Expansion of the Foreign Military Sales F-35 Pilot Training Center

at Ebbing Air National Guard Base, Arkansas

DRAFT

Supplemental Environmental Impact Statement

Volume 2: Appendices

August 2025

Privacy Advisory

This Draft Supplemental Environmental Impact Statement (SEIS) has been provided for public comment in accordance with the National Environmental Policy Act, which provides an opportunity for public input on United States Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on the DAF's analysis of environmental effects.

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 Personal information, home addresses, telephone numbers, and email addresses will not be published in this SEIS.

Section 508 of the Rehabilitation Act of 1973

The digital version of this SEIS and its project website are compliant with Section 508 of the Rehabilitation Act of 1973 because assistive technology (e.g., "screen readers") can be used to help the disabled understand these electronic media. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility may be limited to a descriptive title for each item.

COVER

a. Responsible Lead Agency: Department of the Air Force (DAF); Air Education and Training Command (AETC)

b. Cooperating Agencies: Federal Aviation Administration (FAA); United States Forest Service (USFS)

c. Title: *Supplemental Environmental Impact Statement (SEIS) for the Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base, Arkansas*

d. Inquiries: Information regarding the SEIS is available on the project website at https://www.fmsptceis.com. Questions can also be directed to the AETC Public Affairs: phone number: (210) 652-9324; email address: AETC.PAO@us.af.mil. The Draft SEIS 45-day comment period begins with publication of the Notice of Availability in the Federal Register. The DAF recommends all comments be submitted during this 45-day comment period to allow sufficient time for full consideration in the Final SEIS.

e. Designation: Draft SEIS

f. Abstract: The DAF is proposing to expand the FMS PTC at Ebbing ANG Base, Arkansas. The DAF is the lead agency and FAA and USFS are serving as Cooperating Agencies because the scope of the DAF's Proposed Action and Alternatives involve activities under FAA's and USFS's jurisdiction by law and special expertise. This SEIS was prepared pursuant to the National Environmental Policy Act (NEPA), Title 42 of the United States Code §§ 4321–4347 and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The Proposed Action is to beddown 12 additional F-35s at Ebbing ANG Base, for a total of 36 F-35 and 12 F-16 aircraft, and for F-35B aircraft to conduct Short Takeoff and Vertical Landing Operations on the airfield. The Proposed Action would also include increased airfield and airspace operations; construction projects; and personnel increases. Alternative 1 would implement F-35B Short Takeoff and Vertical Landing operations on the airfield, which would require the construction of a Vertical Landing Pad, but the DAF would not beddown any additional aircraft, construct new facilities, or increase personnel. This SEIS analyzes potential impacts from implementing the Proposed Action, Alternative 1, and the No Action Alternative.

g. Comment Dates: Comments can be submitted on the project website at https://www.fmsptceis.com or mailed in to the Department of the Air Force, c/o Leidos, Attn: Ebbing SEIS, 12304 Morganton Highway #38, Morganton, GA 30560. For comments to be fully considered in the Final SEIS, comments should be postmarked or received by the DAF by September 24, 2025.

h. Note: The DAF is rescinding its NEPA regulations found at Title 32 Code of Federal Regulations §989 because the Council on Environmental Quality's NEPA regulations, which they were meant to supplement, have been rescinded, and because the Department of Defense is promulgating Department-wide NEPA procedures that will guide DAF's NEPA process. The interim final rule is effective July 1, 2025.

i. EIS Identification Number: SEIS-007-57-UAF-1750846563.

This page intentionally left blank.

Draft

Supplemental Environmental Impact Statement Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base, Arkansas

Volume 2

TABLE OF CONTENTS

Page

LIST OF TABLES

This page intentionally left blank.

APPENDIX A
LIST OF PREPARERS AND CONTRIBUTORS

This page intentionally left blank.

List of Preparers and Contributors

Henry McLaurine, Sr. NEPA Project Manager, Leidos
Project Manager
M.S., Biology, Stephen F. Austin State University, 1994
B.S., Environmental Science 1991
Years of Experience: 30

Amanda C. Robydek, Sr. Environmental Scientist, Leidos
Deputy Project Manager, Land Use
B.S., Environmental Science, University of Florida, 2002
Years of Experience: 18

Amy Sands, NEPA Planning Specialist, Leidos
Technical Specialist, Land Use
M.A.S., Environmental Policy and Management, University of Denver, 2007
B.S., Environmental Science, University of North Carolina at Wilmington, 2002
Years of Experience: 21

Kevin Akstulewicz, Sr. Principal Environmental Scientist, Leidos
Quality Assurance
B.S., Environmental Science & Policy, University of West Florida, 1999
Years of Experience: 24

Jay Austin, Environmental Scientist, Leidos
Noise
M.S., Environmental Sciences, Christopher Newport University
B.S., Biology, University of Virginia-Maine Campus
Years of Experience: 24

Micah Downing, Ph.D., Chief Scientist, Blue Ridge Research and Consulting, LLC
Noise Analysis and Noise Modeling
Ph.D., Mechanical Engineering, Georgia Institute of Technology, 1993
M.S., Aeronautics, George Washington University, 1988
B.S., Physics, Davidson College, 1986
Years of Experience: 33

Benjamin Manning, M.S., Senior Engineer, Blue Ridge Research and Consulting, LLC
Noise Analysis and Noise Modeling
M.S., Mechanical Engineering, Duke University, 2006
B.S., Mechanical Engineering, Georgia Institute of Technology, 2003
Years of Experience: 17

Pamela McCarty, Environmental Analyst, Leidos
Socioeconomics
M.S., Industrial and Systems Engineering, University of Florida, 2011
M.A., Applied Economics, University of Central Florida, 2004
B.S., Business Administration, University of Central Florida, 2002
Years of Experience: 17

Brian Tutterow, Environmental Scientist, Leidos
Environmental Justice
B.A., Biology, Southern Illinois University at Edwardsville, 1997
Years of Experience: 26

Elizabeth Gallow, Architectural Historian, Cultural Resource Analysts, Inc.
Cultural Resources
M.H.P, Historic Preservation, the University of Kentucky, 2008
Years of Experience: 19

Jay Gray, Archaeologist, Cultural Resource Analysts, Inc.
Cultural Resources
M.A., Anthropology, University of Memphis, 2001
Years of Experience: 29

Christina Meyer, Environmental Scientist, Leidos
Biological Resources, Physical Resources, and Utilities
B.S., Environmental Science, University of West Florida, 2010
Years of Experience: 10

Ronald R. Combs, Environmental Scientist, Leidos
Physical Resources
M.S., Biology, University of West Florida, 2006
B.S., Biology, San Diego State University, 2000
B.S., Business Administration, Logistics/Transportation, University of Tennessee, 1990
B.S., Business Administration, Marketing, University of Tennessee, 1987
Years of Experience: 21

Allison Williams, Environmental Scientist, Leidos
Air Quality, Health and Safety, Hazardous Materials and Hazardous and Solid Waste
M.S., Environmental Management, University of Denver, 2023
B.S., Environmental Health and Safety, Stony Brook University, 2009
Years of Experience: 5

Michael Nation, GIS Analyst, Leidos
Transportation, Maps and GIS Analysis
B.S., Environmental Science, University of West Florida, 2000
Years of Experience: 21

Heather M. Stepp, Environmental Scientist, Leidos
Editor
B.S., Environmental Engineering Technology, Shawnee State University, 1998
Years of Experience: 27

Jennifer Wallin, Senior Environmental Scientist, Leidos
References Manager
M.S., Environmental Toxicology, Clemson University, 1997
B.S., Biology, Pacific Lutheran University, 1995
Years of Experience: 25

Jessica Welsh, Document Production Manager, Leidos
Editor
B.A., Journalism, The College of New Jersey, 2000
Years of Experience: 25

This page intentionally left blank.

APPENDIX B
PUBLIC AND AGENCY INVOLVEMENT

This page intentionally left blank.

Public and Agency Involvement

B.1 DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS) PUBLIC REVIEW

B.1.1 Public Hearings

This section will be completed for the Final SEIS.

B.1.2 Draft SEIS Public and Agency Comments

This section will be completed for the Final SEIS.

B.2 AGENCY CORRESPONDENCE

B.2.1 Cooperating Agency Correspondence

B.2.1.1 Federal Aviation Administration (FAA) Correspondence

1 ## Department of the Air Force (DAF) Letter to FAA

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE SECRETARY

July 23, 2024

SAF/IEI
1665 Air Force Pentagon
Washington DC 20330-1665

Ms. Danielle Rinsler
Federal Aviation Administration
Office of Airports Planning and Programming
800 Independence Avenue SW
Washington DC 20591

Dear Ms. Rinsler:

The Department of the Air Force (DAF) as Lead Agency (40 Code of Federal Regulations [C.F.R.] §1501.7) requests that the Federal Aviation Administration (FAA) formally participate as a Cooperating Agency (CA) in the preparation of a Supplemental Environmental Impact Statement (SEIS) for Ebbing Air National Guard Base, Arkansas Foreign Military Sales (FMS) Pilot Training including support facilities for all FMS aircraft, and the proposed addition of 12 F-35 aircraft to the 35 total aircraft addressed in the Final EIS and Record of Decision (ROD), signed 11 March 2023. Note that modification to special use airspace is not required as part of the SEIS.

The SEIS is required to assist in meeting national defense strategy requirements and goals and as such, time is of the essence. Consequently, the DAF is committed to concentrating on truly relevant issues, conducting reviews in a coordinated and timely manner (40 CFR § 1500.2(b)), ensuring judicious decision-making by adhering to page and time limits (42 U.S.C. 4336((e)-(g)), and further the intent of the FAA Reauthorization Act of 2024, Title VII, § 783.

This CA arrangement is established pursuant to 40 C.F.R. §1501.8, Cooperating Agencies. As the lead, the DAF requests the FAA support as a CA by:

a. Participating in the scoping, data gathering, analyses, public involvement, and consultation processes.

b. Assuming responsibility, upon request, for developing information and preparing analyses on issues for which the FAA has special expertise and make recommendations to the DAF to address information in the analysis as may be required.

c. Using its own funds. To the extent available funds permit, the DAF will fund those major activities or analyses identified in early scoping required by FAA, specifically the modeling and analysis of military and civil aircraft noise impacts associated with Ebbing ANGB collocation with Fort Smith Regional Airport.

d. Consulting with the DAF in development of a schedule, meet the schedule, and elevate, as appropriate, to the CA signatories, issues that may affect meeting the DAF schedule.

e. Making staff available to enhance interdisciplinary review capability and providing specific written comments within the timelines prescribed in the program milestone schedule.

f. Reviewing and providing timely comments regarding matters for which FAA has jurisdiction by law, special expertise, and allow for future FAA use of the EIS consistent with 40 CFR §§1503.2, 1503.3, 1506.3.

g. Responding, in writing, to this request.

The DAF will act as the Lead Agency for purposes of compliance with Section 7, Endangered Species Act (16 United States Code [USC] §1536); Section 106, National Historic Preservation Act (54 USC §300101 et seq.); and similar regulatory consultation or coordination requirements.

Should you or your staff have further questions regarding this memo, our points of contact at Headquarters Air Force are Ms. Laura Yates at (703) 692-1484 / (931) 494-6628 or laura.yates.1@us.af.mil and Mr. Jack Bush at (703) 695-1773 / (703) 867-1082 or jack.bush@us.af.mil. For day-to-day actions, Mr. Austin Naranjo, (210) 563-0190 or austin.naranjo.1@us.af.mil and Mr. Kevin Patrick, (210) 347-8391 or kevin.patrick.6@us.af.mil

Sincerely,

MORIARTY.ROBERT.E.1013267584
Digitally signed by MORIARTY.ROBERT.E.1013267584
Date: 2024.07.23 12:03:57 -04'00'

ROBERT E. MORIARTY, P.E., SES
Deputy Assistant Secretary of the Air Force
(Installations)

cc:
FAA Airports Division
SAF/GCN
AF/A4C
AF/JAOE-FSC
HQ AETC/A5/8
AFCEC/CI
NGB/A4A

1 **FAA Response to DAF**

U.S. Department of Transportation
Federal Aviation Administration

Federal Aviation Administration
Southwest Region, Airports Division

FAA-ASW-650
10101 Hillwood Parkway
Fort Worth, Texas 76177

August 14, 2024

Mr. Robert E. Moriarty
Deputy Assistant Secretary of the Air Force (Installations)
SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Dear Mr. Moriarty,

Thank you for your letter on July 23, 2024, requesting the Federal Aviation Administration (FAA) to participate as a Cooperating Agency in the preparation of a Supplemental Environmental Impact Statement (SEIS) for Ebbing Air National Guard Base, Arkansas Foreign Military Sales (FMS) Pilot Training at Fort Smith Regional Airport (FSM), Fort Smith, AR.

The Department of the Air Force (DAF) proposal involves additional support facilities for all FMS aircraft and the proposed addition of 12 F-35 aircraft to the 35 total aircraft addressed in the Final EIS and Record of Decision (ROD), signed 11 March 2023. FSM is a Federally obligated airport, and the Ebbing ANG Base is a facility tenant at FSM. Development activities to support the modifications to the FMS Pilot Training mission at FSM, even in tenant-controlled areas of the airport, may be subject to FAA review and approval. Under the Airport and Airway Improvement Act of 1982 (49 U.S.C. 47101) and relevant implementing regulations, FAA must approve of any changes to an airport sponsor's Airport Layout Plan (ALP) before construction activities may begin. This approval, consistent with provisions under 49 U.S.C § 47101 and Section 743 of the 2024 FAA Reauthorization Act, is a major federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. § 4321 et seq.). Therefore, the FAA supports the DAF's decision to prepare a SEIS for this proposal and agrees to be a Cooperating Agency pursuant to 40 CFR §1501.8.

As a Cooperating Agency, we agree to assign staff with the goal to help develop a single, comprehensive analysis to meet each agency's distinct obligations under NEPA and to support the decision making of both agencies. In addition, FAA will:

- Participate in the scoping process.
- Participate in public meetings (as needed or appropriate).
- Upon the DAF's request, to the extent practical, support the development of information and analysis, with the following exceptions:

- During document reviews, pursuant to 40 CFR §1501.8(b)(3), FAA can develop descriptions specific to our action and role as a cooperating agency and make recommendations to the DAF to address any missing information or deficiencies in the analysis associated with FAA's jurisdiction by law and special expertise.

- FAA is relying on the DAF, as lead agency, to fund major activities or analyses pursuant to 40 CFR §1501.8(b)(5), including the modeling and analysis of military and civil aircraft noise impacts.

- Review and provide comments regarding matters for which FAA has jurisdiction by law and special expertise consistent with 40 CFR §1503.2 and specific comments pursuant to 40 CFR §1503.3, as well as ensuring the SEIS is legally sufficient for the purposes of relying on this SEIS pursuant to 40 CFR §1506.3.

We support and emphasize the importance of the development of joint environmental documents pursuant to 40 CFR §1501.7(g) and §1501.8(b)(8). However, FAA's determination to issue a joint decision document will be dependent on several factors and determined later. Note that a cooperating agency makes their own decisions and sometimes has additional legal or regulatory requirements than the lead agency in making decisions based on an analysis under NEPA. For example, if the lead agency analysis is adequate, any disagreements about conclusions to be drawn from this EIS does not necessarily inhibit cooperating agencies from adopting the lead agency's EIS but may warrant the issuance of separate decision documents. Thus, if the FAA can determine the DAF's SEIS is sufficient for FAA's NEPA compliance, but circumstances arise that require issuance of a separate decision document, FAA may proceed with adoption of the DAF's Final SEIS while issuing a separate decision document.

I trust this is responsive to your request. The Arkansas/Oklahoma Airports District Office will be the lead office for the FAA on this project. Your principal FAA contact for day-to-day communications is Kelly Oliver-Amy, Environmental Protection Specialist. Ms. Oliver-Amy can be contacted at 817-222-5645 and kelly.m.oliver-amy@faa.gov. The Regional Environmental Programs Manager, John MacFarlane, will be supporting the AR/OK ADO on this project. Mr. MacFarlane can be contacted at 817-222-5681 and john.macfarlane@faa.gov.

Sincerely,

IGNACIO FLORES

Digitally signed by IGNACIO FLORES
Date: 2024.08.13 15:33:08 -05'00'

Ignacio Flores
Director, Airports Division
Southwest Region

B.2.1.2 United States (U.S). Forest Service (USFS) Correspondence

DAF Letter to the USFS

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE SECRETARY

July 23, 2024

SAF/IEI
1665 Air Force Pentagon
Washington DC 20330-1665

Ms. Andrea Pahlevanpour
Assistant Director
Forest Service, Ecosystem Management Coordination
1400 Independence Avenue, SW
Washington, DC 20250

Dear Ms. Pahlevanpour:

The Department of the Air Force (DAF) as Lead Agency (40 Code of Federal Regulations [C.F.R.] §1501.7) requests that the United States Forest Service (Forest Service) formally participate as a Cooperating Agency (CA) in the preparation of a Supplemental Environmental Impact Statement (SEIS) for Ebbing Air National Guard Base, Arkansas Foreign Military Sales (FMS) Pilot Training including support facilities for all FMS aircraft, and the proposed addition of 12 F-35 aircraft to the 35 total aircraft addressed in the Final EIS and Record of Decision (ROD), signed 11 March 2023. Note that modification to special use airspace is not required as part of the SEIS.

The DAF anticipates the Forest Service having National Environmental Policy Act (NEPA) responsibilities due to potential environmental effects for the Ozark-St. Francis National Forests.

This CA arrangement is established pursuant to 40 C.F.R. §1501.8, Cooperating Agencies. As the lead, the DAF requests the Forest Service support as a CA by:

a. Participating in all scoping, data gathering, analyses, public involvement, and consultation processes.

b. Assuming responsibility, upon request, for developing information and preparing analyses on issues for which the US Forest Service has special expertise.

c. Identify early and fund, if necessary, any unique Forest Service requirements, activities, or analyses to ensure the Supplemental EIS meets Forest Service requirements.

d. Making staff available to enhance interdisciplinary review capability and providing specific written comments within the timelines prescribed in the program milestone schedule.

e. Responding, in writing, to this request.

The DAF will act as the Lead Agency for purposes of compliance with Section 7, Endangered Species Act (16 United States Code [USC] §1536); Section 106, National Historic Preservation Act (54 USC §300101 et seq.); and similar regulatory consultation or coordination requirements, to include coordination with the Forest Service. The DAF is amenable to development of a Memorandum of Understanding/Agreement, the content of which would be established between the CAs subsequent to this request.

The DAF, like other federal agencies, is required to follow the National Environmental Policy Act in preparing documents. Recent statutory amendments limit EISs to 150 pages exclusive of appendices in all but extraordinary circumstances and impose a time limit of two years for completion. The two-year time limit is bounded by publication of the Notice of Intent to prepare the EIS and Final EIS Notice of Availability publication in the Federal Register.

This action is required to meet national defense strategy requirements and goals. As such, and while compliance with applicable legal requirements will be achieved, time is of the essence. A mutually agreeable schedule will be developed and strictly followed.

Should you or your staff have further questions regarding this memo, our point of contact at Headquarters Air Force is Mr. Jack Bush, at (703) 614-0237 or jack.bush@us.af.mil.

Sincerely,

MORIARTY.ROBERT.E.1013267584 Digitally signed by MORIARTY.ROBERT.E.1013267584 Date: 2024.07.23 12:04:47 -04'00'

ROBERT E. MORIARTY, P.E., SES
Deputy Assistant Secretary of the Air Force
(Installations)

cc:
Mr. Daniel Olsen, Forest Service, Ozark-St. Francis National Forest
Ms. Stephanie Lee Madson, Forest Service, Southern Region
SAF/GCN
AF/A4C
AF/JAOE-FSC
HQ AETC/A5/8
AFCEC/CI
NGB/A4A

2

1 **USFS Response to DAF**

United States Department of Agriculture **Forest Service** **Washington Office** **1400 Independence Avenue, SW Washington, D.C. 20250**

File Code: 1950
Date: October 23, 2024

The Honorable Robert E. Moriarty, P.E., SES
Deputy Assistant Secretary of the Air Force (Installations)
U.S. Department of the Air Force
SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Dear Mr. Moriarty:

Thank you for your invitation to be a cooperating Agency for the U.S. Air Force (USAF), Supplemental Environmental Impact Statement (SEIS) for Ebbing Air National Guard Base, Arkansas Foreign Military Sales (FMS) Pilot Training including support facilities for all FMS aircraft, and the proposed addition of 12 F-35 aircraft to the 35 total aircraft addressed in the Final EIS and Record of Decision, signed March 11, 2023. In accordance with Title 40 of the Code of Federal Regulations Part 1501.8, the U.S. Department of Agriculture's Forest Service (Forest Service) agrees to participate as a cooperating Agency in the preparation of the SEIS.

Points of coordination include:

- The Forest Service agrees to provide Agency requirements in support of a comprehensive environmental analysis. This includes any site-specific requirements on the Ozark-St. Francis and Ouachita National Forests, if needed.
- The Forest Service agrees to review and comment on portions of the administrative SEIS that pertain to National Forest System lands. The review of all draft/final documents will require a minimum of 30 days.
- USAF agrees to provide to the Forest Service any agency-specific comments they receive in their public scoping efforts and the SEIS.
- The Forest Service agrees to provide responses to agency-specific comments received during scoping and/or the SEIS comment periods.
- USAF agrees to provide Forest Service access to the project record.

If any coordination is required, please contact Dan Olsen, Forest Supervisor, Ozark-St. Fransis and Ouachita National Forests, at (501) 321-5275 or Daniel.olsen@usda.gov.

The point of contact for requirements is John Campbell, Southern Region, Wilderness and Wild and Scenic Rivers, (404) 805-8110 or john.campbell@usda.gov or Michelle Mitchell, Southern Region Director, Recreation, Wilderness, Heritage, and Volunteer Program, (404) 347-2479 or donna.mitchell1@usda.gov.

The Honorable Robert E. Moriarty, P.E., SES 2

Sincerely,

CHRISTOPHER FRENCH Digitally signed by CHRISTOPHER FRENCH Date: 2024.10.23 10:44:49 -04'00'

CHRISTOPHER B. FRENCH
Deputy Chief, National Forest System

B.2.2 National Historic Preservation Act Section 106 Correspondence

B.2.2.1 Arkansas State Historic Preservation Officer (SHPO)

DAF Letter to Arkansas SHPO

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 188TH WING
FORT SMITH, AR

29 April 2025

Robert T. Hudson
Base Civil Engineer
188th Wing
4850 Leigh Ave
Fort Smith, AR 72903

Scott Kaufman
State Historic Preservation Officer
Arkansas Historic Preservation Program
1100 North Street
Little Rock, AR 72201

SUBJECT: Proposed Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown at Ebbing Air National Guard (ANG) Base, Arkansas

Dear Mr. Kaufman,

Pursuant to the *National Environmental Policy Act of 1969* (NEPA), as amended, and the United States Department of the Air Force (DAF) procedures for implementing NEPA (32 Code of Federal Regulations [CFR] Part 989, *Environmental Impact Analysis Process*), the DAF intends to prepare a Supplemental Environmental Impact Statement (SEIS) for the proposed expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base in Sebastian County, Arkansas. The DAF is the lead agency for the SEIS while the Federal Aviation Administration (FAA) and United States Forest Service (USFS) are acting as Cooperating Agencies. The DAF is coordinating with the FAA and USFS based on their jurisdiction by law and special expertise relating to the DAF's proposal.

The DAF is preparing this SEIS to address proposed changes since the completion of the *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan Final Environmental Impact Statement* (hereinafter referred to as the "2023 FMS PTC EIS"). The DAF signed the Record of Decision (ROD) on March 11, 2023, selecting Ebbing Air National Guard (ANG) Base as the location to establish the FMS F-35 PTC, which included up to 24 F-35s, relocation of 12 Republic of Singapore Air Force (RSAF) F-16s, and supporting infrastructure, among other issues. Since the signing of the 2023 FMS PTC EIS ROD, new training requirements have emerged due to additional FMS purchases of F-35 aircraft, including operations that incorporate the F-35B's Short Takeoff and Vertical Landing (STOVL) capabilities. The Proposed Action Alternative presented in the SEIS would beddown an additional 12 F-35s for a total of 36 F-35 PAA and 12 F-16 aircraft at Ebbing ANG Base. There would also be an increase in F-35 operations, personnel, and new facilities, as further described below. The SEIS will also consider a No Action Alternative, under

1

which DAF would implement the 2023 FMS PTC ROD, and Alternative 1, under which the DAF would refine operations from the 2023 FMS PTC EIS.

The DAF initiated consultation with the Arkansas Historic Preservation Program regarding the action described in the 2023 FMS PTC EIS in January 2022. In a letter dated February 15, 2022, your office concurred with a finding of no historic properties affected. In accordance with Section 306108 of the *National Historic Preservation Act* and its implementing regulations at 36 CFR Part 800, the DAF is now initiating consultation with your office and tribal governments who have expressed an interest in the affected area for the proposed expansion of the FMS PTC beddown at Ebbing ANG Base.

Additional information about the FMS PTC beddown may be found on the Internet at http://www.FMSPTCEIS.com.

The Proposed Action Alternative will include construction and renovation projects at Ebbing ANG Base and Fort Smith Regional Airport (FSRA). It also will include new aircraft operations within the airfield and within established airspace and ranges. F-35 operations under the Proposed Action Alternative would occur within existing designated special use airspace. While aircraft operations would increase, there would be no additions to, or alterations of, the existing designated special use airspace.

Construction and renovation projects would occur at Ebbing ANG Base to support the 12 new F-35 PAA and STOVL operations. These projects are listed below in Error! Reference source not found. and shown in **Figure 1** (Enclosure 1). These projects are in addition to the construction and renovation projects described and listed in the 2023 FMS PTC EIS (§ 2.2.3), which would continue to occur.

Table 1. Construction and Renovation Projects at Ebbing ANG Base (and FSRA) Under the Proposed Action Alternative.

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
108	LRS storage	15,000	Add/Alter to existing building to support PAA increase	15,000	Ebbing ANG Base
115	AME Back Shops	10,000	Add/Alter to existing building to support PAA increase	10,000	Ebbing ANG Base
182	Back Shops, Vehicle Maintenance	20,000	Add/Alter to existing building to support PAA increase	20,000	Ebbing ANG Base
200	F-35 Maintenance	3,000	Add/Alter to existing building to support PAA increase	3,000	Ebbing ANG Base
Existing Fuel Farm	Fuel Storage Expansion	221,000	Expansion to existing fuel storage farm to provide adequate fuel supply capacity	221,000	Ebbing ANG Base

2

1

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
113 and 119 / New Construction (b)	3-Bay Hangar	40,000	Demolish buildings 113 and 119 to construct new MX hangar to support F-35 PAA increase	30,484	Ebbing ANG Base
New Construction (b)	Main Ramp Expansion	203,000	Expansion to main ramp to provide aircraft parking capacity for PAA increase	203,000	Both
New Construction (b)	Arm/De-Arm Expansion (x2)	10,000 each	Capacity expansion to launch 8 F-16 aircraft simultaneously – identified after original EIS	20,000	FSRA
New Construction (b)	VLP	118,400	Provide emergency vertical landing capability for RSAF F-35B aircraft – identified after original EIS	118,400	FSRA
Additional Construction	Parking Lot	7.00 acres (a)	Expansion of existing parking lot	304,920 (7 acres)	Ebbing ANG Base
New Construction (b)	Parking Lot	4.17 acres (a)	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	181,645 (4.17 acres)	Ebbing ANG Base
New Construction (b)	Parking Lot	1.86 acres (a)	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	81,022 (1.86 acres)	Ebbing ANG Base
Total New Ground Disturbance and New Impervious Surface Areas				1,209,471	

Key: AFI = Air Force Instruction; AME = Aircraft Munitions Equipment; ANG = Air National Guard; EIS = Environmental Impact Statement; FSRA = Fort Smith Regional Airport; FSRM = Facilities Sustainment, Restoration and Modernization; LRS = Logistics Readiness Squadron; MILCON = military construction; MX = maintenance; PAA = Primary Aerospace Vehicle Authorization; RSAF = Republic of Singapore Air Force; sq. ft. = square feet; VLP = Vertical Landing Pad

Notes:

a. Acreages listed in the table were converted to square feet for total area calculations.

b. New construction has not been assigned a facility number on Ebbing ANG Base; however, new construction projects are displayed and identified on **Figure 1** as their Proposed Facility Use.

All FMS PTC facilities under the Proposed Action Alternative would primarily be developed near the main ramp. However, the Vertical Landing Pads (VLP), arm/de-arm expansions, and a portion of the main ramp expansion are proposed for other parts of the FSRA airfield, outside Ebbing ANG Base boundaries. During construction, temporary staging areas would be located on current Ebbing ANG Base paved areas or previously disturbed areas. These areas are depicted in **Figure 1** (Enclosure 1) as gray boxes.

To support the proposed STOVL operations, the DAF would construct one 220-foot by 220-foot VLP with a 100-foot by 700-foot taxiway within the FSRA airfield. The SEIS evaluates two alternative locations to site the VLP. The exact location and configuration of the concrete VLP within the area depicted on **Figure 1** (Enclosure 1) will be determined during project design and is not anticipated to impact navigational aids, airport design surfaces, or Perimeter Road; however the entire area would not be disturbed. As shown in the airfield inset of **Figure 1** (Enclosure 1), the West VLP Site Subalternative would construct the VLP and connecting taxiway along the southwestern end of RWY 02/20 and the East VLP Site Subalternative would construct the VLP and connecting taxiway along the southeastern end of RWY 08/26.

The FSRA airfield would be utilized for F-35 training operations under the Proposed Action Alternative and would include VLP maneuvers. The same airspace and ranges originally included and described in the 2023 FMS PTC EIS (§ 2.2.1) would be utilized by the 12 additional F-35 aircraft proposed for Ebbing ANG Base (see **Figure 2** [Enclosure 2]). Aircraft operating out of Ebbing ANG Base primarily utilize the Hog Military Operations Area (MOA); the Shirley MOA; a corridor between the Hog and Shirley MOAs called the "Pig Path"; Military Training Routes (MTRs) consisting of Visual Routes (VRs), including VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182; and Instrument Routes (IRs) consisting of IR-117, IR-120, IR-121, and IR-164. The 188 WG's primary range is Razorback Range, encompassed by Restricted Area R-2401 and R-2402; it is 15 nautical miles to the center point of the range from Fort Smith. R-2401A and R-2402A/B/C are scheduled by the 188 WG through Fort Chaffee (U.S. Army). Overall, the Proposed Action Alternative would increase airspace events by 13 percent (%) as compared to the 2023 FMS PTC EIS. Noise levels within portions of the Hog and Shirley MOAs would range from a decrease of onset rate-adjusted monthly day-night average sound level (L_{dnmr}) 6.3 A-weighted decibels (dBA) to an increase of L_{dnmr} 2.5 dBA compared to the No Action Alternative. Changes in noise levels in the MTRs would range from a decrease of L_{dnmr} 3.5 dBA to an increase of L_{dnmr} 3.1 dBA. However, noise levels would remain below L_{dnmr} 65 dBA throughout the airspace.

The area of potential effect (APE) for this undertaking is defined as the proposed construction and renovation projects at Ebbing ANG Base and FSRA (to include access routes and laydown yards), the off-base land surrounding Ebbing ANG Base and FSRA within the 65 A-weighted decibel day-night average sound level (dBA DNL) noise contour for the undertaking, and the area under the airspace and MTRs to be utilized for the undertaking.

There are no known historic properties located on Ebbing ANG Base, and all proposed construction will occur within existing disturbed land. The 65 dBA DNL contour surrounding Ebbing ANG Base and FSRA for the Proposed Action Alternative is similar to the APE examined in the 2023 FMS PTC EIS (see **Figure 3** [Enclosure]). There are two historic properties – Elmwood Cemetery and the Barling Segment of Old Highway 22 – within the 65 dBA DNL contour APE for the Proposed Action Alternative. These historic properties were also within the APE for the 2023 FMS PTC EIS and will experience similar noise levels under the proposed expansion of the FMS PTC. As described in the 2023 FMS PTC EIS, no adverse effects due to noise or vibration are anticipated.

While there will be increased activity in the airspace and small increases in noise in some areas, anticipated levels of noise and vibration remain well below established damage thresholds. The audible and visual effects of flights on historic properties below the airspace will be similar to the effects described in the 2023 FMS PTC EIS. Given the current use of the airspace and the nature of the proposed future use of the project area, there would be no adverse effects to NRHP-eligible or -listed archaeological resources, architectural resources, or traditional cultural properties with implementation of the Proposed Action Alternative.

In accordance with 36 CFR § 800.3(c)4, the DAF requests your comments on our proposed APE and input regarding any potential issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, given that the effects to historic properties associated with implementation of the Proposed Action Alternative will be similar to the effects described in the 2023 FMS PTC EIS, in accordance with 36 CFR § 800.11(4), the DAF requests your comments on our finding that the Proposed Action Alternative for expansion of the FMS PTC at Ebbing ANG Base will result in no adverse effects to historic properties.

If you have any questions regarding this undertaking, please feel free to contact me by e-mail at robert.hudson.20@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely,

HUDSON.ROBERT.TALMADGE.1270116325 Digitally signed by HUDSON.ROBERT.TALMADGE.1270116325 Date: 2025.04.29 10:52:50 -05'00'

ROBERT T. HUDSON, Lt Col, AR ANG
Base Civil Engineer, 188th Wing

Enclosures:
Enclosure 1 – Area of Potential Development – Ebbing ANG Base
Enclosure 2 – Ebbing ANG Base Operational Airspace and Ranges
Enclosure 3 – Historic Properties and Unevaluated Previously Recorded Resources within the DNL 65 dBA Contour APE Surrounding Ebbing ANG Base and FSRA

ENCLOSURE 1

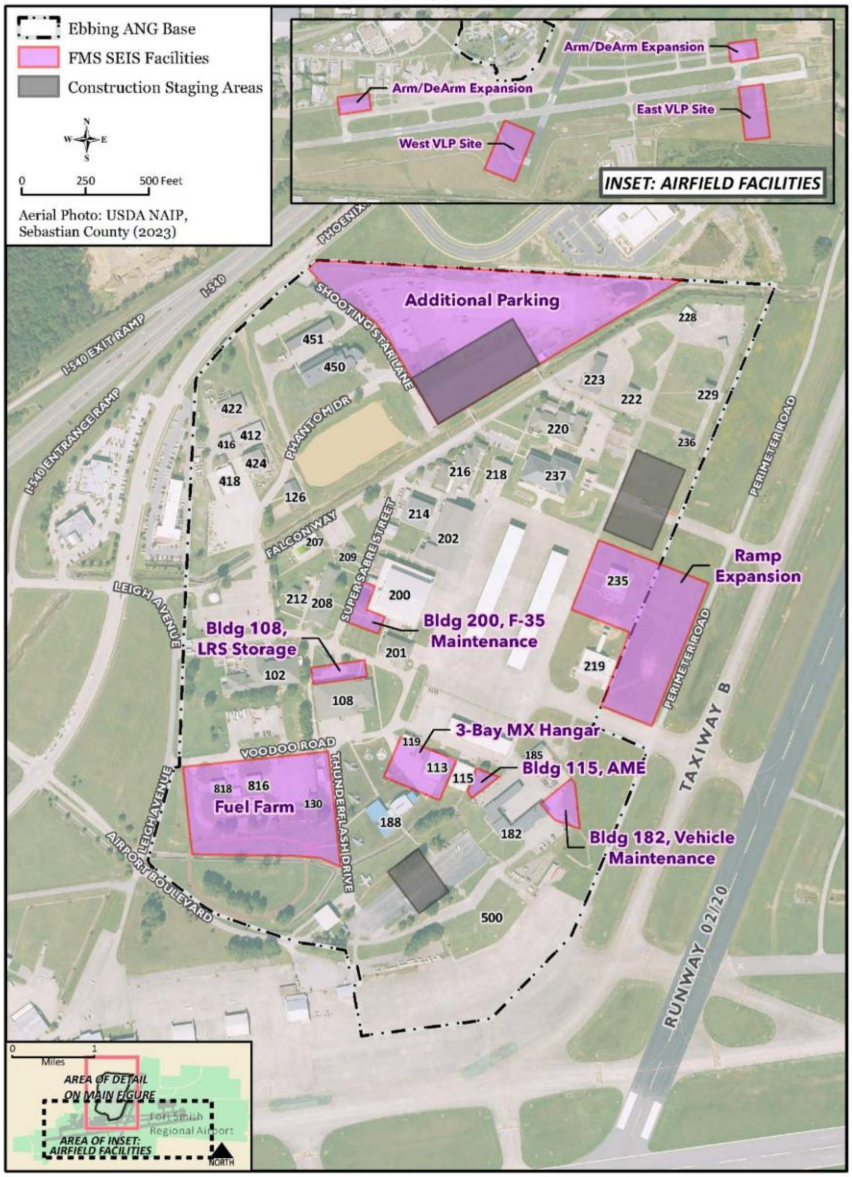


Figure 1. Area of Potential Development – Ebbing ANG Base

6

1

ENCLOSURE 2

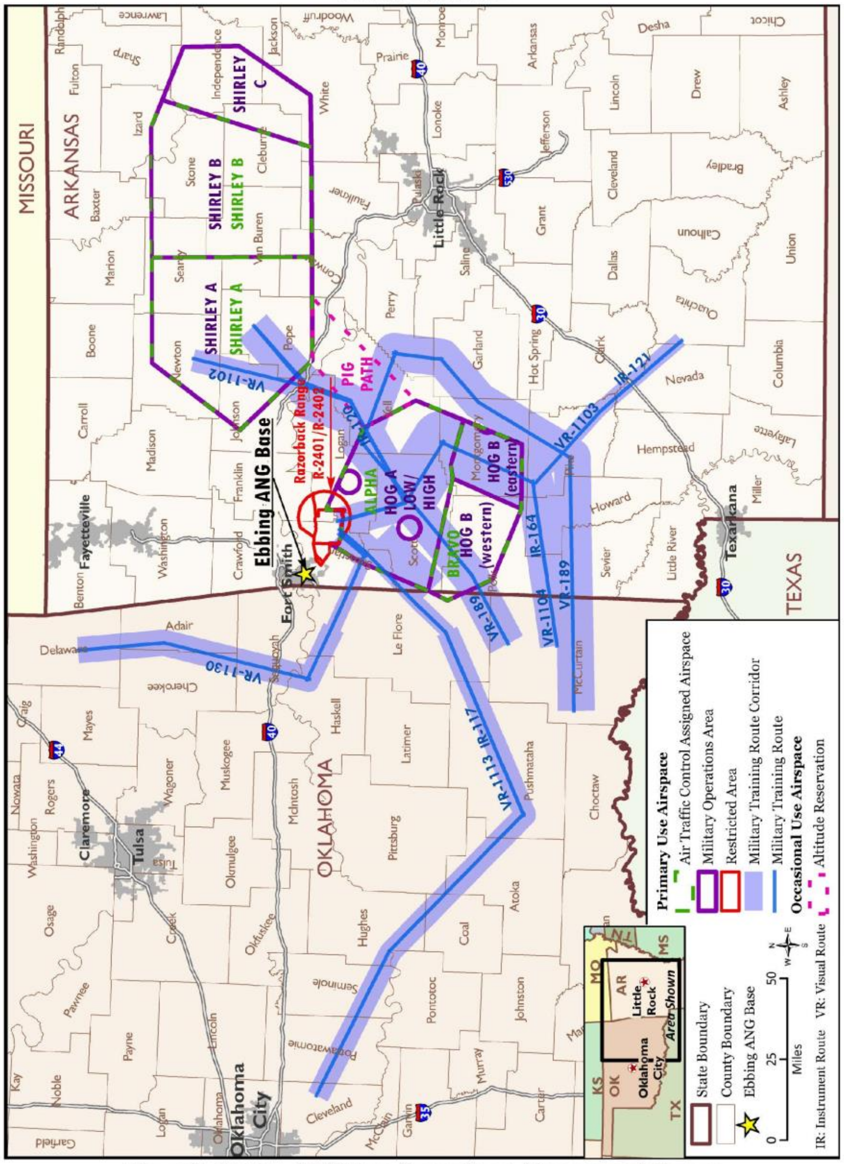


Figure 2. Ebbing ANG Base Operational Airspace and Ranges

7

1

ENCLOSURE 3

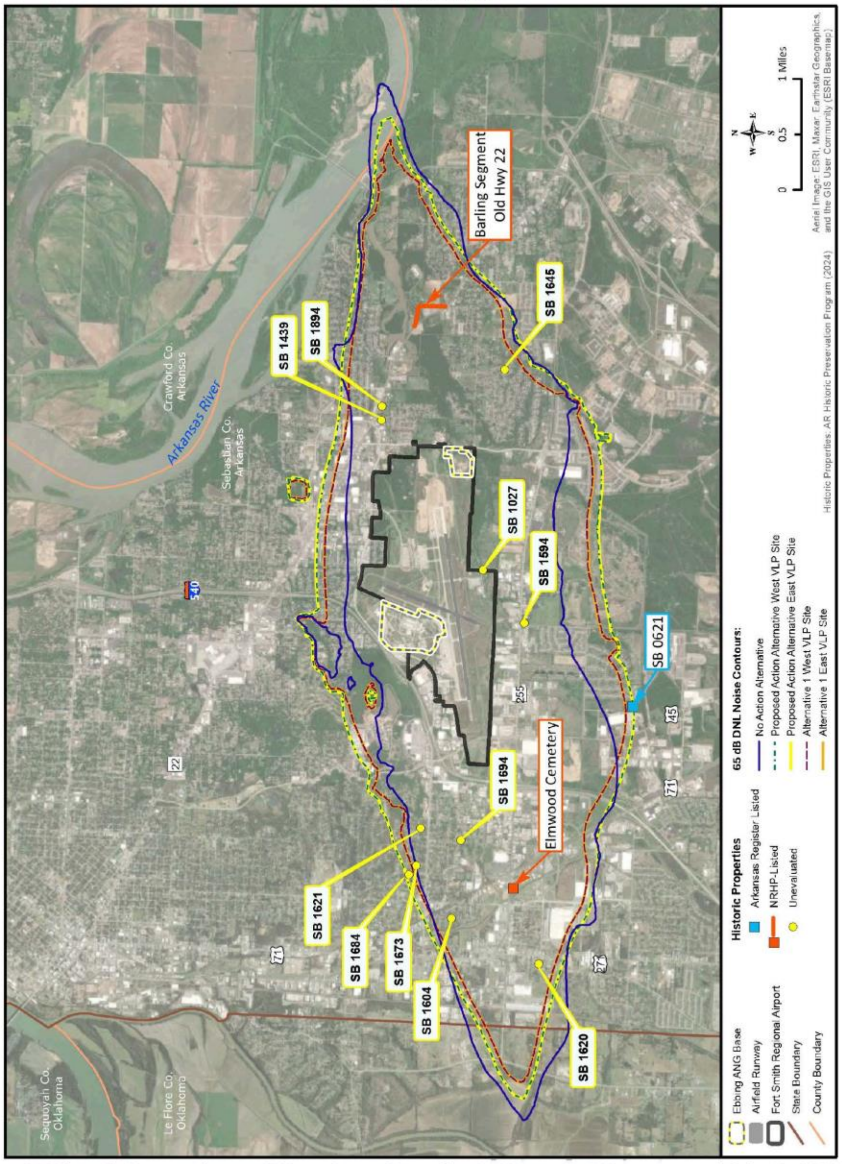


Figure 3. Historic Properties and Unevaluated Previously Recorded Resources within the DNL 65 dBA Contour APE Surrounding Ebbing ANG Base and FSRA

8

B.2.2.2 Oklahoma SHPO

DAF Letter to Oklahoma SHPO

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 188th WING
FORT SMITH, AR

29 April 2025

Robert T. Hudson
Base Civil Engineer
188th Wing
4850 Leigh Ave
Fort Smith, AR 72903

Lynda Ozan
Deputy State Historic Preservation Officer
Oklahoma Historical Society
800 Nazih Zuhdi Drive
Oklahoma City, OK 73105

SUBJECT: Proposed Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown at Ebbing Air National Guard (ANG) Base, Arkansas

Dear Ms. Ozan,

Pursuant to the *National Environmental Policy Act of 1969* (NEPA), as amended, and the United States Department of the Air Force (DAF) procedures for implementing NEPA (32 Code of Federal Regulations [CFR] Part 989, *Environmental Impact Analysis Process*), the DAF intends to prepare a Supplemental Environmental Impact Statement (SEIS) for the proposed expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base in Sebastian County, Arkansas. The DAF is the lead agency for the SEIS while the Federal Aviation Administration (FAA) and United States Forest Service (USFS) are acting as Cooperating Agencies. The DAF is coordinating with the FAA and USFS based on their jurisdiction by law and special expertise relating to the DAF's proposal.

The DAF is preparing this SEIS to address proposed changes since the completion of the *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan Final Environmental Impact Statement* (hereinafter referred to as the "2023 FMS PTC EIS"). The DAF signed the Record of Decision (ROD) on March 11, 2023, selecting Ebbing Air National Guard (ANG) Base as the location to establish the FMS F-35 PTC, which included up to 24 F-35s, relocation of 12 Republic of Singapore Air Force (RSAF) F-16s, and supporting infrastructure, among other issues. Since the signing of the 2023 FMS PTC EIS ROD, new training requirements have emerged due to additional FMS purchases of F-35 aircraft, including operations that incorporate the F-35B's Short Takeoff and Vertical Landing (STOVL) capabilities. The Proposed Action Alternative presented in the SEIS would beddown an additional 12 F-35s for a total of 36 F-35 PAA and 12 F-16 aircraft at Ebbing ANG Base. There would also be an increase in F-35 operations, personnel, and new facilities, as further described below. The SEIS will also consider a No Action Alternative, under

1

which DAF would implement the 2023 FMS PTC ROD, and Alternative 1, under which the DAF would refine operations from the 2023 FMS PTC EIS.

Because the proposed undertaking utilizes military training routes over Oklahoma, the DAF initiated consultation with the Oklahoma State Historic Preservation Office regarding the action described in the 2023 FMS PTC EIS in January 2022. In a letter dated January 21, 2022, your office concurred with a finding of no historic properties affected. In accordance with Section 306108 of the *National Historic Preservation Act* and its implementing regulations at 36 CFR Part 800, the DAF is now initiating consultation with your office and tribal governments who have expressed an interest in the affected area for the proposed expansion of the FMS PTC beddown at Ebbing ANG Base.

Additional information about the FMS PTC beddown may be found on the Internet at http://www.FMSPTCEIS.com.

The Proposed Action Alternative will include construction and renovation projects at Ebbing ANG Base and Fort Smith Regional Airport (FSRA). It also will include new aircraft operations within the airfield and within established airspace and ranges. F-35 operations under the Proposed Action Alternative would occur within existing designated special use airspace. While aircraft operations would increase, there would be no additions to, or alterations of, the existing designated special use airspace.

Construction and renovation projects would occur at Ebbing ANG Base to support the 12 new F-35 PAA and STOVL operations. All such construction and renovation projects will occur in Arkansas and thus will not affect any historic properties in Oklahoma.

The FSRA airfield would be utilized for F-35 training operations under the Proposed Action Alternative and would include vertical landing pad maneuvers. The same airspace and ranges originally included and described in the 2023 FMS PTC EIS (§ 2.2.1) would be utilized by the 12 additional F-35 aircraft proposed for Ebbing ANG Base (see **Figure 1** [Enclosure 1]). Aircraft operating out of Ebbing ANG Base primarily utilize the Hog Military Operations Area (MOA); the Shirley MOA; a corridor between the Hog and Shirley MOAs called the "Pig Path"; Military Training Routes (MTRs) consisting of Visual Routes (VRs), including VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182; and Instrument Routes (IRs) consisting of IR-117, IR-120, IR-121, and IR-164. The 188 WG's primary range is Razorback Range, encompassed by Restricted Area R-2401 and R-2402; it is 15 nautical miles to the center point of the range from Fort Smith. R-2401A and R-2402A/B/C are scheduled by the 188 WG through Fort Chaffee (U.S. Army). Overall, the Proposed Action Alternative would increase airspace events by 13 percent (%) as compared to the 2023 FMS PTC EIS. Noise levels within portions of the Hog and Shirley MOAs would range from a decrease of onset rate-adjusted monthly day-night average sound level (L_{dnmr}) 6.3 A-weighted decibels (dBA) to an increase of L_{dnmr} 2.5 dBA compared to the No Action Alternative. Changes in noise levels in the MTRs would range from a decrease of L_{dnmr} 3.5 dBA to an increase of L_{dnmr} 3.1 dBA. However, noise levels would remain below L_{dnmr} 65 dBA throughout the airspace.

2

1

The area of potential effect (APE) for this undertaking is defined as the proposed construction and renovation projects at Ebbing ANG Base and FSRA(to include access routes and laydown yards), the off-base land surrounding Ebbing ANG Base and FSRA within the 65 A-weighted decibel day-night average sound level (dBA DNL) noise contour for the undertaking, and the area under the airspace and MTRs to be utilized for the undertaking.

There are no known historic properties located on Ebbing ANG Base, and all proposed construction will occur within existing disturbed land. While there will be increased activity in the airspace and small increases in noise in some areas, anticipated levels of noise and vibration remain well below established damage thresholds. The audible and visual effects of flights on historic properties below the airspace will be similar to the effects described in the 2023 FMS PTC EIS. Given the current use of the airspace and the nature of the proposed future use of the project area, there would be no adverse effects to NRHP-eligible or -listed archaeological resources, architectural resources, or traditional cultural properties with implementation of the Proposed Action Alternative.

In accordance with 36 CFR § 800.3(c)4, the DAF requests your comments on our proposed APE and input regarding any potential issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, given that the effects to historic properties associated with implementation of the Proposed Action Alternative will be similar to the effects described in the 2023 FMS PTC EIS, in accordance with 36 CFR § 800.11(4), the DAF requests your comments on our finding that the Proposed Action Alternative for expansion of the FMS PTC at Ebbing ANG Base will result in no adverse effects to historic properties.

