph	0.03	2.24	0.14	0.00	0.07	0.01	347	–	–	347
LDGT1 - 25 mph	0.13	5.98	0.48	0.00	0.08	0.02	499	–	–	499
Composite [c]	**0.07**	**3.62**	**0.26**	**0.00**	**0.07**	**0.02**	**404**	–	–	**404**

Table D.1-24. Annual Average On-Road Vehicle Emission Factors for On-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.036	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.004	0.001	0.144	0.002	–	–	–	–	–	–
Composite [c]	**0.002**	**0.000**	**0.076**	**0.001**	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.017	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.002	0.001	0.072	0.001	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.038**	**0.000**	–	–	–	–	–	–

Table D.1-24. Annual Average On-Road Vehicle Emission Factors for On-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.006	0.009	0.005	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.003**	**0.004**	**0.002**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.002**	**0.002**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.1-24. Annual Average On-Road Vehicle Emission Factors for On-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.007	–	0.001	–	–	0.006
LDGT1 - 25 mph	–	–	0.000	–	–	0.004	–	0.010	–	–	0.021
Composite [c]	–	–	**0.000**	–	–	**0.006**	–	**0.005**	–	–	**0.011**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
Composite [c]	–	–	**0.000**	–	–	**0.003**	–	**0.002**	–	–	**0.006**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Miami County, IN.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 63/37% LDGV/LDGT1 and based on 2002 Grissom ARB AEI vehicle fleet mix.

Table D.1-25. Annual Emissions from On-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 434 ARW [a]	0.04	1.06	0.16	0.00	0.02	0.00	98.91	–	–	98.91
Year 2019 MOB 3 [b]	0.03	1.45	0.11	0.00	0.03	0.01	161.04	–	–	161.04

Table D.1-25. Annual Emissions from On-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 434 ARW [a]	0.001	0.000	0.023	0.000	–	–	–	–	–	–
Year 2019 MOB 3 [b]	0.000	0.000	0.015	0.000	–	–	–	–	–	–

Table D.1-25. Annual Emissions from On-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015 434 ARW [a]	–	–	0.001	0.001	0.001	–	–	0.000	0.000	0.000	–
Year 2019 MOB 3 [b]	–	–	0.001	0.001	0.000	–	–	0.000	0.000	0.000	–

Table D.1-25. Annual Emissions from On-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 434 ARW [a]	–	–	0.000	–	–	0.002	–	0.001	–	–	0.003
Year 2019 MOB 3 [b]	–	–	0.000	–	–	0.001	–	0.001	–	–	0.002

[a] 2015 emissions = 2015 Total On-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total On-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.1-26. Annual Off-Base On-Road Vehicle Mileage Calculations - Grissom ARB KC-46A MOB 3 Mission

Scenario/ Staff Type	# of Workers [b]	Vehicle Occupancy Rate	Off-Base Miles per Round Trip [a]	Days per Year [a]	Off-Base Miles per year
Year 2002 [a]					
Onbase Personnel	511	1.0	27.3	250	3,487,575
Reservists Near	725	1.0	41.4	24	720,360
Reservists Far	598	1.0	98.7	12	708,271
Contractors and Vendors	50	1.0		247	
Total Onbase VMT - Year 2002					**4,916,206**
Year 2015 434 ARW [a]					
Onbase Personnel	293	1.0	2.0	250	1,999,725
Reservists Near	719	1.0	2.0	24	714,371
Reservists Far	593	1.0	2.0	12	702,382
Contractors and Vendors	110	1.0	3.0	247	
Total Onbase VMT - Year 2015					**3,416,478**
Year 2019 MOB 3 [a]					
Onbase Personnel	450	1.0	2.0	250	3,071,250
Reservists Near	655	1.0	2.0	24	650,665
Reservists Far	540	1.0	2.0	12	639,746
Contractors and Vendors	125	1.0	3.0	247	
Total Onbase VMT - Year 2019					**4,361,661**

[a] Source: 2002 Grissom ARB AEI.

[b] Source: # of Workers from EIS Table 2-4.

Table D.1-27. Annual Average On-Road Vehicle Emission Factors for Off-Base POVs - Grissom ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.06	2.12	0.28	0.01	0.05	0.01	283	–	–	283
LDGV - 55 mph	0.04	1.78	0.27	0.00	0.02	0.01	222	–	–	222
LDGT1 - 25 mph	0.26	5.78	0.92	0.01	0.06	0.02	395	–	–	395
LDGT1 - 55 mph	0.11	4.77	0.94	0.01	0.02	0.01	321	–	–	321
Composite [c]	**0.08**	**3.03**	**0.52**	**0.01**	**0.03**	**0.01**	**275**	–	–	**275**
Year 2019										
LDGV - 25 mph	0.03	2.24	0.14	0.00	0.07	0.01	347	–	–	347
LDGV - 55 mph	0.02	1.95	0.14	0.00	0.02	0.01	272	–	–	272
LDGT1 - 25 mph	0.13	5.98	0.48	0.00	0.08	0.02	499	–	–	499
LDGT1 - 55 mph	0.06	5.34	0.50	0.00	0.03	0.01	405	–	–	405
Composite [c]	**0.04**	**3.31**	**0.27**	**0.00**	**0.04**	**0.01**	**342**	–	–	**342**

Table D.1-27. Annual Average On-Road Vehicle Emission Factors for Off-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.036	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.024	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.004	0.001	0.144	0.002	–	–	–	–	–	–
LDGT1 - 55 mph	0.002	0.000	0.061	0.001	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.047**	**0.001**	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.017	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.013	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.002	0.001	0.072	0.001	–	–	–	–	–	–
LDGT1 - 55 mph	0.001	0.000	0.034	0.000	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.025**	**0.000**	–	–	–	–	–	–

Table D.1-27. Annual Average On-Road Vehicle Emission Factors for Off-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGV - 55 mph	–	–	0.001	0.000	0.001	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.006	0.009	0.005	–	–	0.000	0.000	0.000	–
LDGT1 - 55 mph	–	–	0.002	0.004	0.002	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.002**	**0.002**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGV - 55 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
LDGT1 - 55 mph	–	–	0.001	0.002	0.001	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.1-27. Annual Average On-Road Vehicle Emission Factors for Off-Base POVs - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.007	–	0.001	–	–	0.006
LDGV - 55 mph	–	–	0.000	–	–	0.005	–	0.001	–	–	0.004
LDGT1 - 25 mph	–	–	0.000	–	–	0.004	–	0.010	–	–	0.021
LDGT1 - 55 mph	–	–	0.000	–	–	0.002	–	0.004	–	–	0.009
Composite [c]	–	–	**0.000**	–	–	**0.004**	–	**0.003**	–	–	**0.007**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGV - 55 mph	–	–	0.000	–	–	0.002	–	0.000	–	–	0.002
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
LDGT1 - 55 mph	–	–	0.000	–	–	0.001	–	0.002	–	–	0.005
Composite [c]	–	–	**0.000**	–	–	**0.002**	–	**0.001**	–	–	**0.004**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Miami County, IN.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 63/37% LDGV/LDGT1 and based on 2002 Grissom ARB AEI vehicle fleet mix.

Table D.1-28. Annual Emissions from Off-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 434 ARW [a]	0.31	11.42	1.95	0.02	0.11	0.04	1,036	–	–	1,036
Year 2019 MOB 3 [b]	0.21	15.91	1.30	0.01	0.18	0.05	1,645	–	–	1,645

Table D.1-28. Annual Emissions from Off-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 434 ARW [a]	0.004	0.001	0.179	0.002	–	–	–	–	–	–
Year 2019 MOB 3 [b]	0.002	0.001	0.120	0.001	–	–	–	–	–	–

Table D.1-28. Annual Emissions from Off-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
Year 2015 434 ARW [a]	–	–	0.007	0.008	0.005	–	–	0.000	0.001	0.000	–
Year 2019 MOB 3 [b]	–	–	0.005	0.005	0.004	–	–	0.000	0.000	0.000	–

Table D.1-28. Annual Emissions from Off-Base On-Road Vehicle Activities - Grissom ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 434 ARW [a]	–	–	0.000	–	–	0.016	–	0.011	–	–	0.027
Year 2019 MOB 3 [b]	–	–	0.000	–	–	0.010	–	0.007	–	–	0.018

[a] 2015 emissions = 2015 Total Off-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total Off-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.1-29. Annual Number of Workers at Grissom ARB - KC-46A MOB 3 Mission

Scenario	Number of LTOs
Year 2014 All Grissom ARB	3,403
Year 2015 434 ARW	1,100
Year 2019 MOB 3	1,219

Source: EIS Table 2-8 and 2-10.

Table D.1-30. Annual Emissions from Point and Area Sources - Grissom ARB KC-46A MOB 3 Mission

Scenario Year/ Source Type	Tons per Year									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2014 All Grissom ARB [a]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–
Above Ground Storage Tanks	0.46	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	0.35	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
External Combustion	0.01	0.18	0.21	0.00	0.02	0.02	–	–	–	–
Fire Training	0.04	0.02	0.09	0.00	0.02	0.02	–	–	–	–
Internal Combustion	0.08	0.22	1.03	0.07	0.07	0.07	–	–	–	–
Surface Coating	0.14	–	–	–	0.00	–	–	–	–	–
Underground Storage Tank	0.00	–	–	–	–	–	–	–	–	–
Welding/Soldering/Cutting	–	–	–	–	0.00	–	–	–	–	–
Total - Year 2014	**1.09**	**0.42**	**1.33**	**0.07**	**0.11**	**0.10**	–	–	–	–
2015 434 ARW [b]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–
Above Ground Storage Tanks	0.15	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	0.11	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
External Combustion	0.00	0.06	0.07	0.00	0.01	0.01	–	–	–	–
Fire Training	0.01	0.01	0.03	0.00	0.00	0.00	–	–	–	–
Internal Combustion	0.03	0.07	0.33	0.02	0.02	0.02	–	–	–	–
Surface Coating	0.05	–	–	–	0.00	–	–	–	–	–
Underground Storage Tank	–	–	–	–	–	–	–	–	–	–
Welding/Soldering/Cutting	–	–	–	–	0.00	–	–	–	–	–
Total - Year 2015	**0.35**	**0.14**	**0.43**	**0.02**	**0.04**	**0.03**	–	–	–	–
2019 MOB 3 Scenario [b]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–
Above Ground Storage Tanks	0.16	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	0.13	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
External Combustion	0.00	0.06	0.08	0.00	0.01	0.01	–	–	–	–
Fire Training	0.01	0.01	0.03	0.00	0.01	0.01	–	–	–	–
Internal Combustion	0.03	0.08	0.37	0.02	0.03	0.03	–	–	–	–
Surface Coating	0.05	–	–	–	0.00	–	–	–	–	–
Underground Storage Tank	–	–	–	–	–	–	–	–	–	–
Welding/Soldering/Cutting	–	–	–	–	0.00	–	–	–	–	–
Total - 2019 MOB 3 Scenario	**0.39**	**0.15**	**0.48**	**0.02**	**0.04**	**0.04**	–	–	–	–

[a] Source Grissom ARB 2015.

[b] 2014 emissions * future year LTOs/2014 LTOs.

– = Source does not emit particular pollutant

Table D.1-31. 2015 Existing Emissions for the KC-135 434 ARW at Grissom ARB - KC-46A MOB 3 Mission

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-135 Aircraft Operations	4.71	80.30	186.86	16.57	0.90	0.90	50,266	1.39	1.56	46,163
On-Wing Aircraft Engine Testing - KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,396	0.07	0.07	2,200
Aerospace Ground Support Equipment	0.07	0.39	0.42	0.00	0.06	0.06	71	0.01	0.00	65
GOVs/Nonroad Equipment	0.06	1.20	0.25	0.00	0.02	0.01	119	–	–	108
Privately-Owned Vehicles - On-Base	0.04	1.06	0.16	0.00	0.02	0.00	99	–	–	90
Privately-Owned Vehicles - Off-Base	0.31	11.42	1.95	0.02	0.11	0.04	1,036	–	–	942
Point and Area Sources	0.35	0.14	0.43	0.02	0.04	0.03	–	–	–	–
Total Emissions	**6.60**	**109.90**	**196.02**	**17.40**	**1.19**	**1.08**	**53,986**	**1.47**	**1.64**	**49,567**

Table D.1-31. 2015 Existing Emissions for the KC-135 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-135 Aircraft Operations	0.183	0.109	0.411	0.056	0.004	0.005	0.012	0.011	0.003	0.004
On-Wing Aircraft Engine Testing - KC-135	0.041	0.027	0.107	0.015	0.001	0.001	0.001	0.001	0.000	0.001
Aerospace Ground Support Equipment	0.008	0.001	0.010	0.000	–	–	–	–	–	–
GOVs/Nonroad Equipment	0.001	0.000	0.029	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.001	0.000	0.023	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.004	0.001	0.179	0.002	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.237**	**0.138**	**0.759**	**0.074**	**0.005**	**0.005**	**0.013**	**0.012**	**0.003**	**0.005**

Table D.1-31. 2015 Existing Emissions for the KC-135 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
KC-135 Aircraft Operations	0.004	0.026	0.065	1.788	–	–	0.196	–	–	0.157	0.191
On-Wing Aircraft Engine Testing - KC-135	0.000	0.003	0.018	0.417	–	–	0.016	–	–	0.043	0.022
Aerospace Ground Support Equipment	–	–	–	0.012	–	–	–	–	–	0.001	–
GOVs/Nonroad Equipment	–	–	0.001	0.001	0.001	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.001	0.001	0.001	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.007	0.008	0.005	–	–	0.000	0.001	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.005**	**0.029**	**0.092**	**2.228**	**0.007**		**0.212**	**0.000**	**0.001**	**0.202**	**0.213**

Table D.1-31. 2015 Existing Emissions for the KC-135 434 ARW at Grissom ARB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135 Aircraft Operations	0.1189	0.001	0.084	0.005	0.007	0.195	0.004	–	0.021	0.129	0.054
On-Wing Aircraft Engine Testing - KC-135	0.0193	0.000	0.023	0.001	0.001	0.051	0.001	–	0.005	0.034	0.014
Aerospace Ground Support Equipment	–	0.000	–	–	–	0.004	–	–	–	–	0.003
GOVs/Nonroad Equipment	–	–	0.000	–	–	0.002	–	0.002	–	–	0.004
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.002	–	0.001	–	–	0.003
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.016	–	0.011	–	–	0.027
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.1382**	**0.002**	**0.107**	**0.006**	**0.008**	**0.270**	**0.005**	**0.014**	**0.026**	**0.163**	**0.106**

– = Source does not emit particular pollutant

Table D.1-32. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Grissom ARB - 2019

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A Aircraft Operations	21.41	84.06	299.96	16.55	1.08	0.92	49,789	1.38	1.55	45,725
On-Wing Aircraft Engine Testing - KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,899	0.14	0.15	4,500
Aerospace Ground Support Equipment - KC-46A	0.05	0.30	0.31	0.00	0.04	0.04	79	0.01	0.00	72
Government-Owned Vehicles	0.03	1.29	0.16	0.00	0.03	0.01	153	–	–	139
Privately-Owned Vehicles - On-Base	0.03	1.45	0.11	0.00	0.03	0.01	161	–	–	146
Privately-Owned Vehicles - Off-Base	0.21	15.91	1.30	0.01	0.18	0.05	1,645	–	–	1,495
Point and Area Sources	0.39	0.15	0.48	0.02	0.04	0.04		–	–	–
Total Proposed Emissions - 2019	**33.69**	**142.86**	**321.04**	**18.27**	**1.55**	**1.21**	**56,726**	**1.53**	**1.70**	**52,077**
Year 2015 Base Case Emissions	**(6.60)**	**(109.90)**	**(196.02)**	**(17.40)**	**(1.19)**	**(1.08)**	**(53,986)**	**(1.47)**	**(1.64)**	**(49,567)**
Proposed minus Base Case Emissions	**27.09**	**32.96**	**125.02**	**0.86**	**0.36**	**0.13**	**2,740**	**0.06**	**0.06**	**2,510**
Miami/Cass County PSD Thresholds	**250**	**250**	**250**	**250**	**250**	**250**	–	–	–	–

Table D.1-32. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Grissom ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-46A Aircraft Operations	0.803	0.521	2.098	0.300	0.020	0.018	0.039	0.036	0.010	0.019
On-Wing Aircraft Engine Testing - KC-46A	0.445	0.294	1.182	0.171	0.009	0.008	0.015	0.014	0.002	0.010
Aerospace Ground Support Equipment - KC-46A	0.006	0.001	0.008	0.000	–	–	–	–	–	–
Government-Owned Vehicles	0.000	0.000	0.016	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.000	0.000	0.015	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.002	0.001	0.120	0.001	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**1.257**	**0.817**	**3.438**	**0.473**	**0.029**	**0.026**	**0.054**	**0.050**	**0.012**	**0.030**
Year 2015 Base Case Emissions	**(0.237)**	**(0.138)**	**(0.759)**	**(0.074)**	**(0.005)**	**(0.005)**	**(0.013)**	**(0.012)**	**(0.003)**	**(0.005)**
Proposed minus Base Case Emissions	**1.021**	**0.680**	**2.679**	**0.399**	**0.024**	**0.021**	**0.041**	**0.038**	**0.009**	**0.025**

Table D.1-32. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Grissom ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methyleth ylbenzene	Naphth-alene	Phenol
KC-46A Aircraft Operations	0.012	0.088	0.342	8.249	–	–	0.547	–	–	0.836	0.432
On-Wing Aircraft Engine Testing - KC-46A	0.005	0.034	0.194	4.570	–	–	0.152	–	–	0.475	0.239
Aerospace Ground Support Equipment - KC-46A	–	–	–	0.010	–	–	–	–	–	0.000	–
Government-Owned Vehicles	–	–	0.001	0.001	0.000	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.001	0.001	0.000	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.005	0.005	0.004	–	–	0.000	0.000	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.017**	**0.122**	**0.542**	**12.836**	**0.004**	–	**0.699**	**0.000**	–	**1.311**	**0.671**
Year 2015 Base Case Emissions	**(0.005)**	**(0.029)**	**(0.092)**	**(2.228)**	**(0.007)**	–	**(0.212)**	**(0.000)**	–	**(0.202)**	**(0.213)**
Proposed minus Base Case Emissions	**0.012**	**0.093**	**0.450**	**10.608**	**(0.002)**	–	**0.486**	**(0.000)**	–	**1.110**	**0.459**

Table D.1-32. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Grissom ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A Aircraft Operations	0.4552	0.008	0.442	0.020	0.026	1.005	0.017	–	0.097	0.661	0.282
On-Wing Aircraft Engine Testing - KC-46A	0.2034	0.005	0.252	0.010	0.012	0.564	0.008	–	0.050	0.370	0.159
Aerospace Ground Support Equipment - KC-46A	–	0.000	–	–	–	0.003	–	–	–	–	0.002
Government-Owned Vehicles	–	–	0.000	–	–	0.001	–	0.001	–	–	0.002
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.001	–	0.001	–	–	0.002
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.010	–	0.007	–	–	0.018
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.6586**	**0.013**	**0.694**	**0.031**	**0.038**	**1.585**	**0.025**	–	**0.147**	**1.030**	**0.466**
Year 2015 Base Case Emissions	**(0.1382)**	**(0.002)**	**(0.107)**	**(0.006)**	**(0.008)**	**(0.270)**	**(0.005)**	–	**(0.026)**	**(0.163)**	**(0.106)**
Proposed minus Base Case Emissions	**0.5203**	**0.011**	**0.587**	**0.025**	**0.030**	**1.315**	**0.020**	–	**0.121**	**0.867**	**0.360**

– = Source does not emit particular pollutant

D.2 SEYMOUR JOHNSON AIR FORCE BASE REGIONAL CLIMATE

Seymour Johnson Air Force Base (AFB) has a temperate continental climate, characterized by hot and humid summers and mild winters. Meteorological data collected at Goldsboro, North Carolina, are used to describe the climate of the Seymour Johnson AFB project region (State Climate Office of North Carolina 2016).

Temperature. The average high and low temperatures during the summer months at Seymour Johnson AFB range from approximately 91 °F to 64 °F. The average high and low temperatures during the winter months range from 66 °F to 33 °F.

Precipitation. The average annual precipitation at Seymour Johnson AFB is 49.8 inches. Precipitation is greatest during the summer months, and the peak monthly average of 5.7 inches occurs in August. Tropical storms can produce substantial amounts of precipitation during late summer. Precipitation is at a minimum during the fall, with the lowest monthly average of 3.1 inches occurring in October.

Prevailing Winds. The winds at Seymour Johnson AFB prevail from the southwest quadrant with a secondary peak from the northeast quadrant. The annual average wind speed at Seymour Johnson AFB is 6.5 miles per hour. The windiest time of year occurs during the months of February through April, with the average wind speed approximately 7 miles per hour for each month (NOAA 1998).

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D.2.1 OPERATIONS EMISSION CALCULATIONS FOR THE KC-46A MOB 3 MISSION AT SEYMOUR JOHNSON AFB

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Table D.2-1. Annual Aircraft Operations at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Year/Aircraft	Number of Operations				
	LTO	TGO	LFB	LFP	Total
Year 2014 [a]					
F-15	11,669	–	–	–	**11,669**
KC-135R	1,100	–	–	–	**1,100**
Transient	–	–	–	–	–
Totals	**12,769**	–	–	–	**12,769**
Year 2015 [b]					
F-15	18,000	–	–	19,800	**37,800**
KC-135R	756	–	–	1,056	**1,812**
Transient	471	–	–	–	**471**
Totals	**19,227**	–	–	**20,856**	**40,083**

[a] Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx 'AOPS'.

[b] EIS Table 2-9.

Table D.2-2. 2015 KC-135 Closed Pattern Operations for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft Type/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		55%	60%	Climbout	Takeoff	55%	60%	Climbout	Takeoff
KC-135									
Closed Pattern - Radar & Initial to Overhead	482	12.0	2.0	–	1.0	96	16	–	8
Closed Pattern - VFR	328	5.0	2.0	–	1.0	27	11	–	5
Closed Pattern - Tactical	246	8.0	2.0	2.0	1.0	33	8	8	4
Total TIMs - Hours						**157**	**35**	**8**	**18**

[a] Distribution of operations based on assumptions obtained during site survey 2 December 2015.

Table D.2-3. 2015 KC-135 Aircraft Emissions for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Operation/Source	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
LTOs										
KC-135 Aircraft Operations	2.62	38.80	14.25	2.06	0.12	0.12	6,241	0.17	0.19	6,304
Subtotal - LTOs	**2.62**	**38.80**	**14.25**	**2.06**	**0.12**	**0.12**	**6,241**	**0.17**	**0.19**	**6,304**
Closed Patterns										
KC-135 - 55%	0.10	3.13	15.79	1.42	0.07	0.07	4,322	0.12	0.13	4,367
KC-135 - 60%	0.02	0.64	4.08	0.35	0.02	0.02	1,055	0.03	0.03	1,065
KC-135 - Climbout	0.01	0.01	1.70	0.11	0.01	0.01	342	0.01	0.01	345
KC-135 - Take-off	0.01	0.02	5.08	0.29	0.02	0.02	883	0.02	0.03	892
Subtotal - Closed Patterns	**0.15**	**3.81**	**26.65**	**2.18**	**0.12**	**0.12**	**6,602**	**0.18**	**0.21**	**6,669**
Total KC-135 Aircraft Operations	**2.76**	**42.61**	**40.90**	**4.23**	**0.23**	**0.23**	**12,843**	**0.36**	**0.40**	**12,974**

Table D.2-3. 2015 KC-135 Aircraft Emissions for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butad-iene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
LTOs										
KC-135 Aircraft Operations	0.101	0.066	0.264	0.038	0.002	0.002	0.004	0.003	0.001	0.002
Subtotal - LTOs	**0.101**	**0.066**	**0.264**	**0.038**	**0.002**	**0.002**	**0.004**	**0.003**	**0.001**	**0.002**
Closed Patterns										
KC-135 - 55%	0.004	0.002	0.003	0.000	0.000	0.000	0.001	0.001	0.000	0.000
KC-135 - 60%	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KC-135 - Climbout	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KC-135 - Take-off	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal - Closed Patterns	**0.006**	**0.002**	**0.004**	**0.000**	**0.000**	**0.000**	**0.001**	**0.001**	**0.000**	**0.000**
Total KC-135 Aircraft Operations	**0.107**	**0.068**	**0.268**	**0.038**	**0.002**	**0.002**	**0.005**	**0.004**	**0.001**	**0.002**

Table D.2-3. 2015 KC-135 Aircraft Emissions for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons										
	2,4-Dinitro-phenol	**Di(2-Ethylhexyl) Phthalate (DEHP)**	**Ethyl-benzene**	**Formalde-hyde**	**Hexane**	**Methanol**	**Methylene Chloride**	**Methyl tert-Butyl Ether (MTBE)**	**Methylethyl benzene**	**Naphth-alene**	**Phenol**
LTOs											
KC-135 Aircraft Operations	0.001	0.008	0.043	1.031	–	–	0.039	–	–	0.106	0.059
Subtotal - LTOs	**0.001**	**0.008**	**0.043**	**1.031**	–	–	0.039	–	–	**0.106**	**0.059**
Closed Patterns											
KC-135 - 55%	0.000	0.001	0.000	0.035	–	–	0.013	–	–	0.000	0.014
KC-135 - 60%	0.000	0.000	0.000	0.008	–	–	0.003	–	–	0.000	0.003
KC-135 - Climbout	0.000	0.000	0.000	0.001	–	–	0.001	–	–	0.000	0.000
KC-135 - Take-off	–	0.000	0.000	0.001	–	–	0.004	–	–	0.000	0.000
Subtotal - Closed Patterns	**0.000**	**0.002**	**0.000**	**0.046**	–	–	**0.022**	–	–	**0.001**	**0.017**
Total KC-135 Aircraft Operations	**0.002**	**0.010**	**0.044**	**1.077**	–	–	**0.062**	–	–	**0.106**	**0.076**

Table D.2-3. 2015 KC-135 Aircraft Emissions for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
LTOs											
KC-135 Aircraft Operations	0.047	0.001	0.056	0.002	0.003	0.126	0.002	–	0.011	0.083	0.036
Subtotal - LTOs	**0.047**	**0.001**	**0.056**	**0.002**	**0.003**	**0.126**	**0.002**	–	**0.011**	**0.083**	**0.036**
Closed Patterns											
KC-135 - 55%	0.004	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
KC-135 - 60%	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
KC-135 - Climbout	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
KC-135 - Take-off	0.002	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Subtotal - Closed Patterns	**0.008**	–	**0.000**	**0.000**	**0.000**	**0.002**	**0.000**	–	**0.001**	**0.001**	**0.000**
Total KC-135 Aircraft Operations	**0.055**	**0.001**	**0.056**	**0.003**	**0.003**	**0.128**	**0.002**	–	**0.012**	**0.084**	**0.036**

Table D.2-4. 2015 KC-135 On-Wing Engine Testing Activity Data for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-135 [a]							
60-HR INSPECTION	35	4	15	35.2	–	–	–
120-HR INSPECTION	35	4	15	35.2	–	–	–
Idle runs for maintenance	69	1	15	17.3	–	–	–
Idle runs for maintenance	55	2	15	27.7	–	–	–
Idle runs for maintenance	14	4	15	13.9	–	–	–
141 ARW EXPO SORTIE PREFLIGHT	237	4	10	158.1	–	–	–
141 ARW EXPO SORTIE POST-FLIGHT	237	4	6	94.8	–	–	–
DEFUELING	14	1	60	13.9	–	–	–
PREFLIGHT	548	4	10	365.2	–	–	–
P0STFLIGHT	548	2	5	91.3	–	–	–
HIGH POWER ENGINE RUNS	43	2	90	128.0	–	–	–
HIGH POWER ENGINE RUNS	43	2	15	–	21.3	–	–
HIGH POWER ENGINE RUNS	43	2	30	–	–	42.7	–
HIGH POWER ENGINE RUNS	43	2	15	–	–	–	21.3
Total TIMs - KC-135				**981**	**21**	**43**	**21**

[a] Fairchild baseline BaseOps-Aircraft Maintenance - Noise.pdf, then factored these data by 30 KC-135s stationed at FAFB by the 16 KC-135s at Seymour Johnson AFB.