If you have any questions regarding this undertaking, please feel free to contact me by e-mail at robert.hudson.20@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely,

HUDSON.ROBERT.TALMADGE.1270116325
Digitally signed by HUDSON.ROBERT.TALMADGE.1270116325
Date: 2025.04.29 10:53:20 -05'00'

ROBERT T. HUDSON, Lt Col, AR ANG
Base Civil Engineer, 188th Wing

Enclosures:

Enclosure 1 – Ebbing ANG Base Operational Airspace and Ranges

ENCLOSURE 1

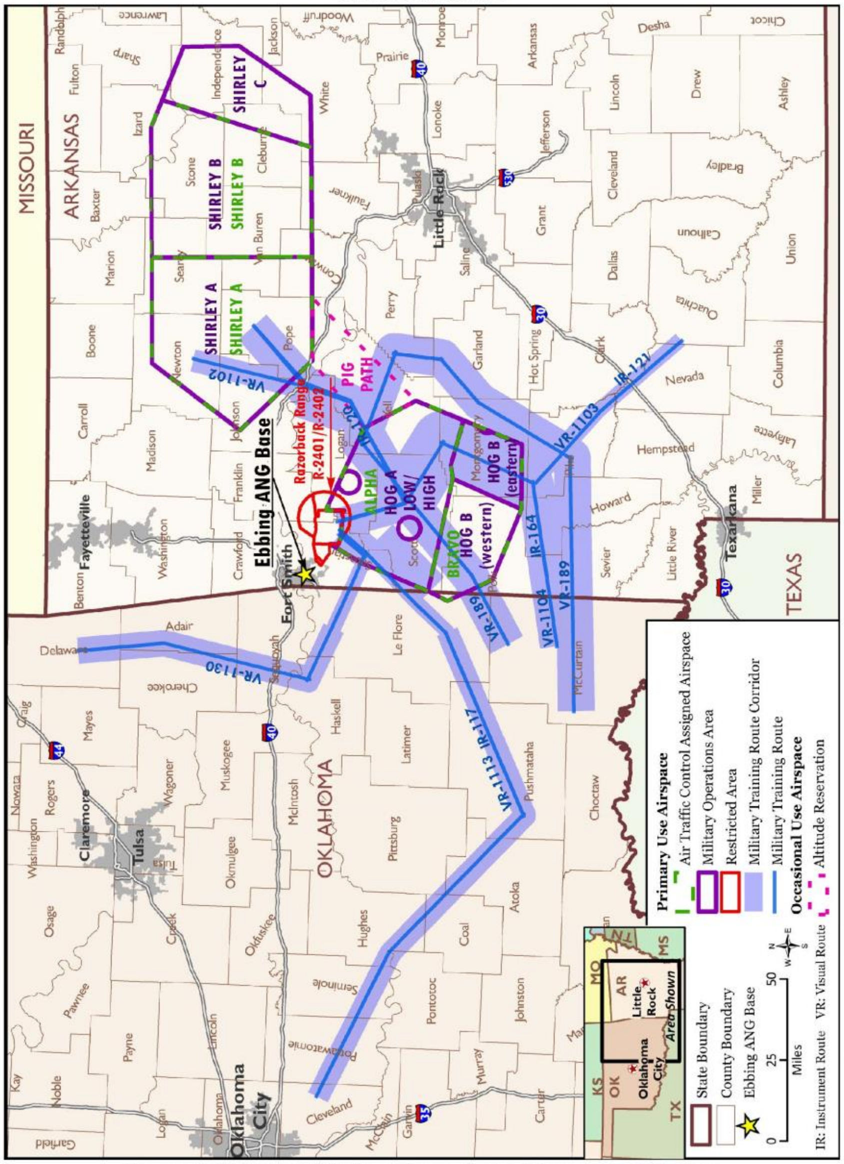


Figure 1. Ebbing ANG Base Operational Airspace and Ranges

4

1

B.2.2.3 Tribal Consultation Letter

Example DAF Letter to the Tribes

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 188TH WING
FORT SMITH, AR

29 April 2025

Robert T. Hudson
Base Civil Engineer
188th Wing
4850 Leigh Ave
Fort Smith, AR 72903

Governor John Johnson
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 S Gordon Cooper Drive
Shawnee, OK 74801

SUBJECT: Proposed Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown at Ebbing Air National Guard (ANG) Base, Arkansas

Dear Governor Johnson,

Pursuant to the *National Environmental Policy Act of 1969* (NEPA), as amended, and the United States Department of the Air Force (DAF) procedures for implementing NEPA (32 Code of Federal Regulations [CFR] Part 989, *Environmental Impact Analysis Process*), the DAF intends to prepare a Supplemental Environmental Impact Statement (SEIS) for the proposed expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base in Sebastian County, Arkansas. The DAF is the lead agency for the SEIS while the Federal Aviation Administration (FAA) and United States Forest Service (USFS) are acting as Cooperating Agencies. The DAF is coordinating with the FAA and USFS based on their jurisdiction by law and special expertise relating to the DAF's proposal.

The DAF is preparing this SEIS to address proposed changes since the completion of the *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan Final Environmental Impact Statement* (hereinafter referred to as the "2023 FMS PTC EIS"). The DAF signed the Record of Decision (ROD) on March 11, 2023, selecting Ebbing Air National Guard (ANG) Base as the location to establish the FMS F-35 PTC, which included up to 24 F-35s, relocation of 12 Republic of Singapore Air Force (RSAF) F-16s, and supporting infrastructure, among other issues. Since the signing of the 2023 FMS PTC EIS ROD, new training requirements have emerged due to additional FMS purchases of F-35 aircraft, including operations that incorporate the F-35B's Short Takeoff and Vertical Landing (STOVL) capabilities. The Proposed Action Alternative presented in the SEIS would beddown an additional 12 F-35s for a total of 36 F-35 PAA and 12 F-16 aircraft at Ebbing ANG Base. There would also be an increase in F-35 operations, personnel, and new facilities, as further described below. The SEIS will also consider a No Action Alternative, under which DAF would implement the 2023 FMS PTC ROD, and Alternative 1, under which the DAF would refine operations from the 2023 FMS PTC EIS.

1

In accordance with Section 306108 of the *National Historic Preservation Act* and its implementing regulations at 36 CFR Part 800, the DAF is now initiating consultation with your office and other tribal governments who have expressed an interest in the affected area for the proposed expansion of the FMS PTC beddown at Ebbing ANG Base.

Additional information about the FMS PTC beddown may be found on the Internet at http://www.FMSPTCEIS.com.

The Proposed Action Alternative will include construction and renovation projects at Ebbing ANG Base and Fort Smith Regional Airport (FSRA). It also will include new aircraft operations within the airfield and within established airspace and ranges. F-35 operations under the Proposed Action Alternative would occur within existing designated special use airspace. While aircraft operations would increase, there would be no additions to, or alterations of, the existing designated special use airspace.

Construction and renovation projects would occur at Ebbing ANG Base to support the 12 new F-35 PAA and STOVL operations. These projects are listed below in Error! Reference source not found. and shown in **Figure 1** (Enclosure 1). These projects are in addition to the construction and renovation projects described and listed in the 2023 FMS PTC EIS (§ 2.2.3), which would continue to occur.

Table 1. Construction and Renovation Projects at Ebbing ANG Base (and FSRA) Under the Proposed Action Alternative.

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
108	LRS storage	15,000	Add/Alter to existing building to support PAA increase	15,000	Ebbing ANG Base
115	AME Back Shops	10,000	Add/Alter to existing building to support PAA increase	10,000	Ebbing ANG Base
182	Back Shops, Vehicle Maintenance	20,000	Add/Alter to existing building to support PAA increase	20,000	Ebbing ANG Base
200	F-35 Maintenance	3,000	Add/Alter to existing building to support PAA increase	3,000	Ebbing ANG Base
Existing Fuel Farm	Fuel Storage Expansion	221,000	Expansion to existing fuel storage farm to provide adequate fuel supply capacity	221,000	Ebbing ANG Base
113 and 119 / New Construction (b)	3-Bay Hangar	40,000	Demolish buildings 113 and 119 to construct new MX hangar to support F-35 PAA increase	30,484	Ebbing ANG Base
New Construction (b)	Main Ramp Expansion	203,000	Expansion to main ramp to provide aircraft parking capacity for PAA increase	203,000	Both

2

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
New Construction [(b)]	Arm/De-Arm Expansion (x2)	10,000 each	Capacity expansion to launch 8 F-16 aircraft simultaneously – identified after original EIS	20,000	FSRA
New Construction [(b)]	VLP	118,400	Provide emergency vertical landing capability for RSAF F-35B aircraft – identified after original EIS	118,400	FSRA
Additional Construction	Parking Lot	7.00 acres [(a)]	Expansion of existing parking lot	304,920 (7 acres)	Ebbing ANG Base
New Construction [(b)]	Parking Lot	4.17 acres [(a)]	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	181,645 (4.17 acres)	Ebbing ANG Base
New Construction [(b)]	Parking Lot	1.86 acres [(a)]	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	81,022 (1.86 acres)	Ebbing ANG Base
Total New Ground Disturbance and New Impervious Surface Areas				**1,208,471**	

Key: AFI = Air Force Instruction; AME = Aircraft Munitions Equipment; ANG = Air National Guard; EIS = Environmental Impact Statement; FSRA = Fort Smith Regional Airport; FSRM = Facilities Sustainment, Restoration and Modernization; LRS = Logistics Readiness Squadron; MILCON = military construction; MX = maintenance; PAA = Primary Aerospace Vehicle Authorization; RSAF = Republic of Singapore Air Force; sq. ft. = square feet; VLP = Vertical Landing Pad

Notes:

a. Acreages listed in the table were converted to square feet for total area calculations.

b. New construction has not been assigned a facility number on Ebbing ANG Base; however, new construction projects are displayed and identified on **Figure 1** as their Proposed Facility Use.

All FMS PTC facilities under the Proposed Action Alternative would primarily be developed near the main ramp. However, the Vertical Landing Pads (VLP), arm/de-arm expansions, and a portion of the main ramp expansion are proposed for other parts of the FSRA airfield, outside Ebbing ANG Base boundaries. During construction, temporary staging areas would be located on current Ebbing ANG Base paved areas or previously disturbed areas. These areas are depicted in **Figure 1** (Enclosure 1) as gray boxes.

To support the proposed STOVL operations, the DAF would construct one 220-foot by 220-foot VLP with a 100-foot by 700-foot taxiway within the FSRA airfield. The SEIS evaluates two alternative locations to site the VLP. The exact location and configuration of the concrete VLP within the area depicted on **Figure 1** (Enclosure 1) will be determined during project design and is not anticipated to impact navigational aids, airport design surfaces, or Perimeter Road; however the entire area would not be disturbed. As shown in the airfield inset of **Figure 1** (Enclosure 1), the West VLP Site Subalternative would construct the VLP and connecting taxiway along the southwestern end of RWY 02/20 and the East VLP Site Subalternative would construct the VLP and connecting taxiway along the southeastern end of RWY 08/26.

The FSRA airfield would be utilized for F-35 training operations under the Proposed Action Alternative and would include VLP maneuvers. The same airspace and ranges originally included and described in the 2023 FMS PTC EIS (§ 2.2.1) would be utilized by the 12 additional F-35 aircraft proposed for Ebbing ANG Base (see **Figure 2** [Enclosure 2]). Aircraft operating

3

1

out of Ebbing ANG Base primarily utilize the Hog Military Operations Area (MOA); the Shirley MOA; a corridor between the Hog and Shirley MOAs called the "Pig Path"; Military Training Routes (MTRs) consisting of Visual Routes (VRs), including VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182; and Instrument Routes (IRs) consisting of IR-117, IR-120, IR-121, and IR-164. The 188 WG's primary range is Razorback Range, encompassed by Restricted Area R-2401 and R-2402; it is 15 nautical miles to the center point of the range from Fort Smith. R-2401A and R-2402A/B/C are scheduled by the 188 WG through Fort Chaffee (U.S. Army). Overall, the Proposed Action Alternative would increase airspace events by 13 percent (%) as compared to the 2023 FMS PTC EIS. Noise levels within portions of the Hog and Shirley MOAs would range from a decrease of onset rate-adjusted monthly day-night average sound level (L_{dnmr}) 6.3 A-weighted decibels (dBA) to an increase of L_{dnmr} 2.5 dBA compared to the No Action Alternative. Changes in noise levels in the MTRs would range from a decrease of L_{dnmr} 3.5 dBA to an increase of L_{dnmr} 3.1 dBA. However, noise levels would remain below L_{dnmr} 65 dBA throughout the airspace.

The area of potential effect (APE) for this undertaking is defined as the proposed construction and renovation projects described in Table 1 (to include access routes and laydown yards), the off-base land surrounding Ebbing ANG Base and FSRA within the 65 A-weighted decibel day-night average sound level (dBA DNL) noise contour for the undertaking, and the area under the airspace and Military Training Routes (MTRs) to be utilized for the undertaking.

Ebbing ANGB, the NGB, and DAF are unaware of any properties of religious or cultural significance on Ebbing ANGB. Furthermore, we do not anticipate any adverse effects to resources located under the airspace, and the DAF will abide by all mitigations described in the 2023 FMS PTC EIS. We understand, however, that the concerns and interests of the tribe may differ from those of the State Historic Preservation Officer and, therefore, would like to invite you to comment and consult on our proposed undertaking. Please provide any comments you may have to robert.hudson.20@us.af.mil.

If you would like additional information on this proposed undertaking, or if you would like additional consultation, please do not hesitate to let us know.

Thank you in advance for your assistance in this effort.

Sincerely,

HUDSON.ROBERT.
TALMADGE.127011
6325

Digitally signed by
HUDSON.ROBERT.TALMADGE.1
270116325
Date: 2025.04.29 07:26:12 -05'00'

ROBERT T. HUDSON, Lt Col, AR ANG
Base Civil Engineer, 188th Wing

Enclosures:
Enclosure 1 – Area of Potential Development – Ebbing ANG Base
Enclosure 2 – Ebbing ANG Base Operational Airspace and Ranges

1

ENCLOSURE 1

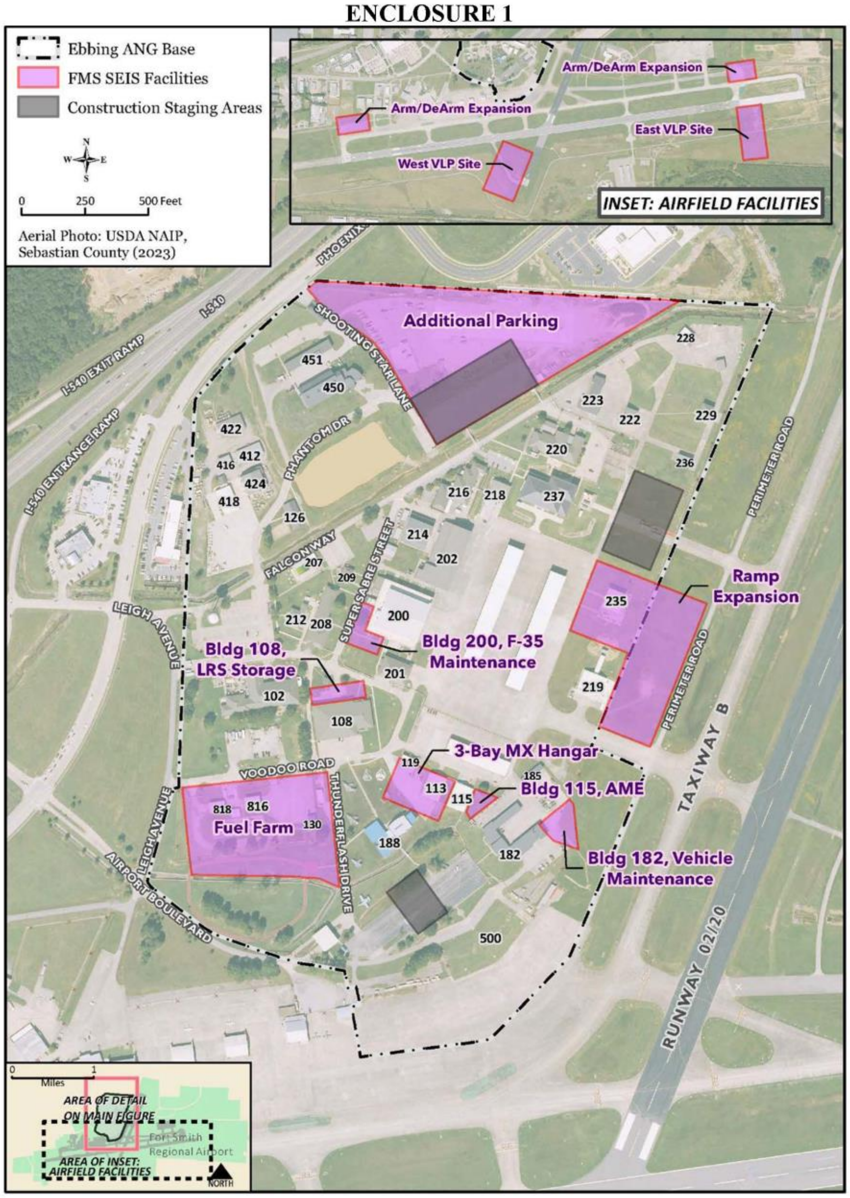


Figure 1. Area of Potential Development – Ebbing ANG Base

5

ENCLOSURE 2

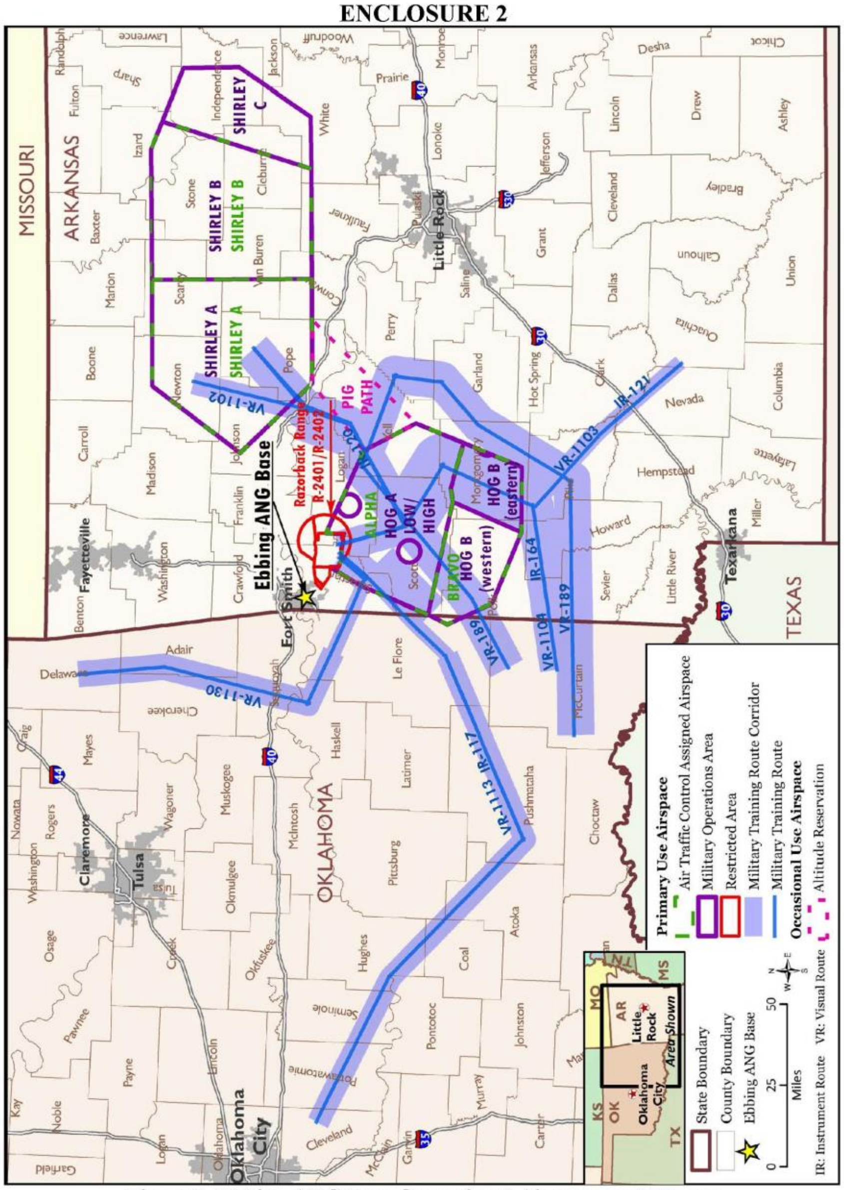


Figure 2. Ebbing ANG Base Operational Airspace and Ranges

6

Delaware Nation Response to DAF

From: Carissa Speck
To: Robydek, Amanda C. [US-US]
Subject: EXTERNAL: RE: Government to Government Consultations - Department of the Air Force
Date: Tuesday, May 06, 2025 10:02:55 AM

Thank you for contacting Delaware Nation regarding the proposed project. You may direct correspondence to our historic preservation department via this email. We are not aware of any cultural resources or historic properties of significance to Delaware Nation within the APE that may be disturbed by construction activities. We will defer on further consultation for this proposed project. We look forward to working with you all in the future though. Thank you.

Wanìshi,

Carissa Speck, M.A.
Director of Historic Preservation
Delaware Nation
PO Box 825, Anadarko, OK 73005
(405) 901-1715 x 1301
cspeck@delawarenation-nsn.gov

From: Deborah Dotson <ddotson@delawarenation-nsn.gov>
Sent: Monday, May 5, 2025 2:51 PM
To: Carissa Speck <cspeck@delawarenation-nsn.gov>; Katelyn Lucas <klucas@delawarenation-nsn.gov>
Subject: FW: Government to Government Consultations - Department of the Air Force

Wanishi,

Debbie Dotson

Deborah Dotson, President
Delaware Nation

"Never allow a person to tell you no who doesn't have the power to say yes."
~Eleanor Roosevelt~

law, and is intented only for the use of the individual or entity named herein. If the reader of this message is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby notified that any retention, dissemination, distribution or copying of this communication is strictly prohibited. Although this e-mail and any attachments are believed to be free of any virus or other defect that might affect any computer system in to which it is received and opened, it is the responsibility of the recipient to ensure that it is virus free and no responsibility is accepted by Delaware Nation or the author hereof in any way from its use. If you have received his communication in error, please immediately notify us by return e-mail. Wanishi.

From: Robydek, Amanda C. [US-US] <AMANDA.C.ROBYDEK@leidos.com>
Sent: Monday, May 5, 2025 2:41 PM
To: NARANJO, AUSTIN N CIV USAF AFMC AFCEC/CIE <austin.naranjo.1@us.af.mil>; Deborah Dotson <ddotson@delawarenation-nsn.gov>
Cc: Katelyn Lucas <klucas@delawarenation-nsn.gov>; McLaurine, Henry C. [US-US] <HENRY.C.MCLAURINE@leidos.com>; Sands, Amy L. [US-US] <AMY.L.SANDS@leidos.com>; 'Elizabeth Gallow' <eagallow@crai-ky.com>
Subject: RE: Government to Government Consultations - Department of the Air Force

All,

As promised, we have attached letter that was mailed last week.

If you have any questions, please let us know.

Very respectfully,
Amanda

Amanda C. Robydek, CSE, CAPM | Leidos
Project Manager I Environmental Scientist
Climate, Energy & Environment Division

amanda.c.robydek@leidos.com | www.leidos.com
+1 (850) 368-3067 **O** | +1 (850) 368-3067 **M**

From: NARANJO, AUSTIN N CIV USAF AFMC AFCEC/CIE <austin.naranjo.1@us.af.mil>
Sent: Thursday, May 01, 2025 8:58 AM
To: ddotson@delawarenation-nsn.gov
Cc: klucas@delawarenation-nsn.gov; McLaurine, Henry C. [US-US] <HENRY.C.MCLAURINE@leidos.com>; Sands, Amy L. [US-US] <AMY.L.SANDS@leidos.com>; Robydek, Amanda C. [US-US] <AMANDA.C.ROBYDEK@leidos.com>
Subject: EXTERNAL: Government to Government Consultations - Department of the Air Force

President Dotson,

My name is Austin Naranjo and I am the Air Force Project Manager for the Supplemental Environmental Impact Statement (SEIS) for the Expansion of the Foreign Military Sales F-35 Pilot Training Center at Ebbing Air National Guard Base, Arkansas.

I am sending this email to notify you that we are preparing to mail a Government-to-Government consultation letter to you regarding the subject project. After the letter is mailed, our SEIS Consultant, Leidos (copied on this email), will e-mail an electronic copy of the letter to you and the other tribal contacts copied on this email.

Please feel free to reach out to myself or Leidos should you have any questions.

Very Respectfully,
//SIGNED//

AUSTIN N. NARANJO, GS-13, DAF
Program Manager
Air Force NEPA Division (AFCEC/CIE)
JBSA-Lackland
San Antonio, TX 78226
Cell: (210)563-0190

Regular Office Hours (Central Time):

1st week of Pay Period: 0530-1500 M-Th, RDO Friday
2nd week of Pay Period: 0530-1500 M-Th, 0630-1500 Friday

"The farther backward you look, the farther forward you see"
-Winston Churchill

1

Quapaw Nation Response to DAF

From: Julia Pebeahsy
To: Robydek, Amanda C. [US-US]; NARANJO, AUSTIN N CIV USAF AFMC AFCEC/CIE; McLaurine, Henry C. [US-US]
Cc: section 106
Subject: EXTERNAL: Response to Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown Sebastian County, Arkansas
Date: Friday, May 09, 2025 9:13:50 AM

CAUTION: This email originated from outside of Leidos. Be cautious when clicking or opening content.

Friday, May 9, 2025

Attn: AUSTIN N. NARANJO, GS-13, DAF
Program Manager
Air Force NEPA Division (AFCEC/CIE)
JBSA-Lackland
San Antonio, TX 78226

Re: Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown Sebastian County, Arkansas
Dear Robert Hudson,
The Quapaw Nation Historic Preservation Program (QNHPP) has received and reviewed the information you have provided. Based upon the information you provided we believe that Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown Sebastian County, Arkansas will have no effect on known properties of cultural or sacred significance to the Quapaw Nation.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d) (6) (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 Quapaw 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, or the Native American Graves Protection and Repatriation Act. If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and that you contact the Quapaw Nation Historic Preservation Office.

Should you have any questions or need any additional information, please feel free to contact Julia

Pebeahsy at Julia.pebeahsy@quapawnation.com, please copy section106@quapawnation.com to ensure additional information requests are reviewed in a timely manner. Thank you for consulting with the Quapaw Nation on this matter.

Sincerely,

Julia Pebeahsy

On behalf of
-Ms. Billie Burtrum
Preservation Officer/ QNHPP Director
Quapaw Nation
P.O. Box 765
Quapaw, OK 74363
(w) 918-238-3100
(f) 918-674-2456

Muscogee (Creek) Response to DAF

From: Section106
To: Robydek, Amanda C. [US-US]
Subject: EXTERNAL: Re: Government to Government Consultations - Department of the Air Force
Date: Tuesday, May 06, 2025 12:48:24 PM
Attachments: image.png

CAUTION: This email originated from outside of Leidos. Be cautious when clicking or opening content.

Good afternoon Amanda,

For each of the 12 projects listed in Table 1 of your letter, please provide the information below and send the request back through our Section106@muscogeenation.com address.

1. Provide the project location: State, County, and GPS coordinates.
2. Provide a topographic and aerial map of the project that shows the APE (Area of Potential Effect) including any staging areas for equipment (i.e. construction, vehicles, etc.).
3. Map or listing of known archaeological sites within 1 mile of the APE or project area. Consult with the state's SHPO concerning this.
4. A cultural resource survey or evaluation of historic or cultural properties within the APE.
5. Agency must identify any historic properties and determine eligibility to the National Register of Historic Places (NRHP).
6. Agency must make a determination of effect on historic properties within the APE.

Until we have this information, we will not be providing a determination on any portion of this proposal. If you have any questions concerning this, please do not hesitate to contact me directly.

Mvto,

Logan Guthrie, MA
Cultural Technician
Historic and Cultural Preservation Department
The Muscogee (Creek) Nation
P.O. Box 580 | Okmulgee, OK 74447
T 918.732.7759 | F 918.758.0649
lguthrie@muscogeenation.com
https://www.muscogeenation.com/

THE MUSCOGEE NATION

From: Robydek, Amanda C. [US-US] <AMANDA.C.ROBYDEK@leidos.com>
Sent: Monday, May 5, 2025 2:26 PM
To: NARANJO, AUSTIN N CIV USAF AFMC AFCEC/CIE <austin.naranjo.1@us.af.mil>; Section106 <section106@muscogeenation.com>
Cc: McLaurine, Henry C. [US-US] <HENRY.C.MCLAURINE@leidos.com>; Sands, Amy L. [US-US] <AMY.L.SANDS@leidos.com>; 'Elizabeth Gallow' <eagallow@crai-ky.com>

Subject: RE: Government to Government Consultations - Department of the Air Force

You don't often get email from amanda.c.robydek@leidos.com. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

All,

As promised, we have attached letter that was mailed last week.

If you have any questions, please let us know.

Very respectfully,
Amanda

Amanda C. Robydek, CSE, CAPM | Leidos
Project Manager I Environmental Scientist
Climate, Energy & Environment Division

amanda.c.robydek@leidos.com | www.leidos.com
+1 (850) 368-3067 **O** | +1 (850) 368-3067 **M**

From: NARANJO, AUSTIN N CIV USAF AFMC AFCEC/CIE <austin.naranjo.1@us.af.mil>
Sent: Thursday, May 01, 2025 8:56 AM
To: section106@muscogeenation.com
Cc: McLaurine, Henry C. [US-US] <HENRY.C.MCLAURINE@leidos.com>; Robydek, Amanda C. [US-US] <AMANDA.C.ROBYDEK@leidos.com>; Sands, Amy L. [US-US] <AMY.L.SANDS@leidos.com>
Subject: EXTERNAL: Government to Government Consultations - Department of the Air Force

Chief Hill,

My name is Austin Naranjo and I am the Air Force Project Manager for the Supplemental Environmental Impact Statement (SEIS) for the Expansion of the Foreign Military Sales F-35 Pilot Training Center at Ebbing Air National Guard Base, Arkansas.

I am sending this email to notify you that we are preparing to mail a Government-to-Government consultation letter to you regarding the subject project. After the letter is mailed, our SEIS Consultant, Leidos (copied on this email), will e-mail an electronic copy of the letter to you and the other tribal contacts copied on this email.

Please feel free to reach out to myself or Leidos should you have any questions

Very Respectfully,
//SIGNED//

1

AUSTIN N. NARANJO, GS-13, DAF
Program Manager
Air Force NEPA Division (AFCEC/CIE)
JBSA-Lackland
San Antonio, TX 78226
Cell: (210)563-0190

Regular Office Hours (Central Time):

1st week of Pay Period: 0530-1500 M-Th, RDO Friday
2nd week of Pay Period: 0530-1500 M-Th, 0630-1500 Friday

"The farther backward you look, the farther forward you see"
-Winston Churchill

DAF Response to Muscogee (Creek)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 188TH WING
FORT SMITH, AR

June 18, 2025

Robert T. Hudson
Base Civil Engineer
188th Wing
4850 Leigh Ave
Fort Smith, AR 72903

Logan Guthrie
Cultural Technician
Historical and Cultural Preservation Department
The Muscogee (Creek) Nation

SUBJECT: Proposed Expansion of the Foreign Military Sales (FMS) F-35 Pilot Training Center (PTC) Beddown at Ebbing Air National Guard (ANG) Base, Arkansas; Government to Government Consultations – Department of the Air Force

Dear Mr. Guthrie,

This letter is in response to your email received May 6, 2025, requesting additional information for the Supplemental Environmental Impact Statement (SEIS) for the Expansion of the Foreign Military Sales F-35 Pilot Training Center at Ebbing Air National Guard (ANG) Base, Sebastian County, Arkansas. The Proposed Action for this project will include construction and renovation projects at Ebbing ANG Base and Fort Smith Regional Airport (FSRA). These projects are listed below in **Table 1 (Enclosure 1)** with location information, and they are depicted in **Figures 1** and **2 (Enclosure 2)**. These projects are in addition to the construction and renovation projects described and listed in the 2023 FMS PTC EIS (§ 2.2.3), which would continue to occur.

Efforts to identify historic properties within the area of potential effects (APE) for the undertaking included a review of previous cultural resource surveys of Ebbing ANG Base, a review of data on-file with the Arkansas Archeological Survey (AAS) through the Automated Management of Archeological Site Data in Arkansas (AMASDA), a review of architectural survey data available through the Arkansas Historic Preservation ArcGIS Program, and a review of the National Register of Historic Places (NRHP) Geospatial Dataset. A final review of AMASDA data was performed on May 21, 2025, for the APE as well as a 1.6 km (1 mile) buffer surrounding the direct APE. This included portions of the South Fort Smith and Barling, Arkansas 7.5-minute topographic quadrangle maps, in Sebastian County, Arkansas.

The results of the file search indicated that 7 previous cultural resource projects have been performed within the boundaries of Ebbing ANG Base, and an additional 10 cultural resource projects have been performed within 1.6 km of the project APE. Data is provided on each of the projects in **Table 2 (Enclosure 3)**, and the locations of project areas in the AMASDA are provided

1

on **Figure 3 (Enclosure 4)**. The review indicated that there are no previously documented sites within the project APE, but there are 6 within a 1-mile buffer of the direct APE. Data on previously documented sites is presented in **Table 3 (Enclosure 5)** and **Figure 2 (Enclosure 2)**. The sites included precontact and historic sites that were identified during previous cultural resource surveys. None of the sites within the file search buffer will be negatively impacted by the proposed actions at Ebbing ANG Base.

In 2007, the National Guard Bureau (NGB) sponsored a Cultural Resource Survey of the 188th Fighter Wing (FW), Arkansas ANG, FSRA, to support compliance with Section 110 of the NHPA. As described in the report, "Primary tasks included coordination with the NGB, the Arkansas Archaeological Survey (AAS) and the Arkansas Historic Preservation Program (AHPP); conducting documentary research; assessment of archaeological potential with fieldwork verification; architectural survey to record and photograph 33 structures and NRHP significance of these resources individually and/or as a historic district or cultural landscape" (National Guard Bureau, 2007). The survey did not record any archaeological sites and did not identify any NRHP-eligible buildings, landscapes, or districts. The report addressed the main installation as well as the 188th FW Fire Training Area. As described in the survey report, "Research indicates that virtually all of the 188 FW has undergone massive contour alternation associated with activities such as site preparation, construction, and demolition, landscaping and intensive land use and training missions" (National Guard Bureau, 2007). As such, the survey included a limited testing regime that was developed following consultation with Arkansas SHPO and focused on areas with some potential for intact subsurface soil contexts. No cultural resources were identified, and no additional archaeological survey was recommended for either the main installation or the Fire Training Area. SHPO accepted the findings of the final cultural resource survey report on April 18, 2008 (McSwain, 2008).

Following the findings of the Cultural Resource Survey of the 188th FW, it is unlikely that any significant archaeological resources survive in the area of impact on FSRA. These areas have not undergone cultural resource surveys. However, two previous archaeological surveys that have been performed on airport property identified a few isolated artifacts in disturbed contexts, but did not identify any archaeological sites (Branam, 2021, Buchner 2017). FSRA was subjected to the same massive contour alteration as described in the 2007 survey of Ebbing ANG Base and is likely heavily disturbed, as is supported by the findings of previous archaeological surveys.

Based upon the findings of the file search, no impacts to archaeological resources are anticipated from the undertaking. There are no previously documented sites in the APE, and prior surveys at Ebbing ANG Base and FSRA outside the APE have indicated extensive stratigraphic disturbance. It is therefore not expected that undiscovered cultural resources would be found during implementation of the undertaking at Ebbing ANG Base or FSRA; however, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur. The project manager would cease work immediately and the discovery would be reported to the 188th FW environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager. The environmental manager would then continue to follow ANG standard operating procedures for cultural resource

Inadvertent Discovery. Therefore, there would be no adverse effects to archaeological resources with implementation of the undertaking.

Thank you for your assistance in this effort. If you have additional concerns, please do not hesitate to contact us.

Sincerely,

HUDSON.ROBERT.TALMADGE.1270116325 Digitally signed by HUDSON.ROBERT.TALMADGE.1270116325 Date: 2025.06.18 10:51:07 -05'00'

ROBERT T. HUDSON, Lt Col, AR ANG
Base Civil Engineer, 188th Wing

Enclosures:
Enclosure 1 – Table 1. Construction and Renovation Projects at Ebbing ANG Base and FSRA under the Proposed Action.
Enclosure 2 – Figures 1 and 2. Maps of the APE
Enclosure 3 – Table 2. Data on Cultural Resource Studies within the Project APE and within a 1.6 km Radius
Enclosure 4 – Figure 3. Cultural Resource Surveys and Sites within 1.6 km of the APE at Ebbing ANG Base and FSRA
Enclosure 5 – Table 3. Data on Previously Recorded Archaeological Sites within 1.6 km of the Project APE
References Cited

ENCLOSURE 1

Table 1. Construction and Renovation Projects at Ebbing ANG Base and FSRA Under the Proposed Action.

State	County	UTM (WGS 84)	Location (Ebbing ANG Base or FSRA)	Ebbing ANG Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)
Arkansas	Sebastian	15N E375356 N3911693	Ebbing ANG Base	108	LRS storage	15,000	Add/Alter to existing building to support PAA increase	15,000
Arkansas	Sebastian	15N E375526 N3911563	Ebbing ANG Base	115	AME Back Shops	10,000	Add/Alter to existing building to support PAA increase	10,000
Arkansas	Sebastian	15N E375626 N3911535	Ebbing ANG Base	182	Back Shops, Vehicle Maintenance	20,000	Add/Alter to existing building to support PAA increase	20,000
Arkansas	Sebastian	15N E375385 N3911769	Ebbing ANG Base	200	F-35 Maintenance	3,000	Add/Alter to existing building to support PAA increase	3,000
Arkansas	Sebastian	15N E375265 N3911531	Ebbing ANG Base	Existing Fuel Farm	Fuel Storage Expansion	221,000	Expansion to existing fuel storage farm to provide adequate fuel supply capacity	221,000
Arkansas	Sebastian	15N E375454 N3911578	Ebbing ANG Base	113 and 119 / New Construction (b)	3-Bay Hangar	40,000	Demolish buildings 113 and 119 to construct new MX hangar to support F-35 PAA increase	30,484
Arkansas	Sebastian	15N E375718 N3911753	Both	New Construction (b)	Main Ramp Expansion	203,000	Expansion to main ramp to provide aircraft parking capacity for PAA increase	203,000
Arkansas	Sebastian	15N E374512 N3911130; 15N E376881 N3911452	FSRA	New Construction (b)	Arm/De-Arm Expansion (x2)	10,000 each	Capacity expansion to launch 8 F-16 aircraft simultaneously –identified after original EIS	20,000
Arkansas	Sebastian	15N E375461 N3910843; 15N E376951 N3911079	FSRA	Additional Construction	VLP	118,400	Provide emergency vertical landing capability for RSAF F-35B aircraft - identified after original EIS	118,400

4

1

State	County	UTM (WGS 84)	Location (Ebbing ANG Base or FSRA)	Ebbing ANG Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)
Arkansas	Sebastian	15N E375524 N3912116	Ebbing ANG Base	New Construction (b)	Parking Lot	7.00 acres (a)	Expansion of existing parking lot	304,920 (7 acres)
Arkansas	Sebastian	15N E375524 N3912116	Ebbing ANG Base	New Construction (b)	Parking Lot	4.17 acres (a)	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	181,645 (4.17 acres)
Arkansas	Sebastian	15N E375524 N3912116	Ebbing ANG Base	New Construction (b)	Parking Lot	1.86 acres (a)	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	81,022 (1.86 acres)

1

ENCLOSURE 2

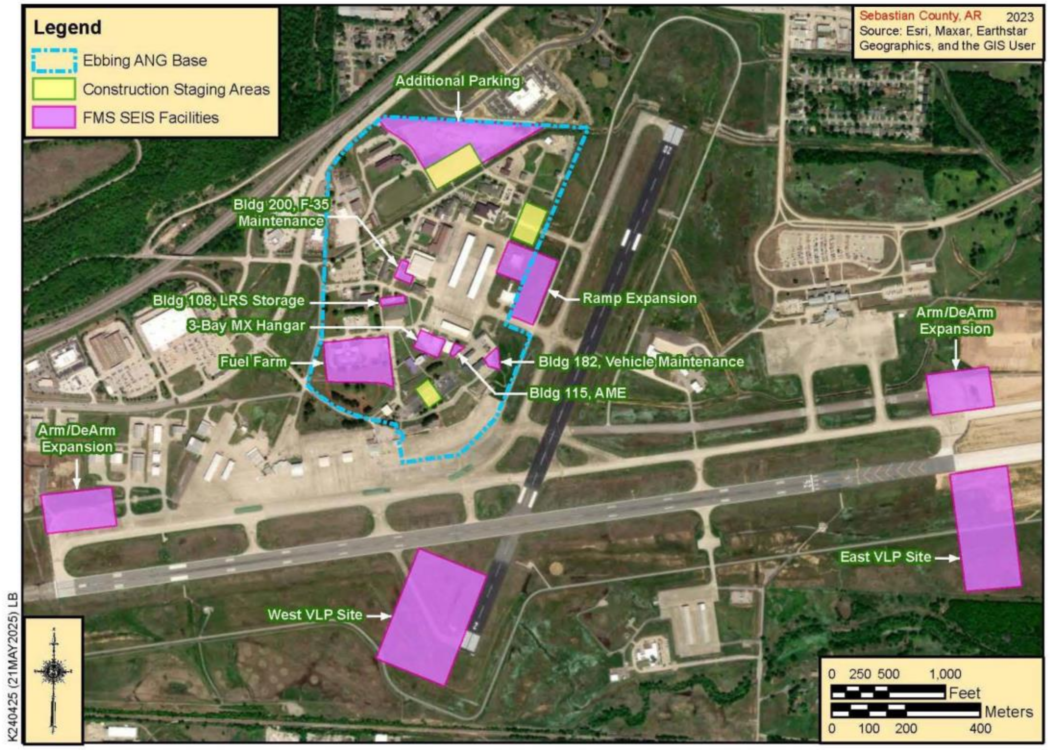


Figure 1. Aerial Image Showing the Area of Potential Effect.

6

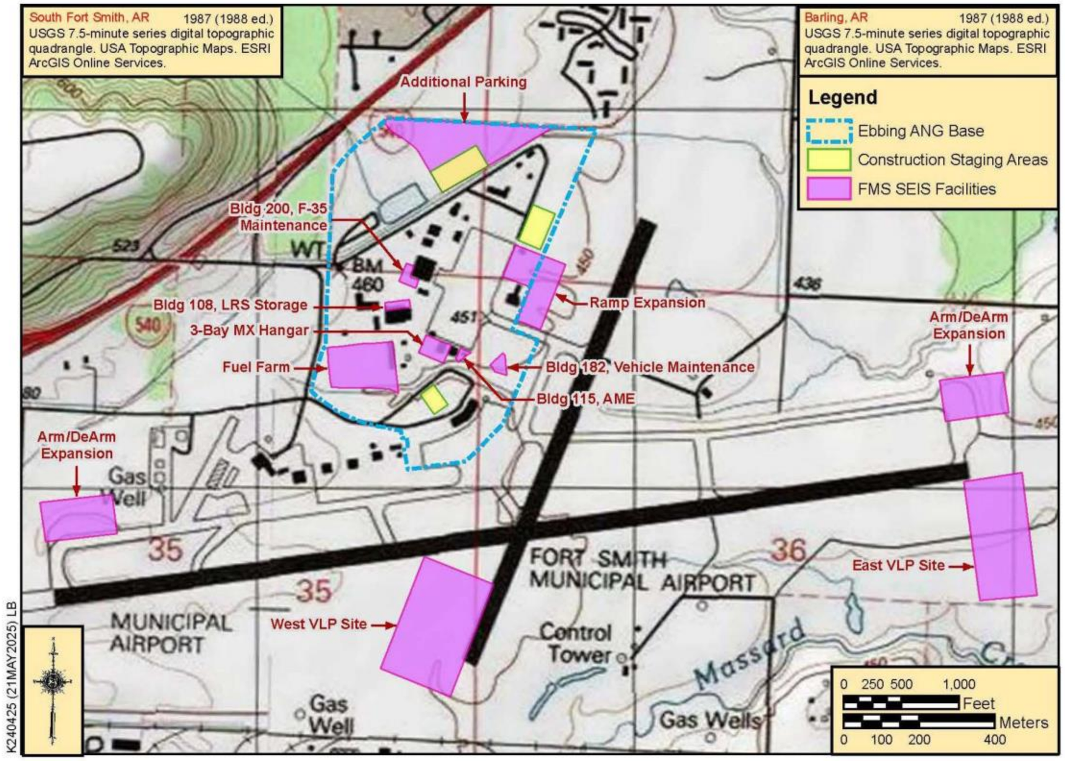


Figure 2. Topographic Map Showing the Area of Potential Effect.

7

1

ENCLOSURE 3

Table 2. Data on Cultural Resource Studies Within the Project APE and Within a 1.6 km Radius.

Within	AMASDA No.	Type	Reference	Project Name	Firm/Agency	Sponsor	Abstract Brief
Ebbing ANGB	n/a	Survey	Rutter et al. 2007	Cultural Resource Survey of the 188th Fighter Wing	Science Applications International Corporation	National Guard Bureau	National Guard Bureau, Environmental Planning Branch (NGB/A7CVN)and the Arkansas Air National Guard (ARANG) completed a Cultural Resource Survey (CRS) atthe 188th Fighter Wing (188 FW), Fort Smith Regional Airport, Sebastian County, Arkansas.
Ebbing ANGB	7815	survey	Branam and Fuentes 2021	Proposed Runway 25 Extension at Fort Smith Airport	Flat Earth Archeology, LLC	Garver	At the request of the Garver, Flat Earth Archeology, LLC conducted a Phase I cultural resources survey of approximately 32.37 hectares (ha) (80 acres [ac]) for a proposed extension of Runway 25 at the Fort Smith Airport in Fort Smith, Sebastian County, Arkansas.
Ebbing ANGB	7074	survey	Buchner 2017	Fort Smith Regional Airport wetlands determination	Panamerican Consultants, Inc.	Pollution Mitigation, Inc.	At the request of Pollution Management, Inc., Panamerican Consultants, Inc. conducted a cultural resources survey of a 43-ac. (17.4-ha) wetland delineation tract at the Fort Smith Regional Airport in Sebastian County, Arkansas.
Ebbing ANGB	928	survey	Heartfield et al. 1984	Ozark Gas Lateral Gas System, Annual Report No. 1, 1982-1983	Heartfield, Price, and Greene	Ozark Gas Pipeline	Ozark Gas Pipeline Corps contracted with Heartfield, Price, and Greene, to survey all small lateral lines from their main natural gas pipeline in Arkansas. In the course of the year under review, approximately 40.3 miles were surveyed, and 23.6 acres of land for an office complex and compression stations were investigated.
Ebbing ANGB	5700	survey	AHTD and Scoggins 2008	Highway 225 Phoenix Avenue Fort Smith Sebastian County (PIF)	Arkansas Highway & Transportation Department	AHTD	The Arkansas Highway and Transportation Department conducted a cultural resources survey to widen Highway 45 from two to five lanes with curb gutters, from the intersection of Highways 255 and 45 for a distance of 1.1 miles to the intersection of Highway 45 on Phoenix Avenue.

8

1

Within	AMASDA No.	Type	Reference	Project Name	Firm/Agency	Sponsor	Abstract Brief
Ebbing ANGB	2552	survey	Santefort et al. 1993	Phoenix Ave. Survey, Fort Smith, Sebastian County	S.P.E.A.R.S.	City of Fort Smith, AR	A survey of approximately three miles of a proposed extension to Phoenix Avenue resulted in the documentation of a historic housesite, 3SB0997.
Ebbing ANGB	3507	survey	Spears and Moerbe 1993	Phoenix Ave. Hwy Extension, Ft. Smith-Massard (records review)	S.P.E.A.R.S.	FTN Ltd. Associates	A literature search and records check was conducted of the 4-mile area to be affected by a proposed road extension, to see if any properties eligible for the National Register existed.
1.6 km buffer	7513	survey	Branam 2019	Phase I Survey of Cleared Lot at 8210 Phoenix Avenue in Forth Smith	Flat Earth Archeology, LLC	Chambers Bank	At the request of Chambers Bank, a Phase I cultural resources survey of approximately 0.6 hectares (1.5 acres) at 8210 Phoenix Avenue in Fort Smith, Sebastian County, Arkansas.
1.6 km buffer	3912	survey	Spears and Gannon 1998	Cultural Resources Survey Two Bridge Improvements-Massard Road	S.P.E.A.R.S.	Mickle-Wagner-Coleman, Inc.	The area to be impacted by bridge improvements over Massard Creek in Fort Smith were surveyed for cultural resources.
1.6 km buffer	7314	survey	Buchner and Saatkamp 2019	AR-DOT Job No. 040716, Massard Creek - Hwy 22	Panamerican Consultants, Inc.	Crafton, Tull & Associates, Inc.	Under a Subconsultant Agreement with Crafton, Tull & Associates, Inc., Panamerican Consultants, Inc. conducted a Phase I cultural resources survey for Arkansas Department of Transportation Job No. 040716, the Massard Creek — Highway 22 Widening and Relocation corridor in Sebastian County, Arkansas as a part of CTA Job No. 17103001.
1.6 km buffer	2355	desktop study	Blakely and Northrip 1989	World War II Structures at Fort Chaffee, Arkansas	Archeological Assessments, Inc.	COE, Little Rock	As part of its continuing program of cultural resource management, a background study focusing on the construction of and activities at Fort Chaffee, Arkansas, during World War II was performed.
1.6 km buffer	5053	survey	Klinger 2005	21 Military Department of Arkansas Armory & Maintenance Shops	Historic Preservation Associates	Military Department of Arkansas Army National Guard	This is a Phase I archeological reconnaissance of 21 Military Department of Arkansas Armory and Organizational Maintenance Shop facilities.

Within	AMASDA No.	Type	Reference	Project Name	Firm/Agency	Sponsor	Abstract Brief
1.6 km buffer	616	survey	Zahn 1986	Fort Chaffee Gas Pipeline	Sponsored Research Program - AASurvey	Arkansas-Oklahoma Gas Corporation	A field survey was conducted of the proposed gas pipeline route for the Arkansas Oklahoma Gas Corporation.
1.6 km buffer	1044	survey	Williams 1986	Fort Chaffee T-Line Survey	Sponsored Research Program - AASurvey	US Army	An archeological survey was conducted of the proposed electric transmission line to be constructed across Fort Chaffee.
1.6 km buffer	1412	survey	Moore 1981	Highway 59-#1 Well Pad & Access, Fort Chaffee	Archeological Research Associates	Samson Resources Co.	A cultural resource survey of the proposed Highway 59-#1 well pad and access road was performed.
1.6 km buffer	3776	testing	Riggs 1997	Investigation of Ten Sites, BRAC Disposal Area, Ft. Chaffee	Little Rock District, Corps of Engineers	COE, Little Rock	Portions of Fort Chaffee are to be returned to private hands. Consultations resulted in designation of 10 sites needing further investigations which determined that none of the sites had any integrity.
1.6 km buffer	5366	survey	Zabecki and Spears 2007	Three Proposed Cell Towers Near Mountainburg and Fort Smith	S.P.E.A.R.S.	Communication Services, Inc.	Phase I, cultural resource survey for three proposed cell tower sites near Mountainburg and Fort Smith.

1

ENCLOSURE 4

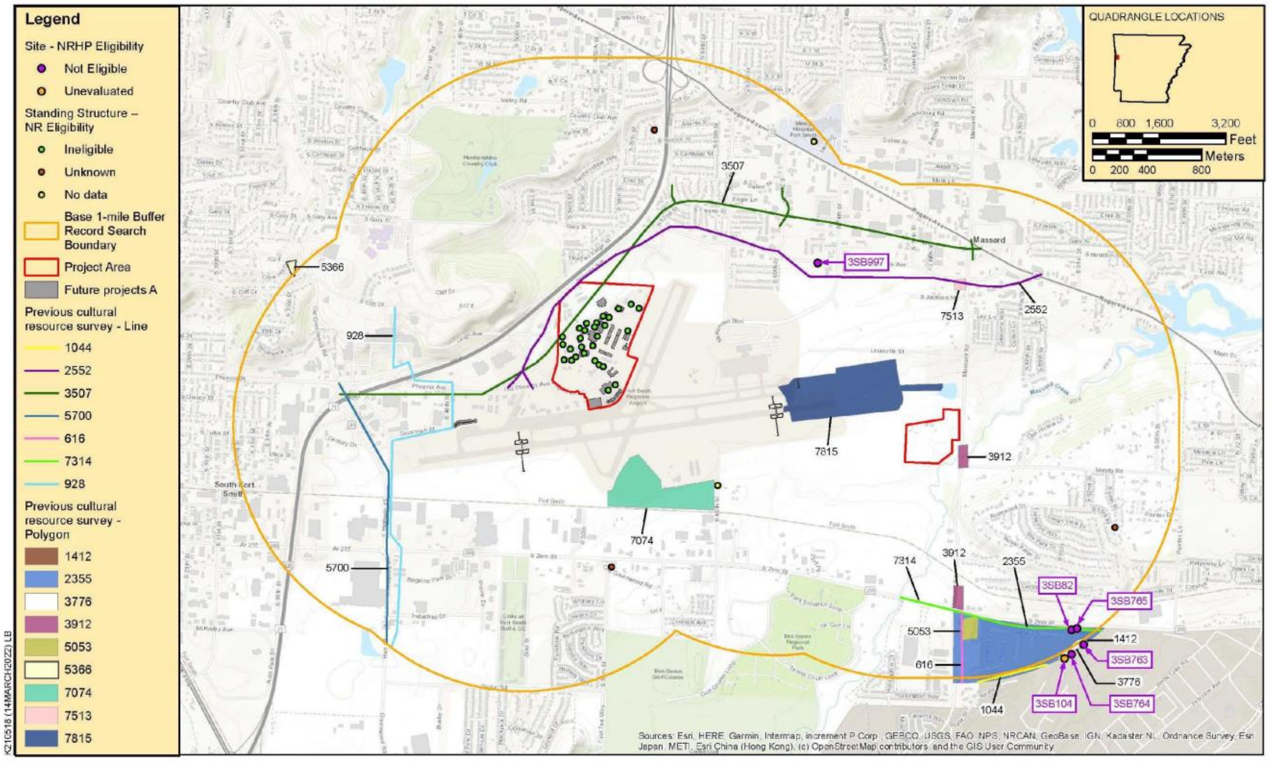


Figure 3. Cultural Resource Surveys and Sites within 1.6 km of the Area of Potential Effect at Ebbing ANG Base and FSRA

11

ENCLOSURE 5

Table 3. Data on Previously Recorded Archaeological Sites Within 1.6 km Radius of the Project Area of Potential Effect.