Table D.2-5. 2015 Emissions from On-Wing Engine Testing for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-135										
Idle	1.05	15.26	1.99	0.53	0.03	0.03	1,598	0.044	0.050	1,615
Approach	0.00	0.11	0.22	0.03	0.00	0.00	84	0.002	0.003	85
Intermediate	0.01	0.01	2.21	0.15	0.01	0.01	445	0.012	0.014	450
Military	0.00	0.01	1.54	0.09	0.01	0.01	268	0.007	0.008	270
Total Emissions - 2015	**1.06**	**15.39**	**5.96**	**0.79**	**0.04**	**0.04**	**2,396**	**0.07**	**0.07**	**2,420**

Table D.2-5. 2015 Emissions from On-Wing Engine Testing for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons									
	Acetaldehyde	**Acrolein**	**Benzene**	**1,3-Butadiene**	**Carbon Disulfide**	**Carbon Tetrachloride**	**Chloroform**	**Chloromethane**	**Dibutyl Phthalate**	**1,2-Dichloropropane**
KC-135										
Idle	0.040	0.027	0.107	0.015	0.001	0.001	0.001	0.001	0.000	0.001
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Total Emissions - 2015	**0.041**	**0.027**	**0.107**	**0.015**	**0.001**	**0.001**	**0.001**	**0.001**	**0.000**	**0.001**

Table D.2-5. 2015 Emissions from On-Wing Engine Testing for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitrophenol	DEHP	Ethylbenzene	Formaldehyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphthalene	Phenol
KC-135											
Idle	0.000	0.003	0.018	0.414	–	–	0.013	–	–	0.043	0.022
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.000
Intermediate	0.000	0.000	0.000	0.002	–	–	0.002	–	–	0.000	0.000
Military	–	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Total Emissions - 2015	**0.000**	**0.003**	**0.018**	**0.417**	–	–	**0.016**	–	–	**0.043**	**0.022**

Table D.2-5. 2015 Emissions from On-Wing Engine Testing for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135											
Idle	0.018	0.000	0.023	0.001	0.001	0.051	0.001	–	0.004	0.033	0.014
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Total Emissions - 2015	**0.019**	**0.000**	**0.023**	**0.001**	**0.001**	**0.051**	**0.001**	–	**0.005**	**0.034**	**0.014**

– = Source does not emit particular pollutant

Table D.2-6. 2014 AGE Usages for the KC-135R Detachment at Seymour Johnson AFB

Source	Fuel Type	Hp	Load Factor	Hours/Year	Annual Hp-Hours
Air Compressor - MC-2A	JP-8	10.5	0.48	60	302
Floodlight (FL-1D & NF2D & lightcart)	JP-8	10.5	0.74	100	777
Next Generation Heater (NGH)	JP-8	7.0	0.95	50	333
Subtotal - 7-11 Hp					**1,412**
Jacking Manifold	JP-8	30.0	0.51	100	1,530
Subtotal - 26-40 Hp					**1,530**
Air Compressor - MC20	JP-8	50.0	1.00	120	6,000
Nitrogen Servicing Cart	JP-8	49.0	0.51	200	4,998
Subtotal - 41-50 Hp					**10,998**
Air Compressor - MC-7	JP-8	52.0	0.48	150	3,744
Generator Set - A/M32A-86D	JP-8	96.5	0.95	750	68,742
Subtotal - 76-100 Hp					**72,486**
Air Conditioners - MA-3D	JP-8	120.0	0.28	150	5,040
Hyd Test Stand - MJ-2	JP-8	125.0	0.51	75	4,781
Start Cart - A/M32A-95	JP-8	155.0	0.95	40	5,890
Subtotal - 101-175 Hp					**15,711**

Note: These data used as surrogates for AGE usages for KC-135 and KC-46A aircraft at all proposed basing locations.
Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx 'GSE', but some Hp ratings obtained from 5-2014 Seymour Johnson AFB Mobile AEI Process Calc Summary.pdf

Table D.2-7. Nonroad Diesel Equipment Emission Factors for 2015 - Seymour Johnson AFB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
Nonroad Equipment - 7-11 Hp	0.72	4.67	4.72	0.00	0.46	0.45	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.49	2.16	4.29	0.00	0.35	0.34	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.41	1.80	4.20	0.00	0.29	0.28	627	0.094	0.007	631
Nonroad Equipment - 76-100 Hp	0.69	4.23	3.82	0.00	0.61	0.59	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.32	1.24	2.67	0.00	0.27	0.26	565	0.094	0.007	569

Table D.2-7. Nonroad Diesel Equipment Emission Factors for 2015 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
Nonroad Equipment - 7-11 Hp	0.086	0.010	0.105	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.059	0.007	0.072	0.003	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.049	0.006	0.059	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.082	0.010	0.100	0.004	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.039	0.005	0.047	0.002	–	–	–	–	–	–

Table D.2-7. Nonroad Diesel Equipment Emission Factors for 2015 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
Nonroad Equipment - 7-11 Hp	–	–	–	0.132	–	–	–	–	–	0.009	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.091	–	–	–	–	–	0.006	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.075	–	–	–	–	–	0.005	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.126	–	–	–	–	–	0.009	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.059	–	–	–	–	–	0.004	–

Table D.2-7. Nonroad Diesel Equipment Emission Factors for 2015 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
Nonroad Equipment - 7-11 Hp	–	0.001	–	–	–	0.046	–	–	–	–	0.032
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.026	–	–	–	–	0.018
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.044	–	–	–	–	0.030
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.021	–	–	–	–	0.014

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Wayne County, NC.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.2-8. 2015 Emissions from AGE Usages for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.00	0.01	0.00	0.00	0.00	0.63	0.00	0.00	0.64
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.74
Nonroad Equipment - 41-50 Hp	0.00	0.02	0.04	0.00	0.00	0.00	5.23	0.00	0.00	5.26
Nonroad Equipment - 76-100 Hp	0.04	0.23	0.21	0.00	0.03	0.03	35.34	0.01	0.00	35.56
Nonroad Equipment - 101-175 Hp	0.00	0.01	0.03	0.00	0.00	0.00	6.73	0.00	0.00	6.78
Total - Year 2015	**0.05**	**0.27**	**0.29**	**0.00**	**0.04**	**0.04**	**48.66**	**0.01**	**0.00**	**48.98**

Table D.2-8. 2015 Emissions from AGE Usages for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.004	0.001	0.005	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.000	0.000	0.001	0.000	–	–	–	–	–	–
Total - Year 2015	**0.006**	**0.001**	**0.007**	**0.000**	–	–	–	–	–	–

Table D.2-8. 2015 Emissions from AGE Usages for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.007	–	–	–	–	–	0.000	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2015	–	–	–	**0.008**	–	–	–	–	–	**0.001**	–

Table D.2-8. 2015 Emissions from AGE Usages for the 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.002	–	–	–	–	0.002
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2015	–	**0.000**	–	–	–	**0.003**	–	–	–	–	**0.002**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2015 Seymour Johnson AFB KC-135 LTOs [756] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2015 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.2-9. KC-46A Aircraft Operations at Seymour Johnson AFB - KC-46A MOB 3 Mission

Scenario/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		Idle	Approach	Climbout	Takeoff	Idle	Approach	Climbout	Takeoff
Landings and Take-offs									
Landings and Take-offs	1,270	47.7	5.2	1.6	0.7	1,010	110	34	15
Scenario/Operation	**Operations/ Year [b]**	**Engine Setting/Time in Mode per Operation (Minutes)**				**Engine Setting Annual Hours**			
		55%	**60%**	**Climbout**	**Takeoff**	**55%**	**60%**	**Climbout**	**Takeoff**
Closed Patterns									
Closed Pattern - Radar & Initial to Overhead	811	12.0	2.0	–	1.0	162	27	–	14
Closed Pattern - VFR	551	5.0	2.0	–	1.0	46	18	–	9
Closed Pattern - Tactical	413	8.0	2.0	2.0	1.0	55	14	14	7
Total TIMs - KC-46A MOB 3						**263**	**59**	**14**	**30**

[a] EIS Table 2-10.

[b] EIS Table 2-10 and KC-46 MOB CP Ops Data for Emissions.xlsx. Closed Pattern - Tactical ops reduced by 7.5% to reflect amount of time above 3,000' AGL.

Table D.2-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Seymour Johnson AFB - MOB 3 Mission 2019

Operation/Engine Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Landings and Take-offs										
Idle	20.97	71.55	6.35	1.78	0.18	0.17	5,400	0.15	0.17	5,456
Approach	0.06	1.21	7.64	0.67	0.03	0.03	2,019	0.06	0.06	2,039
Climbout	0.05	0.29	14.84	0.61	0.04	0.03	1,837	0.05	0.06	1,856
Take-off	0.03	0.20	11.01	0.34	0.03	0.02	1,030	0.03	0.03	1,041
APU	0.06	0.45	9.03	0.76	0.06	0.06	1,845	0.05	0.06	1,864
Subtotal LTOs	**21.17**	**73.69**	**48.87**	**4.15**	**0.34**	**0.31**	**12,132**	**0.34**	**0.38**	**12,256**
Closed Patterns										
55%	0.26	3.63	52.30	3.01	0.17	0.14	9,118	0.25	0.28	9,211
60%	0.06	0.80	13.74	0.74	0.04	0.04	2,243	0.06	0.07	2,266
Climbout	0.02	0.12	6.03	0.25	0.02	0.01	747	0.02	0.02	754
Take-off	0.06	0.39	21.97	0.68	0.05	0.04	2,056	0.06	0.06	2,077
Subtotal Closed Patterns	**0.40**	**4.94**	**94.04**	**4.67**	**0.28**	**0.23**	**14,163**	**0.39**	**0.44**	**14,308**
Total MOB 3 Operations	**21.58**	**78.63**	**142.91**	**8.81**	**0.62**	**0.54**	**26,295**	**0.73**	**0.82**	**26,564**

Table D.2-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Seymour Johnson AFB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Landings and Take-offs										
Idle	0.807	0.535	2.148	0.310	0.017	0.015	0.027	0.025	0.004	0.019
Approach	0.004	0.001	0.002	–	0.000	0.000	0.000	0.000	0.000	0.000
Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Take-off	0.001	0.000	0.001	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.002	0.002	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal LTOs	**0.815**	**0.538**	**2.158**	**0.311**	**0.017**	**0.015**	**0.028**	**0.026**	**0.005**	**0.019**
Closed Patterns										
55%	0.005	0.001	0.007	0.000	0.001	0.001	0.003	0.002	0.001	0.000
60%	0.001	0.000	0.002	0.000	0.000	0.000	0.001	0.001	0.000	0.000
Climbout	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.001	0.000	0.001	–	0.000	0.000	0.000	0.001	0.000	0.000
Subtotal Closed Patterns	**0.008**	**0.002**	**0.010**	**0.001**	**0.001**	**0.001**	**0.004**	**0.004**	**0.002**	**0.000**
Total MOB 3 Operations	**0.823**	**0.540**	**2.168**	**0.312**	**0.018**	**0.016**	**0.033**	**0.030**	**0.007**	**0.019**

Table D.2-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Seymour Johnson AFB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Landings and Take-offs											
Idle	0.008	0.061	0.352	8.301	–	–	0.258	–	–	0.864	0.434
Approach	0.000	0.001	0.000	0.027	–	–	0.005	–	–	0.000	0.013
Climbout	0.000	0.001	0.000	0.010	–	–	0.011	–	–	0.000	0.000
Take-off	–	0.001	0.000	0.003	–	–	0.010	–	–	0.000	0.000
APU	0.000	0.000	0.001	0.023	–	–	0.001	–	–	0.002	0.001
Subtotal LTOs	**0.009**	**0.063**	**0.354**	**8.364**	–	–	**0.284**	–	–	**0.867**	**0.449**
Closed Patterns											
55%	0.001	0.007	0.001	0.058	–	–	0.063	–	–	0.001	0.000
60%	0.000	0.002	0.000	0.014	–	–	0.015	–	–	0.000	0.000
Climbout	0.000	0.000	0.000	0.004	–	–	0.004	–	–	0.000	0.000
Take-off	–	0.001	0.000	0.006	–	–	0.020	–	–	0.000	0.000
Subtotal Closed Patterns	**0.001**	**0.010**	**0.001**	**0.082**	–	–	**0.102**	–	–	**0.001**	**0.000**
Total MOB 3 Operations	**0.010**	**0.073**	**0.355**	**8.446**	–	–	**0.386**	–	–	**0.868**	**0.449**

Table D.2-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Seymour Johnson AFB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Landings and Take-offs											
Idle	0.361	0.008	0.457	0.019	0.021	1.026	0.015	–	0.090	0.671	0.289
Approach	0.002	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Climbout	0.003	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Take-off	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.001	0.000	0.001	0.000	0.000	0.003	0.000	–	0.000	0.002	0.001
Subtotal LTOs	**0.372**	**0.008**	**0.459**	**0.019**	**0.022**	**1.030**	**0.015**	**–**	**0.091**	**0.674**	**0.291**
Closed Patterns											
55%	0.020	–	0.001	0.001	0.001	0.004	0.001	–	0.002	0.003	0.001
60%	0.005	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Climbout	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Take-off	0.010	–	0.000	0.000	0.000	0.001	0.000	–	0.001	0.001	0.000
Subtotal Closed Patterns	**0.036**	**–**	**0.001**	**0.001**	**0.002**	**0.006**	**0.001**	**–**	**0.003**	**0.005**	**0.001**
Total MOB 3 Operations	**0.408**	**0.008**	**0.460**	**0.020**	**0.023**	**1.036**	**0.016**	**–**	**0.095**	**0.679**	**0.292**

– = Source does not emit particular pollutant

Table D.2-11. KC-46A Aircraft On-Wing Engine Testing Activity Data for Seymour Johnson AB - KC-46A MOB 3 Mission

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-46A - MOB 3[a]							
Leak Checks/Troubleshooting	208	2	45	312.0	–	–	–
Fuel Transfer	69	1	80	92.4	–	–	–
Troubleshooting - High Power	35	1	40	11.6	2.9	2.9	5.8
Troubleshooting - High Power	35	2	15	17.3	–	–	–
Engine Trims	4	1	40	1.3	0.3	0.3	0.7
Engine Trims	4	2	10	1.3	–	–	–
ISO Runs	12	2	35	14.0	–	–	–
Backline Runs	12	2	69	465.8	6.9	–	10.4
Post ISO Runs	12	2	55	192.5	–	–	11.0
Total TIMs - KC-46A MOB 3				**1,108**	**10**	**3**	**28**

[a] Altus FTU BaseOps-Aircraft Maintenance-Noise.pdf (April 16, 2013).

Note: The APU operates for the same amount of time as the main engines during testing activities.

Table D.2-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Seymour Johnson AFB - KC-46A MOB 3 Mission

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A - MOB 3										
Idle	11.51	39.27	3.48	0.98	0.10	0.09	2,964	0.08	0.09	2,994
Approach	0.00	0.06	0.35	0.03	0.00	0.00	93	0.00	0.00	94
Intermediate	0.00	0.01	0.71	0.03	0.00	0.00	87	0.00	0.00	88
Military	0.03	0.18	10.32	0.32	0.02	0.02	966	0.03	0.03	976
APU	0.03	0.19	3.86	0.32	0.03	0.02	789	0.02	0.02	797
Total KC-46A MOB 3	**11.57**	**39.71**	**18.73**	**1.68**	**0.16**	**0.14**	**4,899**	**0.14**	**0.15**	**4,950**

Table D.2-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Seymour Johnson AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-46A - MOB 3										
Idle	0.443	0.294	1.179	0.170	0.009	0.008	0.015	0.014	0.002	0.010
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.001	0.000	0.000	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total KC-46A MOB 3	**0.445**	**0.294**	**1.182**	**0.171**	**0.009**	**0.008**	**0.015**	**0.014**	**0.002**	**0.010**

Table D.2-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Seymour Johnson AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-46A - MOB 3											
Idle	0.005	0.033	0.193	4.556	–	–	0.142	–	–	0.474	0.238
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.001
Intermediate	0.000	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Military	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.000	0.010	–	–	0.000	–	–	0.001	0.001
Total KC-46A MOB 3	**0.005**	**0.034**	**0.194**	**4.570**	–	–	**0.152**	–	–	**0.475**	**0.239**

Table D.2-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Seymour Johnson AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A - MOB 3											
Idle	0.198	0.005	0.251	0.010	0.012	0.563	0.008	–	0.049	0.368	0.159
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.000	0.000	0.001	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Total KC-46A MOB 3	**0.203**	**0.005**	**0.252**	**0.010**	**0.012**	**0.564**	**0.008**	–	**0.050**	**0.370**	**0.159**

– = Source does not emit particular pollutant

Table D.2-13. KC-46A Aircraft Closed Pattern Operations at Kinston Regional Jetport - KC-46A MOB 3 Mission

Scenario/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		55%	60%	Climbout	Takeoff	55%	60%	Climbout	Takeoff
Closed Patterns									
Closed Pattern - Radar & Initial to Overhead	811	12.0	2.0	–	1.0	162	27	–	14
Closed Pattern - VFR	551	5.0	2.0	–	1.0	46	18	–	9
Closed Pattern - Tactical	413	8.0	2.0	2.0	1.0	55	14	14	7
Total TIMs - KC-46A MOB 3						**263**	**59**	**14**	**30**

[a] EIS Page 2-21 and KC-46 MOB CP Ops Data for Emissions.xlsx. Closed Pattern - Tactical ops reduced by 7.5% to reflect amount of time above 3,000' AGL.

Table D.2-14. Annual Air Emissions from KC-46A Aircraft Closed Pattern Operations at Kinston Regional Jetport - KC-46A MOB 3 Mission

Operation/Engine Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Closed Patterns										
55%	0.26	3.63	52.30	3.01	0.17	0.14	9,118	0.25	0.28	9,211
60%	0.06	0.80	13.74	0.74	0.04	0.04	2,243	0.06	0.07	2,266
Climbout	0.02	0.12	6.03	0.25	0.02	0.01	747	0.02	0.02	754
Take-off	0.06	0.39	21.97	0.68	0.05	0.04	2,056	0.06	0.06	2,077
Subtotal Closed Patterns	**0.40**	**4.94**	**94.04**	**4.67**	**0.28**	**0.23**	**14,163**	**0.39**	**0.44**	**14,308**

Table D.2-14. Annual Air Emissions from KC-46A Aircraft Closed Pattern Operations at Kinston Regional Jetport - KC-46A MOB 3 Mission (Continued)

Operation/Engine Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Closed Patterns										
55%	0.005	0.001	0.007	0.000	0.001	0.001	0.003	0.002	0.001	0.000
60%	0.001	0.000	0.002	0.000	0.000	0.000	0.001	0.001	0.000	0.000
Climbout	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.001	0.000	0.001	–	0.000	0.000	0.000	0.001	0.000	0.000
Subtotal Closed Patterns	**0.008**	**0.002**	**0.010**	**0.001**	**0.001**	**0.001**	**0.004**	**0.004**	**0.002**	**0.000**

Table D.2-14. Annual Air Emissions from KC-46A Aircraft Closed Pattern Operations at Kinston Regional Jetport - KC-46A MOB 3 Mission (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	**DEHP**	**Ethyl-benzene**	**Formalde-hyde**	**Hexane**	**Methanol**	**Methylene Chloride**	**MTBE**	**Methylethyl benzene**	**Naphth-alene**	**Phenol**
Closed Patterns											
55%	0.001	0.007	0.001	0.058	–	–	0.063	–	–	0.001	0.000
60%	0.000	0.002	0.000	0.014	–	–	0.015	–	–	0.000	0.000
Climbout	0.000	0.000	0.000	0.004	–	–	0.004	–	–	0.000	0.000
Take-off	–	0.001	0.000	0.006	–	–	0.020	–	–	0.000	0.000
Subtotal Closed Patterns	**0.001**	**0.010**	**0.001**	**0.082**	–	–	**0.102**	–	–	**0.001**	**0.000**

Table D.2-14. Annual Air Emissions from KC-46A Aircraft Closed Pattern Operations at Kinston Regional Jetport - KC-46A MOB 3 Mission (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Closed Patterns											
55%	0.020	–	0.001	0.001	0.001	0.004	0.001	–	0.002	0.003	0.001
60%	0.005	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Climbout	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Take-off	0.010	–	0.000	0.000	0.000	0.001	0.000	–	0.001	0.001	0.000
Subtotal Closed Patterns	**0.036**	–	**0.001**	**0.001**	**0.002**	**0.006**	**0.001**	–	**0.003**	**0.005**	**0.001**

Table D.2-15. Nonroad Diesel Equipment Emission Factors for 2019 - Seymour Johnson AFB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019										
Nonroad Equipment - 7-11 Hp	0.67	4.56	4.48	0.00	0.40	0.39	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.30	1.17	3.60	0.00	0.18	0.18	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.25	0.91	3.49	0.00	0.14	0.13	628	0.094	0.007	632
Nonroad Equipment - 76-100 Hp	0.49	2.94	2.52	0.00	0.40	0.39	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.25	0.70	1.48	0.00	0.15	0.14	566	0.094	0.007	570

Table D.2-15. Nonroad Diesel Equipment Emission Factors for 2019 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019										
Nonroad Equipment - 7-11 Hp	0.079	0.010	0.097	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.036	0.004	0.043	0.002	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.030	0.004	0.037	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.058	0.007	0.071	0.003	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.030	0.004	0.036	0.002	–	–	–	–	–	–

Table D.2-15. Nonroad Diesel Equipment Emission Factors for 2019 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019											
Nonroad Equipment - 7-11 Hp	–	–	–	0.122	–	–	–	–	–	0.001	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.055	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.090	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–

Table D.2-15. Nonroad Diesel Equipment Emission Factors for 2019 - Seymour Johnson AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.042	–	–	–	–	0.030
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.019	–	–	–	–	0.013
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Wayne County, NC.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.2-16. Annual Air Emissions for AGE Usages - Seymour Johnson AFB KC-46A MOB 3 Mission

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.01	0.01	0.00	0.00	0.00	0.73	0.00	0.00	0.74
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.85
Nonroad Equipment - 41-50 Hp	0.00	0.01	0.03	0.00	0.00	0.00	6.04	0.00	0.00	6.08
Nonroad Equipment - 76-100 Hp	0.03	0.19	0.16	0.00	0.03	0.02	40.84	0.01	0.00	41.10
Nonroad Equipment - 101-175 Hp	0.00	0.01	0.02	0.00	0.00	0.00	7.77	0.00	0.00	7.83
Total - Year 2019	**0.04**	**0.21**	**0.22**	**0.00**	**0.03**	**0.03**	**56.23**	**0.01**	**0.00**	**56.59**

Table D.2-16. Annual Air Emissions for AGE Usages - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.004	0.000	0.005	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Total - Year 2019	**0.005**	**0.001**	**0.006**	**0.000**	–	–	–	–	–	–

Table D.2-16. Annual Air Emissions for AGE Usages - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.006	–	–	–	–	–	0.000	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2019	–	–	–	**0.007**	–	–	–	–	–	**0.000**	–

Table D.2-16. Annual Air Emissions for AGE Usages - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.002	–	–	–	–	0.001
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2019	–	**0.000**	–	–	–	**0.002**	–	–	–	–	**0.002**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2019 Seymour Johnson AFB MOB 3 KC-46A LTOs [1,270] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2019 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.2-17. 2014 VMT for GOVs by Vehicle Class - Seymour Johnson AFB

Vehicle Class	Annual VMT
LDGV	275,522
LDGT	735,646
HDGV	19,134
HDDV	408,203
Total VMT	**1,438,505**

Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx GOV sheet

Table D.2-18. Annual Number of Workers at Seymour Johnson AFB - KC-46A MOB 3 Mission

Scenario	Total Base Workers	916 ARW Staff Year 2015	MOB 3 Staff
Year 2014 [a]	7,731	–	–
Year 2015 916 ARW [b]	–	1,141	–
Year 2019 MOB 3 [b]	–	–	1,214

[a] Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx POV sheet.

[b] Source: EIS Table 2-8.

Table D.2-19. Annual Average On-Road Vehicle Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.09	3.50	0.38	0.01	0.07	0.01	394	–	–	394
LDGT - 25 mph	0.36	9.50	1.23	0.01	0.08	0.02	550	–	–	550
HGDV - 25 mph	0.33	9.06	1.18	0.01	0.08	0.02	547	–	–	547
HDDV - 25 mph	0.55	2.39	7.97	0.02	0.69	0.39	2,148	–	–	2,148
Year 2019										
LDGV - 25 mph	0.03	2.54	0.14	0.00	0.07	0.01	358	–	–	358
LDGT - 25 mph	0.14	6.76	0.48	0.00	0.08	0.02	514	–	–	514
HGDV - 25 mph	0.12	6.60	0.45	0.00	0.08	0.02	511	–	–	511
HDDV - 25 mph	0.27	1.31	4.39	0.02	0.49	0.20	2,077	–	–	2,077

Table D.2-19. Annual Average On-Road Vehicle Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.051	0.000	–	–	–	–	–	–
LDGT - 25 mph	0.006	0.001	0.205	0.002	–	–	–	–	–	–
HGDV - 25 mph	–	–	0.006	–	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.018	0.000	–	–	–	–	–	–
LDGT - 25 mph	0.002	0.001	0.076	0.001	–	–	–	–	–	–
HGDV - 25 mph	–	–	0.002	–	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–

Table D.2-19. Annual Average On-Road Vehicle Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT - 25 mph	–	–	0.008	0.012	0.007	–	–	0.000	0.001	0.000	–
HGDV - 25 mph	–	–	0.002	–	0.006	–	–	–	–	–	–
HDDV - 25 mph	–	–	0.007	–	0.013	–	–		0.013	–	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT - 25 mph	–	–	0.003	0.005	0.002	–	–	0.000	0.000	0.000	–
HGDV - 25 mph	–	–	0.001	–	0.002	–	–	–	–	–	–
HDDV - 25 mph	–	–	0.004	–	0.007	–	–	–	0.007	–	–

Table D.2-19. Annual Average On-Road Vehicle Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.010	–	0.002	–	–	0.008
LDGT - 25 mph	–	–	0.000	–	–	0.006	–	0.015	–	–	0.030
HGDV - 25 mph	–	–	–	–	–	0.011	–	0.005	–	–	0.010
HDDV - 25 mph	–	–	0.011	–	–	–	–	0.000	–	–	–
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGT - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
HGDV - 25 mph	–	–	–	–	–	0.004	–	0.002	–	–	0.004
HDDV - 25 mph	–	–	0.006	–	–	–	–	0.000	–	–	–

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Wayne County, NC.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.2-20. Annual Emissions from GOV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario/Vehicle Class	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 916 ARW [a]										
LDGV	0.00	0.16	0.02	0.00	0.00	0.00	17.66	–	–	17.66
LDGT	0.04	1.14	0.15	0.00	0.01	0.00	65.82	–	–	65.82
HDGV	0.00	0.03	0.00	0.00	0.00	0.00	1.70	–	–	1.70
HDDV	0.04	0.16	0.53	0.00	0.05	0.03	142.64	–	–	142.64
Total - Year 2015	**0.08**	**1.48**	**0.70**	**0.00**	**0.06**	**0.03**	**227.82**	–	–	**227.82**
Year 2019 MOB 3 [b]										
LDGV	0.01	0.82	0.05	0.00	0.02	0.00	115.63	–	–	115.63
LDGT	0.12	5.83	0.41	0.00	0.07	0.01	443.53	–	–	443.53
HDGV	0.00	0.15	0.01	0.00	0.00	0.00	11.46	–	–	11.46
HDDV	0.13	0.63	2.10	0.01	0.23	0.10	994.20	–	–	994.20
Total - Year 2019	**0.26**	**7.43**	**2.57**	**0.01**	**0.33**	**0.12**	**1,564.82**	–	–	**1,564.82**

Table D.2-20. Annual Emissions from GOV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 916 ARW [a]										
LDGV	0.000	0.000	0.002	0.000	–	–	–	–	–	–
LDGT	0.001	0.000	0.024	0.000	–	–	–	–	–	–
HDGV	–	–	0.000	–	–	–	–	–	–	–
HDDV	–	–	–	–	–	–	–	–	–	–
Total - Year 2015	**0.001**	**0.000**	**0.027**	**0.000**	–	–	–	–	–	–
Year 2019 MOB 3 [b]										
LDGV	0.000	0.000	0.006	0.000	–	–	–	–	–	–
LDGT	0.002	0.000	0.066	0.001	–	–	–	–	–	–
HDGV	–	–	0.000	–	–	–	–	–	–	–
HDDV	–	–	–	–	–	–	–	–	–	–
Total - Year 2015	**0.002**	**0.000**	**0.072**	**0.001**	–	–	–	–	–	–

Table D.2-20. Annual Emissions from GOV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 916 ARW [a]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.001	0.001	0.001	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV	–	–	0.000	–	0.001	–	–	–	0.001	–	–
Total - Year 2015	**–**	**–**	**0.002**	**0.002**	**0.002**	**–**	**–**	**0.000**	**0.001**	**0.000**	**–**
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV	–	–	0.002	–	0.003	–	–	–	0.003	–	–
Total - Year 2015	**–**	**–**	**0.005**	**0.004**	**0.005**	**–**	**–**	**0.000**	**0.003**	**0.000**	**–**

Table D.2-20. Annual Emissions from GOV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 916 ARW [a]											
LDGV	–	–	0.000	–	–	0.000	–	0.000	–	–	0.000
LDGT	–	–	0.000	–	–	0.001	–	0.002	–	–	0.004
HDGV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
HDDV	–	–	0.001	–	–	–	–	0.000	–	–	–
Total - Year 2015	**–**	**–**	**0.001**	**–**	**–**	**0.001**	**–**	**0.002**	**–**	**–**	**0.004**
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	–	–	0.001	–	0.000	–	–	0.001
LDGT	–	–	0.000	–	–	0.002	–	0.005	–	–	0.010
HDGV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
HDDV	–	–	0.003	–	–	–	–	0.000	–	–	–
Total - Year 2015	**–**	**–**	**0.003**	**–**	**–**	**0.003**	**–**	**0.005**	**–**	**–**	**0.011**

[a] 2015 emissions = 2014 GOV VMT * (2015 Seymour Johnson AFB worker population/2014 Seymour Johnson AFB worker population) * 2015 vehicle emission factors.

[b] 2019 emissions = 2014 GOV VMT * (2019 Seymour Johnson AFB worker population/2014 Seymour Johnson AFB worker population) * 2019 vehicle emission factors.

– = Source does not emit particular pollutant

Table D.2-21. Annual On-Base On-Road Vehicle Mileage Calculations - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario	# of Workers	Vehicle Occupancy Rate	On-Base Miles per Round Trip [a]	Days per Year [a]	On-Base Miles per year [b]
Year 2014	7,731	1.0	4.0	30,924	8,040,240
Year 2015 916 ARW [c]	1,141	1.0	4.0	4,564	1,186,640
Year 2019 MOB 3 [c]	1,241	1.0	4.0	4,964	1,290,640

[a] Source: Seymour Johnson AFB Mobile AEI - file 5-2014 SJAFB Mobile AEI Process Calc Summary.pdf page 23.

[b] Based on 260 days per year.

[c] EIS Table 2-8.

Table D.2-22. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.09	3.50	0.38	0.01	0.07	0.01	394	–	–	394
LDGT1 - 25 mph	0.36	9.50	1.23	0.01	0.08	0.02	550	–	–	550
Composite [c]	**0.16**	**5.00**	**0.59**	**0.01**	**0.07**	**0.02**	**433**	–	–	**433**
Year 2019										
LDGV - 25 mph	0.03	2.54	0.14	0.00	0.07	0.01	358	–	–	358
LDGT1 - 25 mph	0.14	6.76	0.48	0.00	0.08	0.02	514	–	–	514
Composite [c]	**0.06**	**3.60**	**0.23**	**0.00**	**0.07**	**0.01**	**397**	–	–	**397**

Table D.2-22. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.051	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.006	0.001	0.205	0.002	–	–	–	–	–	–
Composite [c]	**0.002**	**0.001**	**0.089**	**0.001**	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.018	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.002	0.001	0.076	0.001	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.033**	**0.000**	–	–	–	–	–	–

Table D.2-22. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.008	0.012	0.007	–	–	0.000	0.001	0.000	–
Composite [c]	–	–	**0.004**	**0.004**	**0.003**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.003	0.005	0.002	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.2-22. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.010	–	0.002	–	–	0.008
LDGT1 - 25 mph	–	–	0.000	–	–	0.006	–	0.015	–	–	0.030
Composite [c]	–	–	**0.000**	–	–	**0.009**	–	**0.005**	–	–	**0.014**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
Composite [c]	–	–	**0.000**	–	–	**0.003**	–	**0.002**	–	–	**0.005**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Wayne County, NC.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 75/25% LDGV/LDGT1.

– = Source does not emit particular pollutant

Table D.2-23. Annual Emissions from On-Base On-Road Vehicle Activities - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 916 ARW [a]	0.20	6.54	0.77	0.01	0.10	0.02	566.34	–	–	566.34
Year 2019 MOB 3 [b]	0.08	5.12	0.32	0.00	0.10	0.02	564.64	–	–	564.64

Table D.2-23. Annual Emissions from On-Base On-Road Vehicle Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 434 ARW [a]	0.002	0.001	0.116	0.001	–	–	–	–	–	–
Year 2019 MOB 3 [b]	0.001	0.000	0.047	0.000	–	–	–	–	–	–

Table D.2-23. Annual Emissions from On-Base On-Road Vehicle Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 434 ARW [a]	–	–	0.005	0.005	0.003	–	–	0.000	0.000	0.000	–
Year 2019 MOB 3 [b]	–	–	0.002	0.002	0.001	–	–	0.000	0.000	0.000	–

Table D.2-23. Annual Emissions from On-Base On-Road Vehicle Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 434 ARW [a]	–	–	0.000	–	–	0.011	–	0.007	–	–	0.018
Year 2019 MOB 3 [b]	–	–	0.000	–	–	0.004	–	0.003	–	–	0.007

[a] 2015 emissions = 2015 Total On-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total On-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.2-24. Annual Off-Base On-Road Vehicle Mileage Calculations - Seymour Johnson AFB KC-46A MOB 3 Project Mission

Scenario	# of Workers	Vehicle Occupancy Rate	Off-Base Miles per Round Trip	Days per Year	Off-Base Miles per year [a]
Year 2014	7,731	0.8	10.0	57,983	15,075,450
Year 2015 916 ARW	1,141	0.8	10.0	8,558	2,224,950
Year 2019 MOB 3	1,241	0.8	10.0	9,308	2,419,950

[a] Based on 260 days per year.

Table D.2-25. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.09	3.50	0.38	0.01	0.07	0.01	394	–	–	394
LDGV - 55 mph	0.06	2.96	0.36	0.01	0.02	0.01	307	–	–	307
LDGT1 - 25 mph	0.36	9.50	1.23	0.01	0.08	0.02	550	–	–	550
LDGT1 - 55 mph	0.16	7.93	1.24	0.01	0.03	0.01	443	–	–	443
Composite [c]	**0.10**	**4.40**	**0.58**	**0.01**	**0.04**	**0.01**	**364**	–	–	**364**
Year 2019										
LDGV - 25 mph	0.03	2.54	0.14	0.00	0.07	0.01	358	–	–	358
LDGV - 55 mph	0.02	2.23	0.14	0.00	0.02	0.01	279	–	–	279
LDGT1 - 25 mph	0.14	6.76	0.48	0.00	0.08	0.02	514	–	–	514
LDGT1 - 55 mph	0.06	6.07	0.50	0.00	0.03	0.01	415	–	–	415
Composite [c]	**0.04**	**3.29**	**0.23**	**0.00**	**0.03**	**0.01**	**334**	–	–	**334**

Table D.2-25. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.051	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.035	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.006	0.001	0.205	0.002	–	–	–	–	–	–
LDGT1 - 55 mph	0.003	0.001	0.087	0.001	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.058**	**0.001**	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.018	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.014	0.000	–	–	–	–	–	–
LDGT1 - 25 mph	0.002	0.001	0.076	0.001	–	–	–	–	–	–
LDGT1 - 55 mph	0.001	0.000	0.036	0.000	–	–	–	–	–	–
Composite [c]	**0.000**	**0.000**	**0.022**	**0.000**	–	–	–	–	–	–

Table D.2-25. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGV - 55 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.008	0.012	0.007	–	–	0.000	0.001	0.000	–
LDGT1 - 55 mph	–	–	0.004	0.005	0.003	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.002**	**0.002**	**0.002**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGV - 55 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT1 - 25 mph	–	–	0.003	0.005	0.002	–	–	0.000	0.000	0.000	–
LDGT1 - 55 mph	–	–	0.001	0.002	0.001	–	–	0.000	0.000	0.000	–
Composite [c]	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.2-25. Annual Average On-Road Emission Factors - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.010	–	0.002	–	–	0.008
LDGV - 55 mph	–	–	0.000	–	–	0.007	–	0.001	–	–	0.006
LDGT1 - 25 mph	–	–	0.000	–	–	0.006	–	0.015	–	–	0.030
LDGT1 - 55 mph	–	–	0.000	–	–	0.003	–	0.006	–	–	0.013
Composite [c]	–	–	**0.000**	–	–	**0.006**	–	**0.003**	–	–	**0.009**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGV - 55 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.002
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
LDGT1 - 55 mph	–	–	0.000	–	–	0.001	–	0.003	–	–	0.005
Composite [c]	–	–	**0.000**	–	–	**0.002**	–	**0.001**	–	–	**0.003**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Wayne County, NC.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 75/25% LDGV/LDGT1 and 75/25% 55/25 mph.

– = Source does not emit particular pollutant

Table D.2-26. Annual Emissions from Off-Base POV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 916 ARW [a]	0.25	10.79	1.43	0.02	0.09	0.03	892	–	–	892
Year 2019 MOB 3 [b]	0.10	8.78	0.61	0.01	0.09	0.02	891	–	–	891

Table D.2-26. Annual Emissions from Off-Base POV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 916 ARW [a]	0.002	0.001	0.142	0.001	–	–	–	–	–	–
Year 2019 MOB 3 [b]	0.001	0.000	0.060	0.001	–	–	–	–	–	–

Table D.2-26. Annual Emissions from Off-Base POV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 916 ARW [a]	–	–	0.006	0.006	0.004	–	–	0.000	0.000	0.000	–
Year 2019 MOB 3 [b]	–	–	0.003	0.002	0.002	–	–	0.000	0.000	0.000	–

Table D.2-26. Annual Emissions from Off-Base POV Activities - Seymour Johnson AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 916 ARW [a]	–	–	0.000	–	–	0.016	–	0.008	–	–	0.022
Year 2019 MOB 3 [b]	–	–	0.000	–	–	0.006	–	0.003	–	–	0.009

[a] 2015 emissions = 2015 Total Off-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total Off-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.2-27. Annual Number of Aircraft LTOs - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario	Number of LTOs
Year 2014 All SJAFB	12,769
Year 2015 916 ARW	756
Year 2019 MOB 3	1,270

Source: EIS Tables 2-9 and 2-10.

Table D.2-28. Annual Emissions from Point and Area Sources - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario Year/ Source Type	Tons per Year									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
2014 All Seymour Johnson AFB [a]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–
Above Ground Storage Tanks	0.46	–	–	–	–	–	–	–	–	–
Fuel Cell Maintenance - 90% F-15s	0.35	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	–	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
Fuel Dispensing	–	–	–	–	–	–	–	–	–	–
Fuel Loading Racks	–	–	–	–	–	–	–	–	–	–
Internal Combustion	–	–	–	–	–	–	–	–	–	–
Jet Engine Testing - F-15 Only	–	–	–	–	–	–	–	–	–	–
Munitions	–	–	–	–	–	–	–	–	–	–
Open Burn/Open Detonation	0.01	0.18	0.21	0.00	0.02	0.02	–	–	–	–
Spills/Release	0.04	0.02	0.09	0.00	0.02	0.02	–	–	–	–
Surface Coating	0.08	0.22	1.03	0.07	0.07	0.07	–	–	–	–
Underground Storage Tank	0.14	–	–	–	0.00	–	–	–	–	–
Welding/Soldering/Cutting	0.00	–	–	–	–	–	–	–	–	–
Woodworking	–	–	–	–	0.00	–	–	–	–	–
Total - Year 2014	**1.09**	**0.42**	**1.33**	**0.07**	**0.11**	**0.10**	–	–	–	–
2015 916 ARW [b]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–
Above Ground Storage Tanks	0.03	–	–	–	–	–	–	–	–	–
Fuel Cell Maintenance	0.00	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	–	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
Fuel Dispensing	–	–	–	–	–	–	–	–	–	–
Fuel Loading Racks	–	–	–	–	–	–	–	–	–	–
Internal Combustion	–	–	–	–	–	–	–	–	–	–
Munitions	–	–	–	–	–	–	–	–	–	–
Open Burn/Open Detonation	0.00	0.01	0.01	0.00	0.00	0.00	–	–	–	–
Spills/Release	0.00	–	–	–	–	–	–	–	–	–
Surface Coating	0.00	–	–	–	0.00	0.00	–	–	–	–
Underground Storage Tank	0.01	–	–	–	–	–	–	–	–	–
Welding/Soldering/Cutting	–	–	–	–	–	–	–	–	–	–
Woodworking	–	–	–	–	0.00	–	–	–	–	–
Total - Year 2015	**0.05**	**0.01**	**0.01**	**0.00**	**0.01**	**0.01**	–	–	–	–
2019 MOB 3 Scenario [b]										
Abrasive Cleaning	–	–	–	–	0.00	0.00	–	–	–	–

Table D.2-28. Annual Emissions from Point and Area Sources - Seymour Johnson AFB KC-46A MOB 3 Mission

Scenario Year/ Source Type	Tons per Year									
	VOC	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Above Ground Storage Tanks	0.05	–	–	–	–	–	–	–	–	–
Fuel Cell Maintenance	0.00	–	–	–	–	–	–	–	–	–
Misc Chemical Usage	–	–	–	–	–	–	–	–	–	–
Degreasing/Solvent Cleaning	–	–	–	–	–	–	–	–	–	–
Fuel Dispensing	–	–	–	–	–	–	–	–	–	–
Fuel Loading Racks	–	–	–	–	–	–	–	–	–	–
Internal Combustion	–	–	–	–	–	–	–	–	–	–
Munitions	–	–	–	–	–	–	–	–	–	–
Open Burn/Open Detonation	0.00	0.02	0.02	0.00	0.00	0.00	–	–	–	–
Spills/Release	0.00	–	–	–	–	–	–	–	–	–
Surface Coating	0.01	–	–	–	0.01	0.01	–	–	–	–
Underground Storage Tank	0.01	–	–	–	–	–	–	–	–	–
Welding/Soldering/Cutting	–	–	–	–	–	–	–	–	–	–
Woodworking	–	–	–	–	0.00	–	–	–	–	–
Total - 2019 MOB 3 Scenario	**0.08**	**0.02**	**0.02**	**0.00**	**0.01**	**0.01**	–	–	–	–

[a] Source: 2014 Criteria Pollutant Emissions - Comprehensive Stationary AEI (Seymour Johnson AFB 2015).

[b] 2014 emissions * future year LTOs/2014 LTOs.

– = Source does not emit particular pollutant

Table D.2-29. 2015 Emissions for the KC-135 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-135 Aircraft Operations	2.76	42.61	40.90	4.23	0.23	0.23	12,843	0.36	0.40	11,794
On-Wing Aircraft Engine Testing - KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,396	0.07	0.07	2,200
Aerospace Ground Support Equipment	0.05	0.27	0.29	0.00	0.04	0.04	49	0.01	0.00	45
GOVs/Nonroad Equipment	0.08	1.48	0.70	0.00	0.06	0.03	228	–	–	207
Privately-Owned Vehicles - On-Base	0.20	6.54	0.77	0.01	0.10	0.02	566	–	–	515
Privately-Owned Vehicles - Off-Base	0.25	10.79	1.43	0.02	0.09	0.03	892	–	–	811
Point and Area Sources	0.05	0.01	0.01	0.00	0.01	0.01	–	–	–	–
Total Emissions	**4.45**	**77.09**	**50.06**	**5.05**	**0.57**	**0.40**	**16,973**	**0.43**	**0.47**	**15,572**

Table D.2-29. 2015 Emissions for the KC-135 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-135 Aircraft Operations	0.107	0.068	0.268	0.038	0.002	0.002	0.005	0.004	0.001	0.002
On-Wing Aircraft Engine Testing - KC-135	0.041	0.027	0.107	0.015	0.001	0.001	0.001	0.001	0.000	0.001
Aerospace Ground Support Equipment	0.006	0.001	0.007	0.000	–	–	–	–	–	–
GOVs/Nonroad Equipment	0.001	0.000	0.027	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.002	0.001	0.116	0.001	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.002	0.001	0.142	0.001	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.158**	**0.097**	**0.668**	**0.057**	**0.003**	**0.003**	**0.006**	**0.006**	**0.001**	**0.003**

Table D.2-29. 2015 Emissions for the KC-135 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-135 Aircraft Operations	0.002	0.010	0.044	1.077	–	–	0.062	–	–	0.106	0.076
On-Wing Aircraft Engine Testing - KC-135	0.000	0.003	0.018	0.417	–	–	0.016	–	–	0.043	0.022
Aerospace Ground Support Equipment	–	–	–	0.008	–	–	–	–	–	0.001	–
GOVs/Nonroad Equipment	–	–	0.002	0.002	0.002	–	–	0.000	0.001	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.005	0.005	0.003	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.006	0.006	0.004	–	–	0.000	0.000	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.002**	**0.014**	**0.074**	**1.515**	**0.009**	–	**0.078**	**0.000**	–	**0.150**	**0.098**

Table D.2-29. 2015 Emissions for the KC-135 916 ARW at Seymour Johnson AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135 Aircraft Operations	0.0552	0.001	0.056	0.003	0.003	0.128	0.002	–	0.012	0.084	0.036
On-Wing Aircraft Engine Testing - KC-135	0.0193	0.000	0.023	0.001	0.001	0.051	0.001	–	0.005	0.034	0.014
Aerospace Ground Support Equipment	–	0.000	–	–	–	0.003	–	–	–	–	0.002
GOVs/Nonroad Equipment	–	–	0.001	–	–	0.001	–	0.002	–	–	0.004
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.011	–	0.007	–	–	0.018
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.016	–	0.008	–	–	0.022
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.0745**	**0.001**	**0.081**	**0.004**	**0.004**	**0.210**	**0.003**	–	**0.017**	**0.118**	**0.096**

– = Source does not emit particular pollutant

Table D.2-30. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Seymour Johnson AFB - 2019

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A Aircraft Operations	21.58	78.63	142.91	8.81	0.62	0.54	26,295	0.73	0.82	24,149
On-Wing Aircraft Engine Testing - KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,899	0.14	0.15	4,500
Aerospace Ground Support Equipment - KC-46A	0.04	0.21	0.22	0.00	0.03	0.03	56	0.01	0.00	51
Government-Owned Vehicles	0.26	7.43	2.57	0.01	0.33	0.12	1,565	–	–	1,423
Privately-Owned Vehicles - On-Base	0.08	5.12	0.32	0.00	0.10	0.02	565	–	–	513
Privately-Owned Vehicles - Off-Base	0.10	8.78	0.61	0.01	0.09	0.02	891	–	–	810
Point and Area Sources	0.08	0.02	0.02	0.00	0.01	0.01		–	–	–
Total Proposed Emissions - 2019	**33.71**	**139.90**	**165.38**	**10.51**	**1.33**	**0.88**	**34,271**	**0.87**	**0.97**	**31,446**
Year 2015 Base Case Emissions	**(4.45)**	**(77.09)**	**(50.06)**	**(5.05)**	**(0.57)**	**(0.40)**	**(16,973)**	**(0.43)**	**(0.47)**	**(15,572)**
Proposed minus Base Case Emissions	**29.26**	**62.81**	**115.32**	**5.46**	**0.77**	**0.48**	**17,298**	**0.44**	**0.50**	**15,874**
Miami/Cass County PSD Thresholds	**250**	**250**	**250**	**250**	**250**	**250**	–	–	–	–

Table D.2-30. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Seymour Johnson AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-46A Aircraft Operations	0.823	0.540	2.168	0.312	0.018	0.016	0.033	0.030	0.007	0.019
On-Wing Aircraft Engine Testing - KC-46A	0.445	0.294	1.182	0.171	0.009	0.008	0.015	0.014	0.002	0.010
Aerospace Ground Support Equipment - KC-46A	0.005	0.001	0.006	0.000	–	–	–	–	–	–
Government-Owned Vehicles	0.002	0.000	0.072	0.001	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.001	0.000	0.047	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.001	0.000	0.060	0.001	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**1.276**	**0.836**	**3.533**	**0.485**	**0.028**	**0.024**	**0.048**	**0.045**	**0.009**	**0.030**
Year 2015 Base Case Emissions	**(0.158)**	**(0.097)**	**(0.668)**	**(0.057)**	**(0.003)**	**(0.003)**	**(0.006)**	**(0.006)**	**(0.001)**	**(0.003)**
Proposed minus Base Case Emissions	**1.118**	**0.739**	**2.865**	**0.428**	**0.024**	**0.021**	**0.042**	**0.039**	**0.008**	**0.026**

Table D.2-30. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Seymour Johnson AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-46A Aircraft Operations	0.010	0.073	0.355	8.446	–	–	0.386	–	–	0.868	0.449
On-Wing Aircraft Engine Testing - KC-46A	0.005	0.034	0.194	4.570	–	–	0.152	–	–	0.475	0.239
Aerospace Ground Support Equipment - KC-46A	–	–	–	0.007	–	–		–	–	0.000	–
Government-Owned Vehicles	–	–	0.005	0.004	0.005	–	–	0.000	0.003	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.002	0.002	0.001	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.003	0.002	0.002	–	–	0.000	0.000	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.015**	**0.108**	**0.558**	**13.032**	**0.009**	–	**0.538**	**0.000**	**0.004**	**1.344**	**0.689**
Year 2015 Base Case Emissions	**(0.002)**	**(0.014)**	**(0.074)**	**(1.515)**	**(0.009)**	–	**(0.078)**	**(0.000)**	**(0.150)**	**(0.098)**	**(0.074)**
Proposed minus Base Case Emissions	**0.013**	**0.094**	**0.484**	**11.517**	**(0.001)**	–	**0.460**	**(0.000)**	**(0.147)**	**1.246**	**0.614**

Table D.2-30. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Seymour Johnson AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	**Pyrene**	**Styrene**	**1,1,2,2-Tetrachloroethane**	**Tetrachloroethene**	**Toluene**	**1,1,1-Trichloroethane**	**2,2,4-Trimethylpentane**	**Vinyl Acetate**	**mp-Xylene**	**o-Xylene**
KC-46A Aircraft Operations	0.4083	0.008	0.460	0.020	0.023	1.036	0.016	–	0.095	0.679	0.292
On-Wing Aircraft Engine Testing - KC-46A	0.2034	0.005	0.252	0.010	0.012	0.564	0.008	–	0.050	0.370	0.159
Aerospace Ground Support Equipment - KC-46A	–	0.000	–	–	–	0.002	–	–	–	–	0.002
Government-Owned Vehicles	–	–	0.003	–	–	0.003	–	0.005	–	–	0.011
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.004	–	0.003	–	–	0.007
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.006	–	0.003	–	–	0.009
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.6118**	**0.013**	**0.714**	**0.030**	**0.035**	**1.617**	**0.024**	**0.011**	**0.145**	**1.049**	**0.480**
Year 2015 Base Case Emissions	**(0.0015)**	**(0.081)**	**(0.004)**	**(0.004)**	**(0.210)**	**(0.003)**	**(0.017)**	**(0.118)**	**(0.096)**	–	–
Proposed minus Base Case Emissions	**0.6103**	**(0.068)**	**0.711**	**0.026**	**(0.175)**	**1.614**	**0.007**	**(0.107)**	**0.049**	**1.049**	**0.480**

– = Source does not emit particular pollutant

D.3 TINKER AIR FORCE BASE REGIONAL CLIMATE

The region surrounding Tinker AFB has a continental climate, characterized by pronounced variations in daily and seasonal temperatures and seasonal and annual precipitation. Meteorological data collected within Oklahoma County, Oklahoma, are used to describe the climate of the Tinker AFB project area (Oklahoma Climatological Survey 2015).