Within	Trinomial	Type	Reference	Project Name	Firm/Agency	Site Type	NRHP-Eligibility
1.6 km buffer	3SB997	site	Spears and Moerbe 1993	Phoenix Ave. Hwy Extension, Ft. Smith-Massard (records review)	S.P.E.A.R.S.	historic structure depression and brick drive	no data / unassessed
1.6 km buffer	3SB82	site	Zahn 1986	Fort Chaffee Gas Pipeline	Sponsored Research Program - AASurvey	prehistoric indeterminate	no data / unassessed
1.6 km buffer	3SB765	site	Lee 1990	Fort Chaffee Cultural Resources Survey 1989-1990	Archaeological Assessments, Inc.	Euro-American indeterminate	no data / unassessed
1.6 km buffer	3SB763	site	Lee 1990	Fort Chaffee Cultural Resources Survey 1989-1990	Archaeological Assessments, Inc.	prehistoric indeterminate	no data / unassessed
1.6 km buffer	3SB764	site	Lee 1990	Fort Chaffee Cultural Resources Survey 1989-1990	Archaeological Assessments, Inc.	Euro-American indeterminate	no data / unassessed
1.6 km buffer	3SB104	site	Williams 1986; Riggs 1997	Fort Chaffee T-Line Survey; Investigation of Ten Sites, BRAC Disposal Area, Ft. Chaffee	Sponsored Research Program - AASurvey; Little Rock District, Corps of Engineers	Protohistoric indeterminate	no data / unassessed

1

REFERENCES CITED:

Branam, C. R. (2021). *Cultural Resources Survey of the Proposed Runway 25 Extension at Fort Smith Airport in Sebastian County, Arkansas.* Cabot, AR: Flat Earth Archaeology, LLC.

Buchner, C. A. (2017). *Phase I Cultural Resources Survey of the Fort Smith Regional Airport Wetlands Delineation, Sebastian County, Arkansas. PCI Project No. 37013.* . Memphis, TN: Panamerican Consultants, Inc.

McSwain, F. (2008, April 18). Section 106 Review - NGB 188 Fighter Wing, Arkansas National Guard, Fort Smith Regional Airport (AHPP tracking No. 62224). Litlte Rock, AR: Arkansas Historic Preservation Program .

National Guard Bureau. (2007). *Cultural Resource Survey of the 188th Fighter Wing, Arkansas Air National Guard, Fort Smith Regional Airport.* Andrews AFB, Maryland: National Guard Bureau NGB/A7CVN

1 ## B.2.2.4 Tribal Mailing List

Table B-1. Tribal Mailing List

Name of Tribe	Greeting Line	First Name	Last Name	Address	City	State	Zip Code
Absentee-Shawnee Tribe of Indians of Oklahoma	Governor	John	Johnson	2025 S Gordon Cooper Drive	Shawnee	OK	74801
Alabama-Quassarte Tribal Town	Chief	Wilson	Yargee	2122 Highway 27	Wetumka	OK	74883
Apache Tribe of Oklahoma	Chairman	Matthew	Tselee	PO Box 1330	Anadarko	OK	73005
Caddo Nation of Oklahoma	Chairman	Bobby	Gonzales	PO Box 487	Binger	OK	73009
Cherokee Nation	Principal Chief	Chuck	Hoskin, Jr.	PO Box 948	Tahlequah	OK	74464
Cheyenne and Arapaho Tribes, Oklahoma	Governor	Reggie	Wassana	PO Box 38	Concho	OK	73022
Chickasaw Nation	Governor	Bill	Anoatubby	PO Box 1548	Ada	OK	74820
Choctaw Nation of Oklahoma	Chief	Gary	Batton	1802 Chukka Hina Dr	Durant	OK	74702
Citizen Potawatomi Nation, Oklahoma	Chairman	John	Barrett	1601 S Gordon Cooper Dr	Shawnee	OK	74801
Coushatta Tribe of Louisiana	Vice Chair	Crystal	Williams	PO Box 818	Elton	LA	70532
Delaware Nation, Oklahoma	President	Deborah	Dotson	PO Box 825	Anadarko	OK	73005
Eastern Shawnee Tribe, Oklahoma	Chief	Glenna	Wallace	127 W Oneida	Seneca	MO	64865
Kialegee Tribal Town	Town King	Stephanie	Yahola	100 Kialegee Drive	Wetumka	OK	74883
Kickapoo Tribe of Oklahoma	Chairman	Darwin	Kaskaske	105365 S Highway 102	McCloud	OK	74851
Mississippi Band of Choctaw Indians	Chief	Cyrus	Ben	101 Industrial Rd	Choctaw	MS	39350
Muscogee (Creek) Nation	Principal Chief	David	Hill	1007 E Eufaula St	Okmulgee	OK	74447
Osage Nation	Principal Chief	Geoffrey M.	Standing Bear	PO Box 779	Pawhuska	OK	74056
Quapaw Nation	Chair	Wena	Supernaw	5681 S 630 Rd	Quapaw	OK	74364
Santee Sioux Nation, Nebraska	Chairman	Alonzo	Denney	108 Spirit Lake Ave West	Niobrara	NE	68760
Seminole Nation of Oklahoma	Principal Chief	Lewis	Johnson	PO Box 1498	Wewoka	OK	74884
Seneca-Cayuga Nation	Chief	Charles	Diebold	23701 S 655 Rd	Grove	OK	74344
Thlopthlocco Tribal Town	Interim Town King	Ryan	Morrow	109009 N. 3830 Rd	Okemeh	OK	74859
United Keetoowah Band of Cherokee Indians in Oklahoma	Chief	Joe	Bunch	18300 W Keetoowah Circle	Tahlequah	OK	74464
Wichita and Affiliated Tribes (Wichita, Keechi, Waco and Tawakonie), Oklahoma	President	Amber	Silverhorn-Wolfe	PO Box 729	Anadarko	OK	73005

B.2.3 Endangered Species Act Section 7 Correspondence

B.2.3.1 DAF Letter to the U.S. Fish and Wildlife Service (USFWS)

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER (AFCEC)
JOINT BASE SAN ANTONIO, TEXAS

29 APR 2025

Austin Naranjo
AFCEC/CIE, Program Manager
2261 Hughes Avenue, Suite 155
Joint Base San Antonio
Lackland, TX 78236-9853

Melvin Tobin
Field Supervisor
United States Fish and Wildlife Service
Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, Arkansas 72032-8975

SUBJECT: Reinitiation of Section 7 Consultation for Proposed Expansion of Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base, Arkansas (Project Code 2022-0026129)

Dear Mr. Tobin,

On December 19, 2022, the United States (U.S.) Department of the Air Force (DAF) completed Section 7 consultation with your office for the Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard (ANG) Base, Arkansas (Project Code 2022-0026129). On March 11, 2023, the DAF signed the Record of Decision (ROD) selecting Ebbing ANG Base as the location to establish the FMS PTC (DAF, 2023a), which included the beddown of up to 24 F-35s, relocation of 12 Republic of Singapore Air Force (RSAF) F-16s, and supporting infrastructure as assessed in the *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan Final Environmental Impact Statement (EIS)* (DAF, 2023b), hereinafter referred to as the "2023 FMS PTC EIS." Since the 2023 ROD was signed, new training requirements have emerged due to additional FMS purchases of F-35 aircraft, including operations that incorporate the F-35B's Short Takeoff and Vertical Landing (STOVL) capabilities. Consequently, the DAF is preparing a Supplemental EIS (SEIS) to expand the FMS PTC at Ebbing ANG Base that proposes to beddown an additional 12 F-35 aircraft at Ebbing ANG Base, revise training requirements to include STOVL operations, construct new infrastructure, and increase personnel. As with the 2023 FMS PTC EIS, the DAF is the lead agency and the Federal Aviation Administration (FAA) is a cooperating agency; therefore, FAA Order 1050.1f, *Environmental Impacts: Policies and Procedures*, also applies to this action.

The DAF is requesting to reinitiate consultation to address potential effects on federally listed species from the changes to the Proposed Action since the previous consultation, described in more detail below. Based on the analyses presented in this letter, the DAF determines construction activities and airfield operations at Ebbing ANG Base and Fort Smith Regional Airport (FSRA) *may affect, but are not likely to adversely affect,* the gray bat, northern long-eared bat, Indiana bat, and tricolored bat. There would be *no effect* to piping plover, red knot, eastern black rail, American burying beetle, and monarch butterfly at Ebbing ANG Base/FSRA. Additionally, the DAF determines that aircraft operations in the training airspace *may affect, but are not likely to adversely affect*, Ozark big-eared bat, gray bat, northern long-eared bat, Indiana bat, tricolored bat, piping plover, eastern black rail, red knot, whooping crane, and red-cockaded woodpecker; there would be *no effect* to ESA-listed reptiles, amphibians, fish, mollusks, insects, crustaceans, flowering plants, and designated critical habitat under the airspace.

The DAF requests concurrence from the U.S. Fish and Wildlife Service (USFWS) on these effect determinations. Similar to the previous consultation, the DAF assumes the Arkansas Ecological Services Field Office will take the lead and coordinate with the Oklahoma Ecological Field Office, as appropriate.

PROPOSED ACTION

The DAF proposes to expand the permanent FMS PTC mission at Ebbing ANG Base over what was analyzed and authorized in the 2023 FMS PTC EIS and ROD. This Proposed Action would beddown an additional 12 F-35s for a total of 36 F-35 primary aerospace vehicle authorization (PAA) and 12 F-16 aircraft at Ebbing ANG Base. There would also be an increase in F-35 operations, personnel, and new facilities. Additionally, while the 2023 FMS PTC EIS did not include F-35B STOVL operations, they are included as part of this Proposed Action. This section describes the new elements of the Proposed Action and makes comparisons to what was analyzed in the 2023 FMS PTC EIS (DAF, 2023b) and authorized in the March 2023 ROD (DAF, 2023a).

AIRCRAFT OPERATIONS

In the 2023 FMS PTC EIS, the F-35Bs were modeled to operate in conventional mode to fly like F-35As. F-35 operations under the Proposed Action would be similar to those assessed in the 2023 FMS PTC EIS, with the exception that vertical landing pad (VLP) maneuvers at Ebbing ANG Base/FSRA would be included as a new major mission category based on the F-35B STOVL capabilities and to meet new training requirements. The DAF would continue to utilize existing designated special use airspace for F-35 training and there would be no additions to, or alterations of, the existing special use airspace.

AIRFIELD OPERATIONS

The FSRA airfield would be utilized for F-35 training operations under the Proposed Action and would include VLP maneuvers. **Table 1** lists the civilian, transient, and military aircraft operations proposed at FSRA under the Proposed Action, as well as a comparison to the 2023 FMS PTC EIS.

Table 1. Annual Aircraft Flight Operations [(a)] at FSRA Under the Proposed Action

Aircraft Operation Type	2023 FMS PTC EIS	Proposed Action [(b)]	Total
F-35A	11,664	-234	11,430
F-35B	2,340	5,340	7,680
Agile Combat Employment [(c)]	0	0	576
Civilian Aircraft	28,321	0	28,321
Transient Military Aircraft [(d)]	9,006	0	9,006
Blue Air Aircraft	948	0	948
RSAF F-16	11,700	0	11,700
TOTAL	**63,979**	**5,106**	**69,661**

Source: (DAF, 2023b)

Key: EIS = Environmental Impact Statement; FMS = Foreign Military Sales; FSRA = Fort Smith Regional Airport; PAA = Primary Aerospace Vehicle Authorization; PTC = Pilot Training Center; RSAF = Republic of Singapore Air Force

Notes:

a. "Flight Operations" are specific to airfield flights, and it refers to each time an aircraft crosses a runway threshold.
b. Proposed Action flight operations numbers consider the 12 additional F-35 PAA and incorporate a refinement of operations assessed in the 2023 FMS PTC EIS that were based on an immature syllabus. Additionally, the 2023 FMS PTC EIS assessed F-35B flight operations as conventional operations, similar to F-35A operations.
c. Agile Combat Employment is a new large force exercise since completion of the 2023 FMS PTC EIS. It is included in this table under total flight operations at FSRA but is not part of the Proposed Action.
d. Transient military aircraft include C-130 from the 314th Airlift Wing and other military users of FSRA.

Airspace and Ranges

The same airspace and ranges included and described in the 2023 FMS PTC EIS would be utilized by the 12 additional F-35 aircraft proposed for Ebbing ANG Base under the Proposed Action. Airspace events under the Proposed Action are shown in **Table 2.** Overall, the Proposed Action would increase airspace events by 13 percent (%) as compared to the 2023 FMS PTC EIS.

Table 2. Annual Airspace Events [(a)] Under the Proposed Action

Airspace Unit	2023 FMS PTC EIS	Proposed Action [(b)]	Total	% Increase
Hog A/B MOAs/ATCAAs and Razorback Range [(c)]	6,976	689	7,665	10%
Shirley A/B/C MOAs/ATCAAs	4,925	839	5,764	17%
Total	**11,901**	**1,528**	**13,429**	**13%**

Source: (DAF, 2023b)

Key: % = percent; ATCAA = Air Traffic Control Assigned Airspace; EIS = Environmental Impact Statement; FMS = Foreign Military Sales; MOA = Military Operations Area; PTC = Pilot Training Center; R- = Restricted Area

Notes:

a. An "event" is one aircraft flying in one airspace unit.
b. The Proposed Action considers that F-35A and F-35B aircraft operate similarly in the airspace and event numbers in this table are inclusive of both.
c. Razorback Range consists of R-2401 A/B and R-2402 A/B/C.

Annual proposed MTR events are shown in **Table 3**. Overall, the Proposed Action would increase annual MTR events by 2% as compared to the 2023 FMS PTC EIS.

Table 3. Annual Events [(a)] within Military Training Routes Under the Proposed Action

MTR	2023 FMS PTC EIS [(b)]	Proposed Action [(c)]	Total	% Increase
VR189	124	4	128	3%
VR1102	16	1	17	6%
VR1103	72	1	73	1%
VR1104	33	1	34	3%
VR1113	77	3	80	4%
VR1130	36	2	38	6%
IR117	100	2	102	2%

1

MTR	2023 FMS PTC EIS [(b)]	Proposed Action [(c)]	Total	% Increase
IR120	12	1	13	8%
IR121	620	1	621	0.2%
IR164	28	4	32	14%
Total	**1,118**	**20**	**1,138**	**2%**

Source: (DAF, 2023b)

Key: % = percent; EIS = Environmental Impact Statement; FMS = Foreign Military Sales; IR = Instrument Route; MTR = Military Training Route; PTC = Pilot Training Center; VR = Visual Route

Notes:

a. An "event" is one aircraft flying in one Military Training Route.

b. Annual events include F-35, F-16, and other operations associated with the 2023 FMS PTC EIS.

c. Annual events include only F-35 operations associated with this Proposed Action.

Military night operations occurring between 10:00 p.m. and 7:00 a.m. would decrease by approximately 26% at the airfield and 23% within the airspace under the Proposed Action as compared to the 2023 FMS PTC EIS (**Table 4**).

Table 4. Annual Nighttime [(a)] Operations [(b)] and Events [(c)] Under the Proposed Action

Operations	2023 FMS PTC EIS		Proposed Action		Total	
	Airfield Operations	Airspace Events [(d)]	Airfield Operations	Airspace Events	Airfield Operations	Airspace Events
Civilian Operations	1,643	0	0	0	1,643	0
Military Operations	1,018	312	-262	-72	756	240
Total	**2,661**	**312**	**-262**	**-72**	**2,399**	**240**

Source: (DAF, 2023b)

Key: EIS = Environmental Impact Statement; FMS = Foreign Military Sales; PTC = Pilot Training Center

Notes:

a. Night operations are those considered after 10:00 p.m. and prior to 7:00 a.m.

b. "Operations" are specific to airfield flights, and it refers to each time an aircraft crosses a runway threshold.

c. "Events" are used to describe airspace flights. An "event" is one aircraft flying in one airspace unit.

d. Airspace events include all military aircraft operations, including F-16, F-35, and other transient aircraft. Of this total, 133 events are associated with F-16s and F-35s.

MUNITIONS AND COUNTERMEASURE USE

Munitions and countermeasure use under the Proposed Action would be conducted in the same ranges and airspace as authorized and described in the 2023 FMS PTC EIS. Razorback Range (R-2401/2402) contains varied target sets for supporting laser and air-to-ground weapons training. Live weapons are not permitted in the Razorback Range. However, live-fire training would be conducted during formal training exercises at Fort Polk, Louisiana.

Chaff and flares are currently authorized in the airspace, with certain restrictions. The Hog A MOA allows for flares above 2,000 feet above ground level (AGL) and the Hog B MOA allows for flares above 6,000 feet mean sea level. In the Shirley MOA, use of flares is allowed above 11,000 feet mean sea level. RR-188 chaff is authorized in the Hog and Shirley MOAs/ATCAAs, R-2401A, and R-2402A/B/C. Restricted airspace above/surrounding Razorback Range (R-2401A/B and R-2402A/B/C) allows for flares above 1,000 feet AGL when "Fire Danger Low" conditions are in place. When "Fire Danger Mod" conditions exist, use must be above 2,000 feet AGL. An 8-year average of countermeasure usage in the Hog and Shirley MOAs/ATCAAs is approximately 12,716 flares and 9,185 chaff cartridges. Countermeasure use in the restricted airspace above Razorback Range (R-2401A and R-2402A) averages 7,004 flares and 3,058 chaff cartridges. While these amounts are primarily associated with fighter aircraft, other aircraft may dispense countermeasures during operations and exercises, including illumination flares. The Proposed Action would include munitions and countermeasure use as shown in **Table 5**.

Table 5. Annual Munitions and Countermeasure Use Under the Proposed Action

Munition/Countermeasure	Permitted Range	2023 FMS PTC EIS [(a)]	Proposed Action	Total
GBU-12 (FSWD) (inert)	Fort Polk, LA	48	-48	0
GBU-12 (FSWD) (live)	Fort Polk, LA	32	16	48
GBU-12 (FSWD) (inert)	R-2401/2402	0	196	196
GBU-31 (FSWD) (inert)	R-2401/2402	116	50	166
GBU-31 (FSWD) (live)	Fort Polk, LA	0	40	40
BDU-33	R-2401/2402	500	400	900
BDU-33	Fort Polk, LA	0	100	100
BDU-50	R-2401/2402	16	-4	12
BDU-50	Fort Polk, LA	0	4	4
BDU-56	R-2401/2402	16	-4	12
BDU-56	Fort Polk, LA	0	4	4
GBU-10 (inert)	R-2401/2402	0	34	34
GBU-10 (live)	Fort Polk, LA	0	16	16
GBU-38 (FSWD) (inert)	R-2401/2402	0	82	82
GBU-38 (FSWD) (live)	Fort Polk, LA	0	48	48
GBU-49 (FSWD) (inert)	R-2401/2402	0	144	144
GBU-49 (FSWD) (live)	Fort Polk, LA	0	48	48
GBU-54 (FSWD) (inert)	R-2401/2402	0	72	72
GBU-54 (FSWD) (live)	Fort Polk, LA	0	48	48
GBU-56 (inert)	R-2401/2402	0	8	8
GBU-56 (live)	Fort Polk, LA	0	4	4
20-millimeter	R-2401/2402	15,000	8,000	23,000
20-millimeter	Fort Polk, LA	0	2,000	2,000
25-millimeter TP (PGU-23)	R-2401/2402	28,000	115,500	143,500
MJU-61/B Training Flares	Authorized Airspace	15,000	4,000	19,000
Chaff	Authorized Airspace	0	8,000	8,000

Source: (DAF, 2023b)
Key: BDU = Bomb Dummy Unit; EIS = Environmental Impact Statement; FMS = Foreign Military Sales; FSWD = Full-Scale Weapons Delivery; GBU = Guided Bomb Unit; LA = Louisiana; MJU = Mobile Jettison Unit; PGU = Precision Guided Unit; PTC = Pilot Training Center; R- = Restricted Area; TP = Target Practice
Note:
a. Munitions and countermeasure use in this column include totals of all proposed expenditures listed in the 2023 FMS PTC EIS, Table 2.2.5.

PERSONNEL

The Proposed Action would add 271 personnel and 325 dependents, for a total of an additional 596 persons at Ebbing ANG Base, as shown in **Table 6**. There would be a 31% increase in total persons over the 2023 FMS PTC EIS ROD.

Table 6. Number of Personnel and Dependents at Ebbing ANG Base (and FSRA) Under the Proposed Action

Mission Personnel Type	2023 FMS PTC EIS ROD			Proposed Action [(a)]			% Increase	
	Personnel	Dependents	Total	Personnel	Dependents [(b)]	Total	Personnel	Dependents
F-16/F-35 Security Forces	24	72	96	12 [a]	14 [a]	26	50% [a]	20% [(a)]
F-35 DAF	30	56	86	30	36	66	100%	64%
F-35 Contractor MX	260	600	860	225	270	495	87%	45%
F-16/F-35 Medical	8	24	32	4 [a]	5 [a]	9	50% [a]	20% [(a)]
F-16 DAF, DAF Civilian, and RSAF Pilots/MX	303	556	859	0	0	0	0%	0%
Total	**625**	**1,308**	**1,933**	**271**	**325**	**596**	**43%**	**25%**

Source: (DoD, 2022; DAF, 2023a)

Key: % = percent; ANG = Air National Guard; DAF = Department of the Air Force; EIS = Environmental Impact Statement; FMS = Foreign Military Sales; FSRA = Fort Smith Regional Airport; MX = maintenance; PTC = Pilot Training Center; ROD = Record of Decision; RSAF = Republic of Singapore Air Force

Notes:

a. Personnel and dependent numbers for the Proposed Action are only associated with the F-35.

b. Number of dependents for the Proposed Action were calculated using the 1.2 dependent per personnel ratio based on the 2022 *Demographics Profile of the Military Community* published by the Department of Defense.

FACILITY REQUIREMENTS

Construction and renovation projects would occur at Ebbing ANG Base under the Proposed Action to support the 12 new F-35 PAA and STOVL operations. These projects are listed in **Table 7** and shown in Enclosure 1, **Figure 1.** These projects are in addition to the construction and renovation projects described and listed in the 2023 FMS PTC EIS, which would continue to occur.

All FMS PTC facilities under the Proposed Action would primarily be developed near the main ramp. However, the VLP, arm/de-arm expansions, and a portion of the main ramp expansion are proposed for other parts of the FSRA airfield, outside Ebbing ANG Base boundaries. During construction, temporary staging areas would be located on current Ebbing ANG Base paved areas or previously disturbed areas. These areas are depicted in Enclosure 1, **Figure 1.**

Table 7. Construction and Renovation Projects at Ebbing ANG Base (and FSRA) Under the Proposed Action

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
108	LRS storage	15,000	Add/Alter to existing building to support PAA increase	15,000	Ebbing ANG Base
115	AME Back Shops	10,000	Add/Alter to existing building to support PAA increase	10,000	Ebbing ANG Base

1

7

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
182	Back Shops, Vehicle Maintenance	20,000	Add/Alter to existing building to support PAA increase	20,000	Ebbing ANG Base
200	F-35 Maintenance	3,000	Add/Alter to existing building to support PAA increase	3,000	Ebbing ANG Base
Existing Fuel Farm	Fuel Storage Expansion	221,000	Expansion to existing fuel storage farm to provide adequate fuel supply capacity	221,000	Ebbing ANG Base
113 and 119/New Construction [(a)]	3-Bay Hangar	40,000	Demolish buildings 113 and 119 to construct new MX hangar to support F-35 PAA increase	30,484	Ebbing ANG Base
New Construction [(a)]	Main Ramp Expansion	203,000	Expansion to main ramp to provide aircraft parking capacity for PAA increase	203,000	Both
New Construction [(a)]	Arm/De-Arm Expansion (x2)	10,000 each	Capacity expansion to launch 8 F-16 aircraft simultaneously – identified after original EIS	20,000	FSRA
New Construction [(a)]	VLP	118,400	Provide emergency vertical landing capability for RSAF F-35B aircraft – identified after original EIS	118,400	FSRA
Additional Construction	Parking Lot	7.00 acres [(b)]	Expansion of existing parking lot	304,920 (7 acres)	Ebbing ANG Base
New Construction [(a)]	Parking Lot	4.17 acres [(b)]	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	181,645 (4.17 acres)	Ebbing ANG Base

1

Ebbing ANG Base Facility Number	Proposed Facility Use	Required Facility Area (sq. ft.)	Description	Total Area of New Ground Disturbance and Impervious Surface (sq. ft.)	Proposed Project Occurs on Ebbing ANG Base or FSRA
New Construction (a)	Parking Lot	1.86 acres (b)	Required for parking capacity due to MILCON and FSRM projects, and to replace removal of existing parking	81,022 (1.86 acres)	Ebbing ANG Base
Total New Ground Disturbance and New Impervious Surface Areas			1,209,471		

Key: AFI = Air Force Instruction; AME = Aircraft Munitions Equipment; ANG = Air National Guard; AFI = Air Force Instruction; EIS = Environmental Impact Statement; FSRA = Fort Smith Regional Airport; FSRM = Facilities Sustainment, Restoration and Modernization; LRS = Logistics Readiness Squadron; MILCON = military construction; MX = maintenance; PAA = Primary Aerospace Vehicle Authorization; RSAF = Republic of Singapore Air Force; sq. ft. = square feet; VLP = Vertical Landing Pad

Notes:

a. New construction has not been assigned a facility number on Ebbing ANG Base; however, new construction projects are displayed and identified in **Error! Reference source not found.** as their Proposed Facility Use.

b. Acreages listed in the table were converted to square feet for total area calculations.

Enclosure 1, **Figure 2** shows the entire facilities footprint for all construction and renovation projects under this Proposed Action as well as those included in the 2023 FMS PTC EIS, to support a total of 36 F-35 and 12 F-16 aircraft. However, since the completion of the 2023 FMS PTC EIS, facilities siting was modified based on design and updated locations are represented in Enclosure 1, **Figure 2**. These updated locations occur on previously disturbed areas on Ebbing ANG Base.

ACTION AREAS

The action area for the Proposed Action consists of habitats within a 5-mile radius surrounding Ebbing ANG Base (Installation Action Area), as well as existing airspace areas and habitats beneath the airspace that would be used for aircraft training operations (Airspace Action Area). The Installation Action Area includes areas where construction activities would occur on Ebbing ANG Base and FSRA, as well as areas outside the base and airport boundary where there would be changes in noise levels (Enclosure 2, **Figure 3**). There would be no effect to ESA-listed species from increased personnel on the installation, therefore this component of the Proposed Action is not discussed further.

The Airspace Action Area includes airspace units and ranges in portions of Arkansas and Oklahoma that would be utilized by the 12 additional F-35 aircraft proposed for Ebbing ANG Base (Enclosure 2, **Figure 4**). Aircraft operating out of Ebbing ANG Base primarily utilize the Hog Military Operations Area (MOA)[1]; the Shirley MOA; a corridor between the Hog and Shirley

[1] A MOA is airspace designated outside of Class A airspace, to separate or segregate certain nonhazardous military activities from Instrument Flight Rules traffic and to identify for Visual Flight Rules traffic where these activities are conducted.

1

MOAs called the "Pig Path"; Military Training Routes (MTRs)[2] consisting of Visual Routes[3] (VRs), including VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182; and Instrument Routes[4] (IRs) consisting of IR-117, IR-120, IR-121, and IR-164.

STATUS OF SPECIES

INSTALLATION ACTION AREA

For this reinitiation of consultation, the Information for Planning and Consultation (IPaC) online system was accessed on December 19, 2024, to identify current USFWS resources (e.g., species listed under ESA) with potential to occur within the Installation Action Area (Project Code 2025-0033923). The USFWS Arkansas Ecological Services Field Office provided an automated Official Species List that identified five threatened and endangered species protected under the ESA, three candidate species, and no designated critical habitat within 5 miles of Ebbing ANG Base (USFWS, 2024a) (Enclosure 3). In addition, the DAF considers that federally listed gray bat may occur on the installation (Air National Guard, 2020a; Air National Guard, 2020b). **Table 8** presents federally listed threatened and endangered species known to occur or having the potential to occur in the Installation Action Area.

Of the ten species listed in **Table 8**, only one has been documented on the installation. The gray bat was recorded during 2019 acoustic bat surveys at Ebbing ANG Base (Air National Guard, 2020b). Two additional species have relatively high potential to occur within or near Ebbing ANG Base. The northern long-eared bat may occur due to the presence of roosting habitat, although the species has not been detected (Air National Guard, 2020b). Suitable roosting habitat for the northern long-eared bat is underneath bark, in cavities or in crevices of both live trees and snags, and dead trees. The species has also been found, although less commonly, roosting in structures. In addition, approximately 10.5 acres of habitat on the installation and 54 acres on the eastern end of the FSRA airfield is suitable for the federally listed American burying beetle (Air National Guard, 2020c).

Table 8. Federally Listed Species Known to Occur or with the Potential to Occur at Ebbing ANG Base (and FSRA)

Common Name	Scientific Name[(a)]	Status	Potential for Occurrence on Ebbing ANG Base/FSRA[(b)]
Mammals			
Gray bat	*Myotis grisescens*	E	O
Northern long-eared bat	*Myotis septentrionalis*	T	P
Indiana bat	*Myotis sodalis*	E	P
Tricolored bat	*Perimyotis subflavus*	PE	P
Birds			
Piping plover	*Charadrius melodus*	T	U

[2] Generally, MTRs are established below 10,000 feet MSL for operations at speeds in excess of 250 knots.

[3] Visual Flight Rules means that the aircraft may operate without the use of instrumentation during nice and clear weather. Clouds, heavy precipitation, low visibility, and otherwise adverse weather conditions should be avoided under Visual Flight Rules.

[4] Instrument Flight Rules implies that the flight may operate in cloudy or otherwise adverse weather conditions using instruments only.

1

Common Name	Scientific Name[(a)]	Status	Potential for Occurrence on Ebbing ANG Base/FSRA[(b)]
Eastern black rail	*Laterallus jamaicensis* ssp. *jamaicensis*	T	U
Red knot	*Calidris canutus rufa*	T	U
Insects			
American burying beetle	*Nicrophorus americanus*	T	P
Monarch butterfly	*Danaus plexippus*	PT	P

Sources: (USFWS, 2024a; Air National Guard, 2020c; Air National Guard, 2020a; Air National Guard, 2020b)
Key: ANG = Air National Guard; E = endangered; FSRA = Fort Smith Regional Airport; T = threatened; O = observed, P = potential to occur; PE = Proposed Endangered; PT = Proposed Threatened; U = unlikely to occur; USFWS = U.S. Fish and Wildlife Service
Notes:
a. The USFWS Environmental Conservation Online System was accessed and reviewed for each species to assess habitat use and potential for occurrence in the Action Area.
b. Area includes habitats within a 5-mile radius of the installation.

AIRSPACE ACTION AREA

The IPaC online system was also accessed to identify current USFWS resources with potential to occur within the Airspace Action Area, which occurs in areas over Arkansas and Oklahoma. The Arkansas Ecological Services Field Office provided an automated Official Species List that identified 27 threatened and endangered species and five designated critical habitat areas (Project Code 2025-0034232) (USFWS, 2024b) and the Oklahoma Ecological Services Field Office provided an automated Official Species List that identified 25 threatened and endangered species and four designated critical habitat areas (Project Code 2025-0034296) (USFWS, 2024c). Federally listed species with potential to occur under the Airspace Action Area are presented in **Table 9**. Critical habitat for the Arkansas river shiner (Notropis Girardi), leopard darter (*Percina pantherina*), peppered chub (*Macrhybopsis tetranema*), yellowcheek darter (*Etheostoma moorei*), Neosho mucket (*Lampsilis rafinesqueana*), rabbitsfoot (*Quadrula cylindrica*), Louisiana pigtoe (*Pleurobema riddellii*), and Ouachita fanshell (*Cyprogenia sp. cf. aberti*) also occur under the airspace (Enclosure 2, **Figure 5**). The mammal and bird species listed in the table have the potential to be impacted by noise or collisions associated with F-35 aircraft operations. ESA-listed reptiles, amphibians, fish, mollusks, insects, crustaceans, flowering plants, and critical habitats would not be affected by aircraft noise or collisions and there would be no ground disturbance of areas beneath the airspace. However, this reinitiation considers the proposed increased use of countermeasures (i.e., chaff and flares) in authorized airspace.

Table 9. Federally Listed Species Known to Occur or with the Potential to Occur Under the Airspace[(a)]

Common Name	Scientific Name [(a)]	Status	Potential for Occurrence Under the Airspace	Critical Habitat Under the Airspace
Mammals				
Ozark big-eared bat	*Corynorhinus (Plecotus) townsendii ingens*	E	P	N/A
Gray bat	*Myotis grisescens*	E	P	N/A
Northern long-eared bat	*Myotis septentrionalis*	E	P	N/A
Indiana bat	*Myotis sodalis*	E	P	None
Tricolored bat	*Perimyotis subflavus*	PE	P	N/A
Birds				
Piping plover	*Charadrius melodus*	T	P	None

Common Name	Scientific Name [(a)]	Status	Potential for Occurrence Under the Airspace	Critical Habitat Under the Airspace
Eastern black rail	*Laterallus jamaicensis jamaicensis*	T	P	N/A
Red knot	*Calidris canutus rufa*	T	P	None
Whooping crane	*Grus americana*	E	P	None
Red-cockaded woodpecker	*Dryobates borealis*	T	P	N/A
Reptiles				
American alligator	*Alligator mississippiensis*	T (Similarity of Appearance)	P	N/A
Alligator snapping turtle	*Macrochelys temminckii*	PT	P	N/A
Amphibians				
Ozark hellbender	*Cryptobranchus alleganiensis bishopi*	E	P	N/A
Fishes				
Arkansas river shiner	*Notropis girardi*	T	P	Yes
Leopard darter	*Percina pantherina*	T	P	Yes
Ozark cavefish	*Amblyopsis rosae*	T	P	N/A
Peppered chub	*Macrhybopsis tetranema*	E	P	Yes
Yellowcheek darter	*Etheostoma moorei*	E	P	Yes
Mollusks				
Arkansas fatmucket	*Lampsilis powellii*	T	P	N/A
Neosho mucket	*Lampsilis rafinesqueana*	E	P	Yes
Ouachita rock pocketbook	*Arcidens wheeleri*	E	P	N/A
Pink mucket	*Lampsilis abrupta*	E	P	N/A
Rabbitsfoot	*Quadrula cylindrica*	T	P	Yes
Scaleshell mussel	*Leptodea leptodon*	E	P	N/A
Snuffbox mussel	*Epioblasma triquetra*	E	P	None
Speckled pocketbook	*Lampsilis streckeri*	E	P	N/A
Spectaclecase	*Cumberlandia monodonta*	E	P	N/A
Winged mapleleaf	*Quadrula fragosa*	E	P	N/A
Louisiana pigtoe	*Pleurobema riddellii*	PT	U	Yes
Western fanshell	*Cyprogenia aberti*	T	P	None
Ouachita fanshell	*Cyprogenia cf. aberti*	T	P	Yes
Insects				
American burying beetle	*Nicrophorus americanus*	T	P	N/A
Monarch butterfly	*Danaus plexippus*	PT	P	None
Western regal fritillary	*Argynnis idalia occidentalis*	PT	P	N/A
Crustaceans				
Hell Creek cave crayfish	*Cambarus zophonastes*	E	P	N/A
Flowering Plants				
No Common Name	*Geocarpon minimum*	T	P	N/A
Harperella	*Ptilimnium nodosum*	E	P	N/A
Missouri bladderpod	*Physaria filiformis*	T	P	N/A
Pondberry	*Lindera melissifolia*	E	P	N/A

Sources: (AGFC, 2024; ODWC, 2024; ARANG, 2020; USFWS, 2024b; USFWS, 2024c)

Key: ANG = Air National Guard; E = Endangered; N/A = Not Applicable (critical habitat has not been designated for these species); None = no critical habitat in the action area; P = potential to occur; PE = Proposed Endangered; PT = Proposed Threatened; T = Threatened; U = unlikely to occur; USFWS = U.S. Fish and Wildlife Service

Note:

a. The USFWS Environmental Conservation Online System was accessed and reviewed for each species to assess habitat use and potential for occurrence in the Action Area.

1

ANALYSIS OF EFFECTS

INSTALLATION ACTION AREA

GRAY BAT

Under the Proposed Action, construction activities would occur in maintained/landscaped areas and would therefore have no effect on gray bat foraging habitat. Construction noise would be temporary, localized, and only produced during daylight hours and would not substantially affect bats on or near the installation.

Bats can present hazards to low-flying aircraft, especially near man-made structures, trees, caves, and crevices, and particularly in the late evening around sunset when bats are active. The FAA National Wildlife Strike Database documented 417 reported bat incidents in the United States between 1990 and 2010 (civil aircraft), where the greatest incident rate occurred at dusk and more incidents occurred during aircraft landing (85 percent) than takeoff (11.2 percent) (Biondi et al., 2013). A U.S. Air Force Safety Center study on bat strikes between 1997 and 2007 reported that strikes peak during the spring and fall, and about 82 percent occur between 9:00 p.m. and 9:00 am (Peurach, Dove, & Stepko, 2009). Overall, bat strikes at FSRA are uncommon. The FAA Wildlife Strike Database identifies 109 reported wildlife strikes at FSRA between 1992 and 2024 (FAA, 2024a). All strikes involved birds; bats are not among the taxa listed. An Environmental Assessment prepared for a wildlife hazard mitigation project at FSRA (FSRA, 2017) reported that two bats had been struck by aircraft, and that an additional two bats may have been struck (identification was uncertain), between 1992 and 2017. The year and type of aircraft involved in the strikes were not provided. However, the overall timeframe of strike data reported from the FAA and in the Environmental Assessment encompasses periods when the Ebbing ANG Base mission included A-10 and F-16 military aircraft operations.

Under the Proposed Action, the number of airfield operations at FSRA would increase by about 8 percent over the 2023 FMS PTC EIS (**Table 1**), resulting in a very low potential for a substantial increase in bat-aircraft strikes. Since the night operations would decrease by approximately 26% at the airfield as compared to the 2023 FMS PTC EIS (**Table 4**) and the majority of documented bat strikes occur between 9:00 p.m. and 9:00 a.m., there is a reduced potential for bat strikes under this Proposed Action.

Gray bats roost and hibernate in caves; this habitat type is not known to occur in the vicinity of Ebbing ANG Base. The nearest known roosting and hibernating area is approximately 68 miles from the installation (Air National Guard, 2020a). Therefore, occurrence on and near Ebbing ANG Base likely consists only of foraging or commuting individuals. Gray bats primarily feed over waterways and wetlands that are surrounded by forest habitat. Suitable foraging habitat in the vicinity of FSRA is present at Little Massard Creek, the large pond in the Ebbing ANG Base cantonment area and along the forest edge at the northern cantonment area boundary (see Enclosure 2, **Figure 3**).

Foraging and commuting gray bats occurring near Ebbing ANG Base could potentially be struck during F-35 takeoff and landing operations. Given the distance from the nearest known

1

roosting and hibernating area and the fact that only one acoustic detection was recorded over eight survey nights (Air National Guard, 2020b), the likelihood of occurrence on and near the installation at any given time is low. Although airfield operations would slightly increase, the low probability of species occurrence, low number of documented historical bat strikes, and the timing of most F-35 flights indicates the probability of an aircraft striking a gray bat is extremely low.

The effects on bats from aircraft noise is likely influenced by the noise frequencies and the animals' hearing range. Bats have their best hearing sensitivity at high frequencies. Although aircraft noise is broadband, the highest energy levels are generally in lower frequencies. High-frequency sounds attenuate rapidly with distance from the source. A study of Brazilian free-tailed bats found that foraging activity was not affected by low-level aircraft overflights at an airport (Le Roux & Waas, 2012). The authors concluded that the aircraft noise frequencies with the greatest energy were outside the echolocation frequency range of this species. In addition, the authors speculated that the bats may have habituated to aircraft noise. In general, bats may be found roosting in noisy environments, suggesting that at least some species can tolerate high anthropogenic background noise levels (Le Roux & Waas, 2012).

Under the Proposed Action, foraging bats, including the gray bat, in the immediate vicinity of the airfield would be exposed to noise associated with increased airfield operations, particularly STOVL operations. Noise levels exceeding day-night average sound level (DNL) 65 A-weighted decibels (dBA) would expose up to 8,215 acres of area surrounding Ebbing ANG Base and FSRA, which is an increase of 1,779 acres compared to the 2023 FMS PTC EIS and ROD. Most of the land associated with increased noise levels is considered developed (commercial, residential, agricultural, etc.) and fragmented, with only a relatively small amount of forested and riparian habitat present. Gray bats could potentially be deterred from foraging in areas exposed to high noise levels or could experience reduced foraging efficiency, although study results suggest that such effects vary among species and are dependent on the dominant frequencies of the noise and the species' foraging frequency. Affected animals would be able to forage in other nearby suitable habitat. The potential for impacts would be reduced by the attenuation of high-frequency noise with increasing distance from the airfield and by the fact that only a small percentage of operations would occur after 10:00 p.m. In addition, based on studies of other bat species, individuals could potentially habituate to the aircraft noise.

Based on the above discussion, implementation of the Proposed Action within the Installation Action Area *may affect, but is not likely to adversely affect*, the gray bat.

NORTHERN LONG-EARED BAT AND TRICOLORED BAT

Impacts on northern long-eared bats and tricolored bats would generally be the same as those described for the gray bat, with a few exceptions. During the summer and part of the fall and spring, individuals roost in forest habitats and, less commonly, in structures. Therefore, unlike the gray bat, there is some potential for individuals to roost in forested areas adjacent to Ebbing ANG Base. The potential for individuals to be struck by aircraft would not differ substantively from that discussed for the gray bat. Increased noise levels associated with F-35 aircraft operations could potentially deter roosting near the airfield, requiring affected individuals to seek suitable habitat elsewhere. However, it is noted that at least some bat species are tolerant of anthropogenic noise

1

and may roost in noisy environments. The number of individuals potentially affected is expected to be small relative to population size.

Therefore, implementation of the Proposed Action in the Installation Action Area *may affect, but is not likely to adversely affect* the northern long-eared bat and the tricolored bat.

INDIANA BAT

Based on the Arkansas Determination Key (Dkey) generated by the IPaC, (Enclosure 4), activities associated with the Proposed Action (construction and related noise, aircraft noise, and aircraft operations near the airfield) *may affect, but are not likely to adversely affect* the Indiana bat (USFWS, 2024d).

PIPING PLOVER, RED KNOT, AND EASTERN BLACK RAIL

Under the Proposed Action, increased airfield operations would result in an increased potential for bird/wildlife-aircraft strikes in general, especially during takeoff and landing operations. However, the potential for strikes involving the piping plover, red knot, or eastern black rail is low due to their unlikely occurrence near Ebbing ANG Base. Piping plovers may occur along unvegetated lake shorelines, mudflats, or on sand bars associated with major rivers. In the vicinity of Ebbing ANG Base, such habitats are limited to a few areas along the Arkansas River (approximately 3.8 miles from the runway) and possibly along Massard Creek (approximately 1.7 miles from the runway), although plover use of tributaries such as the creek is uncertain. Migratory stopover habitat for the red knot includes mudflats and unvegetated shores of reservoirs, which are not present near the installation. The eastern black rail inhabits dense marsh vegetation, which does not occur on the installation but could potentially be present at wetlands along Massard Creek or other surface waters in the vicinity. However, the species is not known to occur in the Fort Smith area and is likely a vagrant throughout the state. Continued adherence to measures identified in the existing Arkansas ANG Bird Aircraft Strike Hazard Plan (ARANG, 2002), such as bird harassment near the airfield and reporting of bird watch conditions, would further reduce the risk of collisions. Wildlife strike data for the airfield suggests a low potential to impact ESA-listed bird species. The FAA Wildlife Strike Database identifies 109 wildlife strikes at FSRA between 1992 and 2024 (FAA, 2024a). Of the 24 strikes where species or taxonomic groups were known, none involved shorebirds (the group of birds that includes the piping plover and red knot). One strike involved egrets (unidentified species), but no other marsh-associated birds were identified.

These ESA-listed bird species would not be expected near construction areas due to lack of habitat and would, therefore, not be affected by construction noise or disturbance. Individuals present in the Installation Action Area and close enough to the airfield to detect noise produced by F-35 aircraft could alter their behavior or avoid areas subject to noise exposure. However, due to the very low potential for occurrence, such effects are unlikely. Based on these factors and on the effects determination generated by use of the IPaC system's Arkansas DKey (Enclosure 4), the Proposed Action would have *no effect* on the piping plover, red knot, or eastern black rail (USFWS, 2024d).

AMERICAN BURYING BEETLE

The USFWS divides the American burying beetle's current range into three broad analysis areas based on geographic and ecological patterns. Ebbing ANG Base is located within the Southern Plains analysis area, which occurs primarily in Oklahoma but also encompasses small areas of surrounding states including Arkansas. Habitat for the American burying beetle generally consists of moist, sandy loam soil that contains organic matter. In 2020, the species was reclassified under the ESA from endangered to threatened, with an accompanying rule issued under Section 4(d) (Federal Register, Volume 85, Number 200, October 15, 2020). The 4(d) rule prohibits intentional take of the American burying beetle and prohibits incidental take only on specific conservation lands (Fort Chaffee in Arkansas and two sites in Oklahoma).

Airfield operations under the Proposed Action would have no effect on the American burying beetle because insects are not known to be affected by aircraft noise and direct strikes from aircraft would not occur. Under the Proposed Action, infrastructure projects would result in an estimated total of 1,209,471 square feet of new ground disturbance and new impervious surfaces at Ebbing ANG Base and FSRA airfield. The affected areas are located adjacent to existing structures, have been previously disturbed or developed, and likely have low potential to provide habitat for the American burying beetle. Approximately 10.6 acres of habitat on Ebbing ANG Base and 54 acres on the eastern end of the FSRA airfield is suitable for the federally listed American burying beetle (ARANG, 2020); however, none of the proposed facilities listed in **Table 7** and shown in Enclosure 1, **Figure 1** would occur within these areas.

Given the probable lack of suitable habitat characteristics and on the effects determination generated by use of the IPaC system's Arkansas Dkey (Enclosure 4), the Proposed Action in the Installation Action Area would have *no effect* on the American burying beetle (USFWS, 2024d).

MONARCH BUTTERFLY

Individual monarch butterflies in temperate climates, such as those in Arkansas, undergo long-distance migration in the fall to their respective overwintering sites. Monarch reproduction is dependent on the presence of milkweed, the sole food source for larvae. Adult monarch butterflies, however, feed on nectar from a variety of flowers. Primary threats to the monarch butterfly is loss and degradation of habitat from conversion to grasslands to agriculture, widespread use of herbicides and logging activities at overwintering sites. Monarch butterfly occurrence at Ebbing ANG Base is based on its historic geographic range and presence of potentially suitable habitat.

Airfield operations under the Proposed Action would have no effect on the monarch butterfly because insects are not known be affected by aircraft noise and direct strikes from aircraft would not occur. Construction of facilities under the Proposed Action would primarily occur in previously disturbed areas and would not overlap with potential monarch butterfly habitat on the installation. Therefore, the DAF determines the Proposed Action in the Installation Action Area would be *no effect* to the monarch butterfly.

AIRSPACE ACTION AREA

ESA-LISTED BIRD AND MAMMAL SPECIES IN THE AIRSPACE

The mammal and bird species listed in **Table 9** could be affected by direct strikes and noise associated with aircraft operations in the airspace. The potential to impact an individual animal would be low, as operations would be spread throughout the large training airspace volume. The aircraft would often fly at altitudes above those associated with bird strikes. Most strikes occur at altitudes below 3,000 feet, although strikes at higher altitudes (up to about 7,000 feet) do occur during migration (FAA, 2024b). F-35 aircraft would fly at altitudes above 10,000 feet more than 90 percent of the time. However, low-level training operations (altitudes from 100 to 500 feet) would occur in authorized areas, primarily along military training routes. Strike potential would be greater during low-level operations. Operational planning includes the option to use the Bird Avoidance Model and Avian Hazard Advisory System to decrease collision potential in the airspace (ARANG, 2002). Airspace operations occurring at night would decrease by 26 percent compared to nighttime operations assessed in the 2023 FMS PTC EIS, decreasing the potential for low-level flights to affect foraging bats. Operations will result in an increase in noise levels within the affected airspace. Birds and bats exposed to aircraft noise, as well as individuals that visually perceive the aircraft, may experience effects such as startle or stress response. Individuals could potentially experience more intense reactions in response to exposure to low-level flights. Noise exposure and visual disturbance would be infrequent (spread out across the training airspace) and temporary, lasting only the duration of an overflight. Overall, given the low potential for aircraft strikes and infrequent exposures to aircraft noise, significant impacts on federally listed species are not anticipated.

As shown in **Table 5**, use of live and inert munitions would increase at Fort Polk, Louisiana, and Razorback Range, which are areas where these types of activities have been authorized and are ongoing. ESA-listed species around these areas are likely acclimated to noise and disturbance associated with the use of munitions on an approved military range. The additional amounts of munitions proposed are not expected to result in an appreciable physiological or behavioral change in wildlife that may be in the vicinity while munitions are being expended.

Countermeasure use (i.e., chaff and flares) is currently authorized in the airspace, with certain restrictions that have not changed from the 2023 FMS PTC EIS. An 8-year average of countermeasure usage in the Hog and Shirley MOAs/ATCAAs is approximately 12,716 flares and 9,185 chaff cartridges. Countermeasure use in the restricted airspace above Razorback Range (R-2401A and R-2402A) averages 7,004 flares and 3,058 chaff cartridges. The 2023 FMS PTC EIS did not assess chaff use by F-35 aircraft; however, this Proposed Action proposes 8,000 cartridges of chaff to be released annually during F-35 aircraft operations which represents a 65% increase in chaff use over the 8-year averages discussed above. Flare use was previously assessed in the 2023 FMS PTC EIS, which included 15,000 flares, and would increase under the Proposed Action by approximately 27%.

The very thin fibers of chaff are composed of aluminum-coated silica (naturally occurring elements), which rapidly break down in the environment and are dispersed from an aircraft to form an electronic cloud that temporarily obscures an aircraft from radar detection (DAF, 2023c). Chaff particles have not been found to result in biological effects to terrestrial or aquatic species as summarized in the *Final Programmatic Environmental Assessment for Testing and Training with Defensive Countermeasures* (DAF, 2023c). Even with the proposed increase in chaff releases, distribution of chaff across authorized airspace would be sparse and would not discernibly affect underlying habitats or species. The use of flares would have little effect on the potential to cause wildfires that would impact underlying bat roosting or foraging habitat. The proposed increase would not appreciably change the potential for effects because the DAF would continue to implement flare release restrictions based on Fire Danger conditions.

As such, implementation of the Proposed Action in the Airspace Action Area *may affect, but is not likely to adversely affect*, Ozark big-eared bat, gray bat, northern long-eared bat, Indiana bat, tricolored bat, piping plover, eastern black rail, red knot, whooping crane, and red-cockaded woodpecker.

ESA-LISTED REPTILES, AMPHIBIANS, FISH, MOLLUSKS, INSECTS, CRUSTACEANS, AND CRITICAL HABITAT IN THE AIRSPACE

As previously stated, ESA-listed reptiles, amphibians, fish, mollusks, insects, crustaceans, flowering plants, and critical habitats would not be affected by aircraft noise or collisions and there would be no ground disturbance of areas beneath the airspace.

Chaff and flares would be released over areas where ESA-listed reptiles, amphibians, fish, mollusks, insects, crustaceans, and designated critical habitat in **Table 9** would occur. Even with the proposed increase in chaff and flare releases, distribution of chaff and flare components across authorized airspace would be sparse and would not discernibly affect underlying terrestrial habitats. Furthermore, less than 1% of the airspace authorized for countermeasure use consists of waterbodies, making the potential for chaff and flare effects to aquatic habitats negligible. The DAF would continue to implement countermeasure release restrictions and there would be no changes in areas authorized for these activities. Therefore, the DAF determines that the Proposed Action in the Airspace Action Area would have *no effect* ESA-listed reptiles, amphibians, fish, mollusks, insects, crustaceans, flowering plants, and designated critical habitat listed in **Table 9**.