Temperature. Oklahoma County is known for high temperatures in the summer months and cool conditions during the winter. The average high and low temperatures during the summer months at Oklahoma City range from approximately 93 °F to 62 °F. The average high and low temperatures during the winter months range from 50 °F to 26 °F.

Precipitation. Average annual precipitation for Oklahoma City is 36 inches. Precipitation is greatest during the warmer months of the year, and the peak monthly average of 5.5 inches occurs in May. Precipitation is at a minimum during the winter, with the lowest monthly average of 1.3 inch occurring in January. Snow is not uncommon during winter, but the average annual snowfall is only 9 inches.

Prevailing Winds. The winds in the region prevail from the south to southeast during the warmer months of the year and from the north mainly during winter (NOAA 1998). The region experiences breezy conditions, with the annual average wind speed of 13 miles per hour for Oklahoma City. March and April are generally the windiest months of the year.

Severe Weather. Thunderstorms occur an average of approximately 49 days each year and predominantly in the spring and summer. Tornadoes also occur in the region, and 86 were recorded in Oklahoma County during the period of 1950 through 2003. Within the county, hail exceeds 1 inch in diameter during approximately 4 events per year.

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D.3.1 OPERATIONS EMISSION CALCULATIONS FOR THE KC-46A MOB 3 MISSION AT TINKER AFB

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Table D.3-1. Annual Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Year/Aircraft	Number of Operations				
	LTO	TGO	LFB	LFP	Total
Year 2009 [a]					
KC-135R	1,269	768	–	–	**2,037**
Other	3,924	–	–	–	**3,924**
Totals	**5,193**	**768**	–	–	**5,961**
Year 2015 [b]					
KC-135R	400	–	–	1,599	**1,999**
Based Aircraft	2,100	–	–	14,508	**16,608**
Depot	386	–	–	3,696	**4,082**
Transient	990	–	–	3,008	**3,998**
Totals	**3,876**	–	–	**22,811**	**26,687**

Sources: (1) CH2MHill. 2010. Final - Tinker AFB 2009 Mobile Source Emission Inventory
(2) EIS Table 2-13

Table D.3-2. 2015 KC-135 Closed Pattern Operations for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft Type/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		55%	60%	Climbout	Takeoff	55%	60%	Climbout	Takeoff
KC-135									
Closed Pattern - Radar & Initial to Overhead	731	12.0	2.0	–	1.0	146	24	–	12
Closed Pattern - VFR	496	5.0	2.0	–	1.0	41	17	–	8
Closed Pattern - Tactical	372	8.0	2.0	2.0	1.0	50	12	12	6
Total TIMs - Hours						**237**	**53**	**12**	**27**

[a] Distribution of operations based on assumptions obtained during site survey 15 December 2015.

Table D.3-3. 2015 KC-135 Aircraft Emissions for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Operation/Source	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
LTOs										
KC-135 Aircraft Operations	1.38	20.53	7.54	1.09	0.06	0.06	3,302	0.09	0.10	3,336
Subtotal - LTOs	**1.38**	**20.53**	**7.54**	**1.09**	**0.06**	**0.06**	**3,302**	**0.09**	**0.10**	**3,336**
Closed Patterns										
KC-135 - 55%	0.16	4.75	23.90	2.16	0.11	0.11	6,545	0.18	0.20	6,612
KC-135 - 60%	0.04	0.97	6.18	0.53	0.03	0.03	1,597	0.04	0.05	1,613
KC-135 - Climbout	0.01	0.01	2.58	0.17	0.01	0.01	518	0.01	0.02	523
KC-135 - Take-off	0.02	0.04	7.69	0.44	0.03	0.03	1,337	0.04	0.04	1,351
Subtotal - Closed Patterns	**0.22**	**5.77**	**40.36**	**3.29**	**0.18**	**0.18**	**9,997**	**0.28**	**0.31**	**10,099**
Total KC-135 Aircraft Operations	**1.60**	**26.30**	**47.90**	**4.38**	**0.24**	**0.24**	**13,299**	**0.37**	**0.41**	**13,435**

Table D.3-3. 2015 KC-135 Aircraft Emissions for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butad-iene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
LTOs										
KC-135 Aircraft Operations	0.053	0.035	0.140	0.020	0.001	0.001	0.002	0.002	0.000	0.001
Subtotal - LTOs	**0.053**	**0.035**	**0.140**	**0.020**	**0.001**	**0.001**	**0.002**	**0.002**	**0.000**	**0.001**
Closed Patterns										
KC-135 - 55%	0.007	0.002	0.005	0.000	0.000	0.000	0.001	0.001	0.000	0.000
KC-135 - 60%	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KC-135 - Climbout	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KC-135 - Take-off	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal - Closed Patterns	**0.009**	**0.003**	**0.007**	**0.000**	**0.000**	**0.000**	**0.002**	**0.001**	**0.001**	**0.000**
Total KC-135 Aircraft Operations	**0.062**	**0.038**	**0.146**	**0.020**	**0.001**	**0.001**	**0.003**	**0.003**	**0.001**	**0.001**

Table D.3-3. 2015 KC-135 Aircraft Emissions for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
LTOs											
KC-135 Aircraft Operations	0.001	0.004	0.023	0.546	–	–	0.021	–	–	0.056	0.031
Subtotal - LTOs	**0.001**	**0.004**	**0.023**	**0.546**	–	–	**0.021**	–	–	**0.056**	**0.031**
Closed Patterns											
KC-135 - 55%	0.000	0.002	0.000	0.054	–	–	0.020	–	–	0.001	0.021
KC-135 - 60%	0.000	0.001	0.000	0.012	–	–	0.005	–	–	0.000	0.004
KC-135 - Climbout	0.000	0.000	0.000	0.002	–	–	0.002	–	–	0.000	0.000
KC-135 - Take-off	–	0.000	0.000	0.002	–	–	0.006	–	–	0.000	0.000
Subtotal - Closed Patterns	**0.001**	**0.003**	**0.001**	**0.070**	–	–	**0.034**	–	–	**0.001**	**0.025**
Total KC-135 Aircraft Operations	**0.001**	**0.008**	**0.023**	**0.615**	–	–	**0.055**	–	–	**0.057**	**0.057**

Table D.3-3. 2015 KC-135 Aircraft Emissions for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Operation/Source	Annual Emissions - Tons										
	Propanal	**Pyrene**	**Styrene**	**1,1,2,2-Tetrachloroethane**	**Tetrachloroethene**	**Toluene**	**1,1,1-Trichloroethane**	**2,2,4-Trimethylpentane**	**Vinyl Acetate**	**mp-Xylene**	**o-Xylene**
LTOs											
KC-135 Aircraft Operations	0.025	0.001	0.030	0.001	0.001	0.067	0.001	–	0.006	0.044	0.019
Subtotal - LTOs	**0.025**	**0.001**	**0.030**	**0.001**	**0.001**	**0.067**	**0.001**	–	**0.006**	**0.044**	**0.019**
Closed Patterns											
KC-135 - 55%	0.007	–	0.000	0.000	0.000	0.002	0.000	–	0.001	0.001	0.000
KC-135 - 60%	0.002	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
KC-135 - Climbout	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
KC-135 - Take-off	0.003	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Subtotal - Closed Patterns	**0.012**	–	**0.001**	**0.000**	**0.001**	**0.003**	**0.000**	–	**0.001**	**0.002**	**0.001**
Total KC-135 Aircraft Operations	**0.037**	**0.001**	**0.030**	**0.002**	**0.002**	**0.070**	**0.001**	–	**0.007**	**0.046**	**0.019**

Table D.3-4. 2015 KC-135 On-Wing Engine Testing Activity Data for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-135 [a]							
60-HR inspection	18	4	15	17.6	–	–	–
120-HR inspection	18	4	15	17.6	–	–	–
Idle runs for maintenance	35	1	15	8.7	–	–	–
Idle runs for maintenance	28	2	15	13.9	–	–	–
Idle runs for maintenance	7	4	15	6.9	–	–	–
141 ARW expo sortie preflight	119	4	10	79.0	–	–	–
141 ARW expo sortie post-flight	119	4	6	47.4	–	–	–
Defueling	7	1	60	6.9	–	–	–
Preflight	274	4	10	182.6	–	–	–
Post-flight	274	2	5	45.6	–	–	–
High power engine runs	21	2	90	64.0	–	–	–
High power engine runs	21	2	15	–	10.7	–	–
High power engine runs	21	2	30	–	–	21.3	
High power engine runs	21	2	15	–	–	–	10.7
Total TIMs - KC-135				**490**	**11**	**21**	**11**

[a] Fairchild baseline BaseOps-Aircraft Maintenance - Noise.pdf, then factored these data by 30 KC-135s stationed at FAFB by the 8 KC-135s at Tinker AFB.

Table D.3-5. 2015 Emissions from On-Wing Engine Testing for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Aircraft/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-135										
Idle	0.52	7.63	0.99	0.26	0.01	0.01	799	0.022	0.025	807
Approach	0.00	0.06	0.11	0.01	0.00	0.00	42	0.001	0.001	43
Intermediate	0.00	0.01	1.11	0.07	0.00	0.00	223	0.006	0.007	225
Military	0.00	0.00	0.77	0.04	0.00	0.00	134	0.004	0.004	135
Total Emissions - 2015	**0.53**	**7.69**	**2.98**	**0.39**	**0.02**	**0.02**	**1,198**	**0.03**	**0.04**	**1,210**

Table D.3-5. 2015 Emissions from On-Wing Engine Testing for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-135										
Idle	0.020	0.013	0.054	0.008	0.000	0.000	0.001	0.001	0.000	0.000
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Total Emissions - 2015	**0.020**	**0.013**	**0.054**	**0.008**	**0.000**	**0.000**	**0.001**	**0.001**	**0.000**	**0.000**

Table D.3-5. 2015 Emissions from On-Wing Engine Testing for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitrophenol	DEHP	Ethylbenzene	Formaldehyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphthalene	Phenol
KC-135											
Idle	0.000	0.002	0.009	0.207	–	–	0.006	–	–	0.022	0.011
Approach	0.000	0.000	0.000	0.000	–	–	0.000	–	–	0.000	0.000
Intermediate	0.000	0.000	0.000	0.001	–	–	0.001	–	–	0.000	0.000
Military	–	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Total Emissions - 2015	**0.000**	**0.002**	**0.009**	**0.209**	–	–	**0.008**	–	–	**0.022**	**0.011**

Table D.3-5. 2015 Emissions from On-Wing Engine Testing for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Aircraft/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135											
Idle	0.009	0.000	0.011	0.000	0.001	0.026	0.000	–	0.002	0.017	0.007
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Total Emissions - 2015	**0.010**	**0.000**	**0.011**	**0.000**	**0.001**	**0.026**	**0.000**	–	**0.002**	**0.017**	**0.007**

Table D.3-6. 2014 AGE Usages for the KC-135R Detachment at Seymour Johnson AFB

Source	Fuel Type	Hp	Load Factor	Hours/Year	Annual Hp-Hours
Air Compressor - MC-2A	JP-8	10.5	0.48	60	302
Floodlight (FL-1D & NF2D & lightcart)	JP-8	10.5	0.74	100	777
Next Generation Heater (NGH)	JP-8	7.0	0.95	50	333
Subtotal - 7-11 Hp					**1,412**
Jacking Manifold	JP-8	30.0	0.51	100	1,530
Subtotal - 26-40 Hp					**1,530**
Air Compressor - MC20	JP-8	50.0	1.00	120	6,000
Nitrogen Servicing Cart	JP-8	49.0	0.51	200	4,998
Subtotal - 41-50 Hp					**10,998**
Air Compressor - MC-7	JP-8	52.0	0.48	150	3,744
Generator Set - A/M32A-86D	JP-8	96.5	0.95	750	68,742
Subtotal - 76-100 Hp					**72,486**
Air Conditioners - MA-3D	JP-8	120.0	0.28	150	5,040
Hyd Test Stand - MJ-2	JP-8	125.0	0.51	75	4,781
Start Cart - A/M32A-95	JP-8	155.0	0.95	40	5,890
Subtotal - 101-175 Hp					**15,711**

Note: These data used as surrogates for AGE usages for KC-135 and KC-46A aircraft at all proposed basing locations.
Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx 'GSE', but some Hp ratings obtained from 5-2014 Seymour Johnson AFB Mobile AEI Process Calc Summary.pdf

Table D.3-7. Nonroad Diesel Equipment Emission Factors - Tinker AFB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
Nonroad Equipment - 7-11 Hp	0.72	4.67	4.72	0.00	0.46	0.45	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.49	2.16	4.29	0.00	0.35	0.34	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.41	1.80	4.20	0.00	0.29	0.28	627	0.094	0.007	631
Nonroad Equipment - 76-100 Hp	0.69	4.23	3.82	0.00	0.61	0.59	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.32	1.24	2.67	0.00	0.27	0.26	565	0.094	0.007	569

Table D.3-7. Nonroad Diesel Equipment Emission Factors - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
Nonroad Equipment - 7-11 Hp	0.086	0.010	0.105	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.059	0.007	0.072	0.003	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.049	0.006	0.059	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.082	0.010	0.100	0.004	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.039	0.005	0.047	0.002	–	–	–	–	–	–

Table D.3-7. Nonroad Diesel Equipment Emission Factors - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
Nonroad Equipment - 7-11 Hp	–	–	–	0.132	–	–	–	–	–	0.009	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.091	–	–	–	–	–	0.006	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.075	–	–	–	–	–	0.005	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.126	–	–	–	–	–	0.009	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.059	–	–	–	–	–	0.004	–

Table D.3-7. Nonroad Diesel Equipment Emission Factors - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
Nonroad Equipment - 7-11 Hp	–	0.001	–	–	–	0.046	–	–	–	–	0.032
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.026	–	–	–	–	0.018
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.044	–	–	–	–	0.030
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.021	–	–	–	–	0.014

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Oklahoma County, OK.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.3-8. 2015 Emissions from AGE Usages for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.34
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.39
Nonroad Equipment - 41-50 Hp	0.00	0.01	0.02	0.00	0.00	0.00	2.76	0.00	0.00	2.78
Nonroad Equipment - 76-100 Hp	0.02	0.12	0.11	0.00	0.02	0.02	18.70	0.00	0.00	18.82
Nonroad Equipment - 101-175 Hp	0.00	0.01	0.02	0.00	0.00	0.00	3.56	0.00	0.00	3.59
Total - Year 2015	**0.02**	**0.14**	**0.15**	**0.00**	**0.02**	**0.02**	**25.75**	**0.00**	**0.00**	**25.91**

[a] 2014 SJAFB AGE hp-hr * (2015 TAFB KC-135 LTOs [400] / 2014 SJAFB KC-135 LTOs [1,100]) * (2015 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.3-8. 2015 Emissions from AGE Usages for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.002	0.000	0.003	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Total - Year 2015	**0.003**	**0.000**	**0.004**	**0.000**	–	–	–	–	–	–

Table D.3-8. 2015 Emissions from AGE Usages for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.004	–	–	–	–	–	0.000	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Total - Year 2015	–	–	–	**0.004**	–	–	–	–	–	**0.000**	–

Table D.3-8. 2015 Emissions from AGE Usages for the 507 ARW at Tinker AFB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.001	–	–	–	–	0.001
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2015	–	**0.000**	–	–	–	**0.002**	–	–	–	–	**0.001**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2015 Tinker AFB KC-135 LTOs [400] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2015 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.3-9. KC-46A Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission

Scenario/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		Idle	Approach	Climbout	Takeoff	Idle	Approach	Climbout	Takeoff
Landings and Take-offs									
Landings and Take-offs	1,150	47.7	5.2	1.6	0.7	914	100	31	13
Scenario/Operation	**Operations/ Year [b]**	**Engine Setting/Time in Mode per Operation (Minutes)**				**Engine Setting Annual Hours**			
		55%	**60%**	**Climbout**	**Takeoff**	**55%**	**60%**	**Climbout**	**Takeoff**
Closed Patterns									
Closed Pattern - Radar & Initial to Overhead	1,892	12.0	2.0	–	1.0	378	63	–	32
Closed Pattern - VFR	1,285	5.0	2.0	–	1.0	107	43	–	21
Closed Pattern - Tactical	964	8.0	2.0	2.0	1.0	128	32	32	16
Total TIMs - KC-46A MOB 3						**614**	**138**	**32**	**69**

[a] EIS Table 2-14.

[b] EIS Table 2-14 and KC-46 MOB CP Ops Data for Emissions.xlsx. Closed Pattern - Tactical ops reduced by 7.5% to reflect amount of time above 3,000' AGL.

Table D.3-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission 2019

Operation/Engine Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Landings and Take-offs										
Idle	18.99	64.79	5.75	1.61	0.17	0.15	4,890	0.14	0.15	4,940
Approach	0.06	1.10	6.92	0.60	0.03	0.02	1,828	0.05	0.06	1,846
Climbout	0.04	0.26	13.44	0.55	0.04	0.03	1,664	0.05	0.05	1,681
Take-off	0.03	0.18	9.97	0.31	0.02	0.02	933	0.03	0.03	942
APU	0.05	0.41	8.18	0.68	0.06	0.05	1,671	0.05	0.05	1,688
Subtotal LTOs	**19.17**	**66.73**	**44.25**	**3.75**	**0.31**	**0.28**	**10,985**	**0.30**	**0.34**	**11,098**
Closed Patterns										
55%	0.62	8.47	122.06	7.01	0.39	0.32	21,279	0.59	0.66	21,496
60%	0.15	1.87	32.07	1.73	0.10	0.08	5,234	0.14	0.16	5,288
Climbout	0.04	0.27	14.08	0.57	0.04	0.03	1,743	0.05	0.05	1,760
Take-off	0.14	0.91	51.26	1.58	0.12	0.10	4,798	0.13	0.15	4,847
Subtotal Closed Patterns	**0.94**	**11.52**	**219.46**	**10.89**	**0.65**	**0.54**	**33,053**	**0.91**	**1.03**	**33,391**
Total MOB 3 Operations	**20.12**	**78.25**	**263.71**	**14.65**	**0.96**	**0.82**	**44,039**	**1.22**	**1.37**	**44,489**

Table D.3-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Landings and Take-offs										
Idle	0.731	0.484	1.945	0.281	0.015	0.013	0.025	0.023	0.004	0.017
Approach	0.003	0.001	0.002	–	0.000	0.000	0.000	0.000	0.000	0.000
Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.001	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
APU	0.002	0.001	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal LTOs	**0.738**	**0.487**	**1.954**	**0.282**	**0.015**	**0.014**	**0.026**	**0.024**	**0.004**	**0.017**
Closed Patterns										
55%	0.011	0.003	0.016	0.001	0.002	0.002	0.007	0.005	0.003	0.001
60%	0.003	0.001	0.004	0.000	0.001	0.001	0.002	0.001	0.001	0.000
Climbout	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.003	0.000	0.002	–	0.000	0.000	0.001	0.002	0.000	0.000
Subtotal Closed Patterns	**0.018**	**0.004**	**0.024**	**0.001**	**0.003**	**0.003**	**0.010**	**0.009**	**0.005**	**0.001**
Total MOB 3 Operations	**0.756**	**0.492**	**1.977**	**0.283**	**0.019**	**0.017**	**0.036**	**0.033**	**0.009**	**0.018**

Table D.3-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Landings and Take-offs											
Idle	0.008	0.055	0.319	7.516	–	–	0.234	–	–	0.782	0.393
Approach	0.000	0.000	0.000	0.024	–	–	0.004	–	–	0.000	0.012
Climbout	0.000	0.001	0.000	0.009	–	–	0.010	–	–	0.000	0.000
Take-off	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.001	0.021	–	–	0.001	–	–	0.002	0.001
Subtotal LTOs	**0.008**	**0.057**	**0.320**	**7.574**	–	–	**0.257**	–	–	**0.785**	**0.406**
Closed Patterns											
55%	0.003	0.016	0.002	0.136	–	–	0.146	–	–	0.002	0.001
60%	0.001	0.004	0.000	0.033	–	–	0.035	–	–	0.001	0.000
Climbout	0.000	0.001	0.000	0.010	–	–	0.010	–	–	0.000	0.000
Take-off	–	0.003	0.000	0.013	–	–	0.046	–	–	0.000	0.000
Subtotal Closed Patterns	**0.003**	**0.023**	**0.003**	**0.192**	–	–	**0.237**	–	–	**0.003**	**0.001**
Total MOB 3 Operations	**0.011**	**0.081**	**0.323**	**7.765**	–	–	**0.495**	–	–	**0.788**	**0.407**

Table D.3-10. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Tinker AFB - KC-46A MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Landings and Take-offs											
Idle	0.327	0.008	0.414	0.017	0.019	0.929	0.013	–	0.082	0.608	0.262
Approach	0.001	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.000	0.000
Climbout	0.003	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.000	0.000
Take-off	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.001	0.000	0.001	0.000	0.000	0.003	0.000	–	0.000	0.002	0.001
Subtotal LTOs	**0.337**	**0.008**	**0.415**	**0.017**	**0.019**	**0.933**	**0.014**	–	**0.083**	**0.611**	**0.263**
Closed Patterns											
55%	0.047	–	0.001	0.001	0.003	0.010	0.002	–	0.005	0.007	0.002
60%	0.011	–	0.000	0.000	0.001	0.002	0.000	–	0.001	0.002	0.000
Climbout	0.003	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Take-off	0.024	–	0.000	0.000	0.001	0.001	0.000	–	0.002	0.002	0.000
Subtotal Closed Patterns	**0.085**	–	**0.002**	**0.002**	**0.004**	**0.014**	**0.002**	–	**0.008**	**0.012**	**0.002**
Total MOB 3 Operations	**0.422**	**0.008**	**0.417**	**0.019**	**0.024**	**0.947**	**0.016**	–	**0.091**	**0.622**	**0.266**

– = Source does not emit particular pollutant

Table D.3-11. KC-46A Aircraft On-Wing Engine Testing Activity Data for Tinker AB - KC-46A MOB 3 Mission

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-46A - MOB 3[a]							
Leak Checks/Troubleshooting	208	2	45	312.0	–	–	–
Fuel Transfer	69	1	80	92.4	–	–	–
Troubleshooting - High Power	35	1	40	11.6	2.9	2.9	5.8
Troubleshooting - High Power	35	2	15	17.3	–	–	–
Engine Trims	4	1	40	1.3	0.3	0.3	0.7
Engine Trims	4	2	10	1.3	–	–	–
ISO Runs	12	2	35	14.0	–	–	–
Backline Runs	12	2	69	465.8	6.9	–	10.4
Post ISO Runs	12	2	55	192.5	–	–	11.0
Total TIMs - KC-46A MOB 3				**1,108**	**10**	**3**	**28**

[a] Altus FTU BaseOps-Aircraft Maintenance-Noise.pdf (April 16, 2013).

Note: The APU operates for the same amount of time as the main engines during testing activities.

Table D.3-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Tinker AFB - Proposed MOB 3 Mission

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A - MOB 3										
Idle	11.51	39.27	3.48	0.98	0.10	0.09	2,964	0.08	0.09	2,994
Approach	0.00	0.06	0.35	0.03	0.00	0.00	93	0.00	0.00	94
Intermediate	0.00	0.01	0.71	0.03	0.00	0.00	87	0.00	0.00	88
Military	0.03	0.18	10.32	0.32	0.02	0.02	966	0.03	0.03	976
APU	0.03	0.19	3.86	0.32	0.03	0.02	789	0.02	0.02	797
Total KC-46A MOB 3	**11.57**	**39.71**	**18.73**	**1.68**	**0.16**	**0.14**	**4,899**	**0.14**	**0.15**	**4,950**

Table D.3-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Tinker AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-46A - MOB 3										
Idle	0.443	0.294	1.179	0.170	0.009	0.008	0.015	0.014	0.002	0.010
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.001	0.000	0.000	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total KC-46A MOB 3	**0.445**	**0.294**	**1.182**	**0.171**	**0.009**	**0.008**	**0.015**	**0.014**	**0.002**	**0.010**

Table D.3-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Tinker AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-46A - MOB 3											
Idle	0.005	0.033	0.193	4.556	–	–	0.142	–	–	0.474	0.238
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.001
Intermediate	0.000	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Military	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.000	0.010	–	–	0.000	–	–	0.001	0.001
Total KC-46A MOB 3	**0.005**	**0.034**	**0.194**	**4.570**	–	–	**0.152**	–	–	**0.475**	**0.239**

Table D.3-12. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Tinker AFB - Proposed MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A - MOB 3											
Idle	0.198	0.005	0.251	0.010	0.012	0.563	0.008	–	0.049	0.368	0.159
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.000	0.000	0.001	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Total KC-46A MOB 3	**0.203**	**0.005**	**0.252**	**0.010**	**0.012**	**0.564**	**0.008**	–	**0.050**	**0.370**	**0.159**

– = Source does not emit particular pollutant

Table D.3-13. Nonroad Diesel Equipment Emission Factors for 2019 - Tinker AFB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019										
Nonroad Equipment - 7-11 Hp	0.67	4.56	4.48	0.00	0.40	0.39	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.30	1.17	3.60	0.00	0.18	0.18	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.25	0.91	3.49	0.00	0.14	0.13	628	0.094	0.007	632
Nonroad Equipment - 76-100 Hp	0.49	2.94	2.52	0.00	0.40	0.39	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.25	0.70	1.48	0.00	0.15	0.14	566	0.094	0.007	570

Table D.3-13. Nonroad Diesel Equipment Emission Factors for 2019 - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019										
Nonroad Equipment - 7-11 Hp	0.079	0.010	0.097	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.036	0.004	0.043	0.002	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.030	0.004	0.037	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.058	0.007	0.071	0.003	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.030	0.004	0.036	0.002	–	–	–	–	–	–

Table D.3-13. Nonroad Diesel Equipment Emission Factors for 2019 - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019											
Nonroad Equipment - 7-11 Hp	–	–	–	0.122	–	–	–	–	–	0.001	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.055	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.090	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–

Table D.3-13. Nonroad Diesel Equipment Emission Factors for 2019 - Tinker AFB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.042	–	–	–	–	0.030
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.019	–	–	–	–	0.013
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Oklahoma County, OK.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.3-14. Annual Air Emissions for AGE Usages - Tinker AFB KC-46A MOB 3 Mission

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.01	0.01	0.00	0.00	0.00	0.96	0.00	0.00	0.97
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.01	0.00	0.00	0.00	1.12	0.00	0.00	1.13
Nonroad Equipment - 41-50 Hp	0.00	0.01	0.04	0.00	0.00	0.00	7.95	0.00	0.00	8.01
Nonroad Equipment - 76-100 Hp	0.04	0.25	0.21	0.00	0.03	0.03	53.81	0.01	0.00	54.15
Nonroad Equipment - 101-175 Hp	0.00	0.01	0.03	0.00	0.00	0.00	10.24	0.00	0.00	10.31
Total - Year 2019	**0.05**	**0.28**	**0.29**	**0.00**	**0.04**	**0.04**	**74.08**	**0.01**	**0.00**	**74.56**

Table D.3-14. Annual Air Emissions for AGE Usages - Tinker AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.005	0.001	0.006	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.001	0.000	0.001	0.000	–	–	–	–	–	–
Total - Year 2019	**0.006**	**0.001**	**0.007**	**0.000**	–	–	–	–	–	–

Table D.3-14. Annual Air Emissions for AGE Usages - Tinker AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.007	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2019	–	–	–	**0.009**	–	–	–	–	–	**0.001**	–

Table D.3-14. Annual Air Emissions for AGE Usages - Tinker AFB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.003	–	–	–	–	0.002
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2019	–	**0.000**	–	–	–	**0.003**	–	–	–	–	**0.002**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2019 Seymour Johnson AFB MOB 3 KC-46A LTOs [1,150] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2019 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.3-15. Annual VMT for GOVs by Vehicle Class - Tinker AFB 2009

Vehicle Class	Annual VMT
LDGV	267,636
LDGT1	912,825
LDGT2	186,417
LDGT3	481,071
LDGT4	127,526
LDDT12	229,897
LDDT34	124,785
HDGV2B	562,573
HDGV3	36,588
HDGV4	4,020
HDVG8B	4,910
HDDV2B	50,666
HDDV3	25,698
HDDV4	13,098
HDDV5	13,381
HDDV6	85,275
HDDV7	45,717
HDDV8A	134,719
HDDV8B	56,617
School Bus	23,702
Total VMT	**3,387,121**

Source: 2009 Tinker AFB Air Emissions Inventory (Tinker AFB 2010).

Table D.3-16. Annual Number of Workers at Tinker AFB - KC-46A MOB 3 Mission

Scenario	Total Base Workers	916 ARW Staff Year 2015	MOB 3 Staff
Year 2011 All Tinker AFB [a]	24,414	–	–
Year 2015 507 ARW [b]	–	1,032	–
Year 2019 MOB 3 [b]	–	–	1,443

[a] Source: Socioeconomic Data 2014.pdf for 2011. Used as a surrogate for 2009.

[b] Source: EIS Table 2-12.

Table D.3-17. Annual Average On-Road Vehicle Emission Factors - Tinker AFB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGT1 - 25 mph	0.35	9.55	1.26	0.01	0.08	0.02	552	–	–	552
HDGV2B - 25 mph	0.32	9.10	1.21	0.01	0.08	0.02	549	–	–	549
HDDV8A - 25 mph	0.55	2.39	8.05	0.02	0.69	0.39	2,157	–	–	2,157
Year 2019										
LDGT1 - 25 mph	0.13	6.87	0.49	0.00	0.08	0.02	516	–	–	516
HDGV2B - 25 mph	0.12	6.71	0.47	0.00	0.08	0.02	513	–	–	513
HDDV8A - 25 mph	0.27	1.31	4.43	0.02	0.49	0.20	2,085	–	–	2,085

Table D.3-17. Annual Average On-Road Vehicle Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015										
LDGT1 - 25 mph	0.006	0.001	0.197	0.002	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.006	–	–	–	–	–	–	–
HDDV8A - 25 mph	–	–	–	–	–	–	–	–	–	–
Year 2019										
LDGT1 - 25 mph	0.002	0.001	0.074	0.001	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.002	–	–	–	–	–	–	–
HDDV8A - 25 mph	–	–	–	–	–	–	–	–	–	–

Table D.3-17. Annual Average On-Road Vehicle Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGT1 - 25 mph	–	–	0.008	0.012	0.006	–	–	0.000	–	0.000	–
HDGV2B - 25 mph	–	–	0.002	–	0.005	–	–	–	–	–	–
HDDV8A - 25 mph	–	–	0.007	–	0.013	–	–	–	–	–	–
Year 2019											
LDGT1 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	–	0.000	–
HDGV2B - 25 mph	–	–	0.001	–	0.002	–	–	–	–	–	–
HDDV8A - 25 mph	–	–	0.004	–	0.007	–	–	–	–	–	–

Table D.3-17. Annual Average On-Road Vehicle Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGT1 - 25 mph	–	–	0.000	–	–	0.006	–	0.014	–	–	0.029
HDGV2B - 25 mph	–	–	–	–	–	0.010	–	0.005	–	–	0.010
HDDV8A - 25 mph	–	–	0.011	–	–	–	–	0.000	–	–	–
Year 2019											
LDGT1 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
HDGV2B - 25 mph	–	–	–	–	–	0.004	–	0.002	–	–	0.004
HDDV8A - 25 mph	–	–	0.006	–	–	–	–	0.000	–	–	–

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Oklahoma County, OK.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.3-18. Annual Emissions from GOV Activities - Tinker AFB KC-46A MOB 3 Mission

Scenario/Vehicle Class	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 507 ARW [a b]										
LDGT1	0.03	0.86	0.11	0.00	0.01	0.00	49.68	–	–	49.68
HDGV2B	0.02	0.50	0.07	0.00	0.00	0.00	30.33	–	–	30.33
HDDV8A	0.01	0.03	0.10	0.00	0.01	0.00	27.23	–	–	27.23
Total - Year 2015	**0.06**	**1.39**	**0.28**	**0.00**	**0.02**	**0.01**	**107.25**	–	–	**107.25**
Year 2019 MOB 3 [a c]										
LDGT1	0.02	0.86	0.06	0.00	0.01	0.00	64.94	–	–	64.94
HDGV2B	0.01	0.52	0.04	0.00	0.01	0.00	39.62	–	–	39.62
HDDV8A	0.00	0.02	0.08	0.00	0.01	0.00	36.81	–	–	36.81
Total - Year 2019	**0.03**	**1.40**	**0.18**	**0.00**	**0.02**	**0.01**	**141.37**	–	–	**141.37**

Table D.3-18. Annual Emissions from GOV Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 507 ARW [a b]										
LDGT1	0.001	0.000	0.018	0.000	–	–	–	–	–	–
HDGV2B	–	–	0.000	–	–	–	–	–	–	–
HDDV8A	–	–	–	–	–	–	–	–	–	–
Total - Year 2015	**0.001**	**0.000**	**0.018**	**0.000**	–	–	–	–	–	–
Year 2019 MOB 3 [a c]										
LDGT1	0.000	0.000	0.009	0.000	–	–	–	–	–	–
HDGV2B	–	–	0.000	–	–	–	–	–	–	–
HDDV8A	–	–	–	–	–	–	–	–	–	–
Total - Year 2019	**0.000**	**0.000**	**0.009**	**0.000**	–	–	–	–	–	–

Table D.3-18. Annual Emissions from GOV Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 507 ARW [a b]											
LDGT1	–	–	0.001	0.001	0.001	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV8A	–	–	0.000	–	0.000	–	–	–	–	–	–
Total - Year 2015	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	–	**0.000**	–
Year 2019 MOB 3 [a c]											
LDGT1	–	–	0.000	0.001	0.000	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV8A	–	–	0.000	–	0.000	–	–	–	–	–	–
Total - Year 2019	–	–	**0.001**	**0.001**	**0.001**	–	–	**0.000**	–	**0.000**	–

Table D.3-18. Annual Emissions from GOV Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 507 ARW [a b]											
LDGT1	–	–	0.000	–	–	0.001	–	0.001	–	–	0.003
HDGV2B	–	–	–	–	–	0.001	–	0.000	–	–	0.001
HDDV8A	–	–	0.000	–	–	–	–	0.000	–	–	–
Total - Year 2015	–	–	**0.000**	–	–	**0.001**	–	**0.002**	–	–	**0.003**
Year 2019 MOB 3 [a c]											
LDGT1	–	–	0.000	–	–	0.000	–	0.001	–	–	0.001
HDGV2B	–	–	–	–	–	0.000	–	0.000	–	–	0.000
HDDV8A	–	–	0.000	–	–	–	–	0.000	–	–	–
Total - Year 2019	–	–	**0.000**	–	–	**0.001**	–	**0.001**	–	–	**0.002**

[a] LDGT1/HDGV2B/HDDV8A vehicles would perform 57/35/8% of the total annual GOV VMT.

[b] 2015 emissions = 2009 GOV VMT * (2015 Tinker AFB worker population/2009 Tinker AFB worker population) * 2015 vehicle emission factors.

[c] 2019 emissions = 2009 GOV VMT * (2019 Tinker AFB worker population/2009 Tinker AFB worker population) * 2019 vehicle emission factors.

– = Source does not emit particular pollutant

Table D.3-19. Annual On-Base On-Road Vehicle Mileage Calculations - Tinker AFB MOB 3 Mission

Scenario	# of Workers [a]	Vehicle Occupancy Rate	On-Base Miles per Round Trip [b]	Days per Year	On-Base Miles per year
Year 2015 507 ARW					
Onbase Personnel	30	1.0	2.0	250	15,000
Reservists Near	1,002	1.0	2.0	24	48,096
Reservists Far	–	1.0	2.0	12	–
Contractors and Vendors	–	1.0	3.0	247	–
Total Onbase VMT - Year 2015	–	–	–	–	**63,096**
Year 2019 MOB 3					
Onbase Personnel	194	1.0	2.0	250	97,000
Reservists Near	1,234	1.0	2.0	24	59,232
Reservists Far	–	1.0	2.0	12	–
Contractors and Vendors	15	1.0	3.0	247	11,115
Total Onbase VMT - Year 2019 MOB 3 Scenario	–	–	–	–	**167,347**

[a] # of Workers from EIS Table 2-12.

[b] Source: 2010 Tinker AFB AEI.

Table D.3-20. Annual Average On-Road Emission Factors - Tinker AFB KC-46A MOB 3 Mission

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.08	3.52	0.38	0.01	0.07	0.01	396	–	–	396
LDGT2 - 25 mph	0.35	9.55	1.26	0.01	0.08	0.02	552	–	–	552
HDGV2B - 25 mph	0.32	9.10	1.21	0.01	0.08	0.02	549	–	–	549
Year 2019										
LDGV - 25 mph	0.03	2.59	0.14	0.00	0.07	0.01	359	–	–	359
LDGT2 - 25 mph	0.13	6.87	0.49	0.00	0.08	0.02	516	–	–	516
HDGV2B - 25 mph	0.12	6.71	0.47	0.00	0.08	0.02	513	–	–	513

Table D.3-20. Annual Average On-Road Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.049	0.000	–	–	–	–	–	–
LDGT2 - 25 mph	0.006	0.001	0.197	0.002	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.006	–	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.018	0.000	–	–	–	–	–	–
LDGT2 - 25 mph	0.002	0.001	0.074	0.001	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.002	–	–	–	–	–	–	–

Table D.3-20. Annual Average On-Road Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	–	0.000	–
LDGT2 - 25 mph	–	–	0.008	0.012	0.006	–	–	0.000	–	0.000	–
HDGV2B - 25 mph	–	–	0.002	–	0.005	–	–	–	–	–	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	–	0.000	–
LDGT2 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	–	0.000	–
HDGV2B - 25 mph	–	–	0.001	–	0.002	–	–	–	–	–	–

Table D.3-20. Annual Average On-Road Emission Factors - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.009	–	0.002	–	–	0.008
LDGT2 - 25 mph	–	–	0.000	–	–	0.006	–	0.014	–	–	0.029
HDGV2B - 25 mph	–	–	–	–	–	0.010	–	0.005	–	–	0.010
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGT2 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
HDGV2B - 25 mph	–	–	–	–	–	0.004	–	0.002	–	–	0.004

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Oklahoma County, OK.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.3-21. Annual Emissions from On-Base On-Road Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 507 ARW [a]										
LDGV	0.00	0.21	0.02	0.00	0.00	0.00	23.39	–	–	23.39
LDGT2	0.00	0.10	0.01	0.00	0.00	0.00	5.76	–	–	5.76
HDGV2B	0.00	0.03	0.00	0.00	0.00	0.00	1.91	–	–	1.91
Total	**0.01**	**0.34**	**0.04**	**0.00**	**0.01**	**0.00**	**31.06**	–	–	**31.06**
Year 2019 MOB 3 [b]										
LDGV	0.00	0.41	0.02	0.00	0.01	0.00	56.35	–	–	56.35
LDGT2	0.00	0.19	0.01	0.00	0.00	0.00	14.29	–	–	14.29
HDGV2B	0.00	0.06	0.00	0.00	0.00	0.00	4.73	–	–	4.73
Total	**0.01**	**0.66**	**0.04**	**0.00**	**0.01**	**0.00**	**75.37**	–	–	**75.37**

Table D.3-21. Annual Emissions from On-Base On-Road Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 507 ARW [a]										
LDGV	0.000	0.000	0.003	0.000	–	–	–	–	–	–
LDGT2	0.000	0.000	0.002	0.000	–	–	–	–	–	–
HDGV2B	–	–	0.000	–	–	–	–	–	–	–
Total	**0.000**	**0.000**	**0.005**	**0.000**	–	–	–	–	–	–
Year 2019 MOB 3 [b]										
LDGV	0.000	0.000	0.003	0.000	–	–	–	–	–	–
LDGT2	0.000	0.000	0.002	0.000	–	–	–	–	–	–
HDGV2B	–	–	0.000	–	–	–	–	–	–	–
Total	**0.000**	**0.000**	**0.005**	**0.000**	–	–	–	–	–	–

Table D.3-21. Annual Emissions from On-Base On-Road Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 507 ARW [a]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
LDGT2	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.000	–	0.000	–	–	–	–	–	–
Total	–	–	**0.000**	**0.000**	**0.000**	–	–	**0.000**	–	**0.000**	–
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
LDGT2	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.000	–	0.000	–	–	–	–	–	–
Total	–	–	**0.000**	**0.000**	**0.000**	–	–	**0.000**	–	**0.000**	–

Table D.3-21. Annual Emissions from On-Base On-Road Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 507 ARW [a]											
LDGV	–	–	0.000	–	–	0.001	–	0.0001	–	–	0.000
LDGT2	–	–	0.000	–	–	0.000	–	0.0001	–	–	0.000
HDGV2B	–	–	–	–	–	0.000	–	0.0000	–	–	0.000
Total	–	–	**0.000**	–	–	**0.001**	–	**0.0003**	–	–	**0.001**
Year 2019 MOB 3 [b]											
LDGV	–	–	0.000	–	–	0.001	–	0.0001	–	–	0.000
LDGT2	–	–	0.000	–	–	0.000	–	0.0001	–	–	0.000
HDGV2B	–	–	–	–	–	0.000	–	0.0000	–	–	0.000
Total	–	–	**0.000**	–	–	**0.001**	–	**0.0003**	–	–	**0.001**

[a] 2015 emissions = 2015 Total On-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total On-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.3-22. 2009 Off-Base On-Road Vehicle Mileages - Tinker AFB

Vehicle Class	Off-Base Miles per year [a]
LDGV	112,342,270
LDDV	99,986
LDGT1	4,204,665
LDDT1	495
LDGT2	24,175,126
LDDT2	3,698
LDGT3	10,367,029
LDDT3	130,283
LDGT4	1,441,758
LDDT4	18,114
HDGV2B	9,537,016
HDD2B	2,595,416
HDGV3	74,696
HDDV3	231,088
HDG4	19,522
HDDV4	81,278
HDGV5	955,167
HDDV5	557,553
HDGV6	155,303
HDDV6	227,233
HDGV7	25,741
HDDV7	145,619
HDGV8A	24
HDDV8A	30,216
HDDV8B	20,160
School Bus	1,114,344
Transit Bus	19,656
MC	1,019,448
Total VMT	**169,592,904**

[a] Source: 2010 Tinker AFB AEI.

Table D.3-23. Annual Off-Base On-Road Vehicle Mileage Calculations - Tinker AFB KC-46A MOB 3 Mission

Scenario	# of Workers	Off-Base Miles per year
Year 2011 Total Tinker AFB (1)(2)	24,414	169,592,904
Year 2015 507 ARW (3)	1,032	7,168,833
Year 2019 MOB 3 (3)	1,443	10,023,862

Notes:

(1) Three of the 4 largest contributors of total on-base on-road vehicle VMT in 2009 were were LDGV, LDGT2, and HDGV2B.

The analysis estimates emissions for these vehicles as surrogates for all on-road vehicles that access Tinker AFB.

VMT for post-2009 years = 2009 Total Tinker AFB VMT * future year LTOs/2009 Tinker AFB LTOs.

(2) Source: Socioeconomic Data 2014.pdf for 2011

(3) # of Workers from EIS Table 2-12.

Table D.3-24. Annual Average On-Road Emission Factors for Off-Site Activities - Tinker AFB KC-46A MOB 3 Mission

Project Year/Source Type [c]	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.08	3.52	0.38	0.01	0.07	0.01	396	–	–	396
LDGV - 55 mph	0.06	2.98	0.37	0.01	0.02	0.01	308	–	–	308
Composite [d]	**0.06**	**3.12**	**0.37**	**0.01**	**0.04**	**0.01**	**330**	–	–	**330**
LDGT2 - 25 mph	0.35	9.55	1.26	0.01	0.08	0.02	552	–	–	552
LDGT2 - 55 mph	0.15	7.98	1.27	0.01	0.03	0.01	445	–	–	445
Composite [d]	**0.20**	**8.37**	**1.27**	**0.01**	**0.04**	**0.02**	**472**	–	–	**472**
HDGV2B - 25 mph	0.32	9.10	1.21	0.01	0.08	0.02	549	–	–	549
HDGV2B - 55 mph	0.13	7.51	1.22	0.01	0.03	0.01	437	–	–	437
Composite [d]	**0.18**	**7.91**	**1.22**	**0.01**	**0.04**	**0.01**	**465**	–	–	**465**
Year 2019										
LDGV - 25 mph	0.03	2.59	0.14	0.00	0.07	0.01	359	–	–	359
LDGV - 55 mph	0.02	2.27	0.14	0.00	0.02	0.01	280	–	–	280
Composite [d]	**0.02**	**2.35**	**0.14**	**0.00**	**0.03**	**0.01**	**300**	–	–	**300**
LDGT2 - 25 mph	0.13	6.87	0.49	0.00	0.08	0.02	516	–	–	516
LDGT2 - 55 mph	0.05	5.92	0.49	0.00	0.03	0.01	408	–	–	408
Composite [d]	**0.07**	**6.16**		**0.00**	**0.04**	**0.01**	**435**	–	–	**435**
HDGV2B - 25 mph	0.12	6.71	0.47	0.00	0.08	0.02	513	–	–	513
HDGV2B - 55 mph	0.06	6.17	0.51	0.00	0.03	0.01	416	–	–	416
Composite [d]	**0.08**	**6.31**	**0.50**	**0.00**	**0.04**	**0.01**	**440**	–	–	**440**

Table D.3-24. Annual Average On-Road Emission Factors for Off-Site Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type [c]	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.049	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.033	0.000	–	–	–	–	–	–
Composite [d]	**0.000**	**0.000**	**0.037**	**0.000**	–	–	–	–	–	–
LDGT2 - 25 mph	0.006	0.001	0.197	0.002	–	–	–	–	–	–
LDGT2 - 55 mph	0.002	0.001	0.084	0.001	–	–	–	–	–	–
Composite [d]	**0.003**	**0.001**	**0.112**	**0.001**	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.006	–	–	–	–	–	–	–
HDGV2B - 55 mph	–	–	0.002	–	–	–	–	–	–	–
Composite [d]	–	–	**0.003**	–	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.018	0.000	–	–	–	–	–	–
LDGV - 55 mph	0.000	0.000	0.013	0.000	–	–	–	–	–	–
Composite [d]	**0.000**	**0.000**	**0.014**	**0.000**	–	–	–	–	–	–
LDGT2 - 25 mph	0.002	0.001	0.074	0.001	–	–	–	–	–	–
LDGT2 - 55 mph	0.001	0.000	0.030	0.000	–	–	–	–	–	–
Composite [d]	**0.001**	**0.000**	**0.041**	**0.000**	–	–	–	–	–	–
HDGV2B - 25 mph	–	–	0.002	–	–	–	–	–	–	–
HDGV2B - 55 mph	–	–	0.001	–	–	–	–	–	–	–
Composite [d]	–	–	**0.001**	–	–	–	–	–	–	–

Table D.3-24. Annual Average On-Road Emission Factors for Off-Site Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type [c]	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	–	0.000	–
LDGV - 55 mph	–	–	0.001	0.001	0.001	–	–	0.000	–	0.000	–
Composite [d]	–	–	**0.002**	**0.001**	**0.001**	–	–	**0.000**	–	**0.000**	–
LDGT2 - 25 mph	–	–	0.008	0.012	0.006	–	–	0.000	–	0.000	–
LDGT2 - 55 mph	–	–	0.003	0.005	0.003	–	–	0.000	–	0.000	–
Composite [d]	–	–	**0.005**	**0.007**	**0.004**	–	–	**0.000**	–	**0.000**	–
HDGV2B - 25 mph	–	–	0.002	–	0.005	–	–	–	–	–	–
HDGV2B - 55 mph	–	–	0.001	–	0.002	–	–	–	–	–	–
Composite [d]	–	–	**0.001**	–	**0.003**	–	–	–	–	–	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	–	0.000	–
LDGV - 55 mph	–	–	0.001	0.000	0.000	–	–	0.000	–	0.000	–
Composite [d]	–	–	**0.001**	**0.000**	**0.000**	–	–	**0.000**	–	**0.000**	–
LDGT2 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	–	0.000	–
LDGT2 - 55 mph	–	–	0.001	0.002	0.001	–	–	0.000	–	0.000	–
Composite [d]	–	–	**0.002**	**0.002**	**0.001**	–	–	**0.000**	–	**0.000**	–
HDGV2B - 25 mph	–	–	0.001	–	0.002	–	–	–	–	–	–
HDGV2B - 55 mph	–	–	0.000	–	0.001	–	–	–	–	–	–
Composite [d]	–	–	**0.001**	–	**0.001**	–	–	–	–	–	–

Table D.3-24. Annual Average On-Road Emission Factors for Off-Site Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type [c]	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.009	–	0.002	–	–	0.008
LDGV - 55 mph	–	–	0.000	–	–	0.006	–	0.001	–	–	0.005
Composite [d]	–	–	**0.000**	–	–	**0.007**	–	**0.001**	–	–	**0.006**
LDGT2 - 25 mph	–	–	0.000	–	–	0.006	–	0.014	–	–	0.029
LDGT2 - 55 mph	–	–	0.000	–	–	0.002	–	0.006	–	–	0.012
Composite [d]	–	–	**0.000**	–	–	**0.003**	–	**0.008**	–	–	**0.016**
HDGV2B - 25 mph	–	–	–	–	–	0.010	–	0.005	–	–	0.010
HDGV2B - 55 mph	–	–	–	–	–	0.004	–	0.002	–	–	0.004
Composite [d]	–	–	–	–	–	**0.006**	–	**0.003**	–	–	**0.005**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.003	–	0.001	–	–	0.003
LDGV - 55 mph	–	–	0.000	–	–	0.002	–	0.001	–	–	0.002
Composite [d]	–	–	**0.000**	–	–	**0.003**	–	**0.001**	–	–	**0.002**
LDGT2 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.011
LDGT2 - 55 mph	–	–	0.000	–	–	0.001	–	0.002	–	–	0.004
Composite [d]	–	–	**0.000**	–	–	**0.001**	–	**0.003**	–	–	**0.006**
HDGV2B - 25 mph	–	–	0.000	–	–	0.002	–	0.002	–	–	0.011
HDGV2B - 55 mph	–	–	0.000	–	–	0.001	–	0.001	–	–	0.005
Composite [d]	–	–	–	–	–	–	–	**0.001**	–	–	–

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Oklahoma County, OK.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Three of the 4 largest contributors of total on-base on-road vehicle VMT in 2009 were LDGV, LDGT2, and HDGV2B. The analysis estimates emissions for these vehicles assuming they would perform 77%, 17%, and 7% of the total on-base VMT per year.

[d] Equal to 75/25% 55/25 mph.

– = Source does not emit particular pollutant

Table D.3-25. Annual Emissions from Off-Base Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 507 ARW [a b]										
LDGV	0.38	18.96	2.25	0.04	0.21	0.06	2,006	–	–	2,006
LDGT2	0.27	11.25	1.70	0.01	0.06	0.02	634	–	–	634
HDGV2B	0.10	4.37	0.67	0.01	0.02	0.01	257	–	–	257
Total	**0.75**	**34.58**	**4.63**	**0.06**	**0.30**	**0.09**	**2,897**	–	–	**2,897**
Year 2019 MOB 3 [a c]										
LDGV	0.21	19.97	1.22	0.02	0.27	0.07	2,551	–	–	2,551
LDGT2	0.14	11.57	0.92	0.01	0.07	0.02	818	–	–	818
HDGV2B	0.06	4.88	0.39	0.00	0.03	0.01	341	–	–	341
Total	**0.40**	**36.41**	**2.53**	**0.02**	**0.38**	**0.10**	**3,710**	–	–	**3,710**

Table D.3-25. Annual Emissions from Off-Base Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015 507 ARW [a b]										
LDGV	0.001	0.001	0.226	0.002	–	–	–	–	–	–
LDGT2	0.004	0.001	0.150	0.002	–	–	–	–	–	–
HDGV2B	–	–	0.002	–	–	–	–	–	–	–
Total	**0.006**	**0.002**	**0.378**	**0.004**	–	–	–	–	–	–
Year 2019 MOB 3 [a c]										
LDGV	0.001	0.000	0.121	0.001	–	–	–	–	–	–
LDGT2	0.002	0.001	0.077	0.001	–	–	–	–	–	–
HDGV2B	–	–	0.001	–	–	–	–	–	–	–
Total	**0.003**	**0.001**	**0.199**	**0.002**	–	–	–	–	–	–

Table D.3-25. Annual Emissions from Off-Base Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 507 ARW [a b]											
LDGV	–	–	0.010	0.004	0.006	–	–	0.000	–	0.000	–
LDGT2	–	–	0.006	0.009	0.005	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.001	–	0.002	–	–	–	–	–	–
Total	–	–	**0.017**	**0.013**	**0.012**	–	–	**0.000**	–	**0.000**	–
Year 2019 MOB 3 [a c]											
LDGV	–	–	0.005	0.002	0.003	–	–	0.000	–	0.000	–
LDGT2	–	–	0.003	0.005	0.002	–	–	0.000	–	0.000	–
HDGV2B	–	–	0.000	–	0.001	–	–	–	–	–	–
Total	–	–	**0.009**	**0.007**	**0.007**	–	–	**0.000**	–	**0.000**	–

Table D.3-25. Annual Emissions from Off-Base Vehicle Activities - Tinker AFB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 507 ARW [a b]											
LDGV	–	–	0.000	–	–	0.043	–	0.009	–	–	0.036
LDGT2	–	–	0.000	–	–	0.004	–	0.011	–	–	0.022
HDGV2B	–	–	–	–	–	0.003	–	0.002	–	–	0.003
Total	–	–	**0.001**	–	–	**0.050**	–	**0.021**	–	–	**0.061**
Year 2019 MOB 3 [a c]											
LDGV	–	–	0.000	–	–	0.023	–	0.005	–	–	0.020
LDGT2	–	–	0.000	–	–	0.002	–	0.006	–	–	0.011
HDGV2B	–	–	–	–	–	0.002	–	0.001	–	–	0.002
Total	–	–	**0.000**	–	–	**0.027**	–	**0.011**	–	–	**0.033**

[a] LDGV/LDGT2/HDGV2B vehicles would perform 77/17/7% of the total annual Offbase VMT.