EFFECTS DETERMINATIONS / REQUEST FOR CONCURRENCE

In summary, the DAF makes the following determinations regarding the Proposed Action in this request to reinitiate consultation:

The Proposed Action in the Installation Action Area

- Would have *no effect* on the piping plover, red knot, eastern black rail, American burying beetle, and monarch butterfly.
- *May affect, but is not likely to adversely affect,* the gray bat, northern long-eared bat, tricolored bat, and Indiana bat.

The Proposed Action in the Airspace Action Area

- Would have *no effect* on American alligator, alligator snapping turtle, Ozark hellbender, Arkansas river shiner, leopard darter, Ozark cavefish, peppered chub, yellowcheek darter, Arkansas fatmucket, Neosho mucket, Ouachita rock pocketbook, pink mucket, rabbitsfoot, scaleshell mussel, snuffbox mussel, speckled pocketbook, spectaclecase, winged mapleleaf, western fanshell, Ouachita fanshell, American burying beetle, monarch butterfly, western regal fritillary, Hell Creek cave crayfish, *Geocarpon minimum*, harperella, Missouri bladderpod, or pondberry.

- Would have *no effect* on designated critical habitat for the Arkansas river shiner, leopard darter, peppered chub, yellowcheek darter, Neosho mucket, rabbitsfoot, Louisiana pigtoe, or Ouachita fanshell.
- *May affect, but is not likely to adversely affect*, Ozark big-eared bat, gray bat, northern long-eared bat, Indiana bat, tricolored bat, piping plover, eastern black rail, red knot, whooping crane, and red-cockaded woodpecker.

In accordance with the ESA, the DAF is requesting concurrence from the USFWS Arkansas Ecological Services Field Office, in coordination with the Oklahoma Ecological Field Office, on these effect determinations. Please provide any comments to our office within 30 days so that we may address any concerns. Comments can be provided via email to Mr. Austin Naranjo, at austin.naranjo.1@us.af.mil. Thank you for your assistance.

Sincerely

NARANJO.AUSTIN.NICHOLAS.1540941153 Digitally signed by NARANJO.AUSTIN.NICHOLAS.1540941153 Date: 2025.04.29 09:08:20 -05'00'

Austin Naranjo
Program Manager
Air Force NEPA Division (AFCEC/CIE)

ENCLOSURES:
- Enclosure 1 Facility Requirements
- Enclosure 2 Action Areas
- Enclosure 3 IPaC Official Species Lists
- Enclosure 4 Arkansas Dkey for Installation Action Area (Project Code: 2025-0033923)

REFERENCES

AGFC. (2024). *P1.01 -- Endangered Species List -- Animals*. Retrieved November 7, 2024, from Arkansas Game and Fish Commission: https://apps.agfc.com/regulations/P1.01/. July 1.

Air National Guard. (2020a). *Integrated Natural Resource Managment Plan Fort Smith AIr National Guard Base*. prepared by Ageiss.

Air National Guard. (2020b). *Final Bat Survey Report Air National Guard 188th Wing Fort Smith Arkansas*. prepared by HDR. Joint Base Andrews: Headquarter ANGB.

Air National Guard. (2020c). *Flora and Fauna Surveys Air National Guard - 188th Wing Fort Smith Arkansas*. prepared by Ageiss and HDR. Fort Smith: Headquarters ANG.

ARANG. (2002). *188th Fighter Wing Bird Aircraft Strike Hazard Plan 91-202*. Fort Smith, Arkansas: Arkansas Air National Guard.

ARANG. (2020). *Integrated Natural Resources Management Plan Fort Smith Air National Guard Base*. Arkansas Air National Guard. Prepared by AGEISS.

Biondi et al. (2013). Biondi, K.M., Belant, J. L., Devault, T. L., Martin, J. A., & Wang, G. Bat incidents with U.S. civil aircraft. *Cata Chiropterologica*, 185-192.

DAF. (2023a). *Record of Decision for the Environmental Impact Statement Foreign Military Sales Pilot Training Center at Ebbing Air National Guard Base, AR.*

DAF. (2023b). *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michican Final Environmental Impact Statement.*

DAF. (2023c). *Final Programmatic Environmental Assessment for Testing and Training with Defensive Countermeasures*. Lackland: U.S. Department of the Air Force.

DoD. (2022). *2022 Demographics Profile of the Military Community*. U.S. Department of Defense.

FAA. (2024a). *Wildlife Strike Database*. Federal Aviation Administration. Retrieved from https://wildlife.faa.gov/search.

FAA. (2024b). *Aeronautical Information Manual: Chapter 7. Safety of Flight*. Retrieved December 12, 2024, from Section 5. Bird Hazards and Flight Over National Refuges, Parks, and Forests: https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap7_section_5.html#:~:text=Migratory%20Bird%20Activity&text=While%20over%2090%20percent%20of,at%20lower%20altitudes%20during%20migration.

FSRA. (2017). *Final Environmental Assessment, Proposed Wildlife Hazard Mitigation Project*. Fort Smith Regional Airport.

Le Roux, D., & Waas, J. R. (2012). Do long-tailed bats alter their evening activity in response to aircraft noise? *Acta Chiropterologica, 14*(1), 111-120. doi:10.3161/150811012X654321.

ODWC. (2024). *Threatened and Endangered Species*. Retrieved November 12, 2024, from Oklahoma Department of Wildlife Conservation: https://www.wildlifedepartment.com/wildlife/threatened-and-endangered.

Peurach, S., Dove, C. J., & Stepko, L. (2009). A Decade of U.S. Air Force Bat Strikes. *Human-Wildlife Conflicts, 3*(2), 199-207.

USFWS. (2024a). *List of Threatened and Endangered Species, Ebbing ANG Base and FSRA*. USFWS. Arkansas Ecological Services Field Office. Retrieved December 19, 2024, from https://ipac.ecosphere.fws.gov/

USFWS. (2024b). *List of Threatened and Endangered Species, Arkansas Airspace*. USFWS. Arkansas Ecological Services Field Office. Retrieved December 19, 2024, from https://ipac.ecosphere.fws.gov/

USFWS. (2024c). *List of Threatened and Endangered Species, Oklahoma Airspace*. USFWS. Oklahoma Ecological Services Field Office. Retrieved December 19, 2024, from https://ipac.ecosphere.fws.gov/

USFWS. (2024d). *Concurrence Verification Letter* . Project Code: 2025-0033923. Retrieved December 19, 2024

ENCLOSURE 1

FACILITY REQUIREMENTS

22

PROPOSED ACTION CONSTRUCTION

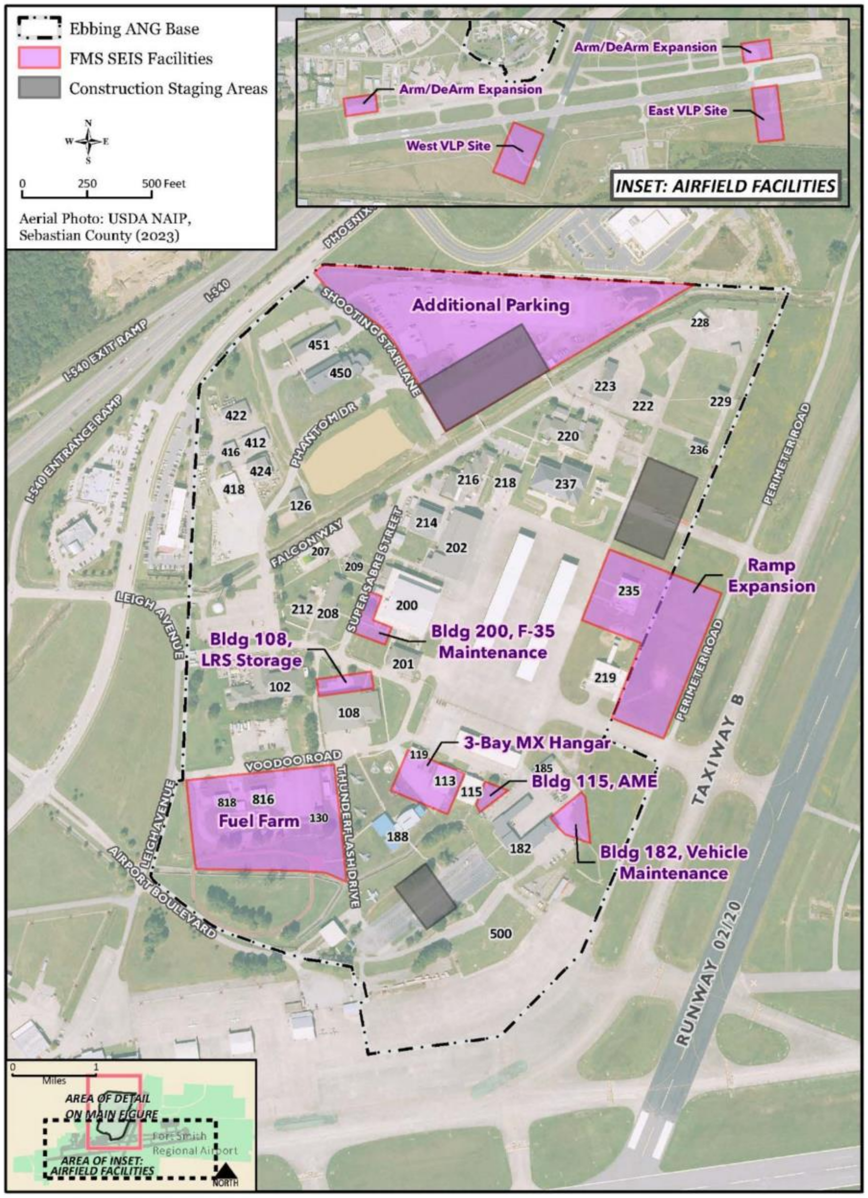


Figure 1. New FMS PTC Facilities at Ebbing ANG Base (and FSRA) Under the Proposed Action

1

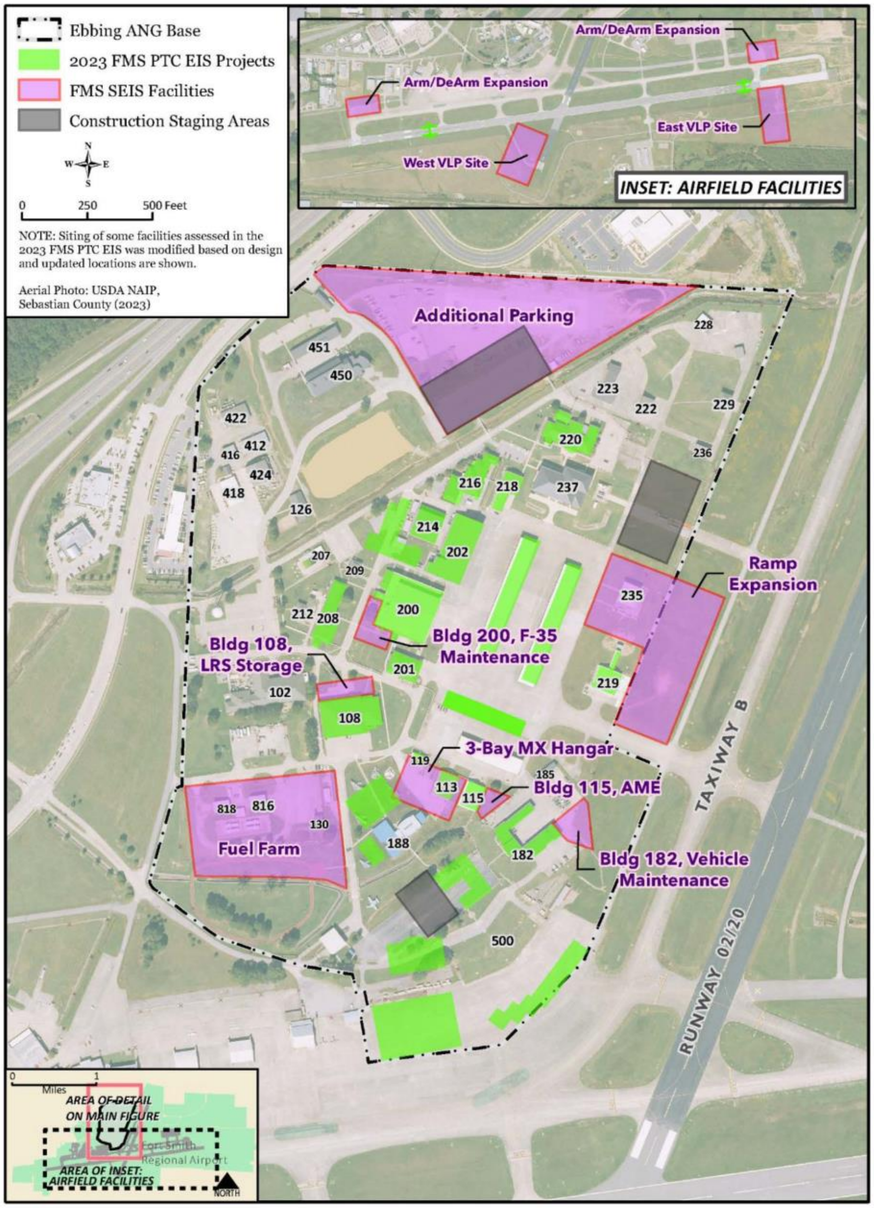


Figure 2. All FMS PTC Facilities at Ebbing ANG Base (and FSRA)

1

ENCLOSURE 2

ACTION AREAS

INSTALLATION ACTION AREA

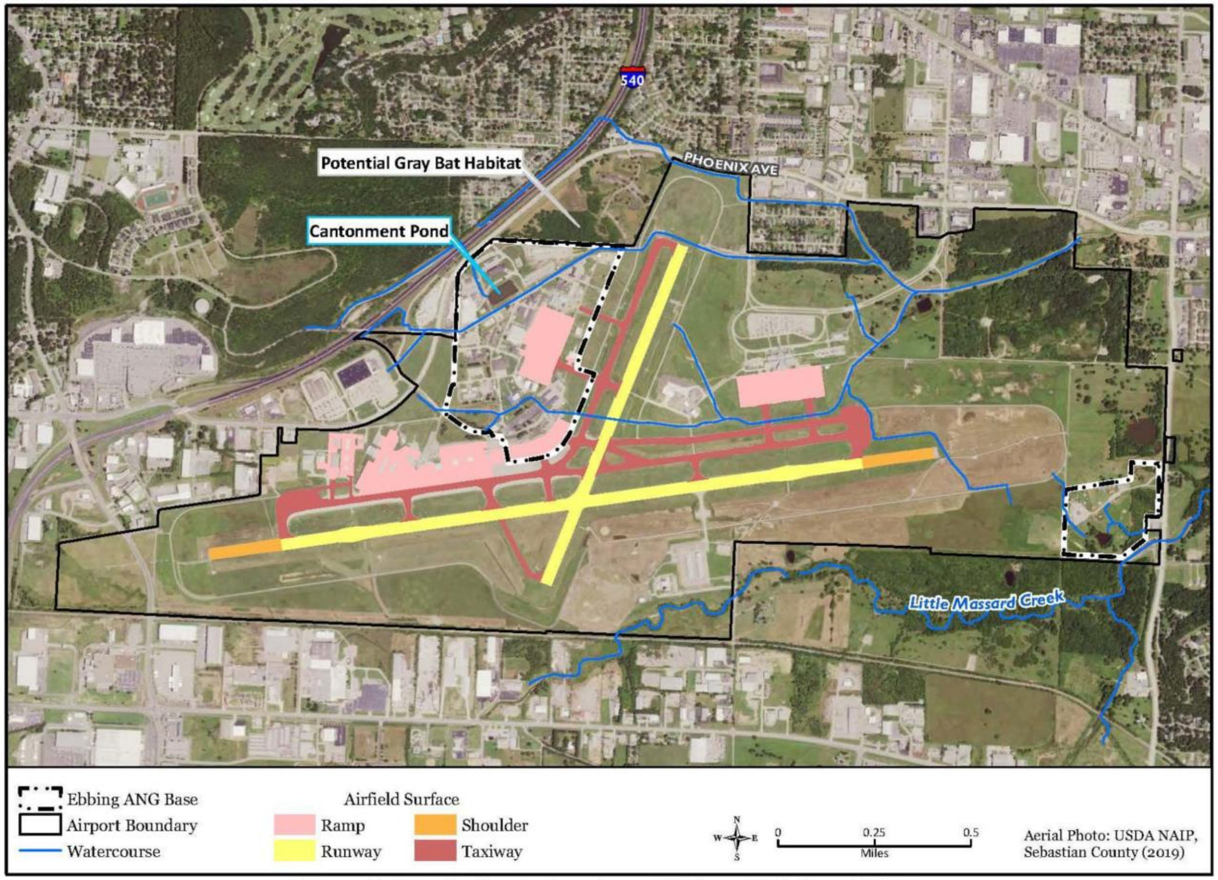


Figure 3. Installation Action Area: Ebbing ANG Base / FSRA

1

26

AIRSPACE ACTION AREA

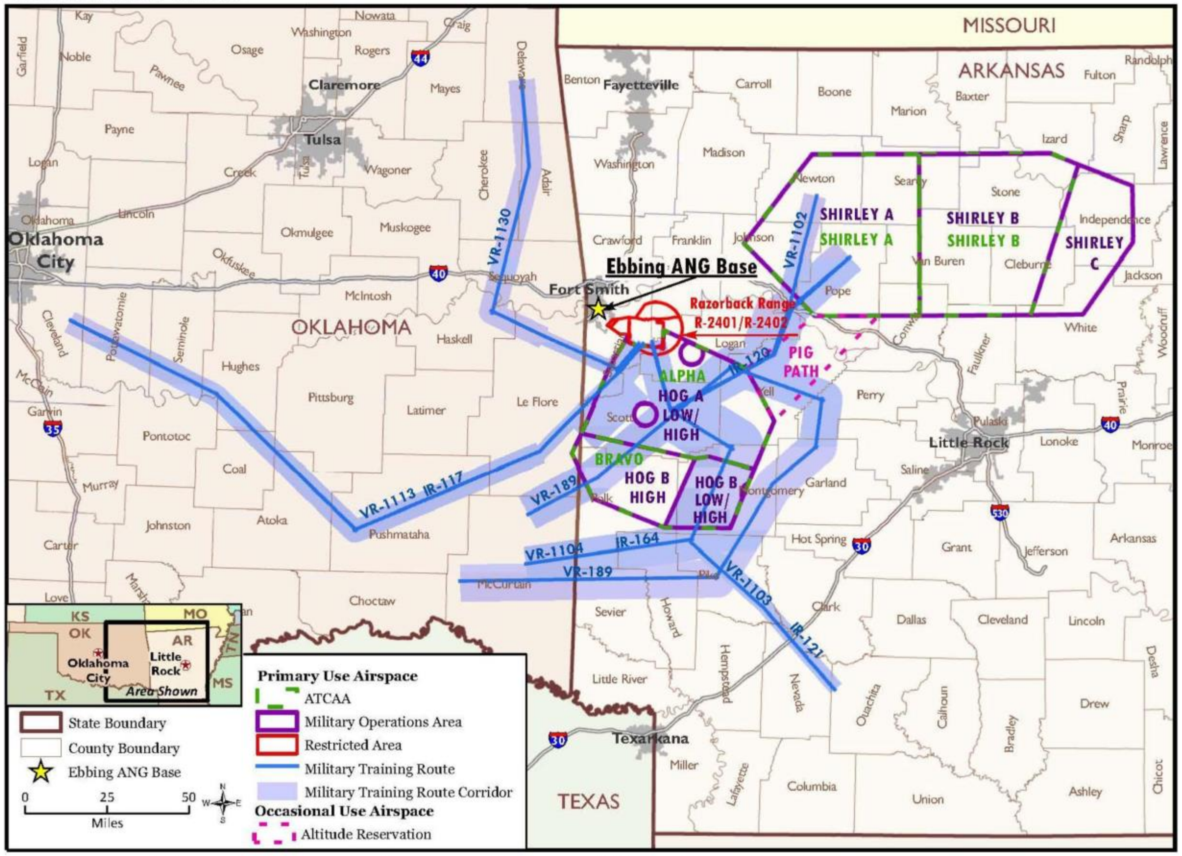


Figure 4. Airspace Action Area: Ebbing ANG Base Operational Airspace and Ranges

27

CRITICAL HABITAT

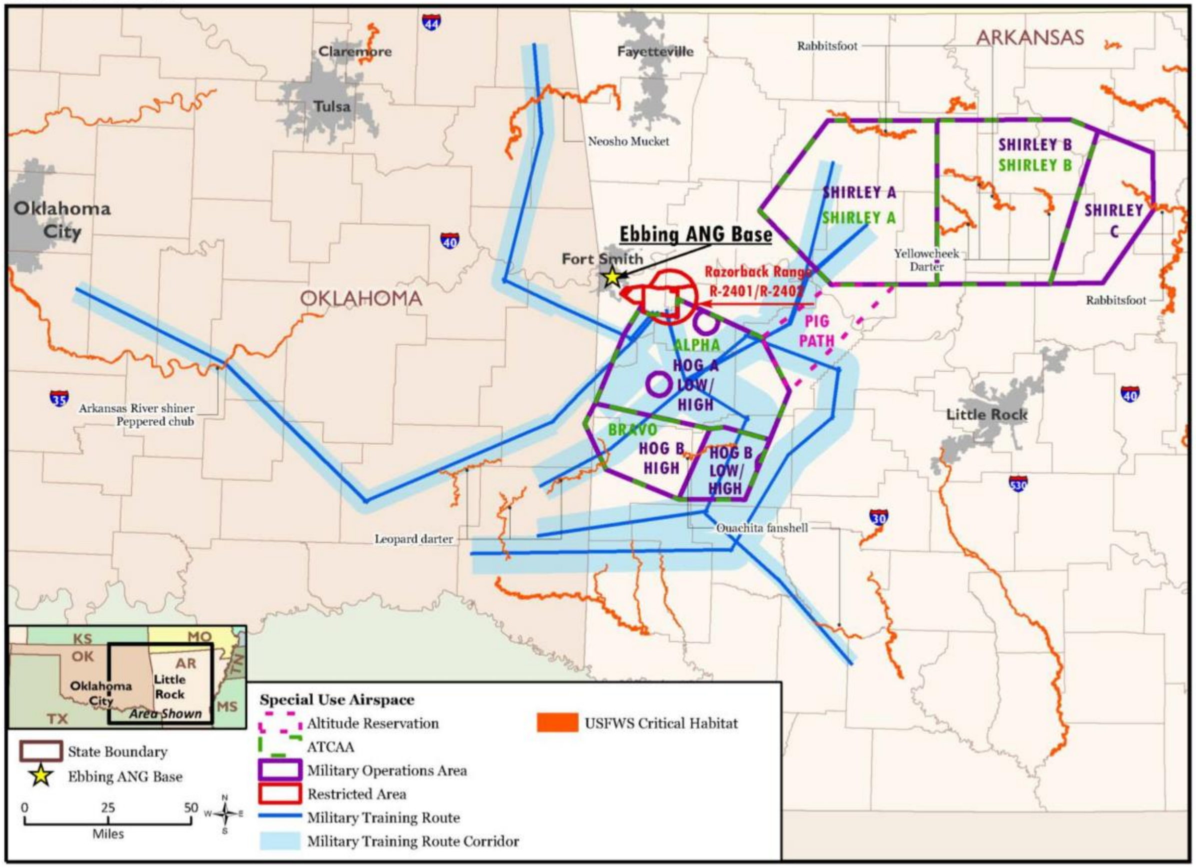


Figure 5. Critical Habitat Under the Airspace Action Area

1

ENCLOSURE 3

IPAC OFFICIAL SPECIES LISTS

29

SPECIES LIST FOR THE INSTALLATION ACTION AREA (PROJECT CODE: 2025-0033923)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
Phone: (501) 513-4470 Fax: (501) 513-4480

In Reply Refer To: 12/19/2024 16:41:36 UTC
Project Code: 2025-0033923
Project Name: Ebbing ANG Base SEIS

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

1

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
(501) 513-4470

PROJECT SUMMARY

Project Code: 2025-0033923
Project Name: Ebbing ANG Base SEIS
Project Type: Military Operations
Project Description: Fort Smith Arkansas and surrounding airspace associated with the expansion of the FMS PTC at Ebbing ANG Base and FSRA
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.3393212,-94.35831230718874,14z

Counties: Sebastian County, Arkansas

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

1

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

INSECTS

NAME	STATUS
American Burying Beetle *Nicrophorus americanus* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/66	Threatened
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

36

SPECIES LIST FOR THE ARKANSAS AIRSPACE ACTION AREA (PROJECT CODE: 2025-0034232)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
Phone: (501) 513-4470 Fax: (501) 513-4480

In Reply Refer To: 12/19/2024 21:25:23 UTC
Project Code: 2025-0034232
Project Name: SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

1

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

1

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
(501) 513-4470

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
(918) 581-7458

1

PROJECT SUMMARY

Project Code: 2025-0034232

Project Name: SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

Project Type: Military Operations

Project Description: The Air Force proposes to expand the FMS PTC mission at Ebbing ANG Base and would beddown an additional 12 F-35 aircraft. There would also be an increase in F-35 operations, personnel, and construction of new facilities at Ebbing ANG Base and Fort Smith Regional Airport. F-35 operations would occur within existing special use airspace that occurs over Arkansas and Oklahoma. Special use airspace in Arkansas includes Shirley A, B, and C Military Operations Areas (MOA), Hog A and B MOAs, Razorback Range, and associated Military Training Routes (MTR).

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@34.839213799999996,-93.7574284112391,14z

Counties: Arkansas and Oklahoma

ENDANGERED SPECIES ACT SPECIES

There is a total of 31 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Ozark Big-eared Bat *Corynorhinus (=Plecotus) townsendii ingens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7245	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker *Dryobates borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

1

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)

AMPHIBIANS

NAME	STATUS
Ozark Hellbender *Cryptobranchus alleganiensis bishopi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/647	Endangered

FISHES

NAME	STATUS
Leopard Darter *Percina pantherina* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8470	Threatened
Yellowcheek Darter *Etheostoma moorei* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7871	Endangered

CLAMS

NAME	STATUS
Arkansas Fatmucket *Lampsilis powellii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2213	Threatened
Ouachita Fanshell *Cyprogenia sp. cf. aberti* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10889	Threatened
Ouachita Rock Pocketbook *Arcidens wheeleri* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4509	Endangered
Pink Mucket (pearlymussel) *Lampsilis abrupta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829	Endangered
Rabbitsfoot *Quadrula cylindrica cylindrica* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5165	Threatened
Scaleshell Mussel *Leptodea leptodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5881	Endangered
Snuffbox Mussel *Epioblasma triquetra*	Endangered

1

NAME	STATUS
There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/4135	
Speckled Pocketbook *Lampsilis streckeri* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7869	Endangered
Western Fanshell *Cyprogenia aberti* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6895	Threatened
Winged Mapleleaf *Quadrula fragosa* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4127	Endangered

INSECTS

NAME	STATUS
American Burying Beetle *Nicrophorus americanus* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/66	Threatened
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRUSTACEANS

NAME	STATUS
Hell Creek Cave Crayfish *Cambarus zophonastes* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1552	Endangered

FLOWERING PLANTS

NAME	STATUS
Geocarpon minimum No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7699	Threatened
Harperella *Ptilimnium nodosum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3739	Endangered
Missouri Bladderpod *Physaria filiformis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5361	Threatened

NAME	STATUS
Pondberry *Lindera melissifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1279	Endangered

CRITICAL HABITATS

There are 5 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Leopard Darter *Percina pantherina* https://ecos.fws.gov/ecp/species/8470#crithab	Final
Louisiana Pigtoe *Pleurobema riddellii* For information on why this critical habitat appears for your project, even though Louisiana Pigtoe is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/10233#crithab	Proposed
Ouachita Fanshell *Cyprogenia sp. cf. aberti* https://ecos.fws.gov/ecp/species/10889#crithab	Final
Rabbitsfoot *Quadrula cylindrica cylindrica* https://ecos.fws.gov/ecp/species/5165#crithab	Final
Yellowcheek Darter *Etheostoma moorei* https://ecos.fws.gov/ecp/species/7871#crithab	Final

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
HOLLA BEND NATIONAL WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22HOLLA+BEND+NATIONAL+WILDLIFE+REFUGE%5C%22"	6,084.042

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

1

SPECIES LIST FOR THE OKLAHOMA AIRSPACE ACTION AREA (PROJECT CODE: 2025-0034296)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
Phone: (918) 581-7458 Fax: (918) 581-7467

In Reply Refer To: 12/19/2024 22:58:38 UTC
Project Code: 2025-0034296
Project Name: SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

1

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

1

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
(918) 581-7458

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
(501) 513-4470

1

PROJECT SUMMARY

Project Code: 2025-0034296

Project Name: SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

Project Type: Military Operations

Project Description: The Air Force proposes to expand the FMS PTC mission at Ebbing ANG Base and would beddown an additional 12 F-35 aircraft. There would also be an increase in F-35 operations, personnel, and construction of new facilities at Ebbing ANG Base and Fort Smith Regional Airport. F-35 operations would occur within existing special use airspace that occurs over Arkansas and Oklahoma. Special use airspace that occurs in Oklahoma includes the Hog B Military Operations Area (MOA) and Military Trainings Routes (MTRs) associated with special use airspace in Arkansas and Oklahoma.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@34.1765874,-94.77838656256066,14z

Counties: Arkansas and Oklahoma

ENDANGERED SPECIES ACT SPECIES

There is a total of 25 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Ozark Big-eared Bat *Corynorhinus (=Plecotus) townsendii ingens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7245	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker *Dryobates borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)

FISHES

NAME	STATUS
Arkansas River Shiner *Notropis girardi* Population: Arkansas River Basin (AR, KS, NM, OK, TX) There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4364	Threatened
Leopard Darter *Percina pantherina* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8470	Threatened
Ozark Cavefish *Amblyopsis rosae* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6490	Threatened
Peppered Chub *Macrhybopsis tetranema* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/532	Endangered

CLAMS

NAME	STATUS
Neosho Mucket *Lampsilis rafinesqueana* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3788	Endangered
Ouachita Rock Pocketbook *Arcidens wheeleri* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4509	Endangered
Rabbitsfoot *Quadrula cylindrica cylindrica* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5165	Threatened
Scaleshell Mussel *Leptodea leptodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5881	Endangered
Winged Mapleleaf *Quadrula fragosa* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species.	Endangered

52

NAME	STATUS
Species profile: https://ecos.fws.gov/ecp/species/4127	

INSECTS

NAME	STATUS
American Burying Beetle *Nicrophorus americanus* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/66	Threatened
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Western Regal Fritillary *Argynnis idalia occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Harperella *Ptilimnium nodosum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3739	Endangered

CRITICAL HABITATS

There are 4 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Arkansas River Shiner *Notropis girardi* https://ecos.fws.gov/ecp/species/4364#crithab	Final
Leopard Darter *Percina pantherina* https://ecos.fws.gov/ecp/species/8470#crithab	Final
Neosho Mucket *Lampsilis rafinesqueana* https://ecos.fws.gov/ecp/species/3788#crithab	Final
Peppered Chub *Macrhybopsis tetranema* https://ecos.fws.gov/ecp/species/532#crithab	Final

ENCLOSURE 4
ARKANSAS DKEY FOR INSTALLATION ACTION AREA
(PROJECT CODE: 2025-0033923)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
Phone: (501) 513-4470 Fax: (501) 513-4480

In Reply Refer To: 12/19/2024 17:23:45 UTC
Project code: 2025-0033923
Project Name: SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

Subject: Concurrence verification letter for 'SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base' for specified federally threatened and endangered species and designated critical habitat that may occur in your proposed project area consistent with the Arkansas Determination Key for project review and guidance for federally listed species (Arkansas Dkey).

Dear Christina Meyer:

The U.S. Fish and Wildlife Service (Service) received on **December 19, 2024** your effect determination(s) for the 'SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base' (the Action) using the Arkansas DKey within the Information for Planning and Consultation (IPaC) system. The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based on your answers, and the assistance in the Service's Arkansas DKey, you made the following effect determination(s) for the proposed Action, including species protective measures that you confirmed will be implemented.

Species	**Listing Status**	**Determination**
American Burying Beetle (*Nicrophorus americanus*)	Threatened	No effect
Eastern Black Rail (*Laterallus jamaicensis ssp. jamaicensis*)	Threatened	No effect
Indiana Bat (*Myotis sodalis*)	Endangered	NLAA
Piping Plover (*Charadrius melodus*)	Threatened	No effect
Rufa Red Knot (*Calidris canutus rufa*)	Threatened	No effect

Status

The Service concurs with the NLAA determination(s) for the species listed above. No further consultation for this project is required for these species.Your agency has met consultation

1

requirements by informing the Service of your “No Effect” determinations. No consultation for this project is required for species that you determined will not be affected by this action.

This concurrence verification letter confirms you may rely on effect determinations you reached by considering the Arkansas DKey to satisfy agency consultation requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.; ESA). No further consultation for this project is required for species that you determined will not be affected by this action.

The Service recommends that your agency contact the Arkansas Ecological Services Field Office or re-evaluate this key in IPaC if: 1) the scope, timing, duration, or location of the proposed project changes, 2) new information reveals the action may affect listed species or designated critical habitat; 3) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Arkansas Ecological Services Field Office should take place before project changes are final or resources committed.

This letter only covers the listed species in the above table. The following species may also occur in the Action area:

- Alligator Snapping Turtle *Macrochelys temminckii* Proposed Threatened
- Monarch Butterfly *Danaus plexippus* Proposed Threatened
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered

If you determine your project may affect additional listed or proposed listed species not covered by the Arkansas ESFO DKey, please contact our office at 501-513-4470, arkansas_es_clearance@fws.gov, or your agency point of contact Arkansas ESFO to discuss methods to avoid or minimize potential adverse effects to those species. Candidate species are not afforded protection under the ESA; however, we recommend they be considered in project planning and that conservation measures be implemented to avoid or minimize impacts to individuals or their habitat as much as possible.

Bald and Golden Eagle Protection Act: The following resources are provided to project proponents and consulting agencies as additional information. Bald and golden eagles are not included in this section 7(a)(2) consultation and this information does not constitute a determination of effects by the Service.

The Service developed the National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with Bald Eagles when and under what circumstances the protective provisions of the Bald and Golden Eagle Protection Act may apply to their activities. The guidelines should be consulted prior to conducting new or intermittent activity near an eagle nest. Activity specific guidelines begin on page 10 of the document. To access a copy of the National Bald Eagle Management Guidelines please visit the Service's Bald and Golden Eagle Management webpage and scroll down to the Guidance and Tools section: https://www.fws.gov/library/collections/bald-and-golden-eagle-management

If the recommendations detailed in the National Bald Eagle Management Guidelines cannot be followed, you may apply for a permit to authorize removal or relocation of an eagle nest in certain instances. To obtain an application form or contact information for Regional Migratory Bird Permit Offices please visit the Service's Bald and Golden Eagle Management webpage and scroll down to the Permits section: https://www.fws.gov/library/collections/bald-and-golden-eagle-management

1

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base

2. Description

The following description was provided for the project 'SEIS for the Expansion of Foreign Military Sales F-35 Pilot Training Center at Ebbing ANG Base':

> The Air Force proposes to expand the FMS PTC mission at Ebbing ANG Base and would beddown an additional 12 F-35 aircraft. There would also be an increase in F-35 operations, personnel, and construction of new facilities at Ebbing ANG Base and Fort Smith Regional Airport. F-35 operations would occur within existing special use airspace that occurs over Arkansas and Oklahoma. A separate IPaC will be submitted for special use airspace.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.3393212,-94.35831230718874,14z

Species Protection Measures
Indiana Bats
https://www.fws.gov/southeast/pdf/species-protective-measures/indiana-bat.pdf

1

QUALIFICATION INTERVIEW

1. Have you made an effects determination of "no effect" for all species in the area of the project? A "no effect" determination means the project will have no beneficial effect, no short-term adverse effects, and no long-term adverse effects on any of the species on the IPaC-generated species list for the proposed project or those species habitat. A project with effects that cannot be meaningfully measured, detected or evaluated, effects that are extremely unlikely to occur, or entirely beneficial effects should not have a "no effect" determination. (If unsure, select "No").

   No
2. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes
3. Are you the the action agency or the designated non-federal representative?

   Yes
4. Choose the agency you represent in this consultation with the U.S. Fish and Wildlife Service:

   g. All other federal agencies or agency designees
5. [Semantic] Does the project intersect designated critical habitat for the Leopard Darter?

   Automatically answered
   No
6. [Semantic] Does the project intersect designated critical habitat for the Neosho Mucket?

   Automatically answered
   No
7. [Semantic] Does the project intersect designated critical habitat for Yellowcheek Darter?

   Automatically answered
   No
8. [Semantic] Does the project intersect designated critical habitat for Rabbitsfoot?

   Automatically answered
   No
9. [Semantic] Does the project intersect designated critical habitat for Ouachita Fanshell?

   Automatically answered
   No
10. [Semantic] Does the project intersect the American burying beetle consultation area?

    Automatically answered
    Yes
11. Have you determined that the proposed action will have “no effect” on the American burying beetle? (If you are unsure select "No")

    Yes

1

12. [Semantic] Does the project intersect the red-cockaded woodpecker AOI?
    Automatically answered
    No
13. [Semantic] Does the project intersect the Eastern black rail AOI?
    Automatically answered
    Yes
14. Will the project take place in freshwater herbaceous wetlands and/or wet prairies?
    No
15. [Semantic] Does the project intersect the red knot AOI?
    Automatically answered
    Yes
16. Will the project affect sand and gravel areas or shorelines along rivers, lakes, or reservoirs?
    No
17. Does the project take place in marshy or flooded open field habitat?
    No
18. [Semantic] Does the project intersect the Piping Plover AOI?
    Automatically answered
    Yes
19. [Semantic] Does the project intersect the Whooping Crane AOI?
    Automatically answered
    No
20. [Semantic] Does the project intersect the interior least tern AOI?
    Automatically answered
    No
21. [Semantic] Does the project intersect the Gray Bat AOI?
    Automatically answered
    No
22. [Semantic] Does the project intersect the Ozark Big-eared Bat AOI?
    Automatically answered
    No
23. [Semantic] Does the project intersect the Indiana bat AOI?
    Automatically answered
    Yes
24. Are there any caves within 0.5 mile of the project area?
    No
25. Does the project involve blasting of any type or tree removal of greater than 10 acres?
    No

1

26. [Semantic] Does the project intersect the Indiana Bat cAOI?
    Automatically answered
    No
27. Does the project involve tree removal (e.g., forestry management practices, timber stand improvement, wildlife stand improvement, prescribed fire, midstory removal, thinning) of trees greater than 3 inches diameter at breast height occurring within suitable habitat?
    No
28. Will the activity affect the roosting environment of cave-dwelling bats (e.g., prescribed fire where smoke may enter occupied caves, filling of karst feature with material or liquid of any type, change in the structure or opening of the cave or feature)?
    No
29. Will the project proponents follow all applicable species protective measures for Indiana Bats?
    Yes
30. [Semantic] Does the project intersect the Benton County Cave Crayfish AOI?
    Automatically answered
    No
31. [Semantic] Does the project intersect the Hell Creek Cave Crayfish AOI?
    Automatically answered
    No
32. [Semantic] Does the project intersect the Ozark cavefish AOI?
    Automatically answered
    No
33. [Semantic] Does the project intersect the Missouri bladderpod AOI?
    Automatically answered
    No
34. [Semantic] Does the project intersect the Geocarpon AOI?
    Automatically answered
    No
35. [Semantic] Does the project intersect the Pondberry AOI?
    Automatically answered
    No
36. [Semantic] Does the project intersect the interior least tern range?
    Automatically answered
    No

1

62

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Christina Meyer
Address: 2110 Bayshore Drive
City: Niceville
State: FL
Zip: 32578
Email christina.a.meyer@leidos.com
Phone: 8505026372

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Air Force

1

B.2.3.2 USFWS Response to DAF

United States Department of the Interior
FISH AND WILDLIFE SERVICE
110 South Amity Road, Suite 300
Conway, Arkansas 72032
Tel.: 501/513-4470 Fax: 501/513-4480

IN REPLY REFER TO: Project Code: 2022-0026129

May 30, 2025

Austin Naranjo
AFCEC/CIE, Program Manager
2261 Hughes Avenue, Suite 155
Joint Base San Antonio
Lackland TX 78236-9853

Dear Mr. Naranjo:

The U. S. Fish and Wildlife Service (Service) received the U. S. Department of the Air Force (DAF) request, dated April 29, 2025, to reinitiate consultation for project code: 2022-0026129 "Proposed Foreign Military Sales (FMS) Pilot Training Center (PTC) Beddown at Ebbing Air National Guard (ANG) Base, Arkansas." The Service's Arkansas Ecological Services Field Office prepared this letter in coordination with the Oklahoma Ecological Services Field Office. The comments are submitted in accordance with the Endangered Species Act (Act; 87 stat. 884, as amended: 16 U.S.C. 1531 *et seq.*) and Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052).

The DAF proposes to expand the permanent FMS PTC mission at Ebbing ANG Base over what was analyzed and authorized in the 2023 *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing ANG Base, Arkansas or Selfridge ANG Base, Michigan Final Environmental Impact Statement*, hereinafter referred to as the "2023 FMS PTC EIS." This proposed action would beddown an additional 12 F-35s for a total of 36 F-35 primary aerospace vehicle authorization (PAA) and 12 F-16 aircraft at Ebbing ANG Base. Additionally, this proposed action includes operations that incorporate the F-35B's Short Takeoff and Vertical Landing (STOVL) capabilities, new construction and renovation projects on parts of the Fort Smith Regional Airport (FSRA) airfield or previously disturbed areas of Ebbing ANG Base to support the 12 new F-35 PAA and STOVL operations, and a 31% increase in total persons over the 2023 RMC PTC EIS. The same airspace and ranges included and described in the 2023 FMS PTC EIS would be utilized by the 12 additional F-35 aircraft. Overall, the proposed action would increase airspace and military training route events by 13 and 2%, respectively, and decrease military night operations occurring between 10:00 p.m. and 7:00 a.m. by ~26% at FSRA airfield and 23% within the airspace as compared to the 2023 FMS PTC EIS.

The DAF has met consultation requirements by informing the Service of their determination of "no effect" for construction activities and airfield operations at Ebbing ANG Base and FSRA on piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), eastern black rail (*Laterallus jamaicensis jamaicensis*), and American burying beetle (*Nicrophorus americanus*) and for aircraft operations in the training airspace on American alligator (*Alligator mississippiensis*), Ozark hellbender (*Cryptobranchus alleganiensis bishopi*), Arkansas river shiner (*Notropis girardi*), leopard darter (*Percina pantherina*), Ozark cavefish (*Amblyopsis rosae*), peppered chub (*Macrhybopsis tetranema*), yellowcheek darter (*Etheostoma moorei*), Arkansas fatmucket (*Lampsilis powellii*), Neosho mucket (*Lampsilis rafinesqueana*), Ouachita rock pocketbook (*Arcidens wheeleri*), pink mucket (*Lampsilis abrupta*), rabbitsfoot (*Quadrula cylindrica cylindrica*), scaleshell mussel (*Leptodea leptodon*), snuffbox mussel (*Epioblasma triquetra*), speckled pocketbook (*Lampsilis streckeri*), spectaclecase (*Cumberlandia monodonta*), winged mapleleaf (*Quadrula fragosa*), western fanshell (*Cyprogenia aberti*), Ouachita fanshell (*Cyprogenia cf. aberti*), American burying beetle (*Nicrophorus americanus*), Hell Creek cave crayfish (*Cambarus zophonastes*), Geocarpon (*Geocarpon minimum)*, harperella (*Ptilimnium nodosum*), Missouri bladderpod (*Physaria filiformis*), pondberry (*Lindera melissifolia*), and designated critical habitat for the Arkansas river shiner, leopard darter, peppered chub, yellowcheek darter, Neosho mucket, rabbitsfoot, and Ouachita fanshell.

The Service concurs with DAF's determination of "may affect, not likely to adversely affect" for the effects of construction activities and airfield operations at Ebbing ANG Base and FSRA on gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*Myotis sodalis*), and tricolored bat (*Perimyotis subflavus*) and for the effects of aircraft operations in the training airspace on Ozark big-eared bat (*Corynorhinus townsendii ingens*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*Myotis sodalis*), tricolored bat (*Perimyotis subflavus*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), eastern black rail (*Laterallus jamaicensis jamaicensis*), whooping crane (*Grus americana*), and red-cockaded woodpecker (*Dryobates borealis*).

Section 7(a)(4) of the Act requires Federal agencies to confer with the Secretary of the Interior on any action that is likely to jeopardize the continued existence of a species proposed for listing and proposed designated critical habitat. Within the proposed action area species proposed for listing are as follows: monarch (*Danaus plexippus*), western regal fritillary (*Argynnis idalia occidentalis*), tricolored bat, and alligator snapping turtle (*Macrochelys temminckii*). Additionally proposed designated critical habitat for the monarch and Louisiana pigtoe (*Pleurobema riddellii*) occurs within the proposed action area. To meet section 7(a)(4) conference requirements for these proposed species and designated critical habitats, the Service's concurrence is not required. However, please document your jeopardy determination for them with a brief justification in writing and add it to the project file.

If you have questions or comments, please contact Rebecca Peak at (501) 513-4475 or rebecca_peak@fws.gov. Thank you for your continued cooperation with our agency.

Sincerely,

JASON HIGHT

Digitally signed by JASON HIGHT
Date: 2025.05.30 11:33:07 -05'00'

Jason L. Hight
Field Supervisor
Arkansas Ecological Services Field Office

Cc: John Hendrix, Field Supervisor, Oklahoma Ecological Services Field Office

This page intentionally left blank.

APPENDIX C
NOISE

This page intentionally left blank.

Noise

This appendix presents information that has been updated from the 2023 *Foreign Military Sales (FMS) Pilot Training Center (PTC) Environmental Impact Statement (EIS*), Appendix C, *Noise Supporting Information*, which is incorporated by reference. The information presented in § C.1.1 on the basics of sound and noise, including definitions of metrics used to describe noise has not changed. Additionally, there have not been updates to the comprehensive review of noise effects described in detail in § C.1.2.

Section C.1, *Noise Modeling Methodology*, of this appendix provides a brief overview of the methodology used in this Supplemental EIS (SEIS) to model noise in training airspace. Section C.2, *Noise Technical Report on the SEIS for Beddown of FMS PTC at Ebbing Air Force Base, Arkansas,* is a technical report providing details on noise modeling methods, input parameters, and results for all noise source activities that would occur under the Proposed Action.

C.1 NOISE MODELING METHODOLOGY

C.1.1 Subsonic

Similar to the 2023 FMS PTC EIS, Appendix C, § C.1.3.1, cumulative noise exposure is assessed using the Military Operating Area and Range Noise Model (MRNMAP), Version 3.2 (Lucas and Calamia, 1994) for subsonic operations. Changes made in the most recent update of MRNMAP (version 3.2), which has become available since publication of the 2023 FMS PTC EIS, are described in a report titled *Updates to Military Operating Area and Range Noise Model*: *MRNMAP 3.2* (Downing and Page, 2023). Noise modeling in this SEIS also reflects corrected floor altitude in Restricted (R-) Area R-2402. In the 2023 FMS PTC EIS, the floor altitude of R-2402B and R-2402C were modeled as being at the surface for certain mission flight profiles, whereas they are actually 10,000 feet mean sea level and 13,000 feet mean sea level, respectively.

C.1.2 Supersonic

Modeling of supersonic flight activity for this SEIS uses the same approach as described in the 2023 FMS PTC EIS, Appendix C, § C.1.3.2.

C.1.3 References

Lucas, M., & Calamia, P. (1994). Military Operations Area and Range Noise Model MRNMAP User's Manual. Wyle Report WR 94-12, Wyle Laboratories, Inc., May 1994.

Downing, M., & Page, J. (2023). Updates to Military Operating Area and Range Noise Model: MRNMap 3.2. Blue Ridge Research and Consulting (BRRC) Report 23-29 (Final), BRRC, LLC., 2023.

C.2 NOISE TECHNICAL REPORT ON THE SEIS FOR BEDDOWN OF FMS PTC AT EBBING ANG BASE, ARKANSAS

Blue Ridge Research and Consulting, LLC

Supplemental Environmental Impact Statement (SEIS) for Beddown of Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, AR: Noise Technical Report

18 June 2025

Prepared for:
Leidos

Blue Ridge Research and Consulting, LLC
29 N Market St, Suite 700
Asheville, NC 28801
828.252.2209
BlueRidgeResearch.com

Prepared by:
Ben Manning
Micah Downing, PhD

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

1 OVERVIEW OF THE NOISE STUDY

1.1 Noise Study Objective

The objective of this effort is to generate Day-Night Average Sound Level (DNL) contours for the Supplemental Environmental Impact Statement (SEIS) study for the beddown of Foreign Military Sales (FMS) F-35A and F-35B and Republic of Singapore Air Force (RSAF) F-16D relocation at Ebbing Air National Guard Base (ANGB) / Fort Smith Regional Airport (FSM), located in Fort Smith, AR. The SEIS noise study updates the Final Environmental Impact Statement (FEIS) noise study from 2022 to account for the increase of 12 F-35 aircraft and add the Short Takeoff and Vertical Landing (STOVL) capabilities of the F-35B at Ebbing ANGB. Under the Proposed Action aircraft schedule, 2029 is the year with the most operational sorties of RSA F-16D, and FMS F-35A and F-35B aircraft. Thus, 2029 is the forecasted year for analysis in this noise study.

The Proposed Action noise results are compared to the No Action, which for this study is the FEIS Record of Decision (ROD) noise contours that were the FEIS Proposed Action 2029 Scenario DNL contours with 5% of F-35 afterburner departures. Datasets for this analysis were originally derived from the FEIS noise study, and they were reviewed and updated via a site-visit at Ebbing ANGB during 8-10 October 2024 as well as from follow-up communications with Ebbing ANGB personnel.

This noise study also updated the FSM civil aircraft operational data set, as the civil aircraft operational data were captured during interviews with FSM and ATC personnel during the 12-13 February 2025 site visit and from a follow up radar data request. The comprehensive datasets include the operational figures (e.g., annual operations and the types of operations flown), flight tracks, flight profiles, runway and flight track utilization, and static operation locations and activities for all based military aircraft, civil aircraft, and transient military aircraft at FSM.

Airspace operational data sets were also collected, and the airspace analysis was performed as part of the SEIS. The airspace operational data included the number of sorties, average sortie duration, power setting, and airspeed in each airspace area as well as the percent of time spent in specified altitude bands for various mission types. The updated data as well as the data that was not updated from the FEIS are displayed in this noise report. The changes from the FEIS are specified within this report.

1.2 Interviews Conducted

Interviews were conducted on-site at Ebbing ANGB for the military noise analysis during 8-10 October 2024. During these interviews, the FEIS data for the F-16D, F-35A, F-35B, and Blue Air aircraft data sets were reviewed and updated. Additionally, data for the added Agile Combat Employment (ACE) aircraft data were also reviewed and added to the noise study since they were not modeled in the FEIS. The pilots and maintainers for the based aircraft types were interviewed along with Air Traffic Control (ATC) personnel. The pilots for the baseline and proposed action aircraft types at Ebbing ANGB were interviewed to determine updates required for the annual operations, operation types, percentages of time during acoustic nighttime (2200-0700 hours), flight tracks, and flight profiles. The aircraft maintainers were interviewed for updates on the aircraft maintenance operations and locations. ATC were interviewed for confirmation on the existing and updated flight tracks, runway utilization, acoustic nighttime percentages, and questions regarding the proposed vertical landing pads.

FSM and ATC personnel interviews occurred during the 12-13 February 2025 site visit. The purpose of these interviews was to capture updates to the civil aircraft operations and fleetmix, percentages of operations during acoustic nighttime, runway utilization, and flight tracks. Civil aircraft radar data were obtained from the Hill AFB 84th RADES group to determine current aircraft fleetmix, percentages during acoustic night, and runway utilization. Details on this radar data along with the data sets obtained from all interviews at Ebbing ANGB and FSM are provided in the following sections.