[b] 2015 emissions = 2015 Total On-base VMT * 2015 composite emission factors.

[c] 2019 emissions = 2019 Total On-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.3-26. Annual Number of Aircraft LTOs - Tinker AFB KC-46A MOB 3 Mission

Scenario	Number of LTOs
Year 2012 All Tinker AFB (1)	4,288
Year 2015 507 ARW (2)	400
Year 2019 MOB 3 (3)	1,150

(1) Source: Tinker AFB Aircraft Data 2011-2015.xlsx

(2) # of LTOs from EIS Table 2-13.

(3) # of LTOs from EIS Table 2-14.

Table D.3-27. Annual Emissions from Point and Area Sources - Tinker AFB KC-46A MOB 3 Mission

Scenario Year/ Source Type	Tons per Year									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2012 All Tinker AFB [a]										
Total - Year 2012	**254.00**	**119.00**	**156.00**	**10.90**	**13.10**	**9.50**	–	–	–	–
Year 2015 507th ARW [b]										
Total - Year 2015	**23.69**	**11.10**	**14.55**	**1.02**	**1.22**	**0.89**	–	–	–	–
Year 2019 MOB 3 Scenario [b]										
Total - Year 2019 MOB 3 Scenario	**68.12**	**31.91**	**41.84**	**2.92**	**3.51**	**2.55**	–	–	–	–

[a] Source: Maintenance EA Table 3-6 (Tinker AFB 2012).

[b] 2012 emissions * future year scenario LTOs/Tinker AFB 2012 LTOs.

– = Source does not emit particular pollutant

Table D.3-28. 2015 Existing Emissions for the KC-135 507 ARW at Tinker AFB - KC-46A MOB 3 Mission

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e (mt)
KC-135 Aircraft Operations	1.60	26.30	47.90	4.38	0.24	0.24	13,299	0.37	0.41	12,213
On-Wing Aircraft Engine Testing - KC-135	0.53	7.69	2.98	0.39	0.02	0.02	1,198	0.03	0.04	1,100
Aerospace Ground Support Equipment	0.02	0.14	0.15	0.00	0.02	0.02	26	0.00	0.00	24
GOVs/Nonroad Equipment	0.06	1.39	0.28	0.00	0.02	0.01	107	–	–	97
Privately-Owned Vehicles - On-Base	0.01	0.34	0.04	0.00	0.01	0.00	31	–	–	28
Privately-Owned Vehicles - Off-Base	0.75	34.58	4.63	0.06	0.30	0.09	2,897	–	–	2,633
Point and Area Sources	23.69	11.10	14.55	1.02	1.22	0.89	–	–	–	–
Total Emissions	**26.67**	**81.55**	**70.53**	**5.86**	**1.82**	**1.27**	**17,557**	**0.41**	**0.45**	**16,096**

Table D.3-28. 2015 Existing Emissions for the KC-135 507 ARW at Tinker AFB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-135 Aircraft Operations	0.062	0.038	0.146	0.020	0.001	0.001	0.003	0.003	0.001	0.001
On-Wing Aircraft Engine Testing - KC-135	0.020	0.013	0.054	0.008	0.000	0.000	0.001	0.001	0.000	0.000
Aerospace Ground Support Equipment	0.003	0.000	0.004	0.000	–	–	–	–	–	–
GOVs/Nonroad Equipment	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.000	0.000	0.005	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	–	–	–	–	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.085**	**0.052**	**0.209**	**0.028**	**0.002**	**0.002**	**0.004**	**0.004**	**0.001**	**0.002**

Table D.3-28. 2015 Existing Emissions for the KC-135 507 ARW at Tinker AFB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-135 Aircraft Operations	0.001	0.008	0.023	0.615	–	–	0.055	–	–	0.057	0.057
On-Wing Aircraft Engine Testing - KC-135	0.000	0.002	0.009	0.209	–	–	0.008	–	–	0.022	0.011
Aerospace Ground Support Equipment	–	–	–	0.004	–	–	–	–	–	0.000	–
GOVs/Nonroad Equipment	–	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	–	–	–	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.001**	**0.009**	**0.032**	**0.828**	**0.000**	–	**0.063**	**0.000**	–	**0.079**	**0.068**

Table D.3-28. 2015 Existing Emissions for the KC-135 507 ARW at Tinker AFB - KC-46A MOB 3 Mission (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135 Aircraft Operations	0.0372	0.001	0.030	0.002	0.002	0.070	0.001	–	0.007	0.046	0.019
On-Wing Aircraft Engine Testing - KC-135	0.0097	0.000	0.011	0.000	0.001	0.026	0.000	–	0.002	0.017	0.007
Aerospace Ground Support Equipment	–	0.000	–	–	–	0.002	–	–	–	–	0.001
GOVs/Nonroad Equipment	–	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.001	–	–	–	–	0.001
Privately-Owned Vehicles - Off-Base	–	–	–	–	–	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.0468**	**0.001**	**0.042**	**0.002**	**0.003**	**0.097**	**0.002**	–	**0.009**	**0.063**	**0.029**

– = Source does not emit particular pollutant

Table D.3-29. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Tinker AFB - 2019

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A Aircraft Operations	20.12	78.25	263.71	14.65	0.96	0.82	44,039	1.22	1.37	40,444
On-Wing Aircraft Engine Testing - KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,899	0.14	0.15	4,500
Aerospace Ground Support Equipment - KC-46A	0.05	0.28	0.29	0.00	0.04	0.04	74	0.01	0.00	68
Government-Owned Vehicles	0.03	1.40	0.18	0.00	0.02	0.01	141	–	–	129
Privately-Owned Vehicles - On-Base	0.01	0.66	0.04	0.00	0.01	0.00	75	–	–	69
Privately-Owned Vehicles - Off-Base	0.40	36.41	2.53	0.02	0.38	0.10	3,710	–	–	3,372
Point and Area Sources	68.12	31.91	41.84	2.92	3.51	2.55	–	–	–	–
Total Proposed Emissions - 2019	**100.30**	**188.64**	**327.32**	**19.28**	**5.08**	**3.66**	**52,939**	**1.37**	**1.52**	**48,581**
Year 2015 Base Case Emissions	**(26.67)**	**(81.55)**	**(70.53)**	**(5.86)**	**(1.82)**	**(1.27)**	**(17,557)**	**(0.41)**	**(0.45)**	**(16,096)**
Proposed minus Base Case Emissions	**73.63**	**107.09**	**256.78**	**13.42**	**3.26**	**2.39**	**35,381**	**0.96**	**1.07**	**32,485**
Oklahoma County PSD Thresholds	**250**	**250**	**250**	**250**	**250**	**250**	–	–	–	–

Table D.3-29. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Tinker AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-46A Aircraft Operations	0.756	0.492	1.977	0.283	0.019	0.017	0.036	0.033	0.009	0.018
On-Wing Aircraft Engine Testing - KC-46A	0.445	0.294	1.182	0.171	0.009	0.008	0.015	0.014	0.002	0.010
Aerospace Ground Support Equipment - KC-46A	0.006	0.001	0.007	0.000	–	–	–	–	–	–
Government-Owned Vehicles	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.000	0.000	0.005	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.003	0.001	0.199	0.002	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**1.210**	**0.788**	**3.370**	**0.456**	**0.028**	**0.025**	**0.051**	**0.048**	**0.011**	**0.028**
Year 2015 Base Case Emissions	**(0.085)**	**(0.052)**	**(0.209)**	**(0.028)**	**(0.002)**	**(0.002)**	**(0.004)**	**(0.004)**	**(0.001)**	**(0.002)**
Proposed minus Base Case Emissions	**1.124**	**0.736**	**3.162**	**0.428**	**0.026**	**0.023**	**0.047**	**0.044**	**0.010**	**0.027**

Table D.3-29. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Tinker AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
KC-46A Aircraft Operations	0.011	0.081	0.323	7.765	–	–	0.495	–	–	0.788	0.407
On-Wing Aircraft Engine Testing - KC-46A	0.005	0.034	0.194	4.570	–	–	0.152	–	–	0.475	0.239
Aerospace Ground Support Equipment - KC-46A	–	–	–	0.009	–	–	–	–	–	0.001	–
Government-Owned Vehicles	–	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	–	–	0.000	0.000	0.000	–	–	0.000	–	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.009	0.007	0.007	–	–	0.000	–	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.016**	**0.115**	**0.526**	**12.351**	**0.007**	–	**0.646**	**0.000**	–	**1.264**	**0.647**
Year 2015 Base Case Emissions	**(0.001)**	**(0.009)**	**(0.032)**	**(0.828)**	**(0.000)**	–	**(0.063)**	**(0.000)**	–	**(0.079)**	**(0.068)**
Proposed minus Base Case Emissions	**0.015**	**0.106**	**0.493**	**11.523**	**0.007**	–	**0.584**	**0.000**	–	**1.186**	**0.579**

Table D.3-29. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Tinker AFB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A Aircraft Operations	0.4218	0.008	0.417	0.019	0.024	0.947	0.016	–	0.091	0.622	0.266
On-Wing Aircraft Engine Testing - KC-46A	0.2034	0.005	0.252	0.010	0.012	0.564	0.008	–	0.050	0.370	0.159
Aerospace Ground Support Equipment - KC-46A	–	0.000	–	–	–	0.003	–	–	–	–	0.002
Government-Owned Vehicles	–	–	–	–	–	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.001	–	–	–	–	0.001
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.027	–	–	–	–	0.033
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.6252**	**0.012**	**0.669**	**0.030**	**0.036**	**1.542**	**0.024**	–	**0.141**	**0.992**	**0.460**
Year 2015 Base Case Emissions	**(0.0468)**	**(0.001)**	**(0.042)**	**(0.002)**	**(0.003)**	**(0.097)**	**(0.002)**	–	**(0.009)**	**(0.063)**	**(0.029)**
Proposed minus Base Case Emissions	**0.5784**	**0.011**	**0.628**	**0.028**	**0.033**	**1.445**	**0.022**	–	**0.131**	**0.929**	**0.432**

– = Source does not emit particular pollutant

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D.4 WESTOVER AIR RESERVE BASE REGIONAL CLIMATE

Westover ARB has a humid continental climate, characterized by warm wet summers and cold and snowy winters. Meteorological data collected at Westfield Barnes Municipal Airport in Massachusetts are used to describe the climate of the Westover ARB project area (National Climatic Data Center 2016).

Temperature. The average high and low temperatures during the summer months for Westover ARB range from approximately 83 °F to 62 °F. The average high and low temperatures during the winter months range from 36 °F to 13 °F.

Precipitation. The average annual precipitation for Westover ARB is 48.4 inches. Precipitation peaks in late spring and early fall, and the peak monthly average of 4.8 inches occurs in October. Precipitation is at a minimum during the winter, with the lowest monthly average of 2.8 inches occurring in February. Snow is common during the colder months of the year, and the average annual snowfall amounts to 49 inches.

Prevailing Winds. The winds in the region prevail from the south during the warmer months and from the west-northwest to north during winter (NOAA 1998). The annual average wind speed at Westover ARB is approximately 6 miles per hour. Spring is generally the windiest season, with the peak average monthly speeds of 8 miles per hour occurring in March and April.

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D.4.1 OPERATIONS EMISSION CALCULATIONS FOR THE KC-46A MOB 3 MISSION AT WESTOVER ARB

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Table D.4-1. KC-46A Aircraft Landings and Take-Offs at Westover ARB - KC-46A MOB 3 Mission

Scenario/Operation	Operations/ Year [a]	Engine Setting/Time in Mode per Operation (Minutes)				Engine Setting Annual Hours			
		Idle	Approach	Climbout	Takeoff	Idle	Approach	Climbout	Takeoff
Landings and Take-offs									
Landings and Take-offs	647	47.7	5.2	1.6	0.7	514	56	17	8
Scenario/Operation	**Operations/ Year [b]**	**Engine Setting/Time in Mode per Operation (Minutes)**				**Engine Setting Annual Hours**			
		55%	**60%**	**Climbout**	**Takeoff**	**55%**	**60%**	**Climbout**	**Takeoff**
Closed Patterns									
Closed Pattern - Radar & Initial to Overhead	2,622	12.0	2.0	–	1.0	524	87	–	44
Closed Pattern - VFR	1,781	5.0	2.0	–	1.0	148	59	–	30
Closed Pattern - Tactical	1,336	8.0	2.0	2.0	1.0	178	45	45	22
Total TIMs - KC-46A MOB 3						**851**	**191**	**45**	**96**

[a] EIS Table 2-18.

[b] EIS Table 2-18 and KC-46 MOB CP Ops Data for Emissions.xlsx. Closed Pattern - Tactical ops reduced by 7.5% to reflect amount of time above 3,000' AGL.

Table D.4-2. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Westover ARB - MOB 3 Mission 2019

Operation/Engine Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Landings and Take-offs										
Idle	10.68	36.45	3.23	0.91	0.09	0.09	2,751	0.08	0.09	2,779
Approach	0.03	0.62	3.89	0.34	0.02	0.01	1,028	0.03	0.03	1,039
Climbout	0.02	0.15	7.56	0.31	0.02	0.02	936	0.03	0.03	946
Take-off	0.02	0.10	5.61	0.17	0.01	0.01	525	0.01	0.02	530
APU	0.03	0.23	4.60	0.38	0.03	0.03	940	0.03	0.03	950
Subtotal LTOs	**10.79**	**37.54**	**24.90**	**2.11**	**0.18**	**0.16**	**6,181**	**0.17**	**0.19**	**6,244**
Closed Patterns										
55%	0.85	11.74	169.17	9.72	0.54	0.45	29,492	0.82	0.92	29,793
60%	0.21	2.59	44.44	2.39	0.14	0.11	7,254	0.20	0.23	7,329
Climbout	0.06	0.38	19.51	0.80	0.05	0.05	2,415	0.07	0.08	2,440
Take-off	0.19	1.26	71.05	2.19	0.17	0.14	6,650	0.18	0.21	6,718
Subtotal Closed Patterns	**1.31**	**15.97**	**304.17**	**15.10**	**0.90**	**0.75**	**45,812**	**1.27**	**1.42**	**46,280**
Total MOB 3 Operations	**12.09**	**53.51**	**329.07**	**17.21**	**1.07**	**0.91**	**51,992**	**1.44**	**1.62**	**52,523**

Table D.4-2. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Westover ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Landings and Take-offs										
Idle	0.411	0.272	1.094	0.158	0.009	0.007	0.014	0.013	0.002	0.010
Approach	0.002	0.001	0.001	–	0.000	0.000	0.000	0.000	0.000	0.000
Climbout	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Take-off	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
APU	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal LTOs	**0.415**	**0.274**	**1.099**	**0.159**	**0.009**	**0.008**	**0.014**	**0.013**	**0.002**	**0.010**
Closed Patterns										
55%	0.016	0.004	0.022	0.001	0.003	0.003	0.009	0.007	0.005	0.001
60%	0.004	0.001	0.005	0.000	0.001	0.001	0.002	0.002	0.001	0.000
Climbout	0.001	0.000	0.002	0.000	0.000	0.000	0.001	0.001	0.000	0.000
Take-off	0.004	0.001	0.003	–	0.000	0.000	0.002	0.003	0.000	0.000
Subtotal Closed Patterns	**0.025**	**0.006**	**0.033**	**0.002**	**0.004**	**0.004**	**0.014**	**0.013**	**0.006**	**0.001**
Total MOB 3 Operations	**0.440**	**0.280**	**1.132**	**0.161**	**0.013**	**0.012**	**0.028**	**0.026**	**0.009**	**0.011**

Table D.4-2. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Westover ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Landings and Take-offs											
Idle	0.004	0.031	0.179	4.229	–	–	0.131	–	–	0.440	0.221
Approach	0.000	0.000	0.000	0.014	–	–	0.002	–	–	0.000	0.007
Climbout	0.000	0.001	0.000	0.005	–	–	0.006	–	–	0.000	0.000
Take-off	–	0.000	0.000	0.001	–	–	0.005	–	–	0.000	0.000
APU	0.000	0.000	0.001	0.012	–	–	0.000	–	–	0.001	0.001
Subtotal LTOs	**0.004**	**0.032**	**0.180**	**4.261**	–	–	**0.145**	–	–	**0.442**	**0.229**
Closed Patterns											
55%	0.004	0.022	0.002	0.188	–	–	0.202	–	–	0.003	0.001
60%	0.001	0.005	0.001	0.045	–	–	0.049	–	–	0.001	0.000
Climbout	0.000	0.002	0.000	0.013	–	–	0.014	–	–	0.000	0.000
Take-off	–	0.004	0.000	0.019	–	–	0.064	–	–	0.000	0.000
Subtotal Closed Patterns	**0.005**	**0.033**	**0.004**	**0.266**	–	–	**0.329**	–	–	**0.004**	**0.002**
Total MOB 3 Operations	**0.009**	**0.065**	**0.184**	**4.527**	–	–	**0.474**	–	–	**0.446**	**0.230**

Table D.4-2. Annual Air Emissions from Proposed KC-46A Aircraft Operations at Westover ARB - MOB 3 Mission 2019 (Continued)

Operation/Engine Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Landings and Take-offs											
Idle	0.184	0.004	0.233	0.010	0.011	0.522	0.007	–	0.046	0.342	0.147
Approach	0.001	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Climbout	0.002	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Take-off	0.003	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.001	0.000	0.001	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Subtotal LTOs	**0.189**	**0.004**	**0.234**	**0.010**	**0.011**	**0.525**	**0.008**	–	**0.047**	**0.344**	**0.148**
Closed Patterns											
55%	0.065	–	0.002	0.002	0.004	0.014	0.002	–	0.006	0.010	0.002
60%	0.016	–	0.000	0.000	0.001	0.003	0.001	–	0.002	0.002	0.001
Climbout	0.005	–	0.000	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Take-off	0.033	–	0.000	0.000	0.001	0.002	0.000	–	0.003	0.003	0.001
Subtotal Closed Patterns	**0.118**	–	**0.003**	**0.003**	**0.006**	**0.020**	**0.003**	–	**0.011**	**0.016**	**0.003**
Total MOB 3 Operations	**0.307**	**0.004**	**0.236**	**0.012**	**0.017**	**0.544**	**0.011**	–	**0.058**	**0.360**	**0.151**

– = Source does not emit particular pollutant

Table D.4-3. KC-46A Aircraft On-Wing Engine Testing Activity Data for Westover ARB - KC-46A MOB 3 Mission

Aircraft/Test Type	Tests/ Year	# of Engines	Duration (Minutes)	Engine Setting/Annual Engine Hours			
				Idle	Approach	Intermediate	Takeoff
KC-46A - MOB 3[a]							
Leak Checks/Troubleshooting	208	2	45	312.0	–	–	–
Fuel Transfer	69	1	80	92.4	–	–	–
Troubleshooting - High Power	35	1	40	11.6	2.9	2.9	5.8
Troubleshooting - High Power	35	2	15	17.3	–	–	–
Engine Trims	4	1	40	1.3	0.3	0.3	0.7
Engine Trims	4	2	10	1.3	–	–	–
ISO Runs	12	2	35	14.0	–	–	–
Backline Runs	12	2	69	465.8	6.9	–	10.4
Post ISO Runs	12	2	55	192.5	–	–	11.0
Total TIMs - KC-46A MOB 3				**1,108**	**10**	**3**	**28**

[a] Altus FTU BaseOps-Aircraft Maintenance-Noise.pdf (April 16, 2013).

Note: The APU operates for the same amount of time as the main engines during testing activities.

Table D.4-4. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Westover ARB - Proposed KC-46A MOB 3 Mission

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
KC-46A - MOB 3										
Idle	11.51	39.27	3.48	0.98	0.10	0.09	2,964	0.08	0.09	2,994
Approach	0.00	0.06	0.35	0.03	0.00	0.00	93	0.00	0.00	94
Intermediate	0.00	0.01	0.71	0.03	0.00	0.00	87	0.00	0.00	88
Military	0.03	0.18	10.32	0.32	0.02	0.02	966	0.03	0.03	976
APU	0.03	0.19	3.86	0.32	0.03	0.02	789	0.02	0.02	797
Total KC-46A MOB 3	**11.57**	**39.71**	**18.73**	**1.68**	**0.16**	**0.14**	**4,899**	**0.14**	**0.15**	**4,950**

Table D.4-4. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Westover ARB - Proposed KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-46A - MOB 3										
Idle	0.443	0.294	1.179	0.170	0.009	0.008	0.015	0.014	0.002	0.010
Approach	0.000	0.000	0.000	–	0.000	0.000	0.000	0.000	0.000	0.000
Intermediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Military	0.001	0.000	0.000	–	0.000	0.000	0.000	0.001	0.000	0.000
APU	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total KC-46A MOB 3	**0.445**	**0.294**	**1.182**	**0.171**	**0.009**	**0.008**	**0.015**	**0.014**	**0.002**	**0.010**

Table D.4-4. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Westover ARB - Proposed KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	2,4-Dinitro-phenol	**DEHP**	**Ethyl-benzene**	**Formalde-hyde**	**Hexane**	**Methanol**	**Methylene Chloride**	**MTBE**	**Methylethyl benzene**	**Naphth-alene**	**Phenol**
KC-46A - MOB 3											
Idle	0.005	0.033	0.193	4.556	–	–	0.142	–	–	0.474	0.238
Approach	0.000	0.000	0.000	0.001	–	–	0.000	–	–	0.000	0.001
Intermediate	0.000	0.000	0.000	0.000	–	–	0.001	–	–	0.000	0.000
Military	–	0.001	0.000	0.003	–	–	0.009	–	–	0.000	0.000
APU	0.000	0.000	0.000	0.010	–	–	0.000	–	–	0.001	0.001
Total KC-46A MOB 3	**0.005**	**0.034**	**0.194**	**4.570**	–	–	**0.152**	–	–	**0.475**	**0.239**

Table D.4-4. Annual Emissions from KC-46A Aircraft On-Wing Engine Testing Activities at Westover ARB - Proposed KC-46A MOB 3 Mission (Continued)

Aircraft Scenario/Throttle Setting	Annual Emissions - Tons										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A - MOB 3											
Idle	0.198	0.005	0.251	0.010	0.012	0.563	0.008	–	0.049	0.368	0.159
Approach	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Intermediate	0.000	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
Military	0.005	–	0.000	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000
APU	0.000	0.000	0.001	0.000	0.000	0.001	0.000	–	0.000	0.001	0.000
Total KC-46A MOB 3	**0.203**	**0.005**	**0.252**	**0.010**	**0.012**	**0.564**	**0.008**	**–**	**0.050**	**0.370**	**0.159**

Table D.4-5. 2014 AGE Usages for the KC-135R Detachment at Seymour Johnson AFB

Source	Fuel Type	Hp	Load Factor	Hours/Year	Annual Hp-Hours
Air Compressor - MC-2A	JP-8	10.5	0.48	60	302
Floodlight (FL-1D & NF2D & lightcart)	JP-8	10.5	0.74	100	777
Next Generation Heater (NGH)	JP-8	7.0	0.95	50	333
Subtotal - 7-11 Hp					**1,412**
Jacking Manifold	JP-8	30.0	0.51	100	1,530
Subtotal - 26-40 Hp					**1,530**
Air Compressor - MC20	JP-8	50.0	1.00	120	6,000
Nitrogen Servicing Cart	JP-8	49.0	0.51	200	4,998
Subtotal - 41-50 Hp					**10,998**
Air Compressor - MC-7	JP-8	52.0	0.48	150	3,744
Generator Set - A/M32A-86D	JP-8	96.5	0.95	750	68,742
Subtotal - 76-100 Hp					**72,486**
Air Conditioners - MA-3D	JP-8	120.0	0.28	150	5,040
Hyd Test Stand - MJ-2	JP-8	125.0	0.51	75	4,781
Start Cart - A/M32A-95	JP-8	155.0	0.95	40	5,890
Subtotal - 101-175 Hp					**15,711**

Note: These data used as surrogates for AGE usages for KC-135 and KC-46A aircraft at all proposed basing locations.
Source: Seymour Johnson AFB Mobile AEI APIMS Data Entry_8Oct15.xlsx 'GSE', but some Hp ratings obtained from 5-2014 Seymour Johnson AFB Mobile AEI Process Calc Summary.pdf

Table D.4-6. Nonroad Diesel Equipment Emission Factors for 2019 - Westover ARB

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019										
Nonroad Equipment - 7-11 Hp	0.67	4.56	4.48	0.00	0.40	0.39	591	0.094	0.007	595
Nonroad Equipment - 26-40 Hp	0.30	1.17	3.60	0.00	0.18	0.18	634	0.094	0.007	638
Nonroad Equipment - 41-50 Hp	0.25	0.91	3.49	0.00	0.14	0.13	628	0.094	0.007	632
Nonroad Equipment - 76-100 Hp	0.49	2.94	2.52	0.00	0.40	0.39	644	0.094	0.007	648
Nonroad Equipment - 101-175 Hp	0.25	0.70	1.48	0.00	0.15	0.14	566	0.094	0.007	570

Table D.4-6. Nonroad Diesel Equipment Emission Factors for 2019 - Westover ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019										
Nonroad Equipment - 7-11 Hp	0.079	0.010	0.097	0.004	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.036	0.004	0.043	0.002	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.030	0.004	0.037	0.002	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.058	0.007	0.071	0.003	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.030	0.004	0.036	0.002	–	–	–	–	–	–

Table D.4-6. Nonroad Diesel Equipment Emission Factors for 2019 - Westover ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019											
Nonroad Equipment - 7-11 Hp	–	–	–	0.122	–	–	–	–	–	0.001	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.055	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.090	–	–	–	–	–	0.001	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.046	–	–	–	–	–	0.000	–

Table D.4-6. Nonroad Diesel Equipment Emission Factors for 2019 - Westover ARB (Continued)

Year/HP Category	Emission Factors (Grams/Horsepower) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.042	–	–	–	–	0.030
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.019	–	–	–	–	0.013
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.031	–	–	–	–	0.022
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.016	–	–	–	–	0.011

[a] Criteria pollutant factors estimated with the use of the USEPA NONROAD2008a model for Hampden County, MA.

[b] HAPs factors estimated with VOC speciation data presented in Table 4-3 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.4-7. Annual Air Emissions for AGE Usages - Westover ARB KC-46A MOB 3 Mission

Year/HP Category	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.37
Nonroad Equipment - 26-40 Hp	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.44
Nonroad Equipment - 41-50 Hp	0.00	0.00	0.02	0.00	0.00	0.00	3.08	0.00	0.00	3.10
Nonroad Equipment - 76-100 Hp	0.02	0.10	0.08	0.00	0.01	0.01	20.81	0.00	0.00	20.94
Nonroad Equipment - 101-175 Hp	0.00	0.00	0.01	0.00	0.00	0.00	3.96	0.00	0.00	3.99
Total - Year 2019	**0.02**	**0.11**	**0.11**	**0.00**	**0.02**	**0.01**	**28.65**	**0.00**	**0.00**	**28.83**

Table D.4-7. Annual Air Emissions for AGE Usages - Westover ARB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2019 [a]										
Nonroad Equipment - 7-11 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 26-40 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 41-50 Hp	0.000	0.000	0.000	0.000	–	–	–	–	–	–
Nonroad Equipment - 76-100 Hp	0.002	0.000	0.003	0.000	–	–	–	–	–	–
Nonroad Equipment - 101-175 Hp	0.001	0.000	0.001	0.000	–	–	–	–	–	–
Total - Year 2019	**0.003**	**0.000**	**0.004**	**0.000**	–	–	–	–	–	–

Table D.4-7. Annual Air Emissions for AGE Usages - Westover ARB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 26-40 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 41-50 Hp	–	–	–	0.000	–	–	–	–	–	0.000	–
Nonroad Equipment - 76-100 Hp	–	–	–	0.003	–	–	–	–	–	0.000	–
Nonroad Equipment - 101-175 Hp	–	–	–	0.001	–	–	–	–	–	0.000	–
Total - Year 2019	–	–	–	**0.005**	–	–	–	–	–	**0.000**	–

Table D.4-7. Annual Air Emissions for AGE Usages - Westover ARB KC-46A MOB 3 Mission (Continued)

Year/HP Category	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2019 [a]											
Nonroad Equipment - 7-11 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 26-40 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 41-50 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Nonroad Equipment - 76-100 Hp	–	0.000	–	–	–	0.001	–	–	–	–	0.001
Nonroad Equipment - 101-175 Hp	–	0.000	–	–	–	0.000	–	–	–	–	0.000
Total - Year 2019	–	**0.000**	–	–	–	**0.002**	–	–	–	–	**0.001**

[a] 2014 Seymour Johnson AFB AGE hp-hr * (2019 Westover ARB MOB 3 KC-46A LTOs [647] / 2014 Seymour Johnson AFB KC-135 LTOs [1,100]) * (2019 Nonroad EFs).

– = Source does not emit particular pollutant

Table D.4-8. Annual VMT for GOVs by Vehicle Class - Westover ARB 2014

Vehicle Class	Annual VMT
LDGV	1,152,280
LDGT	10,613
HDGV	10,613
HDDV	795,350
Total VMT	**1,968,855**

Note: Developed from 2014 Westover ARB GHG Emissions Report (Westover ARB 2015a).

Table D.4-9. Annual Number of Workers at Westover ARB - KC-46A MOB 3 Mission

Scenario	Total Base Workers
Year 2013 Westover ARB Total [a]	3,813
Year 2015 Westover ARB Total [b]	2,654
Year 2019 MOB 3 [b]	627

[a] Source: 439 AW Westover ARB 2014 Westover EIA Report.pdf

[b] Source: EIS Table 2-16.

Table D.4-10. Annual Average On-Road Vehicle Emission Factors - Westover ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.07	2.56	0.33	0.01	0.07	0.02	382	–	–	382
LDGT - 25 mph	0.33	7.74	1.20	0.01	0.08	0.02	533	–	–	533
HGDV - 25 mph	0.30	7.35	1.15	0.01	0.08	0.02	530	–	–	530
HDDV - 25 mph	0.55	2.38	8.24	0.02	0.69	0.39	2,101	–	–	2,101
Year 2019										
LDGV - 25 mph	0.02	1.77	0.11	0.00	0.06	0.01	316	–	–	316
LDGT - 25 mph	0.12	5.52	0.47	0.00	0.08	0.02	498	–	–	498
HGDV - 25 mph	0.11	5.39	0.44	0.00	0.08	0.02	495	–	–	495
HDDV - 25 mph	0.27	1.31	4.54	0.02	0.49	0.20	2,031	–	–	2,031

Table D.4-10. Annual Average On-Road Vehicle Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.040	0.000	–	–	–	–	–	–
LDGT - 25 mph	0.005	0.001	0.185	0.002	–	–	–	–	–	–
HGDV - 25 mph	–	–	0.006	–	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.013	0.000	–	–	–	–	–	–
LDGT - 25 mph	0.002	0.000	0.068	0.001	–	–	–	–	–	–
HGDV - 25 mph	–	–	0.002	–	–	–	–	–	–	–
HDDV - 25 mph	–	–	–	–	–	–	–	–	–	–

Table D.4-10. Annual Average On-Road Vehicle Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT - 25 mph	–	–	0.008	0.011	0.006	–	–	0.000	0.000	0.000	–
HGDV - 25 mph	–	–	0.002	–	0.005	–	–	–	–	–	–
HDDV - 25 mph	–	–	0.007	–	0.013	–	–	–	0.013	–	–
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
HGDV - 25 mph	–	–	0.001	–	0.002	–	–	–	–	–	–
HDDV - 25 mph	–	–	0.004	–	0.007	–	–	–	0.007	–	–

Table D.4-10. Annual Average On-Road Vehicle Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class-Speed	Emission Factors (Grams/Mile) ~~a b~~										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.008	–	0.002	–	–	0.006
LDGT - 25 mph	–	–	0.000	–	–	0.005	–	0.013	–	–	0.027
HGDV - 25 mph	–	–	–	–	–	0.010	–	0.005	–	–	0.009
HDDV - 25 mph	–	–	0.011	–	–	–	–	0.000	–	–	–
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.002	–	0.000	–	–	0.002
LDGT - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.010
HGDV - 25 mph	–	–	–	–	–	0.004	–	0.002	–	–	0.003
HDDV - 25 mph	–	–	0.006	–	–	–	–	0.000	–	–	–

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Hampden County, MA.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

– = Source does not emit particular pollutant

Table D.4-11. Annual Emissions from GOV Activities - Westover ARB KC-46A MOB 3 Mission

Scenario/Vehicle Class	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 Westover ARB Total [a]										
LDGV	0.06	2.26	0.29	0.01	0.06	0.01	338	–	–	338
LDGT	0.00	0.06	0.01	0.00	0.00	0.00	4	–	–	4
HDGV	0.00	0.06	0.01	0.00	0.00	0.00	4	–	–	4
HDDV	0.33	1.45	5.03	0.01	0.42	0.24	1,282	–	–	1,282
Total - Year 2015	**0.40**	**3.84**	**5.34**	**0.02**	**0.49**	**0.25**	**1,629**	–	–	**1,629**
Year 2019 MOB 3 [a]										
LDGV	0.00	0.37	0.02	0.00	0.01	0.00	66	–	–	66
LDGT	0.00	0.01	0.00	0.00	0.00	0.00	1	–	–	1
HDGV	0.00	0.01	0.00	0.00	0.00	0.00	1	–	–	1
HDDV	0.04	0.19	0.65	0.00	0.07	0.03	293	–	–	293
Total - Year 2019	**0.04**	**0.58**	**0.68**	**0.00**	**0.08**	**0.03**	**361**	–	–	**361**

Table D.4-11. Annual Emissions from GOV Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 Westover ARB Total [a]										
LDGV	0.000	0.000	0.035	0.000	–	–	–	–	–	–
LDGT	0.000	0.000	0.002	0.000	–	–	–	–	–	–
HDGV	–	–	0.000	–	–	–	–	–	–	–
HDDV	–	–	–	–	–	–	–	–	–	–
Total - Year 2015	**0.000**	**0.000**	**0.037**	**0.000**	–	–	–	–	–	–
Year 2019 MOB 3 [a]										
LDGV	0.000	0.000	0.003	0.000	–	–	–	–	–	–
LDGT	0.000	0.000	0.000	0.000	–	–	–	–	–	–
HDGV	–	–	0.000	–	–	–	–	–	–	–
HDDV	–	–	–	–	–	–	–	–	–	–
Total - Year 2019	**0.000**	**0.000**	**0.003**	**0.000**	–	–	–	–	–	–

Table D.4-11. Annual Emissions from GOV Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 Westover ARB Total [a]											
LDGV	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV	–	–	0.004	–	0.008	–	–	–	0.008	–	–
Total - Year 2015	**–**	**–**	**0.006**	**0.001**	**0.009**	**–**	**–**	**0.000**	**0.008**	**0.000**	**–**
Year 2019 MOB 3 [a]											
LDGV	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
HDGV	–	–	0.000	–	0.000	–	–	–	–	–	–
HDDV	–	–	0.001	–	0.001	–	–	–	0.001	–	–
Total - Year 2019	**–**	**–**	**0.001**	**0.000**	**0.001**	**–**	**–**	**0.000**	**0.001**	**0.000**	**–**

Table D.4-11. Annual Emissions from GOV Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario/Vehicle Class	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 Westover ARB Total [a]											
LDGV	–	–	0.000	–	–	0.007	–	0.001	–	–	0.006
LDGT	–	–	0.000	–	–	0.000	–	0.000	–	–	0.000
HDGV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
HDDV	–	–	0.007	–	–	–	–	0.000	–	–	–
Total - Year 2015	**–**	**–**	**0.007**	**–**	**–**	**0.007**	**–**	**0.002**	**–**	**–**	**0.006**
Year 2019 MOB 3 [a]											
LDGV	–	–	0.000	–	–	0.001	–	0.000	–	–	0.000
LDGT	–	–	0.000	–	–	0.000	–	0.000	–	–	0.000
HDGV	–	–	–	–	–	0.000	–	0.000	–	–	0.000
HDDV	–	–	0.001	–	–	–	–	0.000	–	–	–
Total - Year 2019	**–**	**–**	**0.001**	**–**	**–**	**0.001**	**–**	**0.000**	**–**	**–**	**0.000**

[a] 2014 Westover ARB GOV VMT * (Scenario Year Population/Westover ARB 2014 Population) * future year vehicle emission factors.

– = Source does not emit particular pollutant

Table D.4-12. Annual On-Base On-Road Vehicle Mileage Calculations - Westover ARB MOB 3 Mission

Scenario	# of Workers [a]	Vehicle Occupancy Rate	On-Base Miles per Round Trip	Days per Year	On-Base Miles per year
Year 2015 Westover ARB Total a					
Onbase Personnel	630	1.0	2.0	250	315,000
Reservists	2,024	1.0	2.0	24	97,152
Total Onbase VMT - Year 2015					**412,152**
Year 2019 MOB 3					
Onbase Personnel	159	1.0	2.0	250	79,500
Reservists	453	1.0	2.0	24	21,744
Contractors and Vendors	15	1.0	3.0	247	11,115
Total Onbase VMT - Year 2019 MOB 3 Scenario					**112,359**

[a] # of Workers from EIS Table 2-16.

Table D.4-13. Annual Average On-Road Emission Factors - Westover ARB KC-46A MOB 3 Mission

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.07	2.56	0.33	0.01	0.07	0.02	382	–	–	382
LDGT1 - 25 mph	0.33	7.74	1.20	0.01	0.08	0.02	533	–	–	533
Composite [c]	**0.16**	**4.48**	**0.65**	**0.01**	**0.08**	**0.02**	**438**	–	–	**438**
Year 2019										
LDGV - 25 mph	0.02	1.77	0.11	0.00	0.06	0.01	316	–	–	316
LDGT2 - 25 mph	0.12	5.52	0.47	0.00	0.08	0.02	498	–	–	498
Composite [c]	**0.06**	**3.15**	**0.24**	**0.00**	**0.06**	**0.01**	**384**	–	–	**384**

Table D.4-13. Annual Average On-Road Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.040	0.000	–	–	–	–	–	–
LDGT2 - 25 mph	0.005	0.001	0.185	0.002	–	–	–	–	–	–
Composite [c]	**0.002**	**0.001**	**0.094**	**0.001**	–	–	–	–	–	–
Year 2019										
LDGV - 25 mph	0.000	0.000	0.013	0.000	–	–	–	–	–	–
LDGT2 - 25 mph	0.002	0.000	0.068	0.001	–	–	–	–	–	–
Composite [c]	**0.001**	**0.000**	**0.033**	**0.000**	–	–	–	–	–	–

Table D.4-13. Annual Average On-Road Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT2 - 25 mph	–	–	0.008	0.011	0.006	–	–	0.000	0.000	0.000	–
Composite [c]	**–**	**–**	**0.004**	**0.005**	**0.003**	**–**	**–**	**0.000**	**0.000**	**0.000**	**–**
Year 2019											
LDGV - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT2 - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
Composite [c]	**–**	**–**	**0.001**	**0.002**	**0.001**	**–**	**–**	**0.000**	**0.000**	**0.000**	**–**

Table D.4-13. Annual Average On-Road Emission Factors - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	Propanal	**Pyrene**	**Styrene**	**1,1,2,2-Tetrachloroethane**	**Tetrachloroethene**	**Toluene**	**1,1,1-Trichloroethane**	**2,2,4-Trimethylpentane**	**Vinyl Acetate**	**mp-Xylene**	**o-Xylene**
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.008	–	0.002	–	–	0.006
LDGT2 - 25 mph	–	–	0.000	–	–	0.005	–	0.013	–	–	0.027
Composite [c]	**–**	**–**	**0.000**	**–**	**–**	**0.007**	**–**	**0.006**	**–**	**–**	**0.014**
Year 2019											
LDGV - 25 mph	–	–	0.000	–	–	0.002	–	0.000	–	–	0.002
LDGT2 - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.010
Composite [c]	**–**	**–**	**0.000**	**–**	**–**	**0.002**	**–**	**0.002**	**–**	**–**	**0.005**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Hampden County, MA.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 63/37% LDGV/LDGT1.

– = Source does not emit particular pollutant

Table D.4-14. Annual Emissions from On-Base On-Road Vehicle Activities - Westover ARB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 Westover Total [a]	0.07	2.03	0.29	0.00	0.03	0.01	199.10	–	–	199.10
Year 2019 MOB 3 [a]	0.01	0.39	0.03	0.00	0.01	0.00	47.53	–	–	47.53

Table D.4-14. Annual Emissions from On-Base On-Road Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 Westover Total [a]	0.001	0.000	0.043	0.000	–	–	–	–	–	–
Year 2019 MOB 3 [a]	0.000	0.000	0.004	0.000	–	–	–	–	–	–

Table D.4-14. Annual Emissions from On-Base On-Road Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 Westover Total [a]	–	–	0.002	0.002	0.001	–	–	0.000	0.000	0.000	–
Year 2019 MOB 3 [a]	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–

Table D.4-14. Annual Emissions from On-Base On-Road Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 Westover Total [a]	–	–	0.000	–	–	0.003	–	0.003	–	–	0.006
Year 2019 MOB 3 [a]	–	–	0.000	–	–	0.000	–	0.000	–	–	0.001

[a] Scenario on-base VMT * scenario year composite emission factors.

– = Source does not emit particular pollutant

Table D.4-15. Annual Off-Base On-Road Vehicle Mileage Calculations - Westover ARB MOB 3 Mission

Scenario	# of Workers [a]	Vehicle Occupancy Rate	On-Base Miles per Round Trip [b]	Days per Year	On-Base Miles per year
Year 2015 Westover ARB Total a					
Onbase Personnel	630	1.0	20.0	250	3,150,000
Reservists	2,024	1.0	100.0	24	4,857,600
Total Offbase VMT - Year 2015					**8,007,600**
Year 2019 MOB 3					
Onbase Personnel	159	1.0	20.0	250	795,000
Reservists	453	1.0	100.0	24	1,087,200
Contractors and Vendors	15	1.0	20.0	247	74,100
Total Offbase VMT - Year 2019 MOB 3 Scenario					**1,956,300**

[a] # of Workers from EIS Table 2-16.

[b] Source: ConformityAnalysis_ArmyBRACtoWestover.pdf but lowered onbase personnel off-base VMT to 20 miles/RT.

Table D.4-16. Annual Average On-Road Emission Factors for Off-Site Activities - Westover ARB KC-46A MOB 3 Mission

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015										
LDGV - 25 mph	0.07	2.56	0.33	0.01	0.07	0.02	382	–	–	382
LDGV - 55 mph	0.05	2.34	0.33	0.01	0.03	0.01	303	–	–	303
LDGT1 - 25 mph	0.33	7.74	1.20	0.01	0.08	0.02	533	–	–	533
LDGT1 - 55 mph	0.14	6.71	1.22	0.01	0.04	0.02	438	–	–	438
Composite [c]	**0.10**	**4.09**	**0.66**	**0.01**	**0.04**	**0.02**	**374**	**–**	**–**	**374**
Year 2019										
LDGV - 25 mph	0.02	1.77	0.11	0.00	0.06	0.01	316	–	–	316
LDGV - 55 mph	0.02	1.74	0.12	0.00	0.02	0.01	276	–	–	276
Composite [d]	**0.02**	**1.74**	**0.12**	**0.00**	**0.03**	**0.01**	**286**	**–**	**–**	**286**
LDGT1 - 25 mph	0.12	5.52	0.47	0.00	0.08	0.02	498	–	–	498
LDGT1 - 55 mph	0.06	5.16	0.49	0.00	0.03	0.01	410	–	–	410
Composite [d]	**0.07**	**5.25**	**0.48**	**0.00**	**0.04**	**0.01**	**432**	**–**	**–**	**432**

Table D.4-16. Annual Average On-Road Emission Factors for Off-Site Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015										
LDGV - 25 mph	0.000	0.000	0.040	0.000	–	–	–	–	–	–
LDGT2 - 25 mph	0.000	0.000	0.028	0.000	–	–	–	–	–	–
LDGT2 - 55 mph	0.005	0.001	0.185	0.002	–	–	–	–	–	–
HDGV2B - 55 mph	0.002	0.001	0.079	0.001	–	–	–	–	–	–
Composite [d]	**0.001**	**0.000**	**0.059**	**0.001**	**–**	**–**	**–**	**–**	**–**	**–**
Year 2019										
LDGT2 - 25 mph	0.000	0.000	0.013	0.000	–	–	–	–	–	–
LDGT2 - 55 mph	0.000	0.000	0.011	0.000	–	–	–	–	–	–
Composite [d]	**0.000**	**0.000**	**0.011**	**0.000**	**–**	**–**	**–**	**–**	**–**	**–**
HDGV2B - 25 mph	0.002	0.000	0.068	0.001	–	–	–	–	–	–
HDGV2B - 55 mph	0.001	0.000	0.032	0.000	–	–	–	–	–	–
Composite [d]	**0.001**	**0.000**	**0.041**	**0.000**	**–**	**–**	**–**	**–**	**–**	**–**

Table D.4-16. Annual Average On-Road Emission Factors for Off-Site Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015											
LDGV - 25 mph	–	–	0.002	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT2 - 25 mph	–	–	0.001	0.001	0.001	–	–	0.000	0.000	0.000	–
LDGT2 - 55 mph	–	–	0.008	0.011	0.006	–	–	0.000	0.000	0.000	–
HDGV2B - 55 mph	–	–	0.003	0.005	0.003	–	–	0.000	0.000	0.000	–
Composite [d]	–	–	**0.002**	**0.003**	**0.002**	–	–	**0.000**	**0.000**	**0.000**	–
Year 2019											
LDGT2 - 25 mph	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT2 - 55 mph	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
Composite [d]	–	–	**0.000**	**0.000**	**0.000**	–	–	**0.000**	**0.000**	**0.000**	–
HDGV2B - 25 mph	–	–	0.003	0.004	0.002	–	–	0.000	0.000	0.000	–
HDGV2B - 55 mph	–	–	0.001	0.002	0.001	–	–	0.000	0.000	0.000	–
Composite [d]	–	–	**0.002**	**0.002**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.4-16. Annual Average On-Road Emission Factors for Off-Site Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Project Year/Source Type	Emission Factors (Grams/Mile) [a b]										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015											
LDGV - 25 mph	–	–	0.000	–	–	0.008	–	0.002	–	–	0.006
LDGT2 - 25 mph	–	–	0.000	–	–	0.005	–	0.001	–	–	0.005
LDGT2 - 55 mph	–	–	0.000	–	–	0.005	–	0.013	–	–	0.027
HDGV2B - 55 mph	–	–	0.000	–	–	0.002	–	0.006	–	–	0.011
Composite [d]	**–**	**–**	**0.000**	**–**	**–**	**0.005**	**–**	**0.004**	**–**	**–**	**0.009**
Year 2019											
LDGT2 - 25 mph	–	–	0.000	–	–	0.002	–	0.000	–	–	0.002
LDGT2 - 55 mph	–	–	0.000	–	–	0.002	–	0.000	–	–	0.002
Composite [d]	**–**	**–**	**0.000**	**–**	**–**	**0.002**	**–**	**0.000**	**–**	**–**	**0.002**
HDGV2B - 25 mph	–	–	0.000	–	–	0.002	–	0.005	–	–	0.010
HDGV2B - 55 mph	–	–	0.000	–	–	0.001	–	0.002	–	–	0.005
Composite [d]	**–**	**–**	**0.000**	**–**	**–**	**0.001**	**–**	**0.003**	**–**	**–**	**0.006**

[a] Estimated with the use of the USEPA MOVES2014a model for default conditions in Hampden County, MA.

[b] HAPs factors estimated with the use of VOC speciation data presented in Table 5-43 of Air Emissions Guide for Air Force Mobile Sources (AFCEC 2014).

[c] Equal to 63/37% LDGV/LDGT and 75/25% 55/25 mph.

[d] Equal to 75/25% 55/25 mph.

– = Source does not emit particular pollutant

Table D.4-17. Annual Emissions from Off-Base Vehicle Activities - Westover ARB KC-46A MOB 3 Mission

Scenario	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2015 Westover Total [a]										
Total	**0.91**	**36.07**	**5.79**	**0.07**	**0.37**	**0.14**	**3,305**	**–**	**–**	**3,305**
Year 2019 MOB 3 [b]										
LDGV	0.03	2.37	0.17	0.00	0.04	0.01	389	–	–	389
LDGT	0.06	4.19	0.39	0.00	0.03	0.01	345	–	–	345
Total	**0.08**	**6.56**	**0.55**	**0.00**	**0.07**	**0.02**	**733**	**–**	**–**	**733**

Table D.4-17. Annual Emissions from Off-Base Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
Year 2015 Westover Total [a]										
Total	**0.011**	**0.003**	**0.517**	**0.005**	–	–	–	–	–	–
Year 2019 MOB 3 [a]										
LDGV	0.000	0.000	0.015	0.000	–	–	–	–	–	–
LDGT	0.001	0.000	0.033	0.000	–	–	–	–	–	–
Total	**0.001**	**0.000**	**0.048**	**0.001**	–	–	–	–	–	–

Table D.4-17. Annual Emissions from Off-Base Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
Year 2015 Westover Total [a]											
Total	–	–	**0.022**	**0.024**	**0.016**	–	–	**0.000**	**0.001**	**0.000**	–
Year 2019 MOB 3 [a]											
LDGV	–	–	0.001	0.000	0.000	–	–	0.000	0.000	0.000	–
LDGT	–	–	0.001	0.002	0.001	–	–	0.000	0.000	0.000	–
Total	–	–	**0.002**	**0.002**	**0.001**	–	–	**0.000**	**0.000**	**0.000**	–

Table D.4-17. Annual Emissions from Off-Base Vehicle Activities - Westover ARB KC-46A MOB 3 Mission (Continued)

Scenario	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
Year 2015 Westover Total [a]											
Total	–	–	**0.001**	–	–	**0.043**	–	**0.031**	–	–	**0.078**
Year 2019 MOB 3 [a]											
LDGV	–	–	0.000	–	–	0.003	–	0.001	–	–	0.002
LDGT	–	–	0.000	–	–	0.001	–	0.002	–	–	0.005
Total	–	–	**0.000**	–	–	**0.004**	–	**0.003**	–	–	**0.007**

[a] 2015 emissions = 2015 Total Off-base VMT * 2015 composite emission factors.

[b] 2019 emissions = 2019 Total Off-base VMT * 2019 composite emission factors.

– = Source does not emit particular pollutant

Table D.4-18. Annual Number of Aircraft LTOs - Westover ARB KC-46A MOB 3 Mission

Scenario	Number of LTOs
Year 2013 All Westover ARB (1)	1,963
Year 2015 Westover Total (2)	1,782
Year 2019 MOB 3 (2)	647

Notes:

(1) Source: For # of Workers (439 AW Westover ARB 2014 Westover EIA Report.pdf)
and for # of LTOs 2013 AICUZ Study.

(2) Source: EIS Tables 2-16 thru 18. For 2015 Westover Total, excluded civilian aircraft.
as these ops not part of the Westover ARB stn source emissions.

Table D.4-19. Annual Emissions from Point and Area Sources - Westover ARB KC-46A MOB 3 Mission

Scenario Year/ Source Type	Tons per Year									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Year 2013 All Westover ARB [a]										
Total - Year 2013	1.72	4.41	6.52	0.08	0.51	0.41	6,739	–	–	–
Year 2015 All Westover [b]										
Total - Year 2015	1.56	4.00	5.92	0.07	0.46	0.37	6,118	–	–	–
Year 2019 MOB 3 Scenario [b]										
Total - Year 2019 MOB 3 Scenario	0.57	1.45	2.15	0.03	0.17	0.14	2,221	–	–	–

[a] Source: Westover ARB 2013 Air Emissions Report (Westover ARB 2014).

[b] 2013 emissions * future year scenario LTOs/Westover ARB year 2013 LTOs.