1.3 Purpose

This SEIS accounts for the additional 12 Proposed Action F-35 aircraft and associated operations at Ebbing ANGB due to the expanded mission requirements. The SEIS also adds the Short Takeoff and Vertical Landing (STOVL) operations of the F-35B to the noise analysis. The FEIS modeled the F-35B aircraft as Conventional Takeoff and Landing (CTOL) only, so the additional short takeoff, slow landing, vertical landing, and hover operations of the F-35B were included in the noise modeling of the SEIS. Updated data inputs such as F-16 and F-35 flight tracks, operation types, and flight profiles were captured through the data collection process, and the civil aircraft modeling was updated to reflect the current aircraft fleetmix and operational data.

This document provides a summary of the operational data utilized for the development and production of DNL contours for the airfield, including A-weighted Onset-Rate Adjusted Monthly DNL (L_{dnmr}) and DNL noise levels for the airspace for the No Action and the Proposed Action. These operational data include flight tracks, engine run-ups, flight operational distributions, flight profiles, airspace utilization, and weather data. Additionally, detailed inputs to the modeling are provided in the attached appendices.

1.4 Operational Scenarios Modeled

The No Action Alternative for this noise study is the 2023 FMS PTC EIS ROD, and the modeled Proposed Action scenarios in this noise study are compared to this No Action. The Alt 1 and Proposed Action noise analysis modeled two different scenarios, each with two options of vertical landing pads. Alternative 1 (Alt 1) models the same number of annual operations of the F-16D, F-35A, F-35B, and Blue Air as the FEIS, but adds the 160 annual sorties of Agile Combat Employment (ACE) aircraft and updates the civil aircraft annual operations to match the current fleetmix and the most recent FAA Terminal Area Forecast (TAF) for 2029 at FSM issued January 2025. Both the east and west F-35B vertical landing pads were modeled for Alt 1. The Proposed Action updates the F-35A and F-35B annual operations to account for the additional 12 Proposed Action F-35A and F-35B aircraft of the Proposed Action, and has the same ACE aircraft and civil aircraft operational parameters as Alt 1. Both vertical landing pad locations are modeled for the Proposed Action, bringing the total number of modeled scenarios for Alt 1 and the Proposed Action at both vertical landing pad locations to four. Additionally, both the Alt 1 and Proposed Action scenarios have the same edited flight tracks and flight profiles from the on-site interviews. The ACE aircraft is modeled as the F-35A for all scenarios.

1.5 Noise Metrics, Effects, and Models

Noise represents one of the most contentious environmental issues associated with aircraft operations. Although many other sources of noise are present in today's communities, aircraft noise is readily identifiable based on its uniqueness. An assessment of aircraft noise requires a general understanding of how sound affects people and the natural environment, as well as how it is measured.

Around a military or civilian airfield, the noise environment is normally described in terms of the time-averaged sound level generated by aircraft operating at that facility. In this study, operations consist of the fixed-wing flight activities conducted during an average annual day, including arrivals and departures at the airfield, flight patterns in the general vicinity of the airfield, static maintenance operations, and aircraft missions in the Special Use Airspace (SUA), along Military Training Routes (MTR), and in ranges.

This noise study was conducted in accordance with the SEIS to assess the potential environmental impacts of adding the Proposed Action F-35 and F-16 operations. The basis of this proposal is to preserve the operational capability of an airfield while protecting the communities surrounding an airfield. The Federal Interagency Committee on Urban Noise (FICUN), formed in 1979, published "Guidelines for Considering Noise in Land-Use Planning and Control." [1] These guidelines complement federal agency criteria by providing for the consideration of noise in all land-use planning and interagency/intergovernmental processes. The FICUN-established DNL is the most appropriate descriptor for all noise sources. In 1982, the Environmental Protection Agency (EPA) published "Guidelines for Noise Impact Analysis" to provide all types of decision-makers with analytic procedures to uniformly express and quantify noise impacts. [2] The American National Standards Institute (ANSI) endorsed DNL in 1990 as the "acoustical measure to be used in assessing compatibility between various land uses and outdoor noise environment." [3] In 1992, the Federal Interagency Committee on Noise reaffirmed the use of DNL as the principal aircraft noise descriptor in the document entitled "Federal Agency Review of Selected Airport Noise Analysis Issues." [4] In general, scientific studies and social surveys have found a high correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL. [5, 6, 7]

A noise metric refers to a unit or quantity that measures an aspect of the received noise and as such, noise metrics are used in environmental noise analyses. A metric is used to relate the received noise to its various effects. To quantify these effects, the Department of Defense (DoD) uses a series of metrics to describe the noise environment. These metrics range from simple to complex measures of the noise environment.

1.5.1 Maximum Sound Level (L_{Amax})

The highest A-weighted integrated sound level measured during a single noise event in which the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level (L_{Amax}). During an aircraft overflight, the noise level starts at the ambient or background sound level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. L_{Amax} indicates the maximum sound level occurring for a fraction of a second during the event. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally 1/8th of a second. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV listening, sleep, or other common activities. Although it provides some measure of the intrusiveness of the event, it does not completely describe the total event, because it does not include the period of time over which the sound is heard.

1.5.2 Sound Exposure Level (SEL)

SEL is a metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net exposure of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the maximum sound level and the lower sound levels produced during onset and recess periods of the overflight.

SEL is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of a constant sound that would, in one second, generate the same acoustic energy as the actual time-varying noise event. For sound from aircraft overflights, which typically last more than one second, the SEL is usually greater than the L_{Amax} because an individual overflight takes seconds and the L_{Amax} occurs in a fraction of a second. SEL also provides the best measure to compare noise levels from different aircraft and/or operations. For aircraft noise, the SEL metric utilizes A-weighting. For airspace noise modeling, the onset-rate adjusted sound exposure level (SEL_r) is used, which has a penalty ranging from 0 to 11 decibels (dB) (higher penalties for higher aircraft airspeed operations) applied to the SEL to account for the added intrusiveness of high-speed aircraft operations in the airspaces.

1.5.3 Peak Pressure Level (LPk)

The peak pressure level (L_{Pk}) is the highest instantaneous, unweighted sound level over any given period. It is used to quantify impulsive, short duration events such as a weapon firing. L_{Pk} is used to assess the potential of structural damage and the risk of complaints. High peak sound levels can generate complaints from people in the local community. L_{Pk} is used to quantify the use of aircraft munitions.

1.5.4 Number-of-Events Above a Threshold Level

The Number-of-Events Above a threshold level (NA_L) describes the number of noise events that exceed a threshold level during a defined period. The threshold level is generally defined by either L_{Amax} or SEL and the value is denoted by the subscript. For example, NA_{65} denotes the number of events that exceed 65 A-weighted decibels (dBA) for a given period. The duration can range from a particular hour of the day to all 24 hours of a day and depends on the descriptive nature of the NA_L analysis. For example, to determine the number of events occurring during a school day, the period would include the hours the local school is occupied. It is important to note that the metrics used for the threshold and duration are not explicitly stated in the NA_L metric and must be defined in the text of the analysis.

1.5.5 Equivalent A-weighted Sound Level (L_{Aeq})

A complex noise metric that is useful in describing noise exposure is the Equivalent A-weighted Sound Level (L_{Aeq}). L_{Aeq} relates the time varying noise level to a steady-state noise level that has the same total energy over a specified period. The L_{Aeq} metric can provide a more accurate quantification of noise exposure for a specific period, particularly for daytime periods when the nighttime adjustment under the DNL metric is inappropriate.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{Aeq} has been established to be a good measure of the impact of a series of events during a given period. Also, while L_{Aeq} is defined as an average, it is effectively a sum over that period and is, thus, a measure of the cumulative impact of noise. For example, the sum of all noise-generating events during the period of 0800 to 1600 could provide the relative impact of noise events for a typical school day and would be denoted by $L_{eq,8hr}$. $L_{eq,8hr}$ is used to assess the cumulative classroom speech interference during the 8-hour school day.

1.5.6 Day/Night Average Sound Level, DNL or L_{dn}

For an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) noise study, the DNL metric is used to describe the long-term noise environment on the airfield and in the surrounding communities. DNL is a complex metric that sums the Sound Exposure Levels (SEL) of all noise events in a 24-hour period. An additional 10 dB is applied to nighttime events to account for the added intrusiveness of sounds that occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than daytime hours. The nighttime period is between 2200 to 0700 (10 p.m. to 7 a.m.).

DNL is an average quantity mathematically representing the continuous A-weighted sound level that would be present if all of the variations in sound level that occur over a 24-hour period were smoothed out so as to contain the same total sound energy. DNL accounts for the maximum noise levels, the duration of the events (operations), the number of events and the timing of their occurrence over a 24-hour period. Like SEL, DNL does not represent the sound level heard at any particular time, but it quantifies the total sound energy received. While it is normalized as an average, it represents all of the sound energy and is therefore a cumulative measure.

Although DNL provides a single measure of the overall noise impact, it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour period. For example, a daily average sound level of 65 dB could result from only a few loud events or many relatively quiet events.

1.5.7 Onset-Rate Adjusted Day-Night Average Sound Level, L_{dnr}

Aircraft noise generated in SUA is typically different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, overflights within SUA can be highly variable in occurrence and location. Individual military overflight events also differ from typical community noise events because noise from a low-altitude, high-airspeed flyover can have a sudden onset (i.e., exhibiting a rate of increase in sound level – onset rate – of up to 30 to 150 dB per second).

To represent these differences, the conventional DNL metric is adjusted to account for the "surprise" effect on humans from the sudden onset of aircraft noise events with an adjustment up to 11 dB above the normal SEL. [8, 9] Onset rates between 15 to 150 dB per second require an adjustment of 0 to 11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted DNL is designated as the Onset-Rate Adjusted Day-Night Average Sound Level (L_{dnr}). L_{dnr} employs A-weighted sound levels. For this airspace noise analysis, both L_{dn} and L_{dnr} are provided.

1.5.8 C-weighted Day-Night Average Sound Level, CDNL or L_{Cdn}

Impulsive noise is defined as sudden noise, with rapid onset and a brief duration. This type of noise would result from firing large caliber weapons, explosive detonations, and sonic booms from supersonic aircraft. For impulsive noise events, CDNL is often used to describe the low frequency environment of the explosives and sonic booms.

1.5.9 Computerized Noise Exposure Models

NoiseMap

Analyses of aircraft noise exposure around military airfield facilities are normally accomplished by using the NoiseMap program. [10] NoiseMap is a suite of computer programs that were developed by the US Air Force, which serves as the lead DoD agency for fixed-wing aircraft noise modeling. NoiseMap allows noise predictions without the actual implementation of the operations and noise monitoring of those actions.

The latest NoiseMap package of computer programs consists of BaseOps Version 7 [11], OMEGA10, OMEGA11 [12], NoiseMap Version 7.3 [13], NMPlot [14], and the latest issue of NOISEFILE. NOISEFILE is the DoD noise database originating from noise measurements of controlled flyovers at prescribed power, speed, and drag configurations for many models of aircraft. The data input module BaseOps allows the user to enter the runway coordinates, airfield information, flight tracks, and flight profiles along each track by each aircraft, numbers of flight operations, run-up coordinates, run-up profiles, and run-up operations. After the operational parameters are defined, NoiseMap calculates DNL values on a grid of ground locations on and around the facility. The NMPlot program draws contours of equal DNL for overlay onto land-use maps. For noise studies, as a minimum, DNL contours of 65, 70, and 75 dB are developed. NoiseMap also has the flexibility of calculating sound metrics (e.g., SEL, $L_{eq,24hr}$, and DNL) at specified points so that noise values at representative locations around an airfield can be described in more detail.

NoiseMap is most accurate for comparing "before-and-after" community noise effects, which would result from the implementation of proposed changes or alternative noise control actions when the calculations are made in a consistent manner. NoiseMap allows predicting noise levels for the proposed action prior to implementing and noise monitoring of the action. The noise modeling results of these computer programs, along with noise impact guidelines, provide a relative measure of noise effects around aircraft operating facilities.

MRNMap

Analyses of aircraft noise exposures and compatible land uses around and underneath SUAs are normally accomplished using MRNMap. [15] The US Air Force developed this general-purpose computer model for calculating noise exposures occurring away from airbases, since aircraft noise is also an issue within Military Operations Areas (MOAs) and ranges, as well as along Military Training Routes (MTRs). This model expands the calculation of noise exposures away from airbases by using algorithms from both NoiseMap [16] and ROUTEMAP. [17]

MRNMap uses two primary noise models to calculate the noise exposure: track and area operations. Track operations are for operations that have a well-defined flight track, such as MTRs, aerial refueling, and strafing tracks. Area operations are for operations that do not have well defined tracks, but occur within a defined area, such as air-to-air combat within a MOA.

The program also uses BaseOps for the development of the input data. For track operations, input requirements are the same as for ROUTEMAP, but more than just MTRs can be modeled. For area operations, the model allows flexibility. If little is known about the airspace utilization within a MOA, then the MOA boundaries can simply be used, and the operations are uniformly distributed within the defined area. However, if more is known about how and where the aircraft fly within the MOA, subareas can be defined within the MOA to more accurately model the noise exposure.

Once the airspace is defined, the user must describe the different types of missions occurring within each airspace segment. Individual aircraft missions include the altitude distribution, airspeed, and engine power settings. These individual profiles are coupled with airspace components and annual operational rates.

Once the airspace and operational parameters are defined, MRNMap calculates the resulting L_{dn} or L_{dnr}. The model calculates these noise metrics either for a user-defined grid or at user-defined specific points. The grid calculation can be passed to NMPlot to plot the noise contours as is provided in this analysis. The specific point calculation generates a table that provides the noise exposure, as well as the top contributors to the noise exposure.

Air Gunnery Noise Model

Air Gunnery Noise Model (AGNM) addresses the generation and propagation of noise from air-weaponry operations. [18] The model handles the complexity of the distributed noise events while maintaining the accurate acoustical modeling required for environmental noise analysis. This noise analysis utilizes AGNM Version 2.0 and this version utilizes BaseOps for operational data entry.

One of the complexities related to AGNM is that aircraft rarely fly the exact attack profile prescribed and, in some cases, the attack run is simply a generalized fan where the pilot can approach the target from a range of headings. To solve this problem of an unknown source location, a generalized statistical firing volume is used. This volume is defined by the parameters of the attack run with a three-dimensional Gaussian distribution of firing points. The noise footprint is then calculated to represent the noise from a single bullet fired from within the space. This statistical method is not representative of a single bullet fired, and instead, represents the average noise expected once a statistically large number of bullets have been fired. AGNM handles the noise from the muzzle blast, as well as the ballistic wave of the projectile. The results from AGNM include L_{Pk} noise contours. The AGNM is utilized in this noise study to analyze the peak levels from strafing profiles for the A-10, F-16, and F-35 in Razorback Range.

BooMap

Some supersonic operations are expected to occur above FL300 in the areas above the Hog and Shirley Air Traffic Control Assigned Airspaces (ATCAAs). BooMap [19] estimates the sonic boom exposures from these operations. BooMap uses the monthly sorties of supersonic potential training mission to calculate the CDNL values underneath the supersonic airspace. BooMap is based on measured data from supersonic airspaces with floors of 6,000 to 10,000 ft Mean Sea Level (MSL). For this analysis, the monthly sorties are adjusted to account for the higher floor of 30,000 ft MSL and the lower potential for the sonic booms to reach the ground.

Aviation Environmental Design Tool

For the civil aircraft operations at FSM, the Aviation Environmental Design Tool (AEDT) was used to model the noise from the civil aircraft operations. AEDT is a software system developed by the FAA that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences. AEDT is a comprehensive tool that provides information to FAA stakeholders on each of these specific environmental impacts. AEDT facilitates environmental review activities required under NEPA by consolidating the modeling of these environmental impacts in a single tool. AEDT is designed to model individual studies ranging in scope from a single flight at an airport to scenarios at the regional, national, and global levels. FAA guidance on use of AEDT specifies using the most recent version of the model that is available at the time the project commences. In this case, it is AEDT Version 3g. [20] Where military aircraft are the dominant noise source at the airport, FAA allows combined use of NoiseMap (for military aircraft) and AEDT (for civil aircraft) to compute the total cumulative aircraft noise exposure. AEDT is not typically used for analysis in DAF NEPA documents, however, the DAF incorporated AEDT modeling at the request of FAA as a cooperating agency for the SEIS.

1.6 Supplemental Noise Metrics

1.6.1 Number-of-Events Above a Threshold Level

The Number-of-Events Above a Threshold Level (NA_L) describes the number of noise events that exceed a threshold level during a defined period. The threshold level is generally defined by either L_{Amax} or SEL, and the value is denoted by the subscript. For example, NA_{65} denotes the number of events that exceed 65 A-weighted decibels (dBA) for a given period. The duration can range from a particular hour of the day to all 24 hours of a day and depends on the descriptive nature of the NA_L analysis. For example, to determine the number of events occurring during a school day, the period would include the hours the local school is occupied. It is important to note that the metrics used for the threshold and duration are not explicitly stated in the NA_L metric and must be defined in the text of the analysis.

1.6.2 Equivalent A-weighted Sound Level (L_{Aeq})

A complex noise metric that is useful in describing noise is the Equivalent A-weighted Sound Level (L_{Aeq}). L_{Aeq} relates the time varying noise level to a steady-state noise level that has the same total energy over a specified period. The L_{Aeq} metric can provide a more accurate quantification of noise exposure for a specific period, particularly for daytime periods when the nighttime adjustment under the DNL metric is inappropriate.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{Aeq} has been established to be a good measure of the impact of a series of events during a given period. Also, while L_{Aeq} is defined as an average, it is effectively a sum over that period and is, thus, a measure of the cumulative impact of noise. For example, the sum of all noise-generating events during the period of 0800 to 1600 could provide the relative impact of noise events for a typical school day and would be denoted by $L_{eq,8hr}$. $L_{eq,8hr}$ is used to assess the cumulative classroom speech interference during the 8-hour school day.

1.6.3 Potential Hearing Loss

Potential Hearing Loss (PHL) applies to people spending multiple decades (over a career) outdoors in high noise environments. The threshold for screening PHL is exposure to DNL greater than or equal to 80 dB. [21] Per DOD guidelines [22], for populations exposed to at least 80 dB DNL, the population in 1-dB bands of 24-hour L_{Aeq} [$L_{eq,24hr}$] are assigned to two categories of Noise-Induced Permanent Threshold Shift (NIPTS). The first category is people with average hearing sensitivity, i.e., their hearing is within the 10^{th} to 90^{th} percentiles. Their NIPTS is called "Average NIPTS." The second category is people with the most sensitive hearing, i.e., their hearing is within the 10^{th} percentile. The NIPTS for the second category is called "10^{th} percentile NIPTS." The U.S. Environmental Protection Agency's (EPA's) Guidelines for Noise Impact

Analysis quantifies hearing loss risk in terms of NIPTS, a quantity that defines the permanent change in the ear's hearing threshold level below which a sound cannot be heard.

The PHL is also computed per the 2013 bulletin [22] as the population's average value of NIPTS. PHL and NIPTS are expressed in dB, apply to several frequencies, and only apply to daily outdoors exposure to noise over decades. The NIPTS reported herein range from less than 1 dB to 19.5 dB; however, as stated in the DOD guidelines, "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 (EPA 1974)." [22]

1.6.4 Residential Nighttime Sleep Disturbance

For sleep disturbance, the DOD guidelines recommend the methodology and standard developed by American National Standards Institute (ANSI) and the Acoustical Society of America (ASA) in 2008 to compute the probability of awakening (PA) adults associated with outdoor noise events heard in homes, and is a function of indoor SEL. [23] [24] [25] However, it is noted that this standard has been withdrawn, although it will be used until further recommendations are made by FICAN. SEL only pertains to flight events so PA is only applied to flight events and not run-up events. The ANSI methodology is valid from an indoor SEL of 50 dBA to a maximum SEL of 100 dBA. The resulting PA range for a single aircraft flight event is approximately 1% to 7.5%, respectively. Only DNL nighttime (2200-0700) flight events and POI representing residential areas were considered (see Section 6). All school POI were included because of their typical proximity to residential areas. PA was computed with Annual Average Day (AAD) events.

NMap computes outdoor noise levels that are converted to interior noise levels by accounting for the noise attenuation provided by the structure (e.g., house or school) dependent upon whether windows are open or closed. The noise attenuation is known as Noise Level Reduction (NLR). Per FICON guidance, NLRs of 15 dB and 25 dB were used to account for the effect of a typical home with windows open and windows closed, respectively. [26]

1.6.5 Daytime Indoor Speech Interference

Speech interference analysis determines the number of times speech intelligibility would be inhibited. For the analysis of the potential for indoor speech interference at residential POI, the NA_L metric was computed for AAD flight and run-up events during the DNL daytime (0700-2200) period. All school POI were included because of their typical proximity to residential areas. The selected noise threshold for NA_L was indoor 50 dB L_{Amax}. [27] [28] L_{Amax} pertains to flight and run-up events.

Consistent with the sleep disturbance analysis, NLRs of 15 dB and 25 dB were used to account for the effect of a typical home with its windows open or closed, respectively. [26] The outdoor thresholds, equivalent to the indoor threshold of 50 dB L_{Amax}, are 65 dB L_{Amax} and 75 dB L_{Amax} for windows open and closed, respectively.

1.6.6 Classroom Learning Interference

To analyze the potential for indoor classroom learning interference, two noise metrics were computed for the representative schools: $L_{eq,8hr}$ and NA_{50} (50 dB L_{Amax}). Per the DOD guidelines, an appropriate set of criteria for speech interference in schools is an indoor L_{eq} of 35 dB for continuous noise and 40 dB for intermittent noise with a single-event indoor noise level of 50 dB

L_{Amax}. The Defense Noise Working Group (DNWG) set a screening level of 60 dB for outdoor $L_{eq,8hr}$. [27] [28]

The school day is assumed to last 8 hours from 8 a.m. to 4 p.m. (0800-1600) and thus would be entirely contained within the DNL daytime period. The distribution of operations within this period is assumed to be identical to the AAD 7 a.m. to 10 p.m. (0700-2200) acoustic day distribution of operations (constant distribution across all hours of the day).

NLRs of 15 dB and 25 dB were used to account for the effect of a typical school building with windows open and windows closed, respectively. These NLRs likely result in potential overestimates of learning interference as schools typically provide greater NLR than homes. The outdoor thresholds, equivalent to the indoor threshold of 50 dB L_{Amax}, are 65 dB L_{Amax} and 75 dB L_{Amax} for windows open and closed, respectively.

The number of annual average daily events whose L_{Amax} would be greater than or equal to 65 dB and 75 dB serve as the measure of potential classroom learning interference and are presented as NA_{65} L_{Amax} and NA_{75} L_{Amax} for windows open and closed, respectively, on a per-hour basis.

1.6.7 Recreational Daytime and Nighttime Speech Interference

In recreational areas, other indicators of noise effects are outdoor daytime speech interference and nighttime events. All POI were analyzed for this type of analysis to account for activities that may occur outdoors at residences, schools, and parks. Consistent with the indoor speech interference methodology, outdoor speech interference is measured by the number of average daily daytime events per hour subject to L_{Amax} of at least 50 dB. Since people are assumed to be outdoors there is no adjustment for building attenuation. Thus, NMap is used to compute the NA_{50} L_{Amax} for AAD for the DNL daytime and nighttime hours.

2 FLIGHT TRACK AND PROFILE MODELING DATA DEVELOPMENT

Tracks are represented by aircraft type (or group of aircraft), operation type, and runway. The military aircraft flight tracks from the FEIS were reviewed during the Ebbing ANGB on-site interviews with Air Traffic Control (ATC) and the AETC pilots that have flown at Ebbing ANGB. These flight tracks were edited by the pilots in a process that required several iterations to ensure accurate depiction in the noise model. The following are edits and additions to the existing FEIS military flight tracks:

1. Tactical overhead break arrival and random entry precautionary flame-out (PFO) tracks were added for F-35A/B flight tracks.
2. Midfield and end of the runway break points were added for the F-35A/B overhead break arrival flight tracks.
3. Instrument Flight Rule (IFR) arrival routing was modified for F-16 and F-35A/B.
4. Arrival tracks from Hog MOA East side were deleted for F-16 and F-35A/B, as there is no Hog MOA east exit.
5. Shirley arrival tracks for F-16 and F-35A/B were modified for tighter turns to the north.
6. F-16 and F-35A/B Runway 08 departure track to Hog MOA west side were deleted. Runway 08 departures to both Shirley and Hog MOAs turn north at the river and were edited to reflect this route.
7. F-16 and F-35A/B Runway 26 departure track to Hog MOA west side were deleted. Runway 26 departures to both Shirely and Hog MOAs turn north after passing across the state line.
8. F-16 and F-35A/B VFR closed pattern abeam distance increased from 0.75 NM to 1 NM, and the pull up turn to downwind starts at the end of the runway instead of extending past the end of the runway.
9. PFO pattern track for F-35A/B was widened to 1.5 NM abeam to reflect PFO pattern procedures.
10. F-35B vertical landing tracks were added to the two separately modeled vertical landing pad locations.

Runway 26 is expected to be extended 1,300 ft to the east by 2028. Since the No Action and Proposed Action analysis year for this noise study is 2029, the runway extension is applied for all flight tracks in this noise study. This is the same approach that was taken in the FEIS for the flight tracks, so no additional edits were made to the FEIS to account for the runway extension. The civilian aircraft flight tracks were obtained directly from the FSM Runway 26 Extension EA. [29] These FSM aircraft flight tracks were derived from 2019 radar data for the runway extension EA and were used in the FEIS. During the site visit to FSM (12-13 February 2025), the ATC Tower personnel at FSM reviewed all of the previously modeled flight tracks and determined that the arrival and departure flight tracks were still accurate, but that the closed pattern flight tracks needed to be edited because they all had flat segments in the turn to downwind and the turn to final. ATC personnel suggested that the flat turn segments be removed to make the turns more rounded. These closed pattern flight tracks were edited in AEDT and approved by ATC tower personnel at FSM.

Appendix A displays the summary flight track graphics arranged by aircraft (based No Action Blue Air fixed wing and helicopter, Proposed Action F-16 and F-35A/B, transient military aircraft, and civilian aircraft), operation type (arrival, departure, and closed pattern) and runway (runways 08, 26, 02, and 20).

2.1 Flight Profiles

The modeled flight profiles for the SEIS were initially developed for the FEIS. The F-16C (F-100-PW-229 engine) profiles were derived from the Luke AFB Pilot Training Center (PTC) EIS [30] noise analysis flight profiles. The F-35A and F-35B flight profiles were derived from the Eglin AFB AICUZ [31] noise study. Transient military aircraft flight profiles were derived from various military bases where each specific transient aircraft has a large presence. For example, the P-8 profiles were derived from the Whidbey Island EIS noise study and the F/A-18E/F profiles were derived from the NAS Oceana Strike Fighter Transition Final EA noise study. [32] Table 2-1 displays the transient aircraft profile sources.

During the on-site interview for the SEIS at Ebbing ANGB, the based aircraft profiles were reviewed by the AETC pilots. During these pilot interviews, STOVL profiles were created for the F-35B, and edits were made to several F-35A, F-35B, and F-16C flight profiles. These discussions require an iterative process as the aircrews and modelers translate the flying parameters into the parameters utilized by the noise model. This iterative process ensures that the modeled flight profiles provide an accurate description of the aircrews' nominal flight procedures throughout the year. For the F-35A and F-35B departure profiles, the altitude, airspeed, and engine power settings at distances from the starting roll along the flight track were aided from input by an F-35 pilot who checked the profiles through the use of the Eglin AFB F-35 simulator. The simulator data was utilized to derive the F-35A and F-35B afterburner departure, combat departure, and military power departures at Ebbing ANGB. The afterburner departure has afterburner power to 350 kts, then military power during the climb to cruise altitude. The combat departure has afterburner power to 450 kts, then climbing in afterburner to cruise altitude. The military departure does not use afterburner, and it has military power to 350 kts, then military power climb to cruise altitude. The airspeed restrictions that were modeled for the mitigation measures in the EIS were removed for this SEIS noise analysis, as these profiles represent how the pilots are intending to fly at Ebbing ANGB. The percentage utilization of these three departure profile types for the F-35A and F-35B are detailed in Section 3.

For the civil aircraft modeled in AEDT, all aircraft utilize the standard AEDT profiles, which is standard practice for civil aircraft modeled in AEDT. For the stage lengths of the departure profiles, stage length 1 (for flights less than 500 miles in distance) is used for all aircraft types except for the air carriers. For the modeled air carriers (B-737 and B-757) only, 67% of departures use the stage 1 standard profile and 33% use the stage 2 standard profile in AEDT.

One representative flight profile for each operation type of the based Blue Air Aircraft, Proposed Action F-16C, Proposed Action F-35A, Proposed Action F-35B, and transient military aircraft at FSM are provided in Appendix B. Note that not all operational profiles are shown; rather, a representative profile on one flight track for each operation type is shown. Each figure includes a table of flight parameters describing the flight trajectory along the flight track. The altitude and airspeed parameters are varied linearly between the points denoted by the corresponding letter whereas engine power changes occur at the discreet points. For departure and pattern profiles, the trajectories proceed as the aircraft flies. However, for arrivals, the trajectories are described in reverse. Please note that some of the profiles depicted in the maps have trajectories that extend beyond the map range. The segments of the profiles outside of the map range are outside of the study area.

Selected modeling parameter terms within NoiseMap include "Variable" and "Parallel", which are interpolation codes. "Variable" means that the power settings are linearly interpolated between two settings for clean configurations (where the gear and flaps are up). "Parallel" represents the "dirty" configuration (where landing gear and flaps are extended). The noise data could be significantly different between the Variable and Parallel configurations for an individual aircraft and thus, a distinction is made between these two configurations for every flight profile.

Table 2-1. Ebbing ANGB Transient Aircraft Profile Sources for the Noise Model

Aircraft	Source of the Transient Profile
F/A-18E/F	NAS Oceana
F-16C	Luke AFB
A-10	Eglin AFB
T-38C	JB Langley-Eustis
KC-135R	Grissom AFB
P-8	NAS Whidbey Island
C-130HNP	Eglin AFB
T-1	Randolph AFB
T-6	NAS Corpus Christi
C-12	NAS Patuxent River

2.2 Ground Run Ups

2.2.1 Maintenance Operations

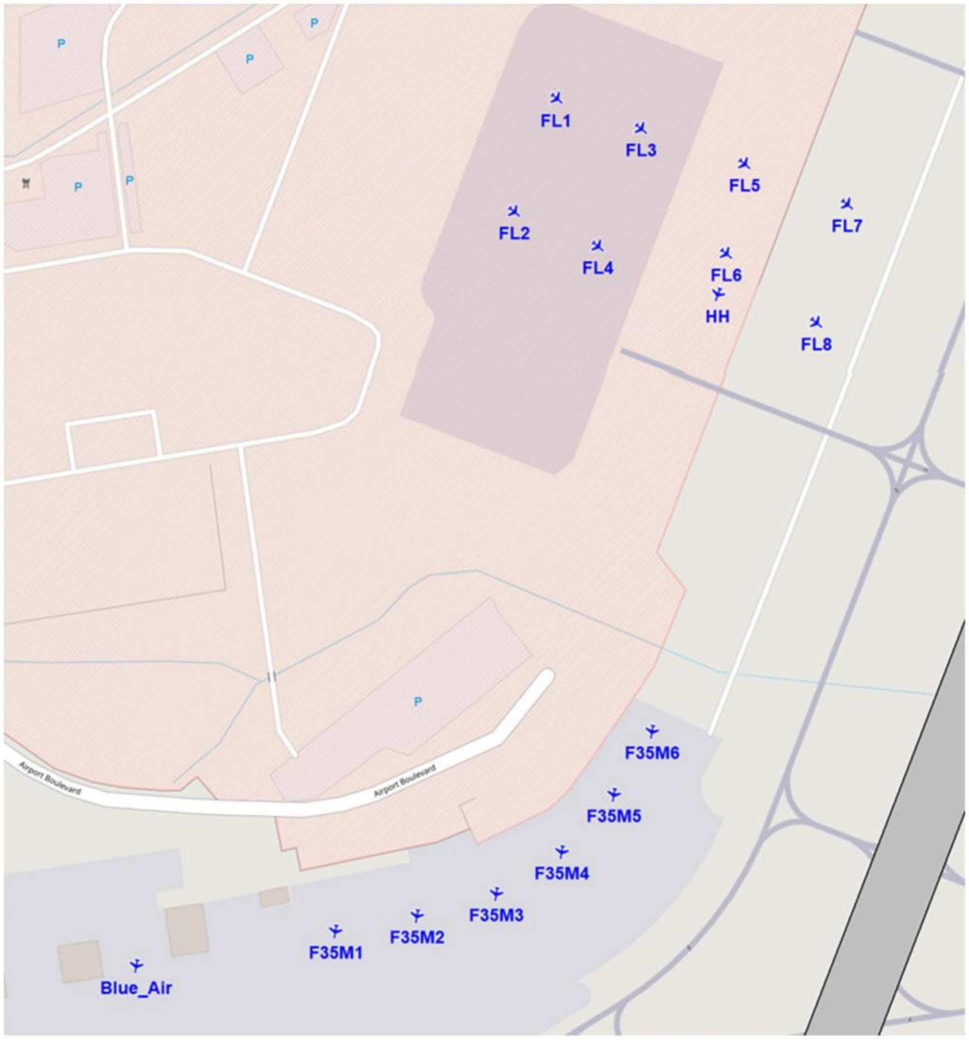
Locations of maintenance operations for Ebbing ANGB aircraft are listed in Section 2.3.2 and the maintenance operations are listed in Section 2.3.3. The No Action (from the FEIS) and the modeled Proposed Action engine runs are displayed in the static operations table. The annual static operations are listed in Section 2.3.3 for the No Action and Section 2.3.4 for the Proposed Action. Engine runs above 80% power are not authorized on the flight lines and must be performed in the hush house (Building 219). Fighter jet pre-flight engine runs last on average 30 minutes in duration and occur on the flight lines. Civil aircraft maintenance operations are all performed inside of the maintenance hangars and at low engine powers; thus, they were not modeled in this noise analysis since there would be minimal noise outside of the hangars from these operations. Additionally, there are no maintenance logs available that track the frequency or duration of the civil aircraft maintenance runs inside of the maintenance hangars.

2.2.2 Static Locations

Table 2-2 below lists the modeled static pads at Ebbing ANGB for the No Action, Alt 1, and the Proposed Action. The Blue Air apron, hush house, and Flight line (FL) 1 through 4 locations were modeled in the No Action, and FL 5 through 8 and the six F-35A/B maintenance locations were added in this noise analysis for Alt 1 and the Proposed Action. These additional static pad locations were added after discussions with the AETC maintenance personnel on the proposed flight line locations and maintenance ops locations for the SEIS.

Table 2-2. Modeled Static Pad Locations at Ebbing ANGB

Static Pad Map ID	Static Pad Name	Modeled Scenarios	Lattitude (deg N)	Longitude (deg W)
Blue_Air	Blue Air Apron	All Scenarios	35.336694	94.372042
HH	Hush House	All Scenarios	35.340894	94.368209
FL1	Flight Line 1	All Scenarios	35.342059	94.369392
FL2	Flight Line 2	All Scenarios	35.341385	94.369699
FL3	Flight Line 3	All Scenarios	35.341880	94.368771
FL4	Flight Line 4	All Scenarios	35.341180	94.369088
FL5	Flight Line 5	Alt 1 and Proposed Action	35.341670	94.368015
FL6	Flight Line 6	Alt 1 and Proposed Action	35.341136	94.368149
FL7	Flight Line 7	Alt 1 and Proposed Action	35.341431	94.367264
FL8	Flight Line 8	Alt 1 and Proposed Action	35.340725	94.367489
F-35M1	F-35 Maintenance 1	Alt 1 and Proposed Action	35.337110	94.371004
F-35M2	F-35 Maintenance 2	Alt 1 and Proposed Action	35.337202	94.370409
F-35M3	F-35 Maintenance 3	Alt 1 and Proposed Action	35.337333	94.369830
F-35M4	F-35 Maintenance 4	Alt 1 and Proposed Action	35.337583	94.369353
F-35M5	F-35 Maintenance 5	Alt 1 and Proposed Action	35.337924	94.368972
F-35M6	F-35 Maintenance 6	Alt 1 and Proposed Action	35.338300	94.368693

1 

2 **Figure 2-1. Ebbing ANGB Static Pad Location Map**

2.2.3 Ebbing ANGB Static Operations

The No Action (FEIS ROD) static operations are displayed in Table 2-3 below. These maintenance operations from the FEIS were modeled with the original non-extended flight line (FL locations 1 through 4), and all F-35A/B maintenance operations were modeled at these four locations. The Alt 1 and the Proposed Action static operations are displayed in Table 2-4. The F-35B vertical press down operations are shown in the table because those press downs to the pad are vertical and must be modeled as static run-ups in the noise model.

Table 2-3. No Action Static Operations BaseOps Inputs

Aircraft Type	Run-up Type	Location	Annual Run-up Events		Reported Power Setting	Average Duration (min)	Number of Engines	Heading (deg)
			0700-2200	2200-0700				
OV-10 (Twin Turboprop)	Maintenance	Blue Air Apron	24	0	Idle	5	1	180
					Mil Power	5	1	180
A-90 Turboprop	Maintenance	Blue Air Apron	24	0	Idle	5	1	180
					Mil Power	5	1	180
IAR-823 Turboprop	Maintenance	Blue Air Apron	24	0	Idle	5	1	180
					Mil Power	5	1	180
Bell 206	Maintenance	Blue Air Apron	24	0	Idle	5	1	180
					Mil Power	5	1	180
RSAF F-16	Maintenance Runs	Equal split between FL1 and FL2	365	0	Idle	10	1	120
	Pre-Flight Runs	Equal split between FL1 and FL2	2450	50	Idle	30	1	120
	Hush House Engine Runs	HH Building 219	30	2	Idle	30	1	190
					Mid Power	15	1	190
					Mil Power	5	1	190
					Afterburner	1	1	190
FMS F-35A	Post Maintenance MBITs	Equal split between FL3 and FL4	234	0	Idle	13	1	120
	Pre-Flight Runs	Equal split between FL3 and FL4	2820	58	Idle	30	1	120
FMS F-35B	Post Maintenance MBITs	Equal split between FL3 and FL4	66	0	Idle	13	1	120
	Pre-Flight Runs	Equal split between FL3 and FL4	796	16	Idle	30	1	120

Table 2-4. Alt 1 and Proposed Action Static Operations BaseOps Inputs

Aircraft Type	Run-up Type	Location	Proposed Action Annual Run-up Events		Alt 1 Annual Run-up Events		Reported Power Setting	Average Duration (min)	Number of Engines	Heading (deg)
			0700-2200	2200-0700	0700-2200	2200-0700				
OV-10 (Twin Turboprop)	Maintenance	Blue Air Apron	24	-	24	-	Idle	5	1	180
							Mil Power	5	1	180
A-90 Turboprop	Maintenance	Blue Air Apron	24	-	24	-	Idle	5	1	180
							Mil Power	5	1	180
IAR-823 Turboprop	Maintenance	Blue Air Apron	24	-	24	-	Idle	5	1	180
							Mil Power	5	1	180
Bell 206	Maintenance	Blue Air Apron	24	-	24	-	Idle	5	1	180
							Mil Power	5	1	180
RSAF F-16	Maintenance Runs	Equal split between FL1 and FL2	365	-	365	-	Idle	10	1	120
	Pre-Flight Runs	Equal split between FL1 and FL2	2,450	50	2,450	50	Idle	30	1	120
	Hush House Engine Runs	HH Building 219	30	2	30	2	Idle	30	1	190
							Mid Power	15	1	190
							Mil Power	5	1	190
							Afterburner	1	1	190
F-35A	Post Maintenance MBITs	Equal split between FL1-FL6 and F-35 Maintenance locations	200	-	200	-	15% ETR	13	1	120
	Maintenance Engine Runs	Equal split between FL1-FL6 and F-35 Maintenance locations	554	6	554	6	15% ETR	6	1	120
							50% ETR	4	1	120
F-35B	Post Maintenance MBITs	Equal split between FL1-FL6 and F-35 Maintenance locations	100	-	50	-	15% ETR	13	1	120
	Maintenance Engine Runs	Equal split between FL1-FL6 and F-35 Maintenance locations	277	3	139	1	15% ETR	6	1	120
							50% ETR	4	1	120
	Vertical Press Down	VL Pad #1 and VL Pad #2	154	-	85	-	Mode 4 Pressdown	0.5	1	Into wind
	Partial Vertical Press Down (for Wave Off Pattern)	VL Pad #1 and VL Pad #2	21	-	11	-	Mode 4 Pressdown	0.2	1	Into wind

3 DEVELOPMENT OF FLIGHT OPERATION DISTRIBUTIONS

Assessment of airfield noise requires a range of data from many sources. These sources provide descriptions of the types, frequency, and location of noise-generating operations occurring at and around the airfields. For this noise study, the data sources include interviews with aircrews, planners, schedulers and ATC. The data from these sources are compiled and integrated into a description of the noise generating activities occurring at the airfield. The operational description includes the frequency of flight operations, airfield layout, runway utilization, flight tracks, and flight profiles.

The based aircraft operations at Ebbing ANGB are composed of the Blue Air OV-10, A-90, IAR-823, and Bell 206 operations. For the Proposed Action as well as the No Action (based on the FEIS ROD), the FMS F-35A and F-35B and RSAF F-16D operations are added to the Blue Air, transient military aircraft, and civil aircraft operations from FSM. The based and transient military and civil aircraft flight operations involve a variety of departure, arrival, and closed pattern procedures. The total number of modeled aircraft operations (including transient and civil aircraft) at Ebbing ANGB/FSM is 61,427 annual operations under Alt 1, which is less than the No Action Alternative 63,979 total annual operations. This reduction is due to the decrease in modeled civil aircraft operations in the SEIS scenarios compared to the FEIS. The forecast year for both the No Action and the Proposed Action scenarios in the SEIS is 2029. The FAA Terminal Area Forecast (TAF) issued in January 2025 was used for the total number of civil aircraft operations at FSM, which is a decrease in the civil operations used in the 2021 FSM Runway 8-26 Extension EA noise analysis [21], which was the source of the civil aircraft noise analysis in the FEIS. The Proposed Action has 66,533 annual operations with a decrease of 234 annual F-35A operations and an increase of 5,340 annual F-35B operations. The Alt 1 and Proposed Action FMS F-35A and F-35B and RSAF F-16D aircraft operational data set was received from the AETC personnel.

Operational data for civil aircraft (including fleetmix, runway utilization, and acoustic day/night distribution) were derived from the January 2024 through February 2025 FSM radar data received from Hill AFB 84th RADES team. The radar data civil aircraft fleetmix for each of the aircraft categories (air carrier, air taxi and business jets, and GA aircraft) was multiplied by the number of operations within each of those categories in the 2029 TAF. This results in the total number of civil aircraft operations that matches the annual operations in the 2029 TAF for each of the aircraft categories.

FSM and FAA ATC personnel reviewed the military transient aircraft operational data from the FEIS, and they determined that no changes needed to be made to the existing data.

This section provides the modeled flight operations as defined by the number of takeoffs and landings; therefore, closed patterns are counted as two flight operations because pattern procedures include both a landing and takeoff. Tabular aircraft operations data for each airfield are organized by aircraft, operation type, and sortie type where a sortie describes the specific flight mission of one aircraft.

3.1 Airfield Operations Data Distributions

The airfield operations distribution from annual operations to average annual day operations include individual worksheets on the following operational data items along with spreadsheets for squadron data checks:

- Estimated Annual Airfield Operations
- Runway Use
- Traffic Flow (Track Use)
- Acoustic Day/Night Distribution
- Operation Type
- NoiseMap Input Daily Operations
- 5-year Monthly Average Weather

3.2 Flight Operational Table Descriptions

The Operations Data Package consists of a series of Microsoft Excel© worksheets summarizing elements of annual flight and maintenance operations. This information was collected during the site visits to Ebbing ANGB on 8-10 October 2024 and FSM 12-13 February 2025, through follow-up emails and data requests, and later validated with AETC, Ebbing ANG, FSM, FAA, and ATC personnel for input into the noise model. The annual flight and maintenance operational data sets are summarized into this Operations Data Package.

Table 3.1 presents the historical total flight operations. Table 3-2 provides the FAA annual Air Traffic Activity Report data, which displays the annual operations for each aircraft category. Table 3-3 lists the FSM runway, helipad, and vertical landing pad information. Table 3-4 provides the FAA TAF issued in January 2025, which is used to determine the modeled 2029 annual civil aircraft in each aircraft category. Table 3.5 displays the input weather data used for the NoiseMap military aircraft modeling. This weather data includes the 5-year monthly average weather data at FSM for January 2017 through December 2021, and it is the same data that was used in the FEIS. The civil aircraft modeling in AEDT uses 10-year average weather data at the airport.

Table 3.5 displays the No Action annual airfield operations at FSM. The No Action was not revised in this SEIS so it is the FEIS ROD annual operations. Tables 3.6 and 3.7 present the SEIS Alt 1 and Proposed Action modeled annual operations, respectively. Note that in these annual operations tables, the based military aircraft are defined based on numbers of sorties, but the transient military and civil aircraft operations were derived based on annual arrivals and departures. Both IFR and VFR pattern rates and pattern operations are displayed in these tables.

Table 3.8 contains the runway utilization for each aircraft type at FSM. The civil aircraft runway utilization was derived from the aircraft heading in the radar data. The runway utilization data were validated by ATC Tower personnel at FSM.

The NoiseMap and AEDT input data for every operation across all flight tracks and flight profiles are included in the Excel Data Validation Package (DVP).

Table 3.9 displays the operation type distribution for the aircraft at FSM / Ebbing ANGB. The column headers display the aircraft type and the percentages of each operation type across each row, displaying that the operation types sum to 100% for arrivals, departures, and closed patterns. In the FEIS, the F-35B was modeled without any of the STOVL operation types, but these operation types have been added in the SEIS, and the percentages of each of the STOVL operation types are displayed in Table 3-9. Civil aircraft only have one operation type for arrivals, departures, and closed patterns, because each aircraft in AEDT has a standard profile for arrival, departures, and closed patterns.

The percentages of operations during acoustic daytime (0700-2200) and acoustic nighttime (2200-0700) are displayed in Table 3.10. The F-35A and F-35B percentages between acoustic daytime and acoustic nighttime changed from the FEIS. This change results from the AETC pilots refining their planned operations during the acoustic nighttime hours. The civil aircraft percentages were also updated based on the January 2024 through February 2025 radar data at FSM. The radar data entries have a local time, and this local time was used to calculate the percentages of arrivals and departures for each civil aircraft type during acoustic nighttime hours.

Table 3.11 shows the arrival and departure directional flow for the based and transient military aircraft types at Ebbing ANGB. The directional flow for acoustic nighttime is the same as acoustic daytime for military aircraft. The closed patterns are always east for Runway 02/20. For Runway 08/26, the VFR patterns are to the south and IFR patterns are to the north. Maps of these flight tracks are displayed in Appendix A. For the civil aircraft, the directional flow is more complex since it was based on the FSM radar data from the 2021 Runway Extension EA noise analysis. The flight tracks and utilizations from this 2021 radar data were reviewed and validated by ATC at FSM. The detailed track specific utilizations of the civil aircraft are displayed in the Traffic Flow tab in the DVP, and the civil aircraft flight track maps are displayed in Appendix A.

Table 3-1. FSM / Ebbing ANGB Historical Annual Flight Operations

Year	Total Annual Operations for Fort Smith
2016	44,527
2017	40,301
2018	34,058
2019	31,715
2020	29,795
2021	29,161
2022	23,657
2023	18,859
2024	23,460
Average	**30,615**
Maximum	**44,527**

Table 3-2. Air Traffic Activity Data Reports

	Itinerant					Local			
Year	Air Carrier	Air Taxi	GA	Military	Total	Civil	Military	Total	Total
2024	2,100	2,016	10,203	2,293	16,612	5,627	1,221	6,848	23,460
2023	1,908	1,353	10,273	1,527	15,061	3,408	390	3,798	18,859
2022	1,468	2,663	11,635	3,656	19,422	3,084	1,151	4,235	23,657
2021	1,218	2,936	12,575	6,570	23,299	4,540	1,322	5,862	29,161
2020	740	2,796	12,234	4,397	20,167	7,966	1,662	9,628	29,795
2019	1,663	3,267	12,482	4,283	21,695	8,054	1,966	10,020	31,715
2018	1,483	3,264	12,833	4,974	22,554	8,547	2,957	11,504	34,058
2017	2,906	2,023	13,962	6,182	25,073	10,393	4,835	15,228	40,301
2016	2,053	2,776	14,533	7,160	26,522	11,816	6,189	18,005	44,527
Annual Average	1,727	2,566	12,303	4,560	21,156	7,048	2,410	9,459	30,615

Table 3-3. Airfield Runway Information

KFSM Runway/Pad	Map ID	Threshold				Width	Elevation
		Lon		Lat		ft	ft
08	08	094-22-53.2328	W	35-20-0.9809	N	150	469
26	26	094-21-02.1096	W	35-20-15.0648	N	150	447.6
02	02	094-22-09.5004	W	35-19-56.1389	N	150	448.8
20	20	094-21-47.6993	W	35-20-42.2556	N	150	447.4
Blue Air Helipad	Blue_Air_Helo	094-22-17.51	W	35-20-12.03	N	50	452.0
Military Transient Helicopter Helipad	Mil_Helo	094-22-27.38	W	35-20-10.47	N	50	455.0
Proposed F-35B Vertical Landing Pad 1 (West Pad)	VL_Pad1	094-22-13.49	W	35-19-55.86	N	50	448.0
Proposed F-35B Vertical Landing Pad 2 (East Pad)	VL_Pad2	094-21-16.68	W	35-20-3.3	N	50	430.0

Note: Noisemap and AEDT both use the same runway information presented in this table
Note: GA Helicopter operations at the airport utilize the runways at the same runway utilization as GA aircraft
Note: There are no displayed thresholds modeled for Fort Smith Regional Airport

Table 3-4. FSM FAA Terminal Area Forecast Issued January 2025

	FSM AIRCRAFT OPERATIONS									
	Itinerant Operations					Local Operations				
Fiscal Year	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops	Based Aircraft
2024*	2,049	2,012	10,091	1,505	15,657	4,793	735	5,528	21,185	77
2025*	2,196	2,012	10,938	1,505	16,651	6,611	735	7,346	23,997	78
2026*	2,343	2,012	11,619	1,505	17,479	7,573	735	8,308	25,787	79
2027*	2,490	2,012	12,353	1,505	18,360	7,941	735	8,676	27,036	80
2028*	2,637	2,012	12,365	1,505	18,519	7,980	735	8,715	27,234	81
2029*	2,784	2,012	12,377	1,505	18,678	8,020	735	8,755	27,433	82
2030*	2,931	2,012	12,389	1,505	18,837	8,060	735	8,795	27,632	83
2031*	3,078	2,012	12,401	1,505	18,996	8,100	735	8,835	27,831	84
2032*	3,225	2,012	12,413	1,505	19,155	8,140	735	8,875	28,030	85
2033*	3,372	2,012	12,425	1,505	19,314	8,181	735	8,916	28,230	86
2034*	3,519	2,012	12,436	1,505	19,472	8,222	735	8,957	28,429	87
2035*	3,666	2,012	12,448	1,505	19,631	8,263	735	8,998	28,629	88

BRRC

Table 3-5. No Action FSM and Ebbing ANGB Airfield Operations (from FEIS ROD)

Group	Sorties at Full Unit Strength	Unit / Description	Patterns per Sortie	VFR Patterns Rate	IFR Patterns Rate	Annual Departures	Annual Arrivals	Annual VFR Pattern Operations	Annual IFR Pattern Operations	Total Annual Operations
Based										
F-16D (PW-229)	2,500	RSAF	1.34	60%	40%	2,500	2,500	4,020	2,680	11,700
F-35B[1]	900	FMS	0.3	65%	35%	900	900	351	189	2,340
F-35A	3,240	FMS	0.8	65%	35%	3,240	3,240	3,370	1,814	11,664
OV-10 (Twin Turboprop)	173	Blue Air	0.1	100%	0%	173	173	35	-	381
A-90 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
IAR-823 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
Bell 206	86	Blue Air	0.1	100%	0%	86	86	17	-	189
								TOTAL:		**26,652**
Civil and Transient Aircraft										
F/A-18E/F	na	Transient Military	0.5	100%	0%	91	91	91	-	273
F-16C	na	Transient Military	0.5	100%	0%	99	99	99	-	297
A-10	na	Transient Military	0.5	100%	0%	18	18	18	-	54
T-38C	na	Transient Military	2	100%	0%	376	376	1,504	-	2,256
T-6	na	Transient Military	2	100%	0%	94	94	376	-	564
T-1	na	Transient Military	2	100%	0%	170	170	680	-	1,020
C-130J	na	Transient Military	4	100%	0%	407	407	3,256	-	4,070
P-8 (B737)	na	Transient Military	0	100%	0%	91	91	-	-	182
E-6 (KC-135R)	na	Transient Military	0	100%	0%	13	13	-	-	26
C-12	na	Transient Military	0.5	100%	0%	58	58	58	-	174
H-60	na	Military Helicopter	1	100%	0%	12	12	24	-	48
CH-47	na	Military Helicopter	0.5	100%	0%	14	14	14	-	42
EMB145	na	Civil Regional Jet	0.0	100%	0%	276	276	-	-	551
EMB175	na	Civil Regional Jet	0.0	100%	0%	296	296	-	-	591
CRJ9-ER (CRJ2, CRJ7, CRJ9)	na	Civil Regional Jet	0.0	100%	0%	1,696	1,696	-	-	3,393
B737-700	na	Civil Air Carrier	0.0	100%	0%	40	40	-	-	80
B737-800	na	Civil Air Carrier	0.0	100%	0%	28	28	-	-	56
CNA55B (Embraer Phenom 300, Cessna Citation II)	na	Civil Business Jet	0.0	100%	0%	292	292	-	-	583
CNA560XL (Cessna Excel/XLS)	na	Civil Business Jet	0.0	100%	0%	1,000	1,000	-	-	2,000
CNA510 (Embraer Phenom 100)	na	Civil Business Jet	0.0	100%	0%	25	25	-	-	50
LEAR35 (Learjet 40, Learjet 60)	na	Civil Business Jet	0.0	100%	0%	266	266	-	-	531
GIV (Gulfstream 4/400)	na	Civil Business Jet	0.0	100%	0%	15	15	-	-	30
CL600 (Bombardier Challenger 300)	na	Civil Business Jet	0.0	100%	0%	9	9	-	-	18
HS748A (IAI 1124 Westwind)	na	Civil Business Jet	0.0	100%	0%	412	412	-	-	824
IA1125 (IAI Astra 1125)	na	Civil Business Jet	0.0	100%	0%	381	381	-	-	762
DHC6 (Beech Super King Air 350)	na	Civil 2 Engine Turboprop	0.0	100%	0%	1,784	1,784	-	-	3,567
BEC58P (Beech 58, Cessna Chancellor 414)	na	Civil 2 Engine Turboprop	0.0	100%	0%	631	631	-	-	1,263
CNA441 (Socata TBM-850)	na	Civil 1 Engine Turboprop	0.0	100%	0%	229	229	-	-	457
GA Single Engine Variable Prop (Cessna 400)	na	Civil 1 Engine Piston Prop	1.263	100%	0%	905	905	2,286	-	4,095
GA Single Engine Fixed Prop (Piper PA-28)	na	Civil 1 Engine Piston Prop	3.8	100%	0%	301	301	2,285	-	2,886
Cessna172	na	Civil 1 Engine Piston Prop	0.0	100%	0%	258	258	-	-	515
Cessna182	na	Civil 1 Engine Piston Prop	2.68	100%	0%	426	426	2,283	-	3,135
COMSEP (Cirrus SR 22)	na	Civil 1 Engine Piston Prop	3.52	100%	0%	325	325	2,285	-	2,934
								TOTAL:		**37,327**
								GRAND TOTAL:		**63,979**

Table 3-6. Alt 1 FSM and Ebbing ANGB Airfield Operations

Group	Sorties at Full Unit Strength	Unit / Description	Patterns per Sortie	VFR Patterns Rate	IFR Patterns Rate	Annual Departures	Annual Arrivals	Annual VFR Pattern Operations	Annual IFR Pattern Operations	Total Annual Operations
Based										
F-16D (PW-229)	2,500	RSAF	1.34	60%	40%	2,500	2,500	4,020	2,680	11,700
F-35B[1]	900	FMS	0.3	65%	35%	900	900	351	189	2,340
F-35A	3,240	FMS	0.8	65%	35%	3,240	3,240	3,370	1,814	11,664
ACE (Agile Combat Employment)	160	FMS	0.8	65%	35%	160	160	166	90	576
OV-10 (Twin Turboprop)	173	Blue Air	0.1	100%	0%	173	173	35	-	381
A-90 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
IAR-823 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
Bell 206	86	Blue Air	0.1	100%	0%	86	86	17	-	189
								TOTAL:		**27,228**
Civil and Transient Aircraft										
F/A-18E/F	na	Transient Military	0.5	100%	0%	91	91	91	-	273
F-16C	na	Transient Military	0.5	100%	0%	99	99	99	-	297
A-10	na	Transient Military	0.5	100%	0%	18	18	18	-	54
T-38C	na	Transient Military	2	100%	0%	376	376	1,504	-	2,256
T-6	na	Transient Military	2	100%	0%	94	94	376	-	564
T-1	na	Transient Military	2	100%	0%	170	170	680	-	1,020
C-130J	na	Transient Military	4	100%	0%	407	407	3,256	-	4,070
P-8 (B737)	na	Transient Military	0	100%	0%	91	91	-	-	182
E-6 (KC-135R)	na	Transient Military	0	100%	0%	13	13	-	-	26
C-12	na	Transient Military	0.5	100%	0%	58	58	58	-	174
H-60	na	Military Helicopter	1	100%	0%	12	12	24	-	48
CH-47	na	Military Helicopter	0.5	100%	0%	14	14	14	-	42
Boeing 737-400 (737400)	na	Civil Air Carrier	0.0	100%	0%	22	22	-	-	44
Boeing 757-200 (757PW)	na	Civil Air Carrier	0.0	100%	0%	3	3	-	-	5
EMBRAER ERJ-170 (EMB170)	na	Civil Regional Jet	0.0	100%	0%	1,367	1,367	-	-	2,735
BOMBARDIER CL-600 (CL600)	na	Civil Business Jet	0.0	100%	0%	186	186	-	-	372
Cessna 550 Citation II (CNA55B)	na	Civil Business Jet	0.0	100%	0%	264	264	-	-	527
Cessna 560 Citation (CNA560XL)	na	Civil Business Jet	0.0	100%	0%	288	288	-	-	576
Cessna 680 Citation Sovereign (CNA680)	na	Civil Business Jet	0.0	100%	0%	52	52	-	-	105
Cessna 750 Citation X (CNA750)	na	Civil Business Jet	0.0	100%	0%	44	44	-	-	88
Gulfstream 650 (G650ER)	na	Civil Business Jet	0.0	100%	0%	32	32	-	-	64
Learjet 45 (Lear35)	na	Civil Business Jet	0.0	100%	0%	135	135	-	-	269
BOMBARDIER BD-700 (BD-700-1A10)	na	Civil Business Jet	0.0	100%	0%	6	6	-	-	11
Cessna 208 (CNA208)	na	Civil 1 Engine Turboprop	0.0	100%	0%	124	124	-	-	249
Beech Baron (BEC58P)	na	Civil 2 Engine Turboprop	0.0	100%	0%	439	439	-	-	878
Beech Super King Air 350 / DHC-6 (DHC6)	na	Civil 2 Engine Turboprop	0.0	100%	0%	680	680	-	-	1,359
Cessna 172 (CNA172)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	2,205	2,205	3,812	-	8,222
Cessna 182 (CNA182)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	481	481	832	-	1,795
Cirrus SR-20 / SR-22 (COMSEP)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	295	295	511	-	1,102
GA Single Engine Fixed Prop (GASEPF)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	872	872	1,508	-	3,252
GA Single Engine Variable Prop (GASEPV)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	785	785	1,357	-	2,927
Bell 407 (B407)	na	Civil Helicopter	0.0	100%	0%	20	20	-	-	40
Eurocopter EC-130 (EC130)	na	Civil Helicopter	0.0	100%	0%	259	259	-	-	518
Bell 206B-3 (B206B3)	na	Civil Helicopter	0.0	100%	0%	19	19	-	-	38
Sikorsky S-76 (S76)	na	Civil Helicopter	0.0	100%	0%	9	9	-	-	18
								TOTAL:		**34,199**
								GRAND TOTAL:		**61,427**

Table 3-7. Proposed Action FSM and Ebbing ANGB Airfield Operations

Group	Sorties at Full Unit Strength	Unit / Description	Patterns per Sortie	VFR Patterns Rate	IFR Patterns Rate	Annual Departures	Annual Arrivals	Annual VFR Pattern Operations	Annual IFR Pattern Operations	Total Annual Operations
Based										
F-16D (PW-229)	2,500	RSAF	1.34	60%	40%	2,500	2,500	4,020	2,680	11,700
Training F-35B[1]	800	FMS	0.8	65%	35%	800	800	832	448	2,880
Operational F-35B[1]	1,600	FMS	0.5	65%	35%	1,600	1,600	1,040	560	4,800
F-35A	3,175	FMS	0.8	65%	35%	3,175	3,175	3,302	1,778	11,430
ACE (Agile Combat Employment)	160	FMS	0.8	65%	35%	160	160	166	90	576
OV-10 (Twin Turboprop)	173	Blue Air	0.1	100%	0%	173	173	35	-	381
A-90 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
IAR-823 Turboprop	86	Blue Air	0.1	100%	0%	86	86	17	-	189
Bell 206	86	Blue Air	0.1	100%	0%	86	86	17	-	189
								TOTAL:		**32,334**
Civil and Transient Aircraft										
F/A-18E/F	na	Transient Military	0.5	100%	0%	91	91	91	-	273
F-16C	na	Transient Military	0.5	100%	0%	99	99	99	-	297
A-10	na	Transient Military	0.5	100%	0%	18	18	18	-	54
T-38C	na	Transient Military	2	100%	0%	376	376	1,504	-	2,256
T-6	na	Transient Military	2	100%	0%	94	94	376	-	564
T-1	na	Transient Military	2	100%	0%	170	170	680	-	1,020
C-130J	na	Transient Military	4	100%	0%	407	407	3,256	-	4,070
P-8 (B737)	na	Transient Military	0	100%	0%	91	91	-	-	182
E-6 (KC-135R)	na	Transient Military	0	100%	0%	13	13	-	-	26
C-12	na	Transient Military	0.5	100%	0%	58	58	58	-	174
H-60	na	Military Helicopter	1	100%	0%	12	12	24	-	48
CH-47	na	Military Helicopter	0.5	100%	0%	14	14	14	-	42
Boeing 737-400 (737400)	na	Civil Air Carrier	0.0	100%	0%	22	22	-	-	44
Boeing 757-200 (757PW)	na	Civil Air Carrier	0.0	100%	0%	3	3	-	-	5
EMBRAER ERJ-170 (EMB170)	na	Civil Regional Jet	0.0	100%	0%	1,367	1,367	-	-	2,735
BOMBARDIER CL-600 (CL600)	na	Civil Business Jet	0.0	100%	0%	186	186	-	-	372
Cessna 550 Citation II (CNA55B)	na	Civil Business Jet	0.0	100%	0%	264	264	-	-	527
Cessna 560 Citation (CNA560XL)	na	Civil Business Jet	0.0	100%	0%	288	288	-	-	576
Cessna 680 Citation Sovereign (CNA680)	na	Civil Business Jet	0.0	100%	0%	52	52	-	-	105
Cessna 750 Citation X (CNA750)	na	Civil Business Jet	0.0	100%	0%	44	44	-	-	88
Gulfstream 650 (G650ER)	na	Civil Business Jet	0.0	100%	0%	32	32	-	-	64
Learjet 45 (Lear35)	na	Civil Business Jet	0.0	100%	0%	135	135	-	-	269
BOMBARDIER BD-700 (BD-700-1A10)	na	Civil Business Jet	0.0	100%	0%	6	6	-	-	11
Cessna 208 (CNA208)	na	Civil 1 Engine Turboprop	0.0	100%	0%	124	124	-	-	249
Beech Baron (BEC58P)	na	Civil 2 Engine Turboprop	0.0	100%	0%	439	439	-	-	878
Beech Super King Air 350 / DHC-6 (DHC6)	na	Civil 2 Engine Turboprop	0.0	100%	0%	680	680	-	-	1,359
Cessna 172 (CNA172)	na	Civil 1 Engine Piston Prop	0.9	100%	0%	2,205	2,205	3,812	-	8,222
Cessna 182 (CNA182)	na	Civil 1 Engine Piston Prop	0.9	100%	0%	481	481	832	-	1,795
Cirrus SR-20 / SR-22 (COMSEP)	na	Civil 1 Engine Piston Prop	0.9	100%	0%	295	295	511	-	1,102
GA Single Engine Fixed Prop (GASEPF)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	872	872	1,508	-	3,252
GA Single Engine Variable Prop (GASEPV)	na	Civil 1 Engine Piston Prop	0.86	100%	0%	785	785	1,357	-	2,927
Bell 407 (B407)	na	Civil Helicopter	0.0	100%	0%	20	20	-	-	40
Eurocopter EC-130 (EC130)	na	Civil Helicopter	0.0	100%	0%	259	259	-	-	518
Bell 206B-3 (B206B3)	na	Civil Helicopter	0.0	100%	0%	19	19	-	-	38
Sikorsky S-76 (S76)	na	Civil Helicopter	0.0	100%	0%	9	9	-	-	18
								TOTAL:		**34,199**
								GRAND TOTAL:		**66,533**

Table 3-8. Distribution of Runway Use at FSM

Based Fixed Wing Aircraft		08	26	02	20
Blue Air Aircraft (Acoustic Day and Acoustic Night)	Arrival	31%	54%	2%	13%
	Departure	31%	54%	2%	13%
	Closed Pattern	31%	54%	2%	13%
Proposed Action F-16 Aircraft (Acoustic Day and Acoustic Night)	Arrival	52.9%	47.1%	0%	0%
	Departure	37.6%	62.4%	0%	0%
	Closed Pattern	45.0%	55.0%	0%	0%
Proposed Action F-35 Aircraft (Acoustic Day and Acoustic Night)	Arrival	52.9%	47.1%	0%	0%
	Departure	37.6%	62.4%	0%	0%
	Closed Pattern	45.0%	55.0%	0%	0%
Civil Aircraft		**08**	**26**	**02**	**20**
Air Carrier/Regional Jet Acoustic Day	Arrival	65%	35%		
	Departure	46%	54%		
Air Carrier/Regional Jet Acoustic Night	Arrival	68%	32%		
	Departure	51%	49%		
Business Jet (Air Taxi) Acoustic Day	Arrival	55%	36%	5%	4%
	Departure	55%	33%	6%	6%
Business Jet (Air Taxi) Acoustic Night	Arrival	69%	31%	0%	0%
	Departure	70%	21%	2%	7%
GA Turboprop and Twin Engine Acoustic Day	Arrival	57%	30%	7%	6%
	Departure	55%	30%	7%	8%
GA Turboprop and Twin Engine Acoustic Night	Arrival	49%	37%	10%	4%
	Departure	68%	13%	10%	9%
GA Single Engine Piston and Helicopter Acoustic Day	Arrival	56%	30%	6%	8%
	Departure	55%	31%	6%	8%
	Closed Pattern	56%	30%	6%	8%
GA Single Engine Piston and Helicopter Acoustic Night	Arrival	48%	38%	6%	8%
	Departure	37%	45%	10%	8%
	Closed Pattern				
Transient Military Fixed Wing Aircraft		**08**	**26**	**02**	**20**
Fighter/Trainer Jet (Acoustic Day and Acoustic Night)	Arrival	52.9%	47.1%	0%	0%
	Departure	37.6%	62.4%	0%	0%
	Closed Pattern	45.0%	55.0%	0%	0%
Large Jet (Acoustic Day and Acoustic Night)	Arrival	67.6%	32.4%	0%	0%
	Departure	46.3%	53.7%	0%	0%
	Closed Pattern	38.0%	62.0%	0%	0%
T-1 (Acoustic Day and Acoustic Night)	Arrival	55.5%	43.3%	1.2%	0%
	Departure	53.2%	46.4%	0.4%	0%
	Closed Pattern	45.0%	55.0%	0%	0%
C-130 (Acoustic Day and Acoustic Night)	Arrival	41.3%	58.5%	0.2%	0%
	Departure	34.1%	65.5%	0.4%	0%
	Closed Pattern	38.0%	62.0%	0%	0%
C-12 (Acoustic Day and Acoustic Night)	Arrival	56.6%	42.1%	1.3%	0%
	Departure	34.9%	65.1%	0.0%	0%
	Closed Pattern	45.0%	55.0%	0%	0%
T-6 (Acoustic Day and Acoustic Night)	Arrival	47.8%	49.0%	1.6%	1.6%
	Departure	43.4%	51.2%	1.8%	3.6%
	Closed Pattern	45.0%	55.0%	0%	0%

Note: Civil Aircraft Runway Utilization derived from Fort Smith Airport Radar Data from January 2024 through December 2024

BRRC

Table 3-9. Operation Types for Based, Civil, and Transient Aircraft

Operation	Type	Blue Air Fixed Wing	Blue Air Helicopter	Proposed F-16D	Proposed F-35A	Proposed F-35B Training Squadron	Proposed F-35B Operational Squadron	Civil Aircraft	Transient Military Aircraft
Arrivals	Pitchout/Overhead Break Arrival (Conventional landing)	20%		60%	26%	20%	26%		10%
	Tactical Break Arrrival			0%	39%	30%	39%		
	Pitchout/Overhead Break Arrival to Slow Landing (F-35B)					10%	4%		
	Pitchout/Overhead Break Arrival to Vertical Landing (F-35B)					3%	1%		
	IFR Straight-in Arrival			24%	15%	8%	8%		
	IFR Straight-in Arrival to Slow Landing (F-35B)					8%	3%		
	TACAN Straight-in				5%	2%	2%		
	VFR Straight-in Arrival (and Standard AEDT arrivals for civil aircraft)	80%	100%	10%	5%	5%	5%	100%	90%
	Straight-in to Slow Landing (F-35B only)					3%	1%		
	Straight-in to Vertical Landing (F-35B only)					1%	1%		
	SFO/PFO Arrival[2]			6%	10%	10%	10%		
Departures	Afterburner Departure	0%	0%	70%	75%	68%	74%		0%
	Combat Departure				20%	20%	20%		0%
	Short Take-off (F-35B)	0%	0%	0%	0%	7%	1%		
	Military (or Standard) Departure	100%	100%	30%	5%	5%	5%	100%	100%
Closed Patterns	IFR Patttern			40%	35%	25%	25%	0%	
	Inside VFR Pattern	100%	100%	55%	55%	40%	55%	100%	100.0%
	SFO/PFO Pattern			5%	10%	10%	10%		
	Short Take-off to Inside VFR Pattern to Slow Landing					2%	0%		
	Short Take-off to Inside VFR Pattern to Vertical Landing					1%	0%		
	Inside VFR Pattern to Slow Landing (F-35B only)					12%	5%		
	Inside VFR Pattern to Vertical Landing (F-35B only)					6%	3%		
	Inside VFR Pattern to Rolling Vertical Landing (F-35B only)					2%	1%		
	Hover Wave Off					2%	1%		

Note:
1. SFO/PFO Arrival Category includes FCFs. 20% of PFO Arrivals for F-35A and F-35B modeled as straight-in PFOs, 10% are Random Entry PFOs, and 70% are overhead break PFOs
2. For Pitchout/Overhead Break, 60% are TAC Initial and 40% are Initial. Of the Initial Overhead Break Arrivals, 70% break at the numbers, 20% break mid-field, and 10% break at the end of the runway
3. For civil aircraft, standard AEDT profiles are used for straight-in arrivals, departures, and inside VFR closed patterns.

Table 3-10. Percentages of Operations during Acoustic Day and Night at FSM

Ebbing ANGB Percentages of Operations during Acoustic Day and Night for Military Aircraft

Operation	Type	Blue Air		Proposed F-16D[1]		Proposed F-35A[2]		Proposed F-35B[3]	
		Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700
Arrivals	IFR Straight-in			80%	20%[1]	90%	10%[2]	85%	15%[3]
	VFR Straight-in	94%	6%	100%	0%	100%	0%	100%	0%
	Overhead Break	100%	0%	100%	0%	100%	0%	100%	0%
Departures	Military/Standard	99%	1%	98%	2%	98%	2%	98%	2%
	Afterburner / Combat			98%	2%	98%	2%	98%	2%
Patterns	VFR Pattern	100%	0%	100%	0%	99%	1%	99%	1%
	IFR Pattern	100%	0%	90%	10%	99%	1%	99%	1%

Notes:
1. 20% of IFR Arrivals for F-16 would result in 5% of all arrivals 2200-0700
2. 10% of IFR Arrivals for F-35A would result in 2% of all arrivals 2200-0700
3. 15% of IFR Arrivals for F-35B would result in 2% of all arrivals 2200-0700

Operation	Type	Transient Military C-130		Transient Militay T-6		Other Transient Military	
		Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700
Arrivals	IFR Straight-in	92%	8%	97%	3%	99%	1%
	VFR Straight-in	92%	8%	97%	3%	99%	1%
	Overhead Break	100%	0%	100%	0%	100%	0%
Departures	Military/Standard	83%	17%	95%	5%	99%	1%
	Afterburner / Combat						
Patterns	VFR Pattern	100%	0%	100%	0%	100%	0%
	IFR Pattern						

Fort Smith Regional Airport Percentages of Operations during Acoustic Day and Night for Civil Aircraft

Operation	Air Carriers and Regional Jets		Business Jets (Air Taxi)		GA Turboprop and Twin Engine Aircraft		GA Helicopters		GA Single Engine Piston Prop	
	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700	Acoustic Day 0700 to 2200	Acoustic Night 2200 to 0700
Arrivals	66%	34%	97%	3%	86%	14%	66%	34%	98%	2%
Departures	66%	34%	96%	4%	90%	10%	73%	27%	98%	2%
Patterns	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	0%

Note: The civil aircraft acoustic day/night data was derived from radar data captured at Fort Smith Regional Airport between Janauary 2024 through February 2025

BRRC

1 **Table 3-11. Directional Flow Patterns for Based and Transient Military Aircraft**

Departures on Runway 08	Baseline Blue Air	Proposed F-16D	Proposed F-35	Transient Military Aircraft
Hog MOA/Razorback Range	100%	46%	47%	
Shirley MOA		54%	53%	
Northeast				25%
Southeast				15%
Southwest				30%
East				30%
Departures on Runway 26	**Baseline Blue Air**	**Proposed F-16D**	**Proposed F-35**	**Transient Military Aircraft**
Hog MOA/Razorback Range	100%	46%	47%	
Shirley MOA		54%	53%	
West				40%
Northwest				20%
Southwest				40%

Arrivals	Baseline Blue Air	Proposed F-16D	Proposed F-35	Transient Military Aircraft
Hog MOA to VFR Arrival	100%	35%	37%	
Hog MOA to IFR Arrival		11%	7%	
Shirley MOA to VFR Arrival		41%	43%	
Shirley MOA to IFR Arrival		13%	8%	
IFR/VFR Straight-in				100%
TACAN			5%	

Note: Acoustic Daytime and Acoustic Nighttime have the same traffic flow for military aircraft at Ebbing ANGB

2 Note: Closed Pattern utilization is in the "OpsType" tab, as all closed patterns are east of Runway 02/20 and south of Runway 08/26 for VFR patterns and north of Runway 08/26 for IFR patterns.

4 AIRSPACE ANALYSIS

This section presents the airspace operational data for the military aircraft at Ebbing ANGB in the SUAs and MTRs. The operations of other aircraft in the airspace units were modeled the same for all airspace scenarios. These operations include the following representational aircraft groups: F-16C for Tulsa ANG operations in/above the Shirley MOA, F-35A and F/A-18E/F for other fighter jets in the SUAs, C-17 for large/cargo jets, C-130J for multi-prop cargo jets, CH-53 and H-60 for helicopters, B-52 for bombers, T-6 for single props, and KC-135R for tankers. The airspace data set was provided by FAA Memphis Center and Razorback Approach, Razorback Range and Range Control, and other Ebbing ANGB and Blue Air personnel for the No Action data and by F-35 and F-16 AETC for the Proposed Action data.

The following tables display the airspace units used in this analysis and the based Blue Air, Proposed Action F-16 and F-35, and other aircraft mission type distributions and mission parameters in the airspace. It is important to note that the airspace utilization (percentages of events between Shirley MOA, Hog MOA, and Razorback Range) and the SUA floor and ceilings did not change for the SEIS. The F-16 mission types modeled in the airspace are the same in the SEIS as the FEIS and include basic fighter maneuvers (BFM), air combat maneuvers (ACM), basic surface attack (BSA), surface attack tactics (SAT), close air support (CAS), Tactical Intercept (TI), offensive counter-air (OCA), and defensive counter-air (DCA).

AETC pilots refined the F-35 mission types and descriptions for the SEIS bases on updated F-35 airspace training parameters. The refinements resulted in the modeled mission types condensed into four groups. The first group includes basic training requirements (TR), aircraft handling characteristics (AHC), SAT, CAS, and suppression of enemy air defenses (SEAD). The second group includes BFM, ACM, and low-altitude step-down training (LASDT). The third group includes TI, Strike, OCA, and DCA. The fourth group is Large Force Exercises (LFE). In addition, the AETC pilots refined the profiles to limited altitudes below 500 ft AGL to the Razorback range. The FEIS included these lower altitudes in the Hog MOAs as well.

F-35A and F-35B events in the SUAs were updated in the SEIS to match the change in airfield sorties of the F-35A and F-35B. The FEIS had a total of 4,140 F-35A events modeled in the SUAs. F-35A and F-35B events were combined and modeled as F-35A since they were assumed to have the same mission profiles within the SUAs. The SEIS separated the F-35A and F-35B airspace events to allow for separate scaling factors of the F-35A and F-35B training and operational squadrons. All of the airfield sorties of F-35A and ACE aircraft (modeled as F-35A) would have events in the SUAs. All of the F-35B operational squadron sorties and 90% of the F-35B training squadron sorties would have events in the SUAs. The Proposed Action for the SEIS modeled 3,335 F-35A and ACE (modeled as F-35A) events, 720 F-35B training squadron events, and 1,600 F-35B operational squadron events for a total of 5,655 total F-35A and F-35B events in the SUAs. The Proposed Action has an increase of 36.6% F-35A/B events in the SUAs over the FEIS airspace noise modeling. The SEIS has no changes from the FEIS airspace modeling of the RSAF F-16 squadron, the Blue Air aircraft, and other representative aircraft units.

Following the airspace operational data, the air gunnery air-to-ground targets and operations are displayed for all aircraft utilizing Razorback Range (R-2401 and R-2402). The comparative analysis looks at low angle strafing (LAS) among the A-10, F-16C/D, and F-35 aircraft since none of the air gunnery operations will generate a significant CDNL. On Razorback range, the loudest air gunnery operation is the gun firing of the AC-130. The SEIS has no change in air gunnery noise modeling since the weapon systems and locations of the weapons firing have not changed from the FEIS.

Supersonic aircraft activity is authorized above Flight Level (FL) 300 in ATCAAs above Shirley A, Shirley B, Hog A, and Hog B MOAs. FL is an aircraft's altitude at standard air pressure, expressed in hundreds of feet. Although the ATCAAs have a ceiling of FL290 and supersonic is not allowed in the ATCAAs, FAA can grant approval for the FL290 to FL500 space above the ATCAAs, and supersonic activity is allowed in these areas above the ATCAAs. For the No Action/Baseline supersonic events, Tulsa ANG F-16C aircraft perform supersonic activities for their missions above Shirley A and Shirley B MOAs. For the Proposed Action, RSAF F-16 and FMS F-35 could perform supersonic activities, so a sonic boom analysis was performed based on F-16C, F-35A, and F-35B supersonic mission parameters, which are displayed in the data tables within this section. This analysis used the BooMap algorithm to calculate the sonic boom exposure level, represented by the CDNL, at the centroid of the airspace. [19] The SEIS assumed no changes in the supersonic mission parameters used in the FEIS, so the results of the sonic boom exposure level CDNL contours remain the same as in the FEIS.

4.1 Airspace Units

Table 4-1. Ebbing ANGB Used Airspace Units

SUA Name	Supersonic	Floor	Ceiling (ft MSL)
Shirley A MOA	No	11,000 ft MSL	17,999
Shirley A ATCAA	Not in the ATCAA, but Yes to above the ATCAA (Greater than FL300)	18,000 ft MSL	29000*
Shirley B MOA	No	11,000 ft MSL	17,999
Shirley B ATCAA	Not in the ATCAA, but Yes to above the ATCAA (Greater than FL300)	18,000 ft MSL	29000*
Shirley C MOA	No	11,000 ft MSL	17,999
Hog A MOA	No	100 ft AGL	17,999
Hog A ATCAA	Not in the ATCAA, but Yes to above the ATCAA (Greater than FL300)	18,000 ft MSL	29000*
Hog B West Shelf MOA	No	6,000 ft MSL	17,999
Hog B East Shelf MOA	No	100 ft AGL	17,999
Hog B ATCAA	Not in the ATCAA, but Yes to above the ATCAA (Greater than FL300)	18,000 ft MSL	29000*
R2401A	No	Surface	30,000
R2401B	No	Surface	30,000
R2402A	No	Surface	30,000
R2402B	No	10,000 ft MSL	22,000
R2402C	No	13,000 ft MSL	22,000
* Can request FL290 to FL500 with FAA approval			

4.2 Ebbing ANGB Airspace Sortie Distributions

Table 4-2. Ebbing ANGB Airspace Event Distributions

Aircraft Type	F-35A		F-35B Training		F-35B Operational		F-16		Blue Air	
Airspace	**Utilization**	**Events**	**Utilization**	**Events**	**Utilization**	**Events**	**Utilization**	**Events**	**Utilization**	**Events**
Hog MOA	36%	1143	36%	259	36%	576	0%	0	40%	172.4
Razorback Range	0%	0	0%	0	0%	0	0%	0	60%	258.6
Hog MOA/Razorback Range Combined	11%	349	11%	79	11%	176	46.4%	1160	0%	0.0
Shirley MOA	53%	1683	53%	382	53%	848	53.6%	1340	0%	0.0
Total	***100%***	***3175***	***100%***	***720***	***100%***	***1600***	***100%***	***2500***	***100%***	***431***

Table 4-3. Other Aircraft Airspace Sortie Distributions

Aircraft Group	Representative Aircraft	Annual Events in MOA and Range										% 2200-0700
		2401B	2401A	2402A	2402B and 2402C	Hog A MOA	Hog B MOA	Shirley A MOA	Shirley B MOA	Shirley C MOA	Shirley A/B/C and ATCAAs	
Fighter 1	F-35				188	63	20	85	61	16		3%
Fighter 2	F-18		16	240	209	147	46	198	142	36		3%
Tulsa ANG	F-16C										565	3%
Bomber	B-52		5	60	21	52	16	7	5	1		3%
Large Jet	C-17							7	5	1		3%
Multi-Prop	C-130		80	240		262	82					3%
Single Prop	T-6		85	419		356	112					3%
Helicopter	CH-53		80									3%
Helicopter	H-60	44		240		115	36					3%
Tanker	KC-135R					52	16	130	93	24		3%
Total:		**44**	**266**	**1198**	**418**	**1048**	**328**	**427**	**307**	**79**	**565**	

Note: Range Total Ops derived from Range Reports and MOA Total Ops derived from FAA SUA Area and Sector Counts 5-year average data

Table 4-4. F-16 Training Mission Type Distributions

Mission Type	Shirley MOA Annual Events			Hog MOA/ Razorback Annual Events			2200-0700 Acoustic Night Percentage
	Total	Aco Day	Aco Night	Total	Aco Day	Aco Night	
BFM/ACM	0.0	0.0	0.0	680.0	666.4	13.6	2.0%
BSA	0.0	0.0	0.0	240.0	235.2	4.8	2.0%
SAT	0.0	0.0	0.0	0.0	0.0	0.0	2.0%
CAS	0.0	0.0	0.0	240.0	235.2	4.8	2.0%
TI/DCA/OCA	1340.0	1313.2	26.8	0.0	0.0	0.0	2.0%
Totals	1340.0	1313.2	26.8	1160.0	1136.8	23.2	

Table 4-5. Blue Air Training Mission Type Distributions

Aircraft Type	Fixed Wing		Helicopters	
Airspace	Aco. Day	Aco. Night	Aco. Day	Aco. Night
Hog MOA	133.8	4.1	33.4	1.1
Razorback Range	200.7	6.2	50.2	1.5

4.3 Airspace Mission Parameters: Subsonic Noise

4.3.1 F-35A

Mission Distribution	% Use	Annual Sorties
TR/AHC/SA/CAS/SEAD	36.6%	1,221
BFM/ACM/LASDT	36.6%	1,221
TI/STRIKE/DCA/OCA	18.2%	607
LFEs	8.6%	286

TR/AHC/SA/CAS/SEAD

Number of Aircraft:	2
Duration (min):	40
Average Subsonic Speed:	400
Supersonic Potential:	N
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
50%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**687**	**40**	56.25%	**0.50%**	684	3
Hog A/B	**458**	**40**	37.50%	**0.50%**	456	2
Razorback Range + Hog A/B	**76**	**40**	6.25%	**0.00%**	76	0
Total	**1,221**	**120**	**100%**	**1.00%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	0%	10%
500 AGL - 2000 AGL	0%	2%	20%
2,000 AGL - 5,000 AGL	0%	2%	20%
5,000 AGL - 10,000 AGL	20%	16%	20%
10,000 AGL - FL180	40%	40%	30%
FL180 - FL290	40%	40%	0%
Total	100%	100%	100%

1

BFM/ACM/LASDT

Number of Aircraft:	3
Duration (min):	40
Average Subsonic Speed:	450
Supersonic Potential:	N
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
75%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**687**	**40**	56.25%	**0.00%**	687	0
Hog A/B	**458**	**40**	37.50%	**0.00%**	458	0
Razorback Range + Hog A/B	**76**	**40**	6.25%	**0.00%**	76	0
Total	**1,221**	**120**	**100%**	**0.00%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	10%	5%
500 AGL - 2000 AGL	0%	5%	15%
2,000 AGL - 5,000 AGL	0%	5%	20%
5,000 AGL - 10,000 AGL	22%	20%	30%
10,000 AGL - FL180	32%	30%	30%
FL180 - FL290	46%	30%	0%
Total	100%	100%	100%

2

TI/STRIKE/DCA/OCA

Number of Aircraft:	4
Duration (min):	40
Average Subsonic Speed:	450
Supersonic Potential:	Y
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
65%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**361**	**40**	59.50%	**0.00%**	361	0
Hog A/B	**246**	**40**	40.50%	**0.00%**	246	0
Razorback Range + Hog A/B	**0**	**0**	0.00%	**0.00%**	0	0
Total	**607**	**80**	**100%**	**0.00%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	0%	0%
500 AGL - 2000 AGL	0%	2%	0%
2,000 AGL - 5,000 AGL	0%	2%	0%
5,000 AGL - 10,000 AGL	10%	2%	0%
10,000 AGL - FL180	17%	17%	0%
FL180 - FL290	73%	77%	0%
Total	100%	100%	0%

LFEs

Number of Aircraft:	10
Duration (min):	40
Average Subsonic Speed:	450
Supersonic Potential:	Y
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
75%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**248**	**40**	86.67%	**0.50%**	247	1
Hog A/B	**38**	**40**	13.33%	**0.00%**	38	0
Razorback Range + Hog A/B	**0**	**0**	0.00%	**0.00%**	0	0
Total	**286**	**80**	**100%**	**0.50%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	2%	0%
500 AGL - 2000 AGL	0%	2%	0%
2,000 AGL - 5,000 AGL	0%	2%	0%
5,000 AGL - 10,000 AGL	12%	2%	0%
10,000 AGL - FL180	15%	17%	0%
FL180 - FL290	73%	75%	0%
Total	100%	100%	0%

1 ### 4.3.2 F-35B

Mission Distribution	% Use	Annual Sorties
TR/AHC/SA/CAS/SEAD	36.6%	849
BFM/ACM/LASDT	36.6%	849
TI/STRIKE/DCA/OCA	18.2%	422
LFEs	8.6%	200

2

TR/AHC/SA/CAS/SEAD

Number of Aircraft:	2
Duration (min):	30
Average Subsonic Speed:	400
Supersonic Potential:	N
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
50%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**478**	**30**	56.25%	**0.50%**	476	2
Hog A/B	**318**	**30**	37.50%	**0.50%**	316	2
Razorback Range + Hog A/B	**53**	**30**	6.25%	**0.00%**	53	0
Total	**849**	**90**	**100%**	**1.00%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	0%	10%
500 AGL - 2000 AGL	0%	2%	20%
2,000 AGL - 5,000 AGL	0%	2%	20%
5,000 AGL - 10,000 AGL	20%	16%	20%
10,000 AGL - FL180	40%	40%	30%
FL180 - FL290	40%	40%	0%
Total	100%	100%	100%

BFM/ACM/LASDT

Number of Aircraft:	3
Duration (min):	30
Average Subsonic Speed:	450
Supersonic Potential:	N
Power Setting Distribution:	
Engine Power (% ETR)	**% in Mode**
75%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	**Duration (Mins)**	**% Usage**	**% of Sorties 2200-0700**	**Ann. Acoustic Day Sorties**	**Ann. Acoustic Day Sorties**
Shirley A/B/C	**478**	**30**	56.25%	**0.00%**	**478**	**0**
Hog A/B	**318**	**30**	37.50%	**0.00%**	**318**	**0**
Razorback Range + Hog A/B	**53**	**30**	6.25%	**0.00%**	**53**	**0**
Total	**849**	**90**	**100%**	**0.00%**		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	**Shirley A/B/C**	**Hog A/B**	**Razorback + Hog A/B**
SFC - 500 AGL	0%	10%	5%
500 AGL - 2000 AGL	0%	5%	15%
2,000 AGL - 5,000 AGL	0%	5%	20%
5,000 AGL - 10,000 AGL	22%	20%	30%
10,000 AGL - FL180	32%	30%	30%
FL180 - FL290	46%	30%	0%
Total	100%	100%	100%

TI/STRIKE/DCA/OCA

Number of Aircraft:	4
Duration (min):	30
Average Subsonic Speed:	450
Supersonic Potential:	Y
Power Setting Distribution:	
Engine Power (% ETR)	% in Mode
65%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	Duration (Mins)	% Usage	% of Sorties 2200-0700	Ann. Acoustic Day Sorties	Ann. Acoustic Day Sorties
Shirley A/B/C	251	30	59.50%	0.00%	251	0
Hog A/B	171	30	40.50%	0.00%	171	0
Razorback Range + Hog A/B	0	30	0.00%	0.00%	0	0
Total	422	90	100%	0.00%		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	Shirley A/B/C	Hog A/B	Razorback + Hog A/B
SFC - 500 AGL	0%	0%	0%
500 AGL - 2000 AGL	0%	2%	0%
2,000 AGL - 5,000 AGL	0%	2%	0%
5,000 AGL - 10,000 AGL	10%	2%	0%
10,000 AGL - FL180	17%	17%	0%
FL180 - FL290	73%	77%	0%
Total	100%	100%	0%

LFEs

Number of Aircraft:	10
Duration (min):	30
Average Subsonic Speed:	450
Supersonic Potential:	Y
Power Setting Distribution:	
Engine Power (% ETR)	% in Mode
75%	100%

Proposed Lateral Utilization:						
	Number of Annual Sorties	Duration (Mins)	% Usage	% of Sorties 2200-0700	Ann. Acoustic Day Sorties	Ann. Acoustic Day Sorties
Shirley A/B/C	173	30	86.67%	0.50%	172	1
Hog A/B	27	30	13.33%	0.00%	27	0
Razorback Range + Hog A/B	0	0	0.00%	0.00%	0	0
Total	200	60	100%	0.50%		

Proposed Vertical/Altitude Utilization:			
Altitude Band (ft)	Shirley A/B/C	Hog A/B	Razorback + Hog A/B
SFC - 500 AGL	0%	2%	0%
500 AGL - 2000 AGL	0%	2%	0%
2,000 AGL - 5,000 AGL	0%	2%	0%
5,000 AGL - 10,000 AGL	12%	2%	0%
10,000 AGL - FL180	15%	17%	0%
FL180 - FL290	73%	75%	0%
Total	100%	100%	0%

4.3.3 F-16

BFM/ACM

Mission Parameters

Number of Aircraft:	2-4	
Max Duration:	30	
Average Subsonic Speed:	475	
Supersonic:	N	
Power Setting Distribution:		
Engine Power (% NC)	**% in Mode**	
100	100%	Idle to full AB

MOA Utilization:

MOA		**Number of Sorties Proposed**	**Average Number of Minutes per**	**% of Sorties 2200-0700**
Hog		680	30	2%
Total	**0**	**680**		

Current Altitude Bands:

Altitude Band	**Hog**
<5,000 AGL	0%
5,000 AGL - 10,000 AGL	0%
10,000 AGL - FL180	100%

BSA

Mission Parameters

Number of Aircraft:	4	
Max Duration:	40	
Average Subsonic Speed:	480	
Supersonic:	N	
Power Setting Distribution:		
Engine Power (% NC)	**% in Mode**	
95%	100%	Idle to MIL

MOA Utilization:

MOA		**Number of Sorties**	**Avg Number of Min/Sortie**	**% of Sorties 2200-0700**
Hog/Razorback		240	40	2%
Total	**0**	**240**		

Current Altitude Bands:

Altitude Band	**Hog/Raz**
500 AGL - 1,000 AGL	5%
1,000 AGL - 5,000 AGL	15%
5,000 AGL - 18,000 AGL	80%

CAS

Mission Parameters

Number of Aircraft:	4	
Max Duration:	40	
Average Subsonic Speed:	480	
Supersonic:	N	
Power Setting Distribution:		
Engine Power (% NC)	% in Mode	
95	100%	mid-range throttle to AB

MOA Utilization:

MOA		Number of Sorties Proposed	Average Number of Minutes per Sortie	% of Sorties 2200-0700
Hog		240	40	2%
Total	0	240		

Current Altitude Bands:

Altitude Band	Hog
<10,000 AGL	0%
10,000 - FL180	100%

TI/DCA/OCA

Mission Parameters

Number of Aircraft:	4	
Max Duration:	40	
Average Subsonic Speed:	500	
Supersonic:	N	
Power Setting Distribution:		
Engine Power (% NC)	% in Mode	
95	100%	Idle to full AB

MOA Utilization:

MOA		Number of Sorties Proposed	Average Number of Minutes per Sortie	% of Sorties 2200-0700
Shirley		1340	40	2%
Total	0	1340		

Current Altitude Bands:

Altitude Band	Shirley
<5,000 AGL	0%
5,000 AGL - 15,000 AGL	0%
15,000 AGL - FL350	100%

1

4.3.4 Other Aircraft

F-35A Altitude Bands: (parameters from F-35A MOB7 EIS)	
Altitude Band	%
5,000–10,000 ft AGL	10%
10,000 ft AGL -- FL180	30%
FL180 – FL300	50%
FL300 – FL500	10%

F-35A Profile

Average	425 kts
Duration	60 min
Power	90% ETR
% Aco. Night	3%

F-18A/C Altitude Bands: (parameters from F-35A MOB7 EIS)	
Altitude Band	%
500–2,000 ft AGL	9%
2,000–3,000 ft AGL	7%
3,000–5,000 ft AGL	13%
5,000 – 10,000 ft AGL	50%
10,000 ft AGL -- FL180	17%
FL180 – FL300	4%

F-18A/C Profile

Average Airspeed	400 kts
Duration	60 min
Power	92% NC
% Aco. Night	12%

C-17 Altitude Bands: (parameters from F-35A MOB7 EIS)	
Altitude Band	%
1,000–3,000 ft AGL	5%
3,000 – 10,000 ft AGL	40%
10,000 ft AGL -- FL180	10%
FL180 – FL300	20%
FL300 – FL500	25%

C-17 Profile

Average Airspeed	250 kts
Duration	60 min
Power	1.25 EPR
% Aco. Night	0%

C-130J Altitude Bands for NTTR and UTTR: (parameters from F-35A MOB7 EIS)	
Altitude Band	%
150–300 ft AGL	7%
300–500 ft AGL	5%
500–1,000 ft AGL	14%
1,000–3,000 ft AGL	6%
3,000 – 10,000 ft AGL	48%
10,000 ft AGL -- FL180	10%
FL180 – FL300	10%

C-130J Profile

Average Airspeed	250 kts
Duration	90 min
Power	850 C TIT
% Aco. Night	20%

CH-53 Altitude Bands: (parameters from Pinecastle EIS)	
Altitude Band	%
50–200 ft AGL	50%
200 – 1,000 ft AGL	40%
1,000 to 2,500 ft AGL	10%

CH-53 Profile

Average Airspeed	120 kts
Duration	90 min
% Aco. Night	5%

KC-135R Altitude Bands: (parameters from F-35A MOB7 EIS)	
Altitude Band	%
FL150 – FL300	80%
FL300 – FL500	20%

KC-135R Profile

Average Airspeed	240 kts
Duration	90 min
Power	80.3% NC
% Aco. Night	18%

Blue Air in Razorback Range:

OV-10 and A-90 (model as T-6) and Bell 206 (model as UH-1)	
Altitude Band	%
100 ft AGL - 5,000 ft AGL	75%
5,000 ft AGL - 10,000 ft AGL	25%

T-6 Profile

Average Airspeed	150 kts
Duration	120 min
Power	80% Torque
% Aco. Night	5%

Blue Air in Hog MOA:

OV-10 and A-90 (model as T-6) and Bell 206 (model as UH-1)	
Altitude Band	%
3,000 ft AGL - 5,000 ft AGL	25%
5,000 ft AGL - 10,000 ft AGL	75%

UH-1 Profile

Average Airspeed	70 kts
Duration	120 min
Power	N/A
% Aco. Night	5%

Tulsa ANG in Shirley MOA and ATCAAs:

F-16C (PW-220) Altitude Bands	
Altitude Band	%
FL110 - FL180	40%
FL180-FL300	40%
FL300-FL500	20%

F-16C (PW-220) Profile

Average Airspeed	500 kts
Duration	100 min
Power	90% NC
% Aco. Night	5%

4.4 MTR Operations and Parameters

Table 4-6. MTR Operations and Profiles

Mission Parameters	F-35A		F-35B		F-16D		F-18A/C		CAP - Cessna 182		C-130J		T-1		T-38C	
Average Subsonic Speed:	475 kts	**Annual Events**	475 kts	**Annual Events**	480 kts	**Annual Events**	500 kts	**Annual Events**	160 kts	**Annual Events**	400 kts	**Annual Events**	400 kts	**Annual Events**	350 kts	**Annual Events**
Power Setting:	95% ETR		95% ETR		95.4% NC		92% NC		100% RPM		2200 HP		85.5% NC		91% NC	
Route Name	**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**	
VR-189	20%	8	20%	4	15%	30	63%	40	29%	10	28%	36				
VR-1102	5%	2	5%	1	5%	10			11%	4						
VR-1103	5%	2	5%	1	15%	30					31%	40				
VR-1104	5%	2	5%	1	10%	20	6%	4	20%	7						
VR-1113	15%	6	15%	3	10%	20			29%	10			6%	31	6%	10
VR-1130	10%	4	10%	2	10%	20			11%	4	6%	8				
IR-117	10%	4	10%	2	10%	20	31%	20			18%	23	5%	25	5%	8
IR-120	5%	2	5%	1	5%	10										
IR-121	5%	2	5%	1	15%	30					16%	21	88%	425	88%	142
IR-164	20%	8	20%	4	5%	20										
Total	*good*	**40**	*good*	**20**	*good*	**210**	*good*	**64**	*good*	**35**	*good*	**128**	*good*	**480**	*good*	**160**

Note: For Altitude, model at 500 ft AGL unless the MTR has a segment with a floor greater than 500 ft AGL - model at the floor for these segments

4.5 Air Gunnery Parameters

Table 4-7. Razorback Range Targets

Target Area Name	Target Name	Target/Impact Areas		Primary Firing Heading	Firing Heading Limits		Munitions Authorized
		Longitude	Latitude	°T North	Right °	Left °	
CY 2021 DATA							
Razorback Main	*Alpha (Conventional Circle)*	*94.091963 W*	*35.260788 N*	*90*	*360*	*0*	BDU33
Razorback Main	Bravo	94.091362 W	35.259406 N	90	180	45	20MM, 30MM, 7.62mm, .50Cal
Razorback Main	Delta-Golf	94.080897 W	35.259294 N	90	*360*	*0*	BDU33
Razorback Main	Delta-Golf	94.080897 W	35.259294 N	110	*160*	*65*	BDU50, BDU56
Razorback Main	Delta-Golf	94.080897 W	35.259294 N	360	*30*	*330*	GBU12, GBU31, GBU38, GBU54, LGTR
Razorback Main	Delta-Golf	94.080897 W	35.259294 N	110	*160*	*65*	2.75 Rkt (TP)
Razorback Main	Delta-Golf	94.080897 W	35.259294 N	90	180	45	20MM, 30MM, 7.62mm, .50Cal
Razorback Main	Charlie	94.084400 W	35.256216 N	90	*360*	*0*	BDU33
Razorback Main	Charlie	94.084400 W	35.256216 N	110	*160*	*65*	BDU50, BDU56
Razorback Main	Charlie	94.084400 W	35.256216 N	360	*30*	*330*	GBU12, GBU31, GBU38, GBU54, LGTR
Razorback Main	Charlie	94.084400 W	35.256216 N	90	180	45	20MM, 30MM, 7.62mm, .50Cal
Razorback Main	Charlie	94.084400 W	35.256216 N	110	160	65	2.75 Rkt (TP)
Razorback Main	Hotel	94.089481 W	35.252131 N	90	180	45	20MM, 30MM, 7.62mm, .50Cal
Razorback Main	India	94.087984 W	35.258003 N	90	*360*	*0*	BDU33
Razorback Main	India	94.087984 W	35.258003 N	110	*160*	*65*	BDU50, BDU56
Razorback Main	India	94.087984 W	35.258003 N	360	*30*	*330*	GBU12, GBU31, GBU38, GBU54, LGTR
Razorback Main	India	94.087984 W	35.258003 N	90	180	45	20MM, 30MM, 7.62mm, .50Cal
Razorback Main	India	94.087984 W	35.258003 N	110	160	65	2.75 Rkt (TP)
Razorback Main	Target 1 (Strafe Pit)	94.093057 W	35.256589 N	90	100	80	30MM
Razorback Main	Target 2 (Strafe Pit)	94.093062 W	35.256013 N	90	100	80	20MM
Army Impact Area	November	94.078982 W	35.245262 N	90	360	0	BDU33
Army Impact Area	November	94.078982 W	35.245262 N	110	160	65	BDU50, BDU56
Army Impact Area	November	94.078982 W	35.245262 N	360	*30*	*330*	GBU31, GBU38, GBU54
Army Impact Area	November	94.078982 W	35.245262 N	110	*160*	*65*	2.75 Rkt (TP/WP/HE/ILLUM)
Army Impact Area	November	94.078982 W	35.245262 N	90	*180*	*45*	30mm TP, 20mm TP
Army Impact Area	Generic Target	94.070142 W	35.257141 N	90	360	0	BDU33
Army Impact Area	Generic Target	94.070142 W	35.257141 N	110	160	65	BDU50, BDU56
Army Impact Area	Generic Target	94.070142 W	35.257141 N	110	*160*	*65*	2.75 Rkt (TP/WP)
Army Impact Area	Generic Target	94.070142 W	35.257141 N	90	*180*	*45*	30mm TP, 20mm TP
Army Impact Area	Generic Target	94.070142 W	35.257141 N	90	*360*	*0*	105mm TP, 30mm TP/HE

Highlighted targets are used for the LAS comparison between the A-10, F-16, and F-35.