– = Source does not emit particular pollutant

Table D.4-20. 2015 Non-Aircraft Emissions for Westover ARB - KC-46A MOB 3 Mission Existing Conditions

Source Type	Annual Emissions (Tons)									
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e (mt)
KC-135 Aircraft Operations	–	–	–	–	–	–	–	–	–	–
On-Wing Aircraft Engine Testing - KC-135	–	–	–	–	–	–	–	–	–	–
Aerospace Ground Support Equipment	–	–	–	–	–	–	–	–	–	–
GOVs/Nonroad Equipment	0.40	3.84	5.34	0.02	0.49	0.25	1,629	–	–	1,480
Privately-Owned Vehicles - On-Base	0.07	2.03	0.29	0.00	0.03	0.01	199	–	–	181
Privately-Owned Vehicles - Off-Base	0.91	36.07	5.79	0.07	0.37	0.14	3,305	–	–	3,004
Point and Area Sources	1.56	4.00	5.92	0.07	0.46	0.37	6,118	–	–	5,561
Total Emissions	**2.94**	**45.95**	**17.34**	**0.16**	**1.35**	**0.77**	**11,250**	–	–	**10,227**
Mobile Sources Only	**1.38**	**41.95**	**11.42**	**0.09**	**0.89**	**0.40**	**5,133**	–	–	**4,666**

Table D.4-20. 2015 Non-Aircraft Emissions for Westover ARB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)									
	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Chloromethane	Dibutyl Phthalate	1,2-Dichloropropane
KC-135 Aircraft Operations	–	–	–	–	–	–	–	–	–	–
On-Wing Aircraft Engine Testing - KC-135	–	–	–	–	–	–	–	–	–	–
Aerospace Ground Support Equipment	–	–	–	–	–	–	–	–	–	–
GOVs/Nonroad Equipment	0.000	0.000	0.037	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.001	0.000	0.043	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.011	0.003	0.517	0.005	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Emissions	**0.012**	**0.004**	**0.597**	**0.006**	–	–	–	–	–	–

Table D.4-20. 2015 Non-Aircraft Emissions for Westover ARB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethyl benzene	Naphth-alene	Phenol
KC-135 Aircraft Operations	–	–	–	–	–	–	–	–	–	–	–
On-Wing Aircraft Engine Testing - KC-135	–	–	–	–	–	–	–	–	–	–	–
Aerospace Ground Support Equipment	–	–	–	–	–	–	–	–	–	–	–
GOVs/Nonroad Equipment	–	–	0.006	0.001	0.009	–	–	0.000	0.008	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.002	0.002	0.001	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.022	0.024	0.016	–	–	0.000	0.001	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**–**	**–**	**0.029**	**0.027**	**0.026**	**–**	**–**	**0.000**	**0.010**	**0.000**	**–**

Table D.4-20. 2015 Non-Aircraft Emissions for Westover ARB - KC-46A MOB 3 Mission Existing Conditions (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-135 Aircraft Operations	–	–	–	–	–	–	–	–	–	–	–
On-Wing Aircraft Engine Testing - KC-135	–	–	–	–	–	–	–	–	–	–	–
Aerospace Ground Support Equipment	–	–	–	–	–	–	–	–	–	–	–
GOVs/Nonroad Equipment	–	–	0.007	–	–	0.007	–	0.002	–	–	0.006
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.003	–	0.003	–	–	0.006
Privately-Owned Vehicles - Off-Base	–	–	0.001	–	–	0.043	–	0.031	–	–	0.078
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Emissions	**–**	**–**	**0.008**	**–**	**–**	**0.053**	**–**	**0.036**	**–**	**–**	**0.091**

– = Source does not emit particular pollutant

Table D.4-21. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Westover ARB - 2019

Source Type	Annual Emissions (Tons)									
	VOC	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
KC-46A Aircraft Operations	12.09	53.51	329.07	17.21	1.07	0.91	51,992	1.44	1.62	47,749
On-Wing Aircraft Engine Testing - KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,899	0.14	0.15	4,500
Aerospace Ground Support Equipment - KC-46A	0.02	0.11	0.11	0.00	0.02	0.01	29	0.00	0.00	26
Government-Owned Vehicles	0.04	0.58	0.68	0.00	0.08	0.03	361	–	–	328
Privately-Owned Vehicles - On-Base	0.01	0.39	0.03	0.00	0.01	0.00	48	–	–	43
Privately-Owned Vehicles - Off-Base	0.08	6.56	0.55	0.00	0.07	0.02	733	0.00	0.00	667
Point and Area Sources	0.57	1.45	2.15	0.03	0.17	0.14	2,221	–	–	2,019
Total Proposed Emissions - 2019	**24.38**	**102.32**	**351.32**	**18.92**	**1.58**	**1.26**	**60,283**	**1.58**	**1.77**	**55,332**
Hampden County PSD Thresholds	**250**	**250**	**250**	**250**	**250**	**250**	**–**	**–**	**–**	**–**

Table D.4-21. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Westover ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)									
	Acetalde-hyde	Acrolein	Benzene	1,3-Butadiene	Carbon Disulfide	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Dibutyl Phthalate	1,2-Dichloro-propane
KC-46A Aircraft Operations	0.440	0.280	1.132	0.161	0.013	0.012	0.028	0.026	0.009	0.011
On-Wing Aircraft Engine Testing - KC-46A	0.445	0.294	1.182	0.171	0.009	0.008	0.015	0.014	0.002	0.010
Aerospace Ground Support Equipment - KC-46A	0.003	0.000	0.004	0.000	–	–	–	–	–	–
Government-Owned Vehicles	0.000	0.000	0.003	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - On-Base	0.000	0.000	0.004	0.000	–	–	–	–	–	–
Privately-Owned Vehicles - Off-Base	0.001	0.000	0.048	0.001	–	–	–	–	–	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.889**	**0.575**	**2.372**	**0.332**	**0.022**	**0.020**	**0.044**	**0.041**	**0.011**	**0.021**

Table D.4-21. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Westover ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	2,4-Dinitro-phenol	DEHP	Ethyl-benzene	Formalde-hyde	Hexane	Methanol	Methylene Chloride	MTBE	Methylethylbenzene	Naphth-alene	Phenol
KC-46A Aircraft Operations	0.009	0.065	0.184	4.527	–	–	0.474	–	–	0.446	0.230
On-Wing Aircraft Engine Testing - KC-46A	0.005	0.034	0.194	4.570	–	–	0.152	–	–	0.475	0.239
Aerospace Ground Support Equipment - KC-46A	–	–	–	0.005	–	–	–	–	–	0.000	–
Government-Owned Vehicles	–	–	0.001	0.000	0.001	–	–	0.000	0.001	0.000	–
Privately-Owned Vehicles - On-Base	–	–	0.000	0.000	0.000	–	–	0.000	0.000	0.000	–
Privately-Owned Vehicles - Off-Base	–	–	0.002	0.002	0.001	–	–	0.000	0.000	0.000	–
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.014**	**0.099**	**0.380**	**9.104**	**0.003**	**–**	**0.626**	**0.000**	**0.001**	**0.922**	**0.470**

Table D.4-21. Annual Emissions Associated with the Proposed KC-46A MOB 3 Mission at Westover ARB - 2019 (Continued)

Source Type	Annual Emissions (Tons)										
	Propanal	Pyrene	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	2,2,4-Trimethylpentane	Vinyl Acetate	mp-Xylene	o-Xylene
KC-46A Aircraft Operations	0.3073	0.004	0.236	0.012	0.017	0.544	0.011	–	0.058	0.360	0.151
On-Wing Aircraft Engine Testing - KC-46A	0.2034	0.005	0.252	0.010	0.012	0.564	0.008	–	0.050	0.370	0.159
Aerospace Ground Support Equipment - KC-46A	–	0.000	–	–	–	0.002	–	–	–	–	0.001
Government-Owned Vehicles	–	–	0.001	–	–	0.001	–	0.000	–	–	0.000
Privately-Owned Vehicles - On-Base	–	–	0.000	–	–	0.000	–	0.000	–	–	0.001
Privately-Owned Vehicles - Off-Base	–	–	0.000	–	–	0.004	–	0.003	–	–	0.007
Point and Area Sources	–	–	–	–	–	–	–	–	–	–	–
Total Proposed Emissions - 2019	**0.5107**	**0.009**	**0.489**	**0.023**	**0.029**	**1.115**	**0.019**	**0.003**	**0.108**	**0.729**	**0.320**

– = Source does not emit particular pollutant

Table D.4-22. Increase in Annual CO Emissions within the Springfield City CO Maintenance Area Due to the KC-46A MOB 3 Mission at Westover ARB

Source Type	Annual Emissions (Tons)						
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2
LTOs - KC-46A [a]	–	0.07	–	–	–	–	–
Closed Patterns - KC-46A [b]	–	0.34	–	–	–	–	–
POVs Off-Base [c]	–	1.64	–	–	–	–	–
Total MOB 3 Scenario	**–**	**2.04**	**–**	**–**	**–**	**–**	**–**
Springfield City Conformity Threshold	**–**	**100**	**–**	**–**	**–**	**–**	**–**

[a] Noise profiles show that ~6.3% of the LTOs would occur below 3,000 feet AGL and within the CO maintenance area

[b] Noise profiles show that ~2.1% of the closed patterns would occur below 3,000 feet AGL and within the CO maintenance area

[c] Assumes that 25% of the offbase commuting VMT would occur within the CO maintenance areas.

– = Source does not emit particular pollutant

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APPENDIX E

COMMON FLORA AND FAUNA KNOWN TO OCCUR AT EACH ALTERNATIVE INSTALLATION

APPENDIX E COMMON FLORA AND FAUNA KNOWN TO OCCUR AT EACH ALTERNATIVE BASE

Appendix E, Tables E-1 through E-4, lists common flora and fauna (common and scientific names) known to occur at each of the proposed KC-46A Third Main Operating Base (MOB 3) beddown alternative locations. Tables E-1 lists common flora and fauna known to occur at Grissom Air Reserve Base (ARB). Table E-2 lists common flora and fauna known to occur at Seymour Johnson Air Force Base (AFB). Table E-3 lists common flora and fauna known to occur at Tinker AFB. Tables E-4 lists common flora and fauna known to occur at Westover ARB.

Table E-1. Common Flora and Fauna Known to Occur at Grissom ARB[a]

Common Name	Scientific Name
Grasses	
colonial bent grass	*Agrostis tenuis*
brome	*Bromus macrostachys*
tall fescue	*Festuca arundinacea*
meadow fescue	*Festuca elatior*
Kentucky bluegrass	*Poa pratensis*
Shrubs	
eastern red cedar	*Juniperus virginiana*
spreading yew	*Taxus caspidata*
pyramidal yew	*Taxus caspidata capitata*
northern white-cedar	*Thuja occidentalis*
eastern hemlock	*Tsuga canadensis*
Trees	
sugar maple	*Acer saccharum*
American beech	*Fagus grandifolia*
white pine	*Pinus strobus*
American sycamore	*Platanus occidentalis*
eastern cottonwood	*Populus deltoides*
white oak	*Quercus alba*
Mammals	
coyote	*Canis latrans*
woodchuck	*Marmota monax*
white-tailed deer	*Odocoileus virginianus*
cotton mouse	*Peromyscus gossypinus*
white-footed mouse	*Peromyscus leucopus*
raccoon	*Procyon lotor*
gray squirrel	*Sciurus carolinensis*
eastern cottontail	*Sylvilagus floridanus*
eastern chipmunk	*Tamias striatus*
red fox	*Vulpes vulpes*
Birds	
red-winged black bird	*Agelaius phoeniceus*
mallard	*Anas platyrhynchos*
black duck	*Anas rubripes*
great blue heron	*Ardea herodias*
American bittern	*Botaurus lentiginosus*
Canada goose	*Branta canadensis*
red-tailed hawk	*Buteo jamaicensis*
red-shouldered hawk	*Buteo lineatus*
cardinal	*Cardinalis cardinalis*
turkey vulture	*Cathartes aura*
killdeer	*Charadrius vociferus*
American kestrel	*Falco sparverius*
American coot	*Fulica americana*
northern mockingbird	*Mimus polyglottos*
black-crowned night heron	*Nycticorax nycticorax*
house sparrows	*Passer domesticus*
yellow-rumped warbler	*Setophaga coronata*
common starling	*Sturnus vulgaris*
American robin	*Turdus migratorius*
mourning dove	*Zenaida macroura*
white-throated sparrow	*Zonotrichia albicollis*

Table E-1. Common Flora and Fauna Known to Occur at Grissom ARB[a] (Continued)

Common Name	Scientific Name
Amphibians and Reptiles	
northern leopard frog	*Lithobates pipiens*
box turtle	*Terrapene carolina*
common garter snake	*Thamnophis sirtalis*
Fish	
central stoneroller	*Campostoma anomalum*
speckled chub	*Extrarius aestivalis*
redfin shiner	*Lythrurus umbratilis*
bluntnose minnow	*Pimephales notatus*
blacknose dace	*Rhinichthys atratulus*

[a] Grissom ARB 2011.

Table E-2. Common Flora and Fauna Known to Occur at Seymour Johnson AFB[a]

Common Name	Scientific Name
Grasses	
onion grass	*Allium canadense*
yellow thistle	*Cirsium horridulum*
Bermuda grass	*Cynodon dactylon*
crab grass	*Digitaria sanguinalis*
goose grass	*Eleusine indica*
Shrubs	
switchcane	*Arundinaria gigantea* ssp. *tecta*
possumhaw	*Ilex decidua*
yaupon	*Ilex vomitoria*
Japanese honeysuckle	*Lonicera japonica*
wax myrtle	*Morella cerifera*
saw greenbrier	*Smilax bona-nox*
roundleaf greenbrier	*Smilax rotundifolia*
sweetleaf	*Symplocos tinctoria*
Munson's grape	*Vitis rotundifolia*
Trees	
red maple	*Acer rubrum*
flowering dogwood	*Cornus florida*
crapemyrtle	*Lagerstroemia indica*
sweetgum	*Liquidambar styraciflua*
longleaf pine	*Pinus palustris*
loblolly pine	*Pinus taeda*
ornamental pear	*Pyrus* sp.
southern red oak	*Quercus falcata*
water oak	*Quercus nigra*
willow oak	*Quercus phellos*
Mammals	
Virginia opossum	*Didelphis virginiana*
white-tailed deer	*Odocoileus virginianus*
raccoon	*Procyon lotor*
gray squirrel	*Sciurus carolinensis*
Birds	
grasshopper sparrows	*Ammodramus savannarum*
northern cardinal	*Cardinalis cardinalis*
gray catbird	*Dumetella carolinensis*
wood thrush	*Hylocichla mustelina*
woodpeckers	*Picidae family*
Carolina chickadee	*Poecile carolinensis*
white-eyed vireo	*Vireo griseus*
red-eyed vireo	*Vireo olivaceus*
Amphibians and Reptiles	
common snapping turtle	*Chelydra serpentina*
eastern painted turtle	*Chrysemys picta*
southern leopard frog	*Lithobates sphenocephala*
redbellied water snake	*Nerodia erythrogaster*
southern water snake	*Nerodia fasciata*
brown water snake	*Nerodia taxispilota*
northern red-bellied turtle	*Pseudemys rubriventris*

Table E-2. Common Flora and Fauna Known to Occur at Seymour Johnson AFB[a] (Continued)

Common Name	Scientific Name
Fish	
mud sunfish	*Acantharchus pomotis*
bluespotted sunfish	*Enneacanthus gloriosus*
banded sunfish	*Enneacanthus obesus*
redfin pickerel	*Esox americanus*
chain pickerel	*Esox niger*
channel catfish	*Ictalurus punctatus*
gar	*Lepisosteus osseus*
white perch	*Morone americana*
yellow perch	*Perca flavescens*

[a] Seymour Johnson AFB 2015.

Table E-3. Common Flora and Fauna Known to Occur at Tinker AFB[a]

Common Name	Scientific Name
Grasses	
buffalograss	*Buchloe dactyloides*
Bermuda grass	*Cynodon dactylon*
fescue	*Festuca* spp.
Shrubs	
Amur honeysuckle	*Lonicera maackii*
Morrow's honeysuckle	*Lonicera morrowii*
smooth sumac	*Rhus glabra*
saw greenbrier	*Smilax bona-nox*
roundleaf greenbrier	*Smilax rotundifolia*
Trees	
redbud	*Cercis canadensis*
persimmon	*Diospyros virginiana*
green ash	*Fraxinus pennsylvanica*
black walnut	*Juglans nigra*
eastern red cedar	*Juniperus virginiana*
osage orange	*Maclura pomifera*
cottonwood	*Populus* spp.
bur oak	*Quercus macrocarpa*
black willow	*Salix nigra*
American elm	*Ulmus americana*
slippery elm	*Ulmus rubra*
Mammals	
beaver	*Castor canadensis*
Virginia opossum	*Didelphis virginiana*
eastern woodrat	*Neotoma floridana*
white-tailed deer	*Odocoileus virginianus*
deer mouse	*Peromyscus maniculatus*
raccoon	*Procyon lotor*
fox squirrel	*Sciurus niger*
Hispid cotton rat	*Sigmodon hispidus*
eastern cottontail rabbit	*Sylvilagus floridanus*
Birds	
northern cardinal	*Cardinalis cardinalis*
barn swallow	*Hirundo rustica*
Franklin gull	*Leucophaeus pipixcan*
eastern meadowlark	*Sturnella magna*
European starling	*Sturnus vulgaris*
mourning dove	*Zenaida macroura*
Amphibians and Reptiles	
gray tree frog	*Hyla versicolor*
plain bellied water snake	*Nerodia erythrogaster*
three-toed box turtle	*Terrapene carolina*
red-eared slider	*Trachemys [Pseudemys] scripta*

Table E-3. Common Flora and Fauna Known to Occur at Tinker AFB[a] (Continued)

Common Name	Scientific Name
Fish	
red shiner	*Cyprinella lutrensis*
western mosquitofish	*Gambusia affinis*
channel catfish	*Ictalurus punctatus*
spotted gar	*Lepisosteus oculatus*
green sunfish	*Lepomis cyanellus*
bluegill sunfish	*Lepomis macrochirus*
bluegill x redear sunfish	*Lepomis macrochirus x microlophus*
longear sunfish	*Lepomis megalotis*
largemouth bass	*Micropterus salmoides*
golden shiner	*Notemigonus crysoleucas*
sand shiner	*Notropis stramineus*
bluntnose minnow	*Pimephales notatus*
fathead minnow	*Pimephales promelas*
rosy-red fathead minnow	*Pimephales promelas 'Golden Strain'*
bullhead minnow	*Pimephales vigilax*

[a] Tinker AFB 2015.

Table E-4. Common Flora and Fauna Known to Occur at Westover ARB[a]

Common Name	Scientific Name
Grasses	
colonial bent grass	*Agrostis tenuis*
chewing fescue	*Festuca altissima*
tall fescue	*Festuca arundinacea*
creeping red fescue	*Festuca rubra*
perennial ryegrass	*Lolium perenne*
timothy	*Phleum pratense*
Kentucky bluegrass	*Poa pratensis*
Shrubs	
eastern red cedar	*Juniperus virginiana*
spreading yew	*Taxus caspidata*
northern white-cedar	*Thuja occidentalis*
Trees	
red maple	*Acer rubrum*
Norway spruce	*Picea abies*
white pine	*Pinus strobus*
Scotch pine	*Pinus sylvestris*
white oak	*Quercus alba*
red oak	*Quercus rubra*
Mammals	
coyote	*Canis latrans*
beaver	*Castor canadensis*
porcupine	*Erethizon dorsatum*
southern flying squirrel	*Glaucomys volans*
river otter	*Lontra canadensis*
woodchuck	*Marmota monax*
striped skunk	*Mephitus mephitis*
white-tailed deer	*Odocoileus virginianus*
muskrat	*Ondatra zibethicus*
white-footed mouse	*Peromyscus leucopus*
raccoon	*Procyon lotor*
gray squirrel	*Sciurus carolinensis*
eastern cottontail	*Sylvilagus floridanus*
eastern chipmunk	*Tamias striatus*
red fox	*Vulpes vulpes*

Table E-4. Common Flora and Fauna Known to Occur at Westover ARB[a] (Continued)

Common Name	Scientific Name
Birds	
red-winged black bird	*Agelaius phoeniceus*
red-tailed hawk	*Buteo jamaicensis*
rough-legged hawk	*Buteo lagopus*
red-shouldered hawk	*Buteo lineatus*
broad-winged hawk	*Buteo platypterus*
turkey vulture	*Cathartes aura*
killdeer	*Charadrius vociferus*
American crow	*Corvus brachyrhynchos*
blue jay	*Cyanocitta cristata*
bobolink	*Dolichonyx oryzivorus*
American kestrel	*Falco sparverius*
eastern screech owl	*Otus asio*
black-capped chickadee	*Poecile atricapilla*
eastern phoebe	*Sayornis phoebe*
barred owl	*Strix varia*
brown thrasher	*Toxostoma rufum*
American robin	*Turdus migratorius*
eastern king bird	*Tyrannus tyrannus*
mourning dove	*Zenaida macroura*
Amphibians and Reptiles	
American toad	*Bufo americanus*
Fowler's toad	*Bufo fowleri*
common snapping turtle	*Chelydra serpentina serpentina*
eastern painted turtle	*Chrysemys picta picta*
northern black racer	*Coluber constrictor constrictor*
northern ringneck snake	*Diadophis punctatus edwardsii*
gray treefrog	*Hyla versicolor*
northern water snake	*Nerodia sipedon*
eastern newt	*Notophthalmus viridescens*
redback salamander	*Plethodon cinereus*
spring peeper	*Pseudacris crucifer*
bullfrog	*Rana catesbeiana*
green frog	*Rana clamitans*
wood frog	*Rana sylvatica*
common garter snake	*Thamnophis sirtalis*
Fish	
yellow bullhead	*Ameriurus natalis*
white sucker	*Catostomus commersoni*
chain pickerel	*Esox niger*
brown bullhead	*Ictalurus nebulosus*
pumpkinseed sunfish	*Lepomis gibbosus*
bluegill	*Lepomis macrochirus*
largemouth bass	*Micropterus salmoides*
golden shiner	*Notemigonus crysoleucus*
yellow perch	*Perca flavescens*
brook trout	*Salvelinus fontialis*

[a] Westover ARB 2016.

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APPENDIX F

BUILDINGS KNOWN TO CONTAIN ASBESTOS, LEAD-BASED PAINT, OR POLYCHLORINATED BIPHENYLS

APPENDIX F BUILDINGS KNOWN TO CONTAIN ASBESTOS, LEAD-BASED PAINT, OR POLYCHLORINATED BIPHENYLS

Appendix F, Tables F-1 through F-4, summarizes the buildings that would be affected by the proposed KC-46A Third Main Operating Base (MOB 3) beddown-related demolition and renovation; their years of construction; and their potential to contain toxic substances (asbestos-containing material [ACM], lead-based paint [LBP], and polychlorinated biphenyls [PCBs]). Tables F-1 summarizes the project-related toxic substance information for the MOB 3 mission at Grissom Air Reserve Base (ARB). Table F-2 summarizes this information for the MOB 3 mission at Seymour Johnson Air Force Base (AFB). Table F-3 summarizes this information for the MOB 3 mission at Tinker AFB. Tables F-4 summarizes this information for the MOB 3 mission at Westover ARB.

Table F-1. Toxic Substances Associated with Projects for the KC-46A MOB 3 Mission at Grissom ARB

Project	Year Constructed	ACM	LBP	PCBs
Demolition				
Building 437 (Hangar 5)	1959	X	X	[c]
Building 438 (Hangar 3)	1959	X	[b]	[c]
Renovation				
Building 209, Logistics Readiness Squadron (Internal fencing and vault)	1956	X	X	[c]
Building 426, Wing Air Refueling Pod (WARP) storage and maintenance	1960	[a]	[b]	[c]
Building 434, (Hangar 6) FuT	1959	[a]	[b]	[c]
Building 436, (Hangar 2) AME	1959	[a]	[b]	[c]
Building 439, (Hangar 1) Maintenance/Various Shops	1959	[a]	[b]	[c]
Building 453, Composite Maintenance Shop	1988			[c]
Building 473, Renovate Lodging (convert rooms into first-term Airmen/Single Airman Quarters)	2004			[c]
Building 663, Squadron Operations	1988			[c]
Building 668, Flight Simulators (WST/BOT)	1959	[a]	[b]	[c]
Relocation of two portable sheds (PB-56 and unnamed)	Unknown	[a]	[b]	[c]

[a] Building assumed to potentially contain ACM based on construction year of 1980 or older (Grissom ARB 2010).
[b] Building assumed to potentially contain LBP. A facility inspection is conducted prior to any renovation or demolition work at pre-1980 facilities at Grissom ARB (Grissom ARB 2012).
[c] Base is PCB free (Walters 2015).
Key: X = Toxic substance known to occur in the building.

Table F-2. Toxic Substances Associated with Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB

Project	Year Constructed	ACM	LBP	PCBs
Demolition				
Hangar 4909	1957	X	X	[b]
Building 4911	1986		[a]	
Renovation				
Building 4810, Logistics Readiness Squadron/Supply	1962	X	X	[b]
Building 4822, FuT	2009		[a]	
Building 4828, KC-46A Various Shops	1963	X	X	[b]
Building 4908, Maintenance	1957	X	X	[b]
Building 4916, Flight Simulators (WST/BOT), Squadron Operations	2009		[a]	

[a] Lead containing. Any detectable amount under OSHA.
[b] None of the electrical transformers have PCB-containing oil (Young 2011). However, there may be PCBs in caulking and sealants (Owen 2016). Caulk or sealant manufactured prior to 1980 may contain PCBs at levels above 50 ppm.
Key: X = Toxic substance known to occur in the building.

Table F-3. Toxic Substances Associated with Projects for the KC-46A MOB 3 Mission at Tinker AFB

Project	Year Constructed	ACM	LBP	PCBs
Demolition				
Building 1030	1960	[a]	[b]	[c]
Building 1067	1983			[c]
Building 1068	1985			[c]
Building 1069	1987			[c]
Deicing Detention Basin	Unknown			[c]
Renovation				
Hangar 1053, Various KC-46A Shops and Storage	2012			[c]
Building 1056, Maintenance Leadership Facility	1999			[c]
Building 1082, FuT	1999			[c]

[a] Buildings constructed before 1980 are assumed to potentially have ACM (thermal system insulation and asphalt and vinyl flooring materials) (AFI 32-1052). High probability of containing ACM (Tinker AFB 2012)
[b] Building constructed before 1980 and is assumed to have LBP. (Tinker AFB 2010).
[c] Tinker AFB is reportedly PCB free (Kline 2015).
Key: X = Toxic substance known to occur in the building.

Table F-4. Toxic Substances Associated with Projects for the KC-46A MOB 3 Mission at Westover ARB

Project	Year Constructed	ACM	LBP	PCBs
Demolition				
Building 2426	1960	X	[b]	[c]
Building 7071	1941	[a]	[b]	[c]
Building 7045, Gas station relocation	1996			
Building 7046, Gas station relocation	1996			
Renovation				
Building 7072, Maintenance Shops	1941	[a]	[b]	[c]
Building 7073 (Hangar 5), AGE	1941	[a]	[b]	[c]
Building 5103, Airmen Dormitory	1957	[a]	[b]	[c]
Building 5375 and 5377, Supply Facilities (secure storage vault and fencing)	1956, 2011	[a]	[b]	[c]

[a] Building assumed to potentially contain ACM based on construction year of 1980 or older (AFI-32-1052).
[b] Building assumed to potentially contain LBP based on construction year of 1980 or older (Westover ARB 2013).
[c] None of the electrical transformers have PCB-containing oil (Moriarty 2015), however sampling should be conducted based on the year of construction.
Key: X=Toxic substance known to occur in the building.

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AFI 32-1052 – Facility Asbestos Management

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