Table 4-8. LAS Attack Run Parameters for Air Gunnery Noise Comparison

Aircraft	RSAF F-16D	F-35	A-10
Type of strafe:	LAS	10 deg LAS	10 deg LAS
Target Name:	Target 1/2 - Strafe Pits	Target 1/2 - Strafe Pits	Target 1/2 - Strafe Pits
Target location:	35°15'23.8"N 94°05'35.1"W	35°15'23.8"N 94°05'35.1"W	35°15'23.8"N 94°05'35.1"W
Firing heading limits	080 - 100 deg	080 - 100 deg	080 - 100 deg
Start firing distance	3200 ft	3200 ft	3200 ft
Stop firing distance	2000 ft	2000 ft	2000 ft
Min/max Firing angle	-5 to -15 deg	-5 to -25 deg	-5 to -25 deg
Min/Max altitude	200 to 900 ft AGL	300 to 1500 ft AGL	200 to 1500 ft AGL

1 ## 4.6 Supersonic Parameters

2 **Table 4-9. Supersonic Operations and Parameters for Flights above FL300**

Aircraft	Mission	% Time Above FL300	% Sorties with Supersonic Segments	Average Number of Supersonic Segments per Sortie	Average Maximum Mach Number	Average Supersonic Duration, s	SUA Units
RSAF F-16D	BFM	0%	1%	1	1.0	5 sec	Hog, Shirley
	ACM	0%	1%	1	1.0	5 sec	Hog, Shirley
	TI	10%	20%	2	1.2	30sec	Shirley
	DCA	10%	10%	1	1.1	30sec	Shirley
	OCA	10%	20%	2	1.2	30sec	Shirley
	OCA - LF	10%	10%	1	1.2	30sec	Hog, Shirley
	SAT	5%	5%	1	1.1	15sec	Hog, Shirley
F-35A	BFM	0%	1%	1	1.0	5 sec	Hog
	ACM	0%	1%	1	1.0	5 sec	Hog/Shirley
	TI	10%	20%	2	1.2	30 sec	Shirley
	DCA	10%	10%	1	1.1	30 sec	Shirley
	OCA	10%	20%	2	1.2	30 sec	Shirley
	OCA-LF	10%	10%	1	1.2	30 sec	Shirley
F-35B	BFM	0%	1%	1	1.0	5 sec	Hog
	ACM	0%	1%	1	1.0	5 sec	Hog/Shirley
	TI	10%	20%	2	1.2	30 sec	Shirley
	DCA	10%	10%	1	1.1	30 sec	Shirley
	OCA	10%	20%	2	1.2	30 sec	Shirley
	OCA-LF	10%	10%	1	1.2	30 sec	Shirley
Other	other	10%	10%	1	1.1	30 sec	Shirley

3

5 NOISE MODELING RESULTS

This section includes the DNL modeling results. Figure 5-1 presents the Alt 1 scenario's 65 dBA DNL contours at FSM in dashed purple (west VL site) and dashed yellow (east VL site) compared to the No Action FEIS contours in dark blue. The Alt 1 65 dBA contour extends to approximately the same distance as the No Action along the extended runway 08/26 centerline. However, the Alt 1 65 dBA DNL contour is wider than the No Action 65 dBA DNL contour north and south of the airfield. The Alt 1 65 dBA DNL contour extends approximately 1,000 ft further to the north than the No Action DNL contour at the greatest difference north of the airfield, and the Alt 1 contour extends approximately 1,300 ft further to the south than the No Action DNL contour as the greatest difference to the south of the airfield. The reason for the greater expansion of the Alt 1 contour compared to the No Action contour is the increase in frequency of afterburner departures. The No Action had 5% afterburner departures for the F-35s while the Alt 1 scenario has 95% afterburner departures. Additionally, the afterburner departures profiles in the No Action were highly restrictive with respect to the airspeed when afterburner is canceled. The profiles modeled in Alt 1 and the Proposed Action are less restrictive and cancels afterburner at 350 kts instead of 250 kts as modeled in the No Action. This change extends the time that the aircraft is in afterburner power, and according to the pilots, is their preferred afterburner departure air speed when switching to mil power from afterburner.

Figures 5-2 and 5-3 display the Alt 1 vs. No Action 60-85 dBA DNL contours for both the west and east vertical landing (VL) pad options, respectively. The difference between the two Alt 1 pad locations DNL levels is minimal and only noticeable at higher DNL levels close to the VL pads. The reason for this small difference is that the noise drivers for these DNL contours are the F-35A and F-35B afterburner departures closer to the airport and IFR arrivals further away from the airport near the extended runway centerlines. The F-35B vertical landings at the VL pads have an impact at higher DNL levels close to the VL pads, but their contribution to the overall DNL levels diminish away from the VL pads. The primary noise contributor is the F-35A and F-35B afterburner departures, which have equal noise impacts for both the east and west VL pad options. The biggest difference between the Alt 1 and the No Action is in the 60 dBA DNL contour along the extended runway 08/26 centerline. The Alt 1 contour loses the long skinny lobe coming out from the runway 08/26 centerline in the No Action. The reason for this decrease in the 60 dBA contour in Alt 1 (and the Proposed Action) is due to F-35B profile edits during the Ebbing ANGB site visit. During the site visit, every F-35B profile from the FEIS was reviewed for accuracy and several changes were made to the flight profiles. One of the changes that was made was a decrease in the power for the IFR pattern approach and IFR straight-in arrival. The primary contributor in the No Action lobe along the extended runway 08/26 centerline is the F-35B IFR pattern and IFR arrival where the F-35B had a power setting of 55% ETR inside of that long, skinny lobe segment in the 60 dBA DNL contour. However, from the interview with the F-35B pilot, the actual power setting for that segment should be 40% ETR. This causes the lobe to disappear in the SEIS Alt 1 and Proposed Action noise contours, as this reduction in power setting is significant for a straight-in arrival segment. The FEIS F-35B profiles were derived from dated F-35B simulator data, and these updated SEIS F-35B flight profiles were adjusted based on the experience of the F-35B pilot. The No Action 60 dBA DNL lobes located to the southwest (at the state line) and northeast (just across the Arkansas river) were minimized in the Alt 1 60 dBA DNL contour due to flight track changes during the pilot interviews that moved the flight tracks away from those corridors.

Figure 5-4 presents the Proposed Action 65 dBA DNL contours at FSM in dashed purple (west VL site) and dashed yellow (east VL site) compared to the No Action FEIS contours in dark blue. The Proposed Action 65 dBA contour extends to approximately the same distance as the No Action and Alt 1 65 dBA DNL contour along the extended runway 08/26 centerline. However, the Proposed Action 65 dBA DNL contour extends approximately 400 ft further to the north than the Alt 1 65 dBA contour and approximately 600 ft further to the south at the widest section compared to the Alt 1 contour north and south of the airfield. The reason for the greater expansion of the Proposed Action contour compared to the Alt 1 and No Action contours is the increase in frequency of afterburner departures. While the Alt 1 and Proposed Action both have the same ratio of F-35A and F-35B afterburner to military power departures, the Proposed Action adds an additional 1,500 annual F-35B sorties and removes 65 annual F-35A sorties compared to Alt 1. These changes result in a net increase of 1,435 annual sorties, of which 95% utilize afterburner departure. This increase causes the greater expansion of the 65 dBA DNL contour to the north and south of the airfield.

Figures 5-5 and 5-6 display the Proposed Action vs. No Action 60-85 dBA DNL contours for both the west and east vertical landing (VL) pad options, respectively. The VL pad locations have a larger effect on the 75, 80, and 85 dBA DNL contours close to the pads because of the increase in 1,500 annual F-35B sorties for the Proposed Action. The same differences between the Alt 1 and the No Action DNL contours apply to the Proposed Action vs. No Action DNL contours. The reason that the Proposed Action and Alt 1 DNL contours are so similar is that the only difference between the Proposed Action and Alt 1 is the change in the number of F-35A and F-35B operations. All other modifications made for Alt 1 including flight track and flight profiles changes of the F-35A and F-35B also apply to the Proposed Action. Several of the Proposed Action and Alt 1 DNL lobes extend to the south of the airfield because the overhead break and closed patterns are all to the south of the airfield. The Proposed Action and Alt 1 lobe in the 60 dBA contour to the northwest of the airfield is larger than the No Action 60 dBA lobe at that same spot because of the shift in Runway 26 departures. In the No Action, departures from Runway 26 turned north to Shirley MOA and also turned south to Hog MOA west side. However, the AETC pilots stated that this southern departure to Hog MOA does not occur. Thus, all departures from Runway 26 are to the north towards Shirley and Hog MOA east side. This shifting of the departures to this north turn track causes the increase in the northwest lobe and a decrease in the southwest lobe in the 60 dBA DNL contour.

Tables 5-1 and 5-2 present the DNL levels of the points of interest (POI) for Alt 1 west VL pad option and east VL pad option compared to the No Action. Minimal differences between the east and west VL pad locations are observed at the POI locations. The east VL pad POI DNL levels are 0.2 dBA higher than the west VL pad at REC_3 (Parrot Island Waterpark) and 0.1 dBA higher at REC_4 (Ben Geren Regional Park). All other POI locations have identical results between the two pad locations. The largest increase in DNL between the No Action and Alt 1 is at POI location POW_1, Cliff Terrace Church, which has a 2.6 dBA increase in DNL from 64.4 dBA in the No Action to 66.0 dBA in Alt 1. The second largest increase is at POI location SCH_3, Southside High School, which has a 2.4 dBA increase in DNL from 62.8 dBA in the No Action to 65.2 dBA in Alt 1. All other POI locations have an increase under 2 dBA from the No Action to Alt 1.

Tables 5-3 and 5-4 present the DNL levels of the POI for the Proposed Action west VL pad option and east VL pad option compared to the No Action. There is a slight increase in DNL at four of the POI locations from the west pad location to the east pad location. These four POI see an increase of 0.1 to 0.4 under the east pad VL location compared to the west pad VL location. Compared to the No Action DNL, the POI locations see an increase of up to 3.5 dBA. The largest increases in the Proposed Action of 3.5 dBA and 3.3 dBA occur at POW_1, Cliff Terrace Church and SCH_3, Southside High School, respectively. One other location, REC_4 (Ben Geren Regional Park), has in increase above 3.0 dBA, which occurs for the Proposed Action east VL pad scenario.

The SUA analysis L_{dnmr} and DNL results are displayed in Tables 5-5 and 5-6 for Alt 1 compared to the No Action and the Proposed Action compared to the No Action (FEIS ROD). L_{dnmr} is the preferred noise metric for aircraft noise in training areas and along MTRs since this metric accounts for the sudden onset of noise for low-altitude, high-speed aircraft operations, which is more conservative metric compared to DNL. DNL results are provided at the request of the FAA. The Alt 1 and Proposed Action results show lower noise levels than the No Action in Hog MOA because the AETC pilots stated that they would not fly lower than 500 ft AGL in Hog MOA, which is a change from the FEIS. A change was made to the modeled floor of R2402B. In the No Action, the aircraft were modeled below the floor, but the SEIS modeling corrected this error. Additionally, there were improvements made to the MRNMap model [33] between the No Action FEIS and these Alt 1 and Proposed Action scenarios. This MRNMap improvement accounts for the decreases in noise between the No Action and the Alt 1 and Proposed Action scenarios in the avoidance areas and MTRs. Most L_{dnmr} noise levels in the SUAs are less than 60 dBA, and all DNL noise levels in the SUAs are under 60 dBA. The areas where the projected levels are greater than 60 dBA L_{dnmr} lie within the Restricted airspace that composes Razorback Range or directly under the MTR in Hog A MOA.

Table 5-7 presents the number of events exceeding L_{Amax} 85 dBA under the SUAs in Alt 1 and the Proposed Action compared to the EIS ROD results. For many of the SUAs, the number of events exceeding L_{Amax} 85 dBA decreased compared to the FEIS ROD results due to the MRNMap improvements and increase in the Hog MOA floor (no lower than 500 ft AGL) for the F-35A/B in the SEIS. The only increases for Alt 1 and the Proposed Action compared to the FEIS ROD are under R-2401B (increase in 0.4 daily events) and several of the VR and IR routes (increases between 0.1 and 0.3 daily events).

The air gunnery noise model Peak Pressure Level (L_{pk}) comparative results are displayed in Figure 5-3 for LAS of the A-10 (in black), F-16 (in blue) and F-35 (in green). This comparison shows that both the F-16 and F-35 strafing noise is less than the existing A-10 strafing noise. This single event noise analysis of the weapons systems in the A-10, F-16, and F-35 hasn't changed between the No Action, Alt 1, and the Proposed Action since the weapons systems of these aircraft types have no changed between the FEIS and the SEIS.

Table 5.8 displays the cumulative sonic boom exposure levels. Projected sonic boom cumulative exposure levels are expected to be under 45 dBC CDNL under Shirley MOAs and ATCAAs. These results are approximately 1 dBC less than the No Action sonic boom exposure results because the estimate of percentage of time of the F-35A/B above 30,000 ft MSL has decreased from 10% in the FEIS to 5% for the Alt 1 and Proposed Action noise modeling. These low boom levels are still well below any threshold for impacts, but the public may hear a few booms throughout the year under and around the Shirley MOAs and ATCAAs.

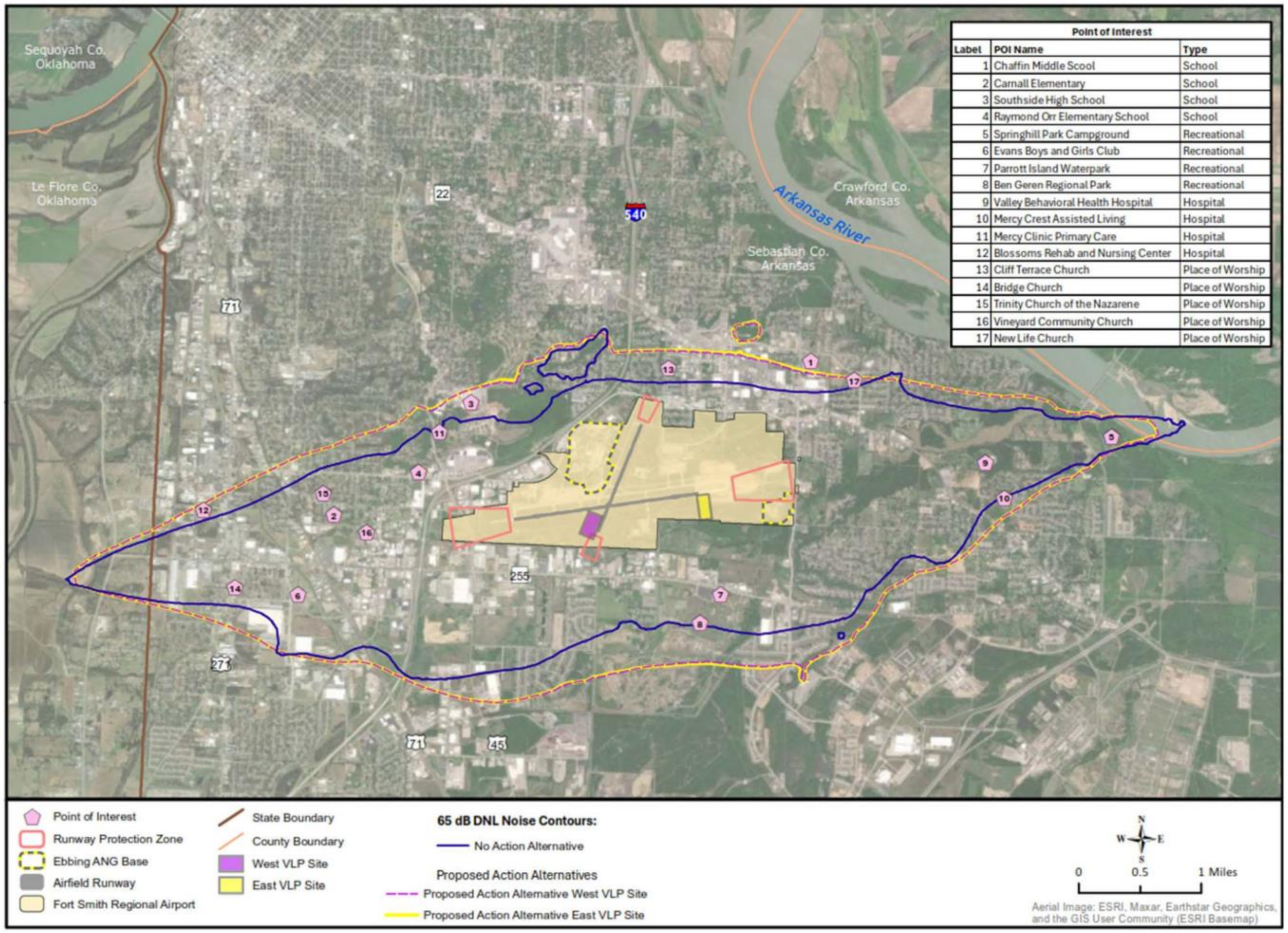
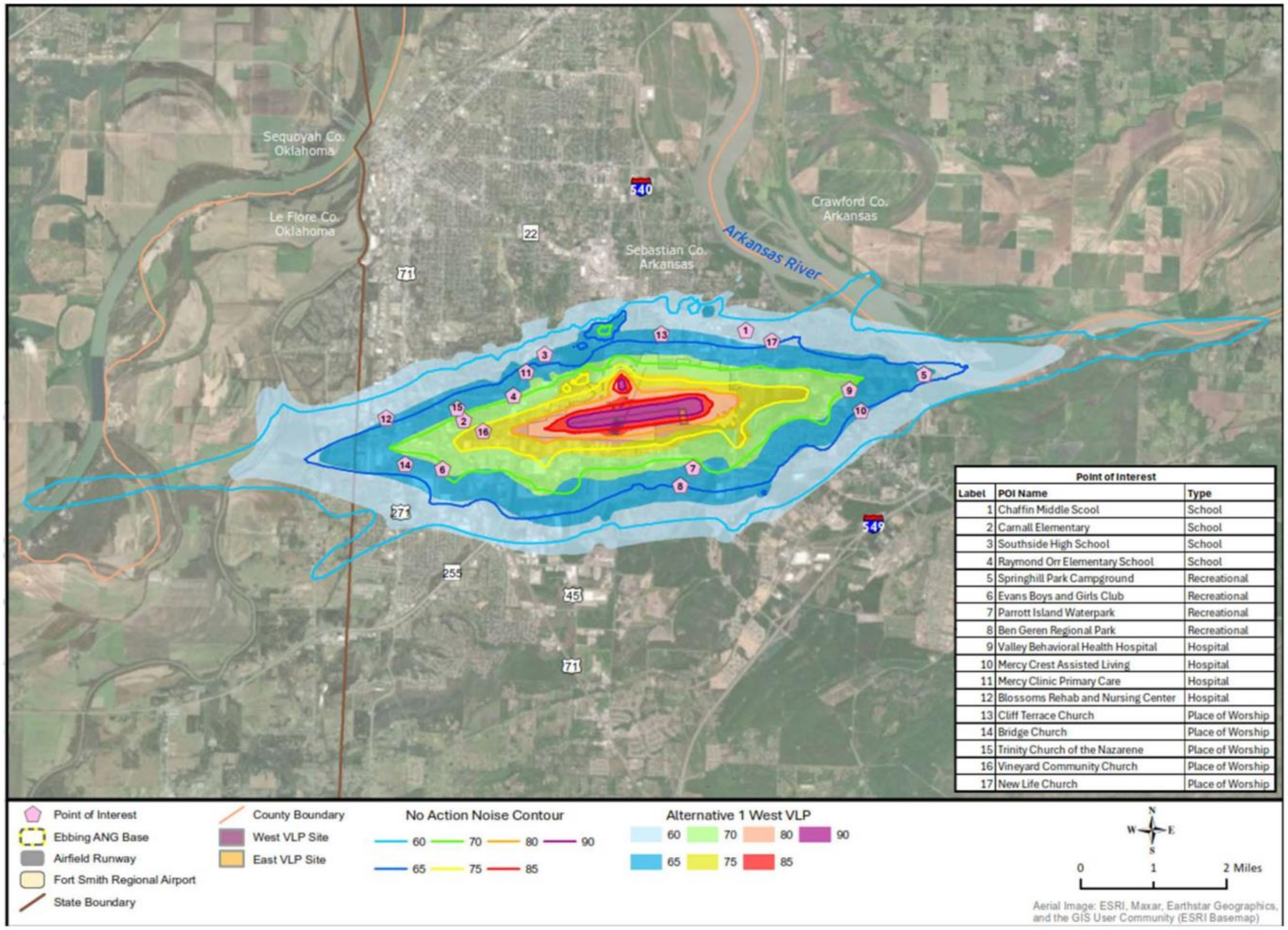


Figure 5-1. FSM Alt 1 vs. No Action 65 dBA DNL Contours for both East and West VL Pad Sites



Point of Interest		
Label	POI Name	Type
1	Chaffin Middle Scool	School
2	Carnall Elementary	School
3	Southside High School	School
4	Raymond Orr Elementary School	School
5	Springhill Park Campground	Recreational
6	Evans Boys and Girls Club	Recreational
7	Parrott Island Waterpark	Recreational
8	Ben Geren Regional Park	Recreational
9	Valley Behavioral Health Hospital	Hospital
10	Mercy Crest Assisted Living	Hospital
11	Mercy Clinic Primary Care	Hospital
12	Blossoms Rehab and Nursing Center	Hospital
13	Cliff Terrace Church	Place of Worship
14	Bridge Church	Place of Worship
15	Trinity Church of the Nazarene	Place of Worship
16	Vineyard Community Church	Place of Worship
17	New Life Church	Place of Worship

Figure 5-2. FSM Alt 1 West VL Pad Site vs. No Action 60-85 dBA DNL Contours

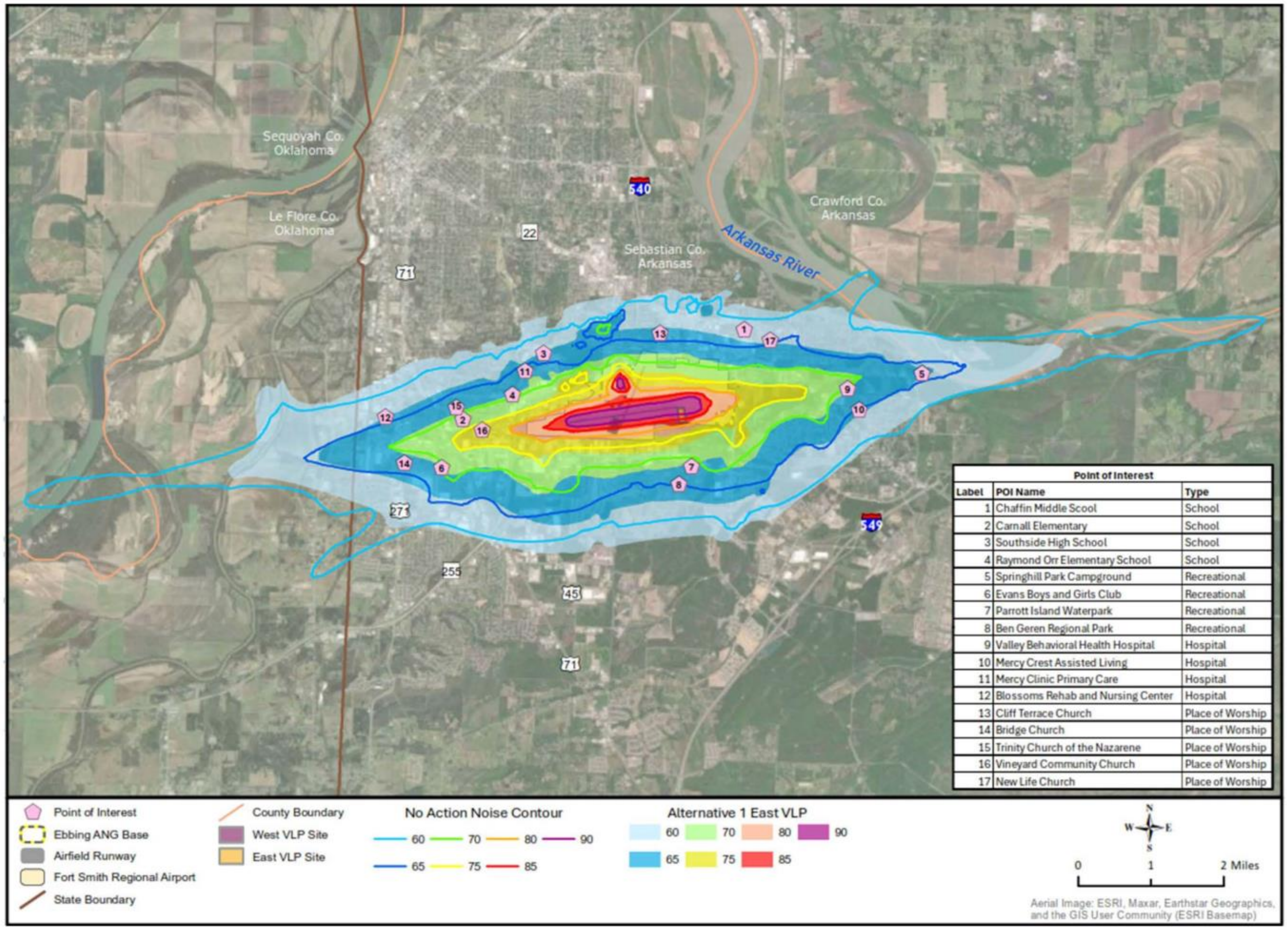


Figure 5-3. FSM Alt 1 East VL Pad Site vs. No Action 60-85 dBA DNL Contours

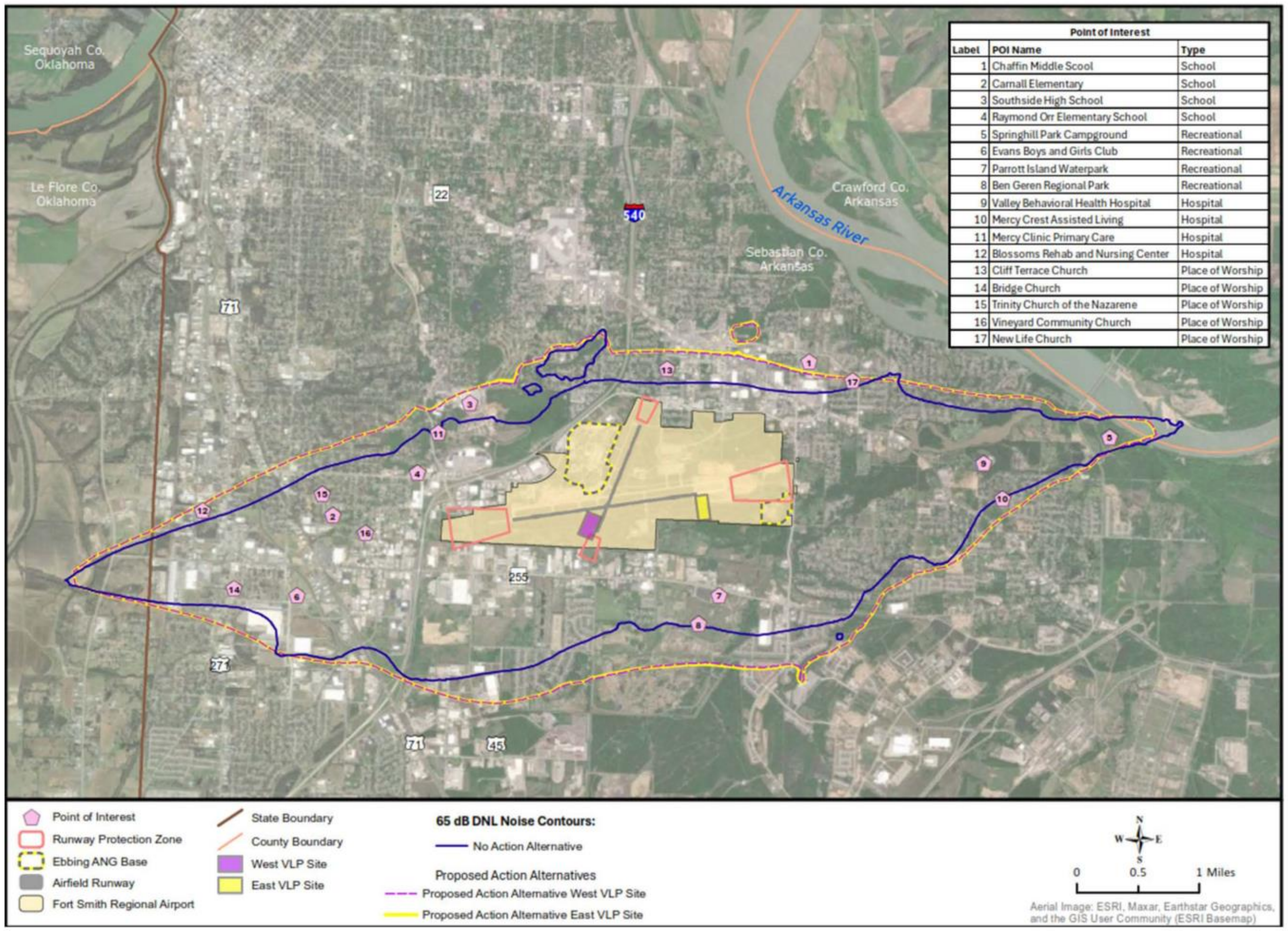


Figure 5-4. FSM Proposed Action vs. No Action 65 dBA DNL Contours for both East and West VL Pad Sites

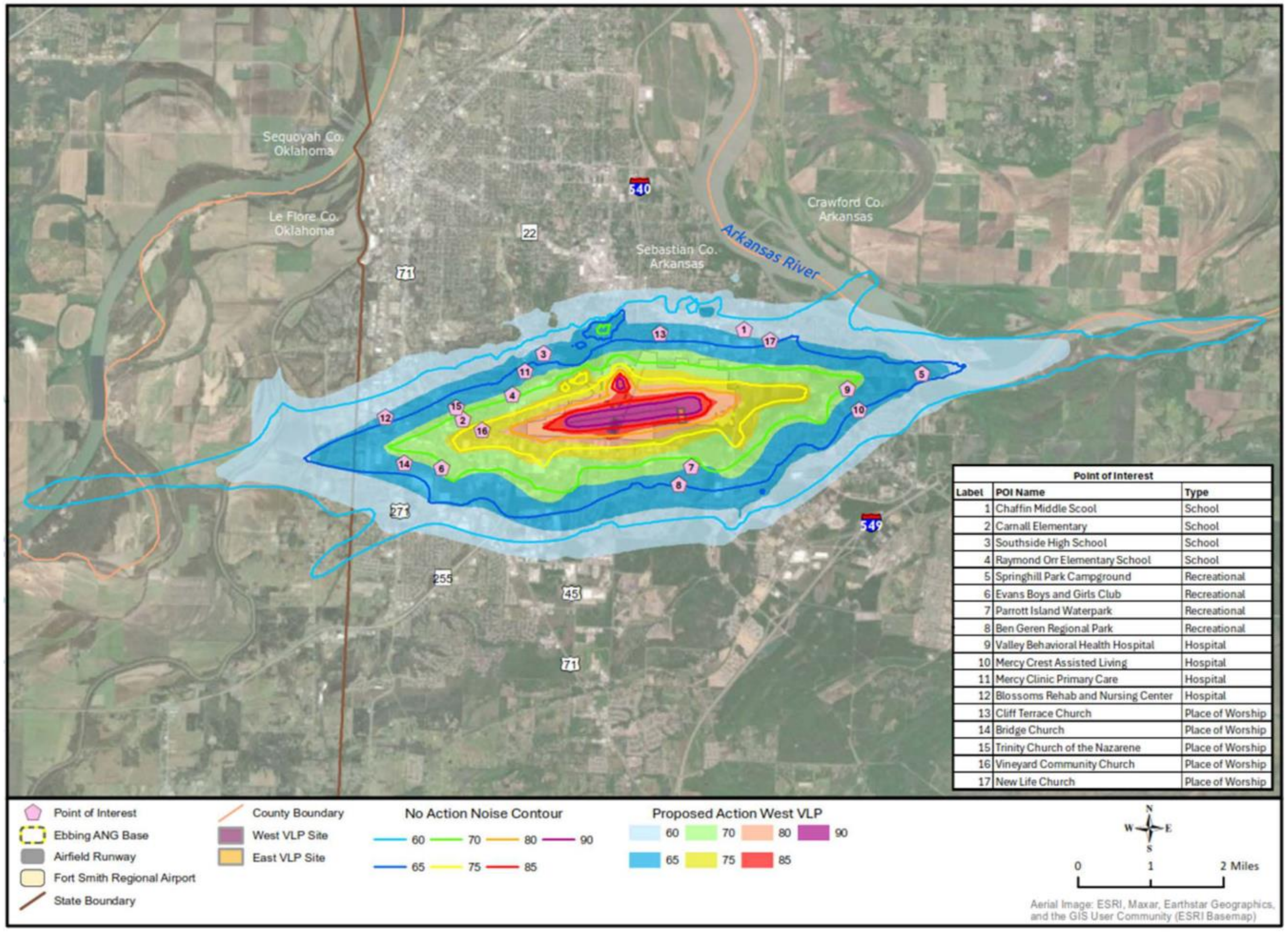


Figure 5-5. FSM Proposed Action West VL Pad Site vs. No Action 60-85 dBA DNL Contours

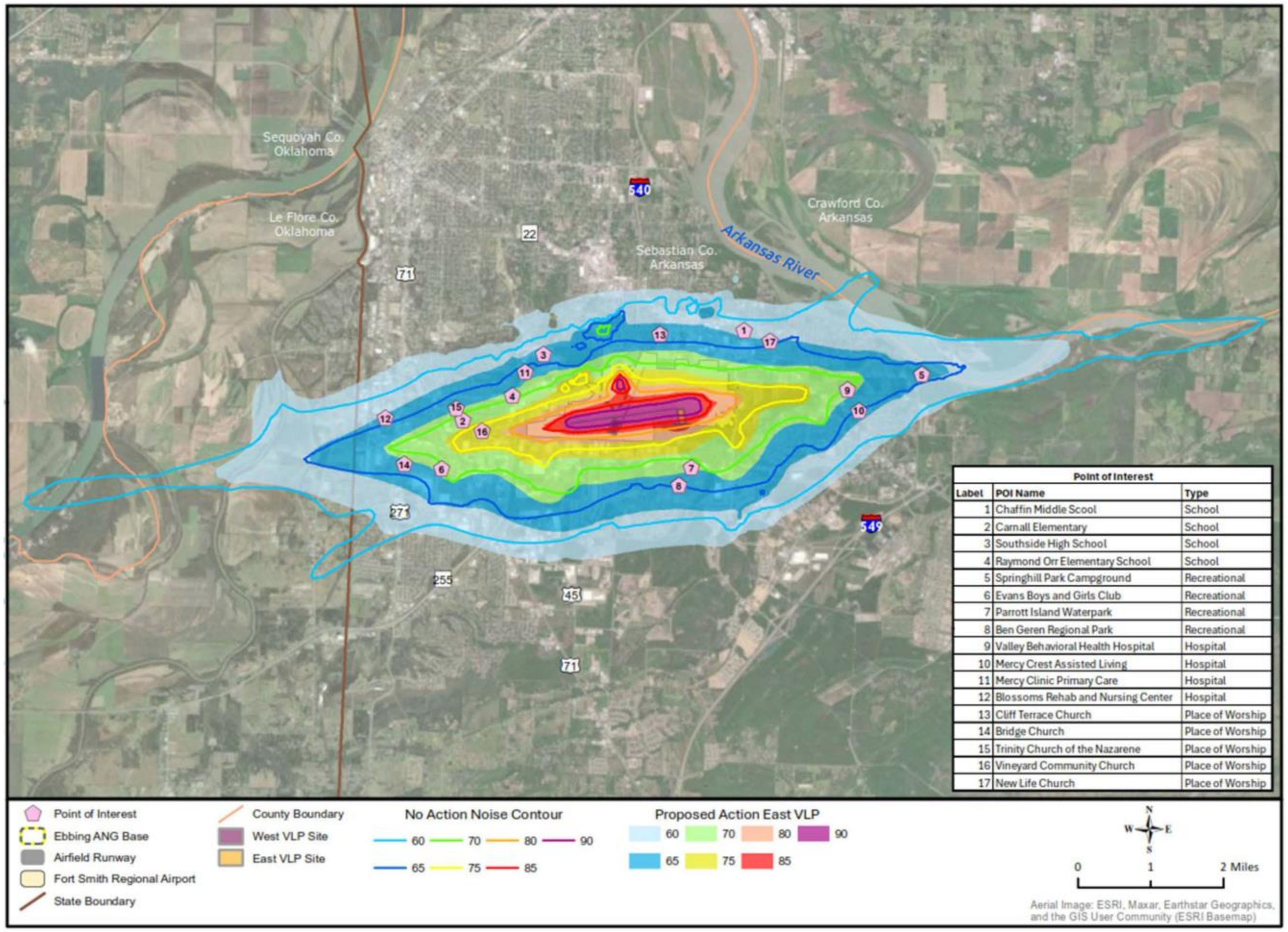


Figure 5-6. FSM Proposed Action East VL Pad Site vs. No Action 60-85 dBA DNL Contours

Table 5-1. FSM Points of Interest (POI) DNL Results for the Alt 1 West VL Pad Option

Point of Interest			DNL (dBA)		
Type	ID	Description	No Action	Proposed Alt 1 West VL Pad	Increase re No Action
Hospital	HSP_1	Valley Behavioral Health Hospital	69.9	70.4	+0.5
	HSP_2	Mercy Crest Assisted Living	64.9	66.0	+1.1
	HSP_3	Mercy Clinic Primary Care	64.8	66.5	+1.7
	HSP_4	Blossoms Rehab and Nursing Center	63.7	64.8	+1.1
Place of Worship	POW_1	Cliff Terrace Church	63.4	66.0	+2.6
	POW_2	Bridge Church	67.1	68.2	+1.1
	POW_3	Trinity Church of the Nazarene	67.9	68.6	+0.7
	POW_4	Vineyard Community Church	77.7	77.9	+0.2
	POW_5	New Life Church	63.9	64.3	+0.4
Recreational	REC_1	Springhill Park Campground	66.2	65.2	-1.0
	REC_2	Evans Boys and Girls Club	69.6	70.0	+0.4
	REC_3	Parrott Island Waterpark	68.3	69.3	+1.0
	REC_4	Ben Geren Regional Park	65.1	67.0	+1.9
School	SCH_1	Chaffin Middle Scool	61.6	63.0	+1.4
	SCH_2	Carnall Elementary	71.8	72.1	+0.3
	SCH_3	Southside High School	62.8	65.2	+2.4
	SCH_4	Raymond Orr Elementary School	69.3	70.2	+0.9

Table 5-2. FSM Points of Interest (POI) DNL Results for the Alt 1 East VL Pad Option

Point of Interest			DNL (dBA)		
Type	ID	Description	No Action	Proposed Alt 1 East VL Pad	Increase re No Action
Hospital	HSP_1	Valley Behavioral Health Hospital	69.9	70.4	+0.5
	HSP_2	Mercy Crest Assisted Living	64.9	66.0	+1.1
	HSP_3	Mercy Clinic Primary Care	64.8	66.5	+1.7
	HSP_4	Blossoms Rehab and Nursing Center	63.7	64.8	+1.1
Place of Worship	POW_1	Cliff Terrace Church	63.4	66.0	+2.6
	POW_2	Bridge Church	67.1	68.2	+1.1
	POW_3	Trinity Church of the Nazarene	67.9	68.6	+0.7
	POW_4	Vineyard Community Church	77.7	77.9	+0.2
	POW_5	New Life Church	63.9	64.3	+0.4
Recreational	REC_1	Springhill Park Campground	66.2	65.2	-1.0
	REC_2	Evans Boys and Girls Club	69.6	70.0	+0.4
	REC_3	Parrott Island Waterpark	68.3	69.5	+1.2
	REC_4	Ben Geren Regional Park	65.1	67.1	+2.0
School	SCH_1	Chaffin Middle Scool	61.6	63.0	+1.4
	SCH_2	Carnall Elementary	71.8	72.1	+0.3
	SCH_3	Southside High School	62.8	65.2	+2.4
	SCH_4	Raymond Orr Elementary School	69.3	70.2	+0.9

Table 5-3. FSM Points of Interest (POI) DNL Results for the Proposed Action West VL Pad Option

Point of Interest			DNL (dBA)		
Type	ID	Description	No Action	Proposed Action West VL Pad	Increase re No Action
Hospital	HSP_1	Valley Behavioral Health Hospital	69.9	71.2	+1.3
	HSP_2	Mercy Crest Assisted Living	64.9	66.7	+1.8
	HSP_3	Mercy Clinic Primary Care	64.8	67.3	+2.5
	HSP_4	Blossoms Rehab and Nursing Center	63.7	65.6	+1.9
Place of Worship	POW_1	Cliff Terrace Church	63.4	66.8	+3.4
	POW_2	Bridge Church	67.1	69.0	+1.9
	POW_3	Trinity Church of the Nazarene	67.9	69.5	+1.6
	POW_4	Vineyard Community Church	77.7	78.9	+1.2
	POW_5	New Life Church	63.9	65.2	+1.3
Recreational	REC_1	Springhill Park Campground	66.2	65.8	-0.4
	REC_2	Evans Boys and Girls Club	69.6	71.0	+1.4
	REC_3	Parrott Island Waterpark	68.3	70.3	+2.0
	REC_4	Ben Geren Regional Park	65.1	68.0	+2.9
School	SCH_1	Chaffin Middle Scool	61.6	63.9	+2.3
	SCH_2	Carnall Elementary	71.8	73.0	+1.2
	SCH_3	Southside High School	62.8	66.1	+3.3
	SCH_4	Raymond Orr Elementary School	69.3	71.1	+1.8

Table 5-4. FSM Points of Interest (POI) DNL Results for the Proposed Action East VL Pad Option

Point of Interest			DNL (dBA)		
Type	ID	Description	No Action	Proposed Action East VL Pad	Increase re No Action
Hospital	HSP_1	Valley Behavioral Health Hospital	69.9	71.2	+1.3
	HSP_2	Mercy Crest Assisted Living	64.9	66.7	+1.8
	HSP_3	Mercy Clinic Primary Care	64.8	67.3	+2.5
	HSP_4	Blossoms Rehab and Nursing Center	63.7	65.6	+1.9
Place of Worship	POW_1	Cliff Terrace Church	63.4	66.9	+3.5
	POW_2	Bridge Church	67.1	69.0	+1.9
	POW_3	Trinity Church of the Nazarene	67.9	69.5	+1.6
	POW_4	Vineyard Community Church	77.7	78.9	+1.2
	POW_5	New Life Church	63.9	65.2	+1.3
Recreational	REC_1	Springhill Park Campground	66.2	65.8	-0.4
	REC_2	Evans Boys and Girls Club	69.6	71.0	+1.4
	REC_3	Parrott Island Waterpark	68.3	70.7	+2.4
	REC_4	Ben Geren Regional Park	65.1	68.2	+3.1
School	SCH_1	Chaffin Middle Scool	61.6	64.0	+2.4
	SCH_2	Carnall Elementary	71.8	73.0	+1.2
	SCH_3	Southside High School	62.8	66.1	+3.3
	SCH_4	Raymond Orr Elementary School	69.3	71.1	+1.8

Table 5-5. Ebbing ANGB SUA L_{dnmr} and DNL Results Under Alt 1

SUA Name	L_{dnmr}, dBA			DNL, dBA		
	No Action	Alt 1	Δ	No Action	Alt 1	Δ
HOG A	57.2	53.5	*-3.7*	55.9	52.3	*-3.6*
w/MTRs	61.2	59.8	-1.4	58.8	57.1	-1.7
HOG B East	57.1	53.7	*-3.4*	55.8	52.3	*-3.5*
w/MTRs	58.9	56.3	-2.6	57.0	54.2	-2.8
HOG B West	48.2	<45	*na*	48.2	<45	*na*
w/MTRs	54.3	53.9	-0.4	52.0	51.0	-1.0
R2401A	57.5	58.8	1.3	57.0	56.9	-0.1
R2401B	54.9	54.9	0.0	50.4	50.4	0.0
R2402A	59.7	60.6	0.9	58.8	58.8	0.0
w/MTRs	61.1	61.6	0.5	59.6	59.2	-0.4
R2402B	57.2	50.8	-6.4	56.8	50.8	-6.0
w/MTRs	61.9	59.1	-2.8	60.4	57.0	-3.4
R2402B&HOG A	60.1	55.1	-5.0	59.3	54.4	-4.9
R2402C	57.1	50.8	-6.3	56.8	50.8	-6.0
SHIRLEY A	<45	<45	na	<45	<45	na
w/MTRs	50.5	50.1	*-0.4*	48.5	47.4	*-1.1*
SHIRLEY B	<45	<45	na	<45	<45	na
SHIRLEY C	<45	<45	na	<45	<45	na
MTRs (Highest section outside of SUA)	L_{dnmr}, dBA			DNL, dBA		
	No Action	Alt 1	Δ	No Action	Alt 1	Δ
VR-189	53	53.4	*0.4*	49.7	50.0	*0.3*
VR-1102	<45	<45	na	<45	<45	na
VR-1103	50.3	52.2	*1.9*	47.1	48.9	*1.8*
VR-1104	48.8	47.0	*-1.8*	45.6	<45	*na*
VR-1113	53.4	55.4	*2*	49.7	51.6	*1.9*
VR-1130	50.5	46.1	*-4.4*	46.9	45.9	*-1*
IR-117	52.9	54.8	*1.9*	49.6	51.4	*1.8*
IR-120	46.1	46.9	*0.8*	45.1	<45	*na*
IR-121	50.1	52.1	*2*	47.5	49.4	*1.9*
IR-164	54.3	52.5	*-1.8*	48.3	48.8	*0.5*
Overlapping MTRs						
IR-117+VR-1113	56.2	58.1	*1.9*	54.2	54.5	*0.3*
IR-120+VR-1102	47.2	47.6	*0.4*	45.1	<45	*na*
IR-121+VR-1103	53.2	55.2	*2*	52	52.2	*0.2*
IR-164+VR-1104	53.8	53.6	*-0.2*	49.5	50	*0.5*
Avoidance Areas	L_{dnmr}, dBA			DNL, dBA		
	No Action	Alt 1	Δ	No Action	Alt 1	Δ
BEARCE (portion under Hog B East)	49.8	49.6	*-0.2*	49.8	47.9	*-1.9*
BOONEVILLE	50.8	47.2	*-3.6*	50.8	47.2	*-3.6*
WALDRON	51.1	48	*-3.1*	51.0	47.6	*-3.4*

1 **Table 5-6. Ebbing ANGB SUA L_{dnmr} and DNL Results Under the Proposed Action**

SUA Name	L_{dnmr}, dBA			DNL, dBA		
	No Action	PAA	Δ	No Action	PAA	Δ
HOG A	57.2	55.0	*-2.2*	55.9	53.9	*-2.0*
w/MTRs	61.2	61.0	*-0.2*	58.8	58.2	*-0.6*
HOG B East	57.1	55.2	*-1.9*	55.8	53.8	*-2.0*
w/MTRs	58.9	57.7	*-1.2*	57.0	55.5	*-1.5*
HOG B West	48.2	45.6	*-2.6*	48.2	45.6	*-2.6*
w/MTRs	54.3	54.9	*0.6*	52.0	52.0	*0.0*
R2401A	57.5	60.0	*2.5*	57.0	57.3	*0.3*
R2401B	54.9	54.9	*0.0*	50.4	50.4	*0.0*
R2402A	59.7	61.4	*1.7*	58.8	59.0	*0.2*
w/MTRs	61.1	62.5	*1.4*	59.6	59.7	*0.1*
R2402B	57.2	50.9	*-6.3*	56.8	50.9	*-5.9*
w/MTRs	61.9	60.2	*-1.7*	60.4	58.0	*-2.4*
R2402B&HOG A	60.1	56.3	*-3.8*	59.3	55.4	*-3.9*
R2402C	57.1	50.8	*-6.3*	56.8	50.8	*-6.0*
SHIRLEY A	<45	<45	na	<45	<45	na
w/MTRs	50.5	51.2	*0.7*	48.5	48.5	*0.0*
SHIRLEY B	<45	<45	na	<45	<45	na
SHIRLEY C	<45	<45	na	<45	<45	na
MTRs (Highest section outside of SUA)	L_{dnmr}, dBA			DNL, dBA		
	No Action	PAA	Δ	No Action	PAA	Δ
VR-189	53	54.4	*1.4*	49.7	50.9	*1.2*
VR-1102	<45	<45	na	<45	<45	na
VR-1103	50.3	53.0	*2.7*	47.1	49.6	*2.5*
VR-1104	48.8	48.1	*-0.7*	45.6	<45	*na*
VR-1113	53.4	56.5	*3.1*	49.7	52.7	*3.0*
VR-1130	50.5	47.0	*-3.5*	46.9	46.9	*0.0*
IR-117	52.9	55.7	*2.8*	49.6	52.2	*2.6*
IR-120	46.1	48.0	*1.9*	45.1	<45	*na*
IR-121	50.1	52.9	*2.8*	47.5	50.0	*2.5*
IR-164	54.3	53.7	*-0.6*	48.3	49.9	*1.6*
Overlapping MTRs						
IR-117+VR-1113	56.2	59.1	*2.9*	52.7	55.5	*2.8*
IR-120+VR-1102	47.2	48.7	*1.5*	<45	45.7	*1.3*
IR-121+VR-1103	53.2	56	*2.8*	50.3	52.8	*2.5*
IR-164+VR-1104	53.8	54.8	*1.0*	49.5	51	*1.5*
Avoidance Areas	L_{dnmr}, dBA			DNL, dBA		
	No Action	PAA	Δ	No Action	PAA	Δ
BEARCE (portion under Hog B East)	49.8	51.1	*1.3*	49.8	49.4	*-0.4*
BOONEVILLE	50.8	48.6	*-2.2*	50.8	48.6	*-2.2*
WALDRON	51.1	49.3	*-1.8*	51.0	49	*-2.0*

2

1 **Table 5-7. Ebbing ANGB SUA NA85 L_{Amax} Results Under Alt 1 and the Proposed Action**

Airspace Description	2023 FMS PTC FEIS ROD NA85 L_{Amax}	Alternative 1 NA85 L_{Amax}	Change	Proposed Action NA85 L_{Amax}	Change
	# Events	# Events	# Events	# Events	# Events
HOG A MOA	1.5	0.5	-1	0.6	-0.9
Hog A MOA and MTRs	1.5	1.1	-0.4	1.2	-0.3
HOG B MOA (eastern portion)	1.3	0.5	-0.8	0.6	-0.7
HOG B MOA (eastern portion) and MTRs	1.3	0.6	-0.7	0.7	-0.6
HOG B MOA (western portion)	1.2	0.3	-0.9	0.4	-0.8
HOG B MOA (western portion) and MTRs	1.2	0.4	-0.8	0.5	-0.7
R-2401A	1.9	1.8	-0.1	1.8	-0.1
R-2401B	0.3	0.7	0.4	0.7	0.4
R-2402A	4.7	3.1	-1.6	3.1	-1.6
R-2402 and MTRs	5.8	3.6	-2.2	3.6	-2.2
R-2402B	4.2	0	-4.2	0	-4.2
R-2402B and MTRs	5.5	0.5	-5	0.5	-5
R-2402B and HOG A MOA	5.5	0	-5.5	0	-5.5
R-2402C	4.1	0	-4.1	0	-4.1
SHIRLEY A MOA	0.3	0	-0.3	0	-0.3
Shirley A MOA and MTRs	0.3	0	-0.3	0	-0.3
SHIRLEY B MOA	0.3	0	-0.3	0	-0.3
SHIRLEY C MOA	0.3	0	-0.3	0	-0.3
VR-189	0	0.1	0.1	0.1	0.1
VR-1102	0	0	0	0	0
VR-1103	0	0	0	0	0
VR-1104	0	0	0	0	0
VR-1113	0	0.1	0.1	0.1	0.1
VR-1130	0	0.1	0.1	0.1	0.1
IR-117	0	0.2	0.2	0.2	0.2
IR-120	0	0	0	0	0
IR-121	0	0.1	0.1	0.1	0.1
IR-164	0	0	0	0	0
IR-117 and VR-1113	0	0.3	0.3	0.3	0.3
IR-120 and VR-1102	0	0	0	0	0
IR-121 and VR-1103	0	0.1	0.1	0.1	0.1
IR-164 and VR-1104	0	0	0	0	0
BEARCE (Avoidance Area, portion under Hog B East)	0	0	0	0	0
BOONEVILLE (Avoidance Area)	1.2	0	-1.2	0	-1.2
WALDRON (Avoidance area)	1.2	0	-1.2	0	-1.2

2

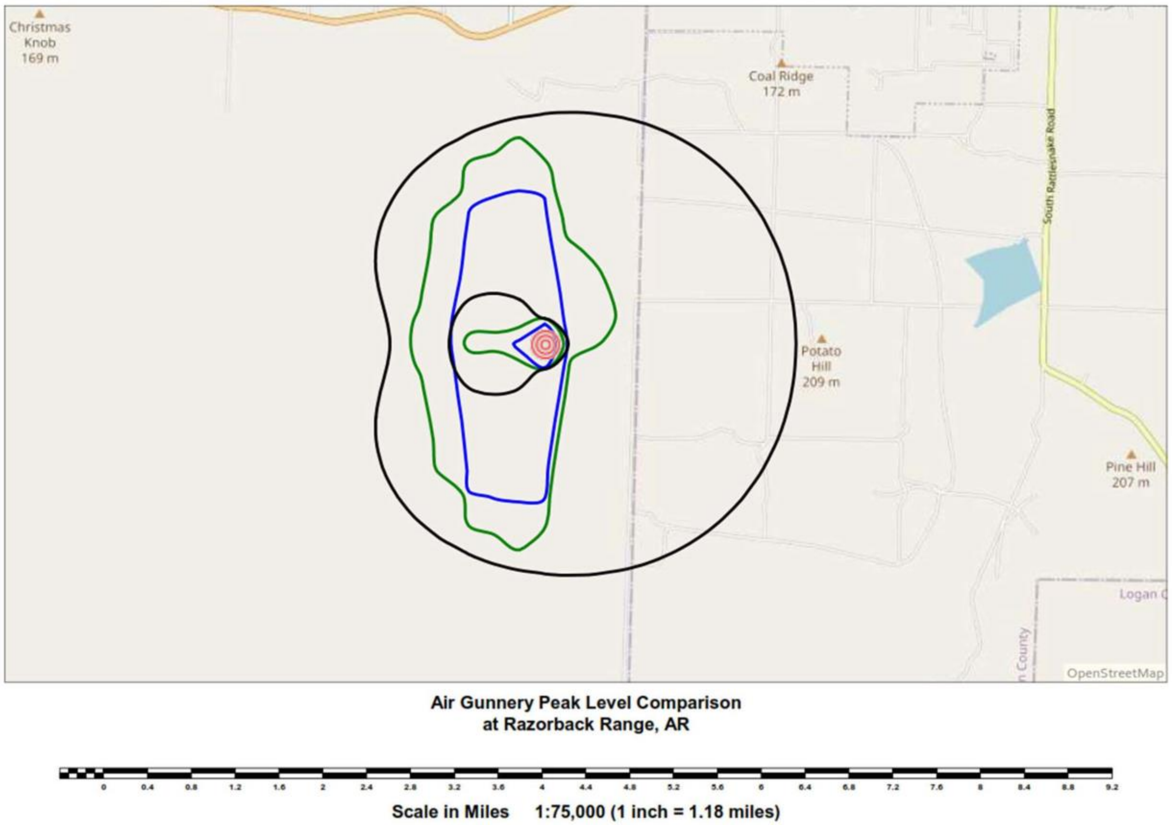


Figure 5-7. Razorback Range LAS Air Gunnery Peak Pressure Level (L_{pk}) Comparative Results

Table 5-8. Ebbing ANGB Cumulative Sonic Boom Exposure Levels

Ebbing ANGB Cumulative Sonic Boom Exposure Levels for Alt 1

Aircraft	Mission	% Time Above FL300	% Sorties with Supersonic Segments	Annual Day	Annual Night	Annual Adj for Monthly Rates & above FL300	CDNL at Center, dBC	SUA Units
RSAF F-16D	TI	10%	20%	1313.2	26.8	32.9	40.2	Shirley
	DCA	10%	10%					Shirley
	OCA	10%	20%					Shirley
F-35	TI/Strike/DCA/OCA	5%	20%	467.0	0.0	9.7	34.9	Shirley
	LFE	5%	20%	319.0	1.0	6.9	33.4	Shirley
Other	other	10%	10%	522.0	16.0	14.2	36.5	Shirley
				TOTAL CDNL at Center of Shirley			43.1	

Ebbing ANGB Cumulative Sonic Boom Exposure Levels for PAA

Aircraft	Mission	% Time Above FL300	% Sorties with Supersonic Segments	Annual Day	Annual Night	Annual Adj for Monthly Rates & above FL300	CDNL at Center, dBC	SUA Units
RSAF F-16D	TI	10%	20%	1313.2	26.8	32.9	40.2	Shirley
	DCA	10%	10%					Shirley
	OCA	10%	20%					Shirley
F-35	TI/Strike/DCA/OCA	5%	20%	612.0	0.0	12.8	36.1	Shirley
	LFE	5%	20%	418.0	2.0	9.1	34.6	Shirley
Other	other	10%	10%	522.0	16.0	14.2	36.5	Shirley
				TOTAL CDNL at Center of Shirley			43.4	

6 SUPPLEMENTAL METRICS RESULTS

The supplemental metrics noise results at each of the Points of Interest (POI) are presented in this section. The POI chosen for analysis include representative hospitals/clinics, places of worship, schools, and recreational areas/parks. Tables 6-1 through 6-3 present the Probability of Awakening at the POI results for the No Action, Alternative 1, and the Proposed Action. The results were identical for the east and west VL pad options, so the results shown are for both options. All locations are displayed for these results to provide a frame of reference. If a residential area is near a school, for example, then the probability of awakening for that area would be very similar to the results at the school. A decrease of one to two in the probability of awakening occurs at most of the POI locations for Alternative 1 and the Proposed Action compared to the No Action, because the percentage of acoustic nighttime (2200-0700) arrivals of the F-35A and F-35B decreased from 9% in the No Action to 2% in Alternative 1 and the Proposed Action. This decrease leads to generally lower percentages of awakening at the POI locations. In Alt 1, the probability of awakening is between 3% and 5% for windows open and between 2% and 4% for windows closed. For the Proposed Action, the probability of awakening is between 4% and 6% for windows open and between 2% and 4% for windows closed. The Vineyard Community Church has the highest probability of awakening in the Proposed Action at 6% for windows open and 4% for windows closed. However, this result is a decrease of 2% for windows open and a decrease of 1% for windows closed compared to the No Action.

The indoor speech interference results at the POI are shown in Tables 6-4 through 6-8. The results are presented as the annual average daily indoor acoustic daytime (0700-2200) number of events per hour. These events have an indoor sound level of at least 50 dBA. The results are shown for windows open (15 dBA noise level reduction through the home) and windows closed (25 dBA noise level reduction through the home and windows). The maximum number of indoor events per hour (on an annual average day basis) greater than a 50 dBA threshold is five events per hour for the No Action at POW_4 (Vineyard Community Church) for windows open and four events per hour at this same location for windows closed. For Alt 1, the greatest increase is 0.6 events per hour at two of the hospital POI locations (HSP_1 and HSP_2) for windows closed and the East VL Pad option. For the Proposed Action, the greatest increase is 1.2 events per hour at REC_2 (Evans Boys and Girls Club) for windows open and 1.1 events per hour at two hospital POI locations (HSP_1 and HSP_2) for windows closed.

The indoor classroom learning disruption for the four applicable school locations is presented in Tables 6-9 through 6-11. The outdoor $L_{eq(8h)}$ is between 62.5 and 72.7 dBA at the schools for the No Action, which is above the recommended DNWG guideline of 60 dBA [27], and increases by 0.5 to 2.4 dBA for Alt 1 and between 1.4 and 3.3 dBA for the Proposed Action. The results at the schools were identical under the east and west VL pad options for Alt 1 and the Proposed Action. The number of events per hour above 50 dBA with the windows open or closed increases by under 0.2 events per hour for Alt 1 and under 0.8 events per hour for the Proposed Action compared to the No Action. The greatest increase in events per hour above 50 dBA occurs at SCH_1, Chaffin Middle School, which has an increase of 0.2 events per hour with the windows closed under Alt 1 and an increase of 0.8 events per hour with the windows closed under the Proposed Action.

The recreational outdoor interference for the No Action, Alt 1, and the Proposed Action are displayed in Tables 6-12 through 6-15. The recreational POI have on average between 4.6 and 7.3 events per hour over 50 dBA for the No Action. The events per hour over 50 dBA during the acoustic daytime for Alt 1 decreases by 0.2 to 1.4 dBA compared to the No Action. The reason for this decrease is in the fleetmix change between the No Action and Alt 1 for the civil aircraft. The FEIS modeled a civil aircraft fleetmix with more regional jets and business jets than the current fleetmix based on the 2029 TAF with fewer jets. This decrease in civil jet aircraft in the SEIS causes a shift in the civil aircraft noise of the jets in the 50 dBA to 55 dBA range at the POI locations, which is just above the threshold for the 50 dBA L_{Amax}, to less than 50 dBA (which is below the cutoff for the number of events above 50 dBA L_{Amax} metric). For the Proposed Action scenario, there is an increase in the number of F-35B operations, which offsets the decrease in number of events above 50 dBA L_{Amax} from the civil aircraft operations. The net result is an increase in the events per hour over 50 dBA of up to 0.5 events per hour during acoustic daytime and an increase of up to 0.2 events per hour during acoustic nighttime.

Tables 6-16 through 6-18 display the top noise event (operations with the highest SEL, regardless of the number of operations) at each POI location for the No Action, Alt 1, and Proposed Action scenarios. For the Alt 1 and Proposed Action, the east VL pad option was used for the analysis, since the east VL pad had a 4 dBA higher SEL for the F-35B vertical landing wave off pattern at POI REC_4, Parrott Island Waterpark. For the No Action scenario, two places of worship, three recreational locations, and two schools have the transient F/A-18E/F as the highest contributor, and one place of worship has the transient F-16C as the highest noise event, but the remainder of the POI locations have F-35B or F-16C as the highest SEL noise event. The operation types for the No Action F-35A and F-35B top contributors (highest SEL) vary from military and afterburner departures, IFR patterns, or IFR straight-in arrivals. For Alt 1 and the Proposed Action, the top contributors at seven of the POI locations are the F-35B straight-in to slow landing (STOVL mode) because the higher power in STOVL mode during the slow straight-in arrival results in an SEL that is higher than a conventional straight-in arrival. This differs from the No Action, where all F-35B operations were modeled in conventional mode only.

The SEL and L_{Amax} comparison of aircraft operations at a single POI for reference is displayed in Table 6-19. The POI chosen for the comparison is the Vineyard Community Church (POW_4) due to its proximity to the extended runway 08/26 centerline. For departure operations, the F-35A military departure has the highest SEL at 120 dBA and the highest L_{Amax} at 116 dBA at POW_4. The reason that the military power departure is louder than the afterburner, combat, or short takeoff departure at this location is because the military departure has a lower climb rate and airspeed, and thus, its altitude is lower at this POI location than for the other departure operations. For arrivals, F-35B straight-in to slow landing has the highest SEL at 121 dBA and the F-35B straight-in to vertical landing has the highest L_{Amax} at 117 dBA. For closed pattern operations, the F-35B short takeoff to slow landing pattern has the highest SEL and L_{Amax} at 118 dBA and 115 dBA, respectively. The civilian aircraft are not listed in this table because the highest SEL and L_{Amax} of the civilian aircraft are 10 to 20 dBA less than the highest SEL and L_{Amax} of the military aircraft.

Table 6-1. Average Indoor Nightly (2200-0700) Probability of Awakening at Representative Residential Receptors for No Action

Point of Interest			Annual Average Nightly (2200-0700) Probability of Awakening (%) (1)	
Type	ID	Description	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	6%	4%
	HSP_2	Mercy Crest Assisted Living	4%	3%
	HSP_3	Mercy Clinic Primary Care	4%	3%
	HSP_4	Blossoms Rehab and Nursing Center	4%	3%
Place of Worship	POW_1	Cliff Terrace Church	4%	2%
	POW_2	Bridge Church	5%	3%
	POW_3	Trinity Church of the Nazarene	5%	3%
	POW_4	Vineyard Community Church	8%	5%
	POW_5	New Life Church	4%	3%
Recreational	REC_1	Springhill Park Campground	5%	3%
	REC_2	Evans Boys and Girls Club	5%	3%
	REC_3	Parrott Island Waterpark	5%	3%
	REC_4	Ben Geren Regional Park	5%	2%
School	SCH_1	Chaffin Middle Scool	4%	2%
	SCH_2	Carnall Elementary	6%	4%
	SCH_3	Southside High School	4%	2%
	SCH_4	Raymond Orr Elementary School	5%	3%

(1) assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-2. Average Indoor Nightly (2200-0700) Probability of Awakening at Representative Residential Receptors for Alternative 1 East and West VL Pad Options

Point of Interest			Annual Average Nightly (2200-0700) Probability of Awakening (%) [1]			
			Proposed Action Alt 1 West VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	4%	3%	-2%	-1%
	HSP_2	Mercy Crest Assisted Living	3%	2%	-1%	-1%
	HSP_3	Mercy Clinic Primary Care	3%	2%	-1%	-1%
	HSP_4	Blossoms Rehab and Nursing Center	3%	2%	-1%	-1%
Place of Worship	POW_1	Cliff Terrace Church	4%	2%	-	-
	POW_2	Bridge Church	4%	2%	-1%	-1%
	POW_3	Trinity Church of the Nazarene	4%	2%	-1%	-1%
	POW_4	Vineyard Community Church	6%	4%	-2%	-1%
	POW_5	New Life Church	3%	2%	-1%	-1%
Recreational	REC_1	Springhill Park Campground	3%	2%	-2%	-1%
	REC_2	Evans Boys and Girls Club	4%	3%	-1%	-
	REC_3	Parrott Island Waterpark	4%	3%	-1%	-
	REC_4	Ben Geren Regional Park	4%	2%	-1%	-
School	SCH_1	Chaffin Middle Scool	3%	2%	-1%	-
	SCH_2	Carnall Elementary	5%	3%	-1%	-1%
	SCH_3	Southside High School	3%	2%	-1%	-
	SCH_4	Raymond Orr Elementary School	4%	3%	-1%	-

(1) assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-3. Average Indoor Nightly (2200-0700) Probability of Awakening at Representative Residential Receptors for Proposed Action East and West VL Pad Options

Point of Interest			Annual Average Nightly (2200-0700) Probability of Awakening (%) (1)			
			Proposed Action West VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	5%	3%	-1%	-1%
	HSP_2	Mercy Crest Assisted Living	4%	2%	-	-1%
	HSP_3	Mercy Clinic Primary Care	4%	2%	-	-1%
	HSP_4	Blossoms Rehab and Nursing Center	4%	2%	-	-1%
Place of Worship	POW_1	Cliff Terrace Church	4%	2%	-	-
	POW_2	Bridge Church	4%	3%	-1%	-
	POW_3	Trinity Church of the Nazarene	4%	3%	-1%	-
	POW_4	Vineyard Community Church	6%	4%	-2%	-1%
	POW_5	New Life Church	4%	2%	-	-1%
Recreational	REC_1	Springhill Park Campground	4%	2%	-1%	-1%
	REC_2	Evans Boys and Girls Club	5%	3%	-	-
	REC_3	Parrott Island Waterpark	5%	3%	-	-
	REC_4	Ben Geren Regional Park	4%	3%	-1%	+1%
School	SCH_1	Chaffin Middle Scool	4%	2%	-	-
	SCH_2	Carnall Elementary	5%	3%	-1%	-1%
	SCH_3	Southside High School	4%	2%	-	-
	SCH_4	Raymond Orr Elementary School	5%	3%	-	-

(1) assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-4. Indoor Speech Interference for No Action Conditions

Point of Interest			Annual Average Daily Indoor Daytime (0700-2200) Events per Hour (1)	
Type	ID	Description	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	4.0	2.1
	HSP_2	Mercy Crest Assisted Living	3.2	1.6
	HSP_3	Mercy Clinic Primary Care	3.6	2.0
	HSP_4	Blossoms Rehab and Nursing Center	2.6	1.6
Place of Worship	POW_1	Cliff Terrace Church	3.2	2.5
	POW_2	Bridge Church	3.6	1.9
	POW_3	Trinity Church of the Nazarene	4.0	2.1
	POW_4	Vineyard Community Church	5.1	4.0
	POW_5	New Life Church	3.9	2.1
Recreational	REC_1	Springhill Park Campground	2.3	1.5
	REC_2	Evans Boys and Girls Club	4.1	2.7
	REC_3	Parrott Island Waterpark	4.3	3.0
	REC_4	Ben Geren Regional Park	4.1	3.5
School	SCH_1	Chaffin Middle Scool	3.3	2.3
	SCH_2	Carnall Elementary	4.6	2.9
	SCH_3	Southside High School	3.3	2.4
	SCH_4	Raymond Orr Elementary School	4.4	2.9

(1) with an indoor Maximum Sound Level of at Least 50 dB; assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-5. Indoor Speech Interference for Alternative 1 West VL Pad Option

Point of Interest			Annual Average Daily Indoor Daytime (0700-2200) Events per Hour (1)			
			Proposed Action Alt 1 West VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	3.5	2.5	-0.5	+0.4
Hospital	HSP_2	Mercy Crest Assisted Living	3.5	2.2	+0.3	+0.6
Hospital	HSP_3	Mercy Clinic Primary Care	3.7	2.4	+0.1	+0.4
Hospital	HSP_4	Blossoms Rehab and Nursing Center	3.0	2.0	+0.4	+0.4
Place of Worship	POW_1	Cliff Terrace Church	3.5	2.7	+0.3	+0.2
Place of Worship	POW_2	Bridge Church	3.7	2.3	+0.1	+0.4
Place of Worship	POW_3	Trinity Church of the Nazarene	3.8	2.4	-0.2	+0.3
Place of Worship	POW_4	Vineyard Community Church	4.7	3.7	-0.4	-0.3
Place of Worship	POW_5	New Life Church	3.5	2.6	-0.4	+0.5
Recreational	REC_1	Springhill Park Campground	2.6	1.3	+0.3	-0.2
Recreational	REC_2	Evans Boys and Girls Club	3.9	2.9	-0.2	+0.2
Recreational	REC_3	Parrott Island Waterpark	4.2	3.1	-0.1	+0.1
Recreational	REC_4	Ben Geren Regional Park	4.1	3.4	-	-0.1
School	SCH_1	Chaffin Middle Scool	3.4	2.5	+0.1	+0.2
School	SCH_2	Carnall Elementary	4.2	2.9	-0.4	-
School	SCH_3	Southside High School	3.4	2.5	+0.1	+0.1
School	SCH_4	Raymond Orr Elementary School	4.2	2.9	-0.2	-

(1) with an indoor Maximum Sound Level of at Least 50 dB; assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-6. Indoor Speech Interference for Alternative 1 East VL Pad Option

Point of Interest			Annual Average Daily Indoor Daytime (0700-2200) Events per Hour (1)			
			Proposed Action Alt 1 East VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	3.5	2.7	-0.5	+0.6
Hospital	HSP_2	Mercy Crest Assisted Living	3.5	2.2	+0.3	+0.6
Hospital	HSP_3	Mercy Clinic Primary Care	3.7	2.3	+0.1	+0.3
Hospital	HSP_4	Blossoms Rehab and Nursing Center	3.0	2.0	+0.4	+0.4
Place of Worship	POW_1	Cliff Terrace Church	3.5	2.6	+0.3	+0.1
Place of Worship	POW_2	Bridge Church	3.7	2.3	+0.1	+0.4
Place of Worship	POW_3	Trinity Church of the Nazarene	3.8	2.5	-0.2	+0.4
Place of Worship	POW_4	Vineyard Community Church	4.7	4.1	-0.4	+0.1
Place of Worship	POW_5	New Life Church	3.6	2.6	-0.3	+0.5
Recreational	REC_1	Springhill Park Campground	2.6	1.5	+0.3	-
Recreational	REC_2	Evans Boys and Girls Club	3.8	3.0	-0.3	+0.3
Recreational	REC_3	Parrott Island Waterpark	4.2	3.1	-0.1	+0.1
Recreational	REC_4	Ben Geren Regional Park	4.1	3.4	-	-0.1
School	SCH_1	Chaffin Middle Scool	3.4	2.5	+0.1	+0.2
School	SCH_2	Carnall Elementary	4.2	3.0	-0.4	+0.1
School	SCH_3	Southside High School	3.4	2.5	+0.1	+0.1
School	SCH_4	Raymond Orr Elementary School	4.2	2.9	-0.2	-

(1) with an indoor Maximum Sound Level of at Least 50 dB; assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-7. Indoor Speech Interference for Proposed Action West VL Pad Option

Point of Interest			Annual Average Daily Indoor Daytime (0700-2200) Events per Hour (1)			
			Proposed Action West VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	4.1	3.0	+0.1	+0.9
	HSP_2	Mercy Crest Assisted Living	4.0	2.7	+0.8	+1.1
	HSP_3	Mercy Clinic Primary Care	4.3	2.9	+0.7	+0.9
	HSP_4	Blossoms Rehab and Nursing Center	3.6	2.5	+1.0	+0.9
Place of Worship	POW_1	Cliff Terrace Church	4.1	3.2	+0.9	+0.7
	POW_2	Bridge Church	4.3	2.8	+0.7	+0.9
	POW_3	Trinity Church of the Nazarene	4.4	3.0	+0.4	+0.9
	POW_4	Vineyard Community Church	5.3	4.3	+0.2	+0.3
	POW_5	New Life Church	4.1	3.1	+0.2	+1.0
Recreational	REC_1	Springhill Park Campground	3.1	1.5	+0.8	-
	REC_2	Evans Boys and Girls Club	4.4	3.5	+0.3	+0.8
	REC_3	Parrott Island Waterpark	4.8	3.6	+0.5	+0.6
	REC_4	Ben Geren Regional Park	4.7	3.9	+0.6	+0.4
School	SCH_1	Chaffin Middle Scool	3.9	3.0	+0.6	+0.7
	SCH_2	Carnall Elementary	4.8	3.5	+0.2	+0.6
	SCH_3	Southside High School	4.0	3.1	+0.7	+0.7
	SCH_4	Raymond Orr Elementary School	4.8	3.5	+0.4	+0.6

(1) with an indoor Maximum Sound Level of at Least 50 dB; assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-8. Indoor Speech Interference for Proposed Action East VL Pad Option

Point of Interest			Annual Average Daily Indoor Daytime (0700-2200) Events per Hour (1)			
			Proposed Action East VL Pad		Increase re No Action	
Type	ID	Description	Windows Open	Windows Closed	Windows Open	Windows Closed
Hospital	HSP_1	Valley Behavioral Health Hospital	4.6	3.2	+0.6	+1.1
	HSP_2	Mercy Crest Assisted Living	4.3	2.7	+1.1	+1.1
	HSP_3	Mercy Clinic Primary Care	4.3	2.8	+0.7	+0.8
	HSP_4	Blossoms Rehab and Nursing Center	3.6	2.5	+1.0	+0.9
Place of Worship	POW_1	Cliff Terrace Church	3.9	3.1	+0.7	+0.6
	POW_2	Bridge Church	4.6	2.8	+1.0	+0.9
	POW_3	Trinity Church of the Nazarene	4.6	3.0	+0.6	+0.9
	POW_4	Vineyard Community Church	5.9	4.6	+0.8	+0.6
	POW_5	New Life Church	4.4	3.1	+0.5	+1.0
Recreational	REC_1	Springhill Park Campground	3.5	1.7	+1.2	+0.2
	REC_2	Evans Boys and Girls Club	4.7	3.5	+0.6	+0.8
	REC_3	Parrott Island Waterpark	4.9	3.7	+0.6	+0.7
	REC_4	Ben Geren Regional Park	4.8	4.0	+0.7	+0.5
School	SCH_1	Chaffin Middle Scool	3.9	3.1	+0.6	+0.8
	SCH_2	Carnall Elementary	5.2	3.5	+0.6	+0.6
	SCH_3	Southside High School	4.0	3.1	+0.7	+0.7
	SCH_4	Raymond Orr Elementary School	5.1	3.5	+0.7	+0.6

(1) with an indoor Maximum Sound Level of at Least 50 dB; assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.

Table 6-9. Indoor Classroom Learning Disruption at the Applicable School Locations for No Action

Point of Interest			No Action				
				Indoor (1)			
				Windows Open		Windows Closed	
Type	ID	Description	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	$L_{eq(8h)}$ (dB)	Events per Hour(2)
School	SCH_1	Chaffin Middle Scool	62.5	47.5	3.3	<45	2.3
School	SCH_2	Camall Elementary	72.7	57.7	4.6	47.7	2.9
School	SCH_3	Southside High School	64.0	49.0	3.3	<45	2.4
School	SCH_4	Raymond Orr Elementary School	70.4	55.4	4.4	45.4	2.9
Number of Sites Exceeding 1 Intrusive Event per Hour					4		4
Minimum Number of Intrusive Events per Hour if Exceeding 1					3.3		2.3
Maximum Number of Intrusive Events per Hour if Exceeding 1					4.6		2.9

Notes:

(1) assumes 15 dB and 25 dB of Noise Level Reductions for w indow s open and closed, respectively.

(2) Number of Average School-Day Events per hour during 8-hour school day (0800-1600) At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;

Table 6-10. Indoor Classroom Learning Disruption at the Applicable School Locations for Alternative 1 West and East VL Pad Options

Point of Interest			Proposed Action Alt 1 East VL Pad					Increase re No Action				
				Indoor (1)					Indoor (1)			
				Windows Open		Windows Closed			Windows Open		Windows Closed	
Type	ID	Description	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	$L_{eq(8h)}$ (dB)	Events per Hour(2)
School	SCH_1	Chaffin Middle Scool	64.2	49.2	3.4	<45	2.5	+1.7	+1.7	+0.1	+1.7	+0.2
School	SCH_2	Carnall Elementary	73.2	58.2	4.2	48.2	2.9	+0.5	+0.5	-0.4	+0.5	-
School	SCH_3	Southside High School	66.4	51.4	3.4	<45	2.5	+2.4	+2.4	+0.1	+2.4	+0.1
School	SCH_4	Raymond Orr Elementary School	71.3	56.3	4.2	46.3	2.9	+0.9	+0.9	-0.2	+0.9	-
Number of Sites Exceeding 1 Intrusive Event per Hour					4		4			4		3
Minimum Number of Intrusive Events per Hour if Exceeding 1					3.3		2.5			+0.1		+0.1
Maximum Number of Intrusive Events per Hour if Exceeding 1					4.6		3.0			+0.1		+0.2

Notes:

(1) assumes 15 dB and 25 dB of Noise Level Reductions for w indow s open and closed, respectiv ely.

(2) Number of Average School-Day Events per hour during 8-hour school day (0800-1600) At or Above an Indoor Maximum (single-ev ent) Sound Level (L_{max}) of 50 dB;

Table 6-11. Indoor Classroom Learning Disruption at the Applicable School Locations for Proposed Action West and East VL Pad Options

Point of Interest			Proposed Action East VL Pad					Increase re No Action				
				Indoor (1)					Indoor (1)			
				Windows Open		Windows Closed			Windows Open		Windows Closed	
Type	ID	Description	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour(2)	$L_{eq(8h)}$ (dB)	Events per Hour(2)
School	SCH_1	Chaffin Middle Scool	65.1	50.1	3.9	<45	3.1	+2.6	+2.6	+0.6	+2.6	+0.8
School	SCH_2	Carnall Elementary	74.1	59.1	4.8	49.1	3.5	+1.4	+1.4	+0.2	+1.4	+0.6
School	SCH_3	Southside High School	67.3	52.3	4.0	<45	3.1	+3.3	+3.3	+0.7	+3.3	+0.7
School	SCH_4	Raymond Orr Elementary School	72.3	57.3	4.8	47.3	3.5	+1.9	+1.9	+0.4	+1.9	+0.6
Number of Sites Exceeding 1 Intrusive Event per Hour					4		4			4		4
Minimum Number of Intrusive Events per Hour if Exceeding 1					3.9		3.0			+0.2		+0.6
Maximum Number of Intrusive Events per Hour if Exceeding 1					4.8		3.5			+0.7		+0.8

Notes:
(1) assumes 15 dB and 25 dB of Noise Level Reductions for w indow s open and closed, respectively.
(2) Number of Average School-Day Events per hour during 8-hour school day (0800-1600) At or Above an Indoor Maximum (single-event) Sound Level (L_{max}) of 50 dB;

Table 6-12. Recreational Interference for the No Action

Representative Park Receptor			Annual Average Outdoor Daily Events per Hour	
Type	ID	Description	Daytime (0700-2200)	Nightime (2200-0700)
Hospital	HSP_1	Valley Behavioral Health Hospital	5.6	0.3
	HSP_2	Mercy Crest Assisted Living	5.0	0.3
	HSP_3	Mercy Clinic Primary Care	6.7	0.4
	HSP_4	Blossoms Rehab and Nursing Center	5.2	0.3
Place of Worship	POW_1	Cliff Terrace Church	6.5	0.5
	POW_2	Bridge Church	5.3	0.3
	POW_3	Trinity Church of the Nazarene	6.2	0.3
	POW_4	Vineyard Community Church	6.7	0.3
	POW_5	New Life Church	6.2	0.4
Recreational	REC_1	Springhill Park Campground	4.6	0.3
	REC_2	Evans Boys and Girls Club	5.9	0.3
	REC_3	Parrott Island Waterpark	6.9	0.5
	REC_4	Ben Geren Regional Park	6.5	0.5
School	SCH_1	Chaffin Middle Scool	6.1	0.4
	SCH_2	Carnall Elementary	6.4	0.3
	SCH_3	Southside High School	6.7	0.5
	SCH_4	Raymond Orr Elementary School	7.3	0.4

Notes:

Number of events at or above 50 dB Lmax; reflects potential for outdoor speech interference

Table 6-13. Recreational Interference for Alternative 1 West VL Pad Option

Representative Park Receptor			Annual Average Outdoor Daily Events per Hour			
			Proposed Action Alt 1 West VL Pad		Increase re No Action	
Type	ID	Description	Daytime (0700-2200)	Nightime (2200-0700)	Daytime (0700-2200)	Nightime (2200-0700)
Hospital	HSP_1	Valley Behavioral Health Hospital	5.0	0.4	-0.6	+0.1
	HSP_2	Mercy Crest Assisted Living	4.8	0.4	-0.2	+0.1
	HSP_3	Mercy Clinic Primary Care	5.3	0.4	-1.4	-
	HSP_4	Blossoms Rehab and Nursing Center	4.7	0.4	-0.5	+0.1
Place of Worship	POW_1	Cliff Terrace Church	6.2	0.4	-0.3	-0.1
	POW_2	Bridge Church	4.8	0.4	-0.5	+0.1
	POW_3	Trinity Church of the Nazarene	5.6	0.4	-0.6	+0.1
	POW_4	Vineyard Community Church	6.3	0.5	-0.4	+0.2
	POW_5	New Life Church	5.8	0.5	-0.4	+0.1
Recreational	REC_1	Springhill Park Campground	4.3	0.3	-0.3	-
	REC_2	Evans Boys and Girls Club	5.4	0.4	-0.5	+0.1
	REC_3	Parrott Island Waterpark	6.2	0.5	-0.7	-
	REC_4	Ben Geren Regional Park	6.0	0.4	-0.5	-0.1
School	SCH_1	Chaffin Middle Scool	5.9	0.4	-0.2	-
	SCH_2	Carnall Elementary	5.9	0.4	-0.5	+0.1
	SCH_3	Southside High School	5.8	0.4	-0.9	-0.1
	SCH_4	Raymond Orr Elementary School	6.3	0.5	-1.0	+0.1

Notes:

Number of events at or above 50 dB Lmax; reflects potential for outdoor speech interference

BRRC

Table 6-14. Recreational Interference for Alternative 1 East VL Pad Option

Representative Park Receptor			Annual Average Outdoor Daily Events per Hour			
			Proposed Action Alt 1 East VL Pad		Increase re No Action	
Type	ID	Description	Daytime (0700-2200)	Nightime (2200-0700)	Daytime (0700-2200)	Nightime (2200-0700)
Hospital	HSP_1	Valley Behavioral Health Hospital	5.1	0.4	-0.5	+0.1
	HSP_2	Mercy Crest Assisted Living	4.8	0.4	-0.2	+0.1
	HSP_3	Mercy Clinic Primary Care	5.3	0.4	-1.4	-
	HSP_4	Blossoms Rehab and Nursing Center	4.7	0.4	-0.5	+0.1
Place of Worship	POW_1	Cliff Terrace Church	6.2	0.4	-0.3	-0.1
	POW_2	Bridge Church	4.8	0.4	-0.5	+0.1
	POW_3	Trinity Church of the Nazarene	5.6	0.4	-0.6	+0.1
	POW_4	Vineyard Community Church	6.3	0.5	-0.4	+0.2
	POW_5	New Life Church	5.8	0.5	-0.4	+0.1
Recreational	REC_1	Springhill Park Campground	4.3	0.3	-0.3	-
	REC_2	Evans Boys and Girls Club	5.4	0.4	-0.5	+0.1
	REC_3	Parrott Island Waterpark	6.2	0.5	-0.7	-
	REC_4	Ben Geren Regional Park	6.0	0.4	-0.5	-0.1
School	SCH_1	Chaffin Middle Scool	5.9	0.4	-0.2	-
	SCH_2	Carnall Elementary	5.9	0.4	-0.5	+0.1
	SCH_3	Southside High School	5.8	0.4	-0.9	-0.1
	SCH_4	Raymond Orr Elementary School	6.3	0.5	-1.0	+0.1

Notes:

Number of events at or above 50 dB Lmax; reflects potential for outdoor speech interference

Table 6-15. Recreational Interference for the Proposed Action East and West VL Pad Options

Representative Park Receptor			Annual Average Outdoor Daily Events per Hour			
			Proposed Action West VL Pad		Increase re No Action	
Type	ID	Description	Daytime (0700-2200)	Nightime (2200-0700)	Daytime (0700-2200)	Nightime (2200-0700)
Hospital	HSP_1	Valley Behavioral Health Hospital	5.7	0.4	+0.1	+0.1
	HSP_2	Mercy Crest Assisted Living	5.4	0.4	+0.4	+0.1
	HSP_3	Mercy Clinic Primary Care	6.0	0.4	-0.7	-
	HSP_4	Blossoms Rehab and Nursing Center	5.3	0.4	+0.1	+0.1
Place of Worship	POW_1	Cliff Terrace Church	7.0	0.4	+0.5	-0.1
	POW_2	Bridge Church	5.5	0.4	+0.2	+0.1
	POW_3	Trinity Church of the Nazarene	6.3	0.4	+0.1	+0.1
	POW_4	Vineyard Community Church	7.0	0.5	+0.3	+0.2
	POW_5	New Life Church	6.5	0.5	+0.3	+0.1
Recreational	REC_1	Springhill Park Campground	4.9	0.4	+0.3	+0.1
	REC_2	Evans Boys and Girls Club	6.1	0.4	+0.2	+0.1
	REC_3	Parrott Island Waterpark	6.9	0.5	-	-
	REC_4	Ben Geren Regional Park	6.7	0.4	+0.2	-0.1
School	SCH_1	Chaffin Middle Scool	6.6	0.4	+0.5	-
	SCH_2	Carnall Elementary	6.6	0.5	+0.2	+0.2
	SCH_3	Southside High School	6.5	0.4	-0.2	-0.1
	SCH_4	Raymond Orr Elementary School	6.9	0.6	-0.4	+0.2

Notes:

Number of events at or above 50 dB Lmax; reflects potential for outdoor speech interference

Table 6-16. No Action Top Contributors at each POI (Aircraft and Operation with Highest SEL)

Point of Interest			Operation with the Highest SEL						
Type	ID	Description	Aircraft Group	Aircraft	Operation Type	Annual Acoustic Daytime (0700-2200) Operations at this SEL	Annual Acoustic Nighttime (2200-0700) Operations at this SEL	SEL (dBA)	Lmax (dBA)
Hospital	HSP_1	Valley Behavioral Health Hospital	Proposed Action	F-35B	IFR Straight-in Arrival	0.07	0.105	111	105
	HSP_2	Mercy Crest Assisted Living	Proposed Action	F-16C	Mil Departure	0.348	0.007	106	100
	HSP_3	Mercy Clinic Primary Care	Proposed Action	F-35B	Afterburner Departure	0.04	0.001	103	98
	HSP_4	Blossoms Rehab and Nursing Center	Proposed Action	F-16C	Mil Departure	0.679	0.014	102	95
Place of Worship	POW_1	Cliff Terrace Church	Transients	F/A-18E/F	Afterburner Departure	0.0239	0.0009	102	96
	POW_2	Bridge Church	Proposed Action	F-16C	Mil Departure	0.578	0.012	106	100
	POW_3	Trinity Church of the Nazarene	Transients	F-16C	Mil Departure	0.0608	0.0019	110	104
	POW_4	Vineyard Community Church	Transients	F/A-18E/F	Overhead Break Arrival	0.013	0	119	115
	POW_5	New Life Church	Proposed Action	F-35B	IFR Straight-in Arrival	0.023	0.035	108	99
Recreational	REC_1	Springhill Park Campground	Proposed Action	F-35B	IFR Straight-in Arrival	0.07	0.105	110	101
	REC_2	Evans Boys and Girls Club	Transients	F/A-18E/F	Overhead Break Arrival	0.013	0	113	108
	REC_3	Parrott Island Waterpark	Transients	F/A-18E/F	VFR Closed Pattern	0.122	0.002	108	99
	REC_4	Ben Geren Regional Park	Transients	F/A-18E/F	VFR Closed Pattern	0.122	0.002	112	105
School	SCH_1	Chaffin Middle Scool	Transients	F/A-18E/F	Afterburner Departure	0.049	0.002	100	91
	SCH_2	Carnall Elementary	Proposed Action	F-35B	IFR Pattern	0.117	0	109	104
	SCH_3	Southside High School	Transients	F/A-18E/F	Afterburner Departure	0.09	0.003	101	95
	SCH_4	Raymond Orr Elementary School	Proposed Action	F-35B	IFR Pattern	0.117	0	107	101

*Note: 1 closed pattern event equals 2 operations, an arrival and a departure
Operations are combined if the corresponding SELs of the same aircraft and operation type are within 1 dBA

BRRC

Table 6-17. Proposed Action Alternative 1 East VL Pad Option Top Contributors at each POI (Aircraft and Operation with Highest SEL)

Point of Interest			Operation with the Highest SEL						
Type	ID	Description	Aircraft Group	Aircraft	Operation Type	Annual Acoustic Daytime (0700-2200) Operations at this SEL	Annual Acoustic Nighttime (2200-0700) Operations at this SEL	SEL (dBA)	Lmax (dBA)
Hospital	HSP_1	Valley Behavioral Health Hospital	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.113	0.014	117	112
	HSP_2	Mercy Crest Assisted Living	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.113	0.014	108	100
	HSP_3	Mercy Clinic Primary Care	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.442	0.029	106	99
	HSP_4	Blossoms Rehab and Nursing Center	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.128	0.015	107	99
Place of Worship	POW_1	Cliff Terrace Church	RSAF and FMS	F-35A/B	Combat Afterburner Departure	0.868	0.018	104	96
	POW_2	Bridge Church	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.128	0.015	112	105
	POW_3	Trinity Church of the Nazarene	Transients	F-16C	Mil Departure	0.032	0.001	110	104
	POW_4	Vineyard Community Church	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.128	0.015	121	116
	POW_5	New Life Church	RSAF and FMS	F-35A/B	Combat Afterburner Departure	0.868	0.018	105	99
Recreational	REC_1	Springhill Park Campground	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.113	0.014	113	106
	REC_2	Evans Boys and Girls Club	Transients	F/A-18E/F	Overhead Break Arrival	0.013	0	113	108
	REC_3	Parrott Island Waterpark	RSAF and FMS	F-35B	Vertical Landing Wave Off Pattern to Vertical Landing	0.008	0	115	98
	REC_4	Ben Geren Regional Park	Transients	F/A-18E/F	VFR Closed Pattern	0.122	0.002	112	105
School	SCH_1	Chaffin Middle Scool	RSAF and FMS	F-35A/B	Combat Afterburner Departure	0.868	0.018	103	97
	SCH_2	Carnall Elementary	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.128	0.015	113	105
	SCH_3	Southside High School	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.442	0.029	104	96
	SCH_4	Raymond Orr Elementary School	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.442	0.029	110	104

*Note: 1 closed pattern event equals 2 operations, an arrival and a departure
Operations are combined if the corresponding SELs of the same aircraft and operation type are within 1 dBA

Table 6-18. Proposed Action East VL Pad Option Top Contributors at each POI (Aircraft and Operation with Highest SEL)

Point of Interest			Operation with the Highest SEL						
Type	ID	Description	Aircraft Group	Aircraft	Operation Type	Annual Acoustic Daytime (0700-2200) Operations at this SEL	Annual Acoustic Nighttime (2200-0700) Operations at this SEL	SEL (dBA)	Lmax (dBA)
Hospital	HSP_1	Valley Behavioral Health Hospital	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.175	0.022	117	112
	HSP_2	Mercy Crest Assisted Living	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.175	0.022	108	100
	HSP_3	Mercy Clinic Primary Care	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.922	0.039	106	99
	HSP_4	Blossoms Rehab and Nursing Center	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.195	0.025	107	99
Place of Worship	POW_1	Cliff Terrace Church	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.158	0.024	104	96
	POW_2	Bridge Church	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.195	0.025	112	105
	POW_3	Trinity Church of the Nazarene	Transients	F-16C	Mil Departure	0.032	0.001	110	104
	POW_4	Vineyard Community Church	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.195	0.025	121	116
	POW_5	New Life Church	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.158	0.024	105	99
Recreational	REC_1	Springhill Park Campground	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.175	0.022	113	106
	REC_2	Evans Boys and Girls Club	Transients	F/A-18E/F	Overhead Break Arrival	0.013	0	113	108
	REC_3	Parrott Island Waterpark	RSAF and FMS	F-35B	Vertical Landing Wave Off Pattern to Vertical Landing	0.031	0	115	98
	REC_4	Ben Geren Regional Park	Transients	F/A-18E/F	VFR Closed Pattern	0.122	0.002	112	105
School	SCH_1	Chaffin Middle Scool	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.158	0.024	103	97
	SCH_2	Carnall Elementary	RSAF and FMS	F-35B	VFR and IFR Straight-in to Slow Landing	0.195	0.025	113	105
	SCH_3	Southside High School	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.922	0.039	104	96
	SCH_4	Raymond Orr Elementary School	RSAF and FMS	F-35A/B	Combat Afterburner Departure	1.922	0.039	110	104

*Note: 1 closed pattern event equals 2 operations, an arrival and a departure
Operations are combined if the corresponding SELs of the same aircraft and operation type are within 1 dBA

Table 6-19. SEL and L_{Amax} Comparison of Aircraft Operations at Ebbing ANGB (East and West VL Pad Options)

Aircraft	Operation Type	Engine Power	Airspeed (knots)	Altitude (feet MSL)	Slant Distance (feet)	SEL (dBA)	Lmax (dBA)
F-35A (Military Power Only)	Departure	100% ETR	300	1044	645	120	116
F-35B (Military Power Only)		100% ETR	300	1044	645	119	115
F-35A (Combat Afterburner)		150% ETR	450	2063	1656	114	111
F-35B (Combat Afterburner)		150% ETR	450	2063	1656	114	111
F-16C (Military Power)		93% NC	145	1321	893	113	107
F-35A (Afterburner Power)		100% ETR	350	2172	1744	110	104
F-35B (Afterburner Power)		100% ETR	350	2172	1744	110	103
F-35B (Short Takeoff)		100% ETR	350	2179	1743	110	104
F-16C (Afterburner Power)		93% NC	350	1424	993	110	106
Transient T-38C (Afterburner Power)		99.42% RPM	300	1065	662	110	105
Transient F/A-18E/F (Afterburner Power)		95% NC	300	3639	3312	104	97
F-35B (Straight-in to Slow Landing)	Arrival	83% ETR	100	882	509	121	116
F-35B (Straight-in to Vertical Landing)		83% ETR	150	845	475	120	117
Transient F/A-18E/F (Overhead Break)		84% NC	130	780	443	119	115
F-35B (Overhead Break to Slow Landing)		60% ETR	150	1012	622	115	106
F-35A (Overhead and Tactical Break)		60% ETR	200	852	497	114	107
F-35B (Overhead and Tactical Break)		60% ETR	200	852	497	114	108
F-35B (Overhead Break to Vertical Landing)		60% ETR	150	1084	686	113	105
F-35A (Straight-in Arrival)		40% ETR	180	717	399	108	102
F-35B (Straight-in Arrival CTOL)		40% ETR	180	717	399	107	101
F-16C (Overhead Break)		84% NC	150	854	490	99	94
Transient T-38C (Overhead Break)		89% RPM	200	792	452	95	88
F-35B (Short Takeoff to Slow Landing)	Closed Pattern	60% ETR	120	884	552	118	115
F-35A (VFR Closed Pattern)		60% ETR	190	870	503	115	107
Transient F/A-18E/F (VFR Pattern)		82.2% NC	130	976	623	115	111
F-35B (VFR Closed Pattern)		60% ETR	190	870	503	114	108
F-35B (Short Takeoff to Vertical Landing)		60% ETR	150	1078	704	113	105
F-35B (Vertical Landing Wave Off Pattern)		60% ETR	150	1076	699	113	105
F-35A (IFR Pattern)		80% ETR	250	1697	1275	113	105
F-35B (IFR Pattern)		80% ETR	250	1697	1275	111	103
F-16C (IFR Pattern)		93% NC	170	1702	1259	110	103
Transient T-38C (VFR Closed Pattern)		95% RPM	200	780	487	98	93

Note: Noise levels presented were calculated at POW_4: Vineyard Community Church for the departure, arrival, and closed pattern flight that has the largest SEL at this location. Actual individual overlight noise levels vary from the noise levels listed because of variations in aircraft configuration, flight track, altitude, and atmospheric conditions. Representative noise levels were calculated using NOISEMAP Version 7.3 and the same operational data (e.g. flight tracks and flight profiles) used to calculate the DNL noise contours.

Results are identical for East and West VL Options since POW_4 is further away from the VL Pads

7 TRAFFIC NOISE

I-540 is the dominant road noise source in the area of the airfield. Thus, increases in personnel under the Proposed Action will have a marginal impact on the traffic volume. A simple analysis of the potential changes in local traffic noise is provided here to document that marginal impact. This analysis uses published data from the Bureau of Transportation Statistics and results from the Traffic Noise Model (TNM), using a conservative estimate that the additional Ebbing ANGB personnel will have four road trips per day: arrival, lunch (round trip), and departure. The additional personnel under the Proposed Action are used to scale the personnel percentage contribution to the local traffic daily volume. Table 7-1 provides the data for five major roads that surround Ebbing ANGB along with the annual average daily traffic count (the segment with the lowest traffic count was used). Second, the table provides the percentage of Ebbing ANGB personnel in these traffic counts. Third, the table provides the estimated change in noise level at a distance of 100 ft from the road. Table 7-1 shows that the change in the estimated noise level is 0.3 dBA or less, which will not be a noticeable increase. Traffic noise was modeled as a contractual requirement, however this resource area was not carried forward for detailed analysis in the SEIS.

Table 7-1. Estimated Changes in Local Traffic Noise for the Proposed Action

Road Name	Average Annual Daily Traffic	Estimated Ebbing Personnel Percentage		Estimated Traffic Noise Level (dBA) at 100 ft, $L_{eq,24hr}$		
		Baseline	SEIS	Baseline	SEIS	Change
I-540	52,000	7.4%	9.5%	71.4	71.5	0.1
Phoenix Ave	15,000	25.8%	33.0%	68.4	68.7	0.3
Old Greenwood Rd.	14,000	27.6%	35.3%	61	61.3	0.3
Zero St.	17,000	22.7%	29.1%	65.6	65.9	0.3
Massad Rd.	15,000	25.8%	33.0%	60.3	60.6	0.3

8 REFERENCES

[1] Federal Interagency Committee on Urban Noise (FICUN), "Guidelines for Considering Noise in Land-Use Panning and Control," August 1980.

[2] US Environmental Protection Agency (EPA), "Guidelines for Noise Impact Analysis, Report 550/9-82-105 and #PB82-219205," April 1982.

[3] American National Standards Institute, Inc. (ANSI), "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 5: Sound Level Descriptors for Determination of Compatible Land Use, ANSI S12.9/Part 5-1998 (R 2003)," 2003.

[4] Federal Interagency Committee on Noise (FICON), "Federal Agency Review of Selected Airport Noise Analysis Issues," August 1992.

[5] T. Schultz, "Synthesis of Social Surveys on Noise Annoyance," *Journal of the Acoustical Society of America*, vol. 64, pp. 377-405, August 1974.

[6] S. Fidell, D. S. Barger and T. J. Schultz, "Updating a Dosage-Effect Relationship for the Prevalence of Annoyance Due to General Transportation Noise," *J. Acoust. Soc. Am.*, vol. 89, pp. 221-233, January 1991.

[7] L. Finegold, C. Harris and H. v. Gierke, "Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People"," *Noise Control Engineering Journal*, vol. 42, pp. 25-30, 1994.

[8] Stusnick, E., K.A. Bradley, J.A. Molino, and G. DeMiranda, "The Effect of Onset Rate on Aircraft Noise Annoyance, Volume 2: Rented Home Experiment," Wyle Laboratories Research Report WR 92-3, March 1992.

[9] Stusnick, E., K.A. Bradley, M.A. Bossi, J.A. Molino, and D.G. Rickert, "The Effect of Onset Rate on Aircraft Noise Annoyance, Volume 3: Hybrid Own-Home Experiment," Wyle Laboratories Research Report WR 93-22, December 1993.

[10] J. Czech and K. Plotkin, "NMAP 7.0 User's Manual, Wyle Research Report, WR 98-13," November 1998.

[11] F. Wasmer and F. Maunsell, *BaseOps 7.3 User's Guide*, Wasmer Consulting, 2006.

[12] H. T. Mohlmann, *Computer Programs for Producing Single-Event Aircraft Noise Data for Specific Engine Power and Meteorological Conditions for Use with USAF Community Noise Model (NOISEMAP)*, AFAMRL-TR-83-020, 1983.

[13] Downing, J. Micah, "Validation of Updates to NoiseFile Database and NoiseMap Modeling Software," Blue Ridge Research and Consulting, LLC, Technical Note, BRRC 16-16, 2016.

[14] F. Wasmer and F. Maunsell, *NMPlot 4.955 User's Guide*, Wasmer Consulting, 2006.

[15] B. Ikelheimer and M. Downing, "MRNMap 3.0 -- Noise Model Improvements," BRRC 13-03, 2013.

[16] C. Moulton, "Air Force Procedure for Predicting Noise Around Airbases: Noise Exposure Model (NOISEMAP) Technical Report, Report AL-TR-1992-0059," 1992.

[17] K. Bradley, "Routemap Version 2.0: Military Training Route Noise Model User's Manual, AL/OE-MN-1996-0002," Armstrong Research Laboratory, Brooks AFB, TX, 1996.

[18] B. Ikelheimer, M. Downing, M. James and S. McInerny, "Airborne Weapons Noise Prediction Model," NOISE-CON, Reno, NV, 2007.

[19] K. Plotkin and F. Grandi, "Computer Models for Sonic Boom Analysis: PCBoom4, CABoom, BooMap, CORBoom," Wyle Report WR 02-11, 2002.

[20] U.S. Department of Transportation Federal Aviation Administration, "Aviation Environmental Design Tool (AEDT) Version 3g User Manual," August 2024.

[21] OSD, *Memorandum on Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis, the Under Secretary of Defense, 16 June,* 2009.

[22] DoD, "Technical Bulletin, Noise-Induced Hearing Impairment, Defense Noise Working Group," December 2013.

[23] ANSI, "Quantities 3 and Procedures for Description and Measurement of Environmental Sound – Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes. American National Standard ANSI/ASA S12.9-2008," American National Standards Institute and Acoustical Society of America, July., 2008.

[24] DOD, "Technical Bulletin, Sleep Disturbance from Aviation Noise. April," 2009.

[25] FICAN, "Research Review of Selected Aviation Noise Issues. April.," 2018.

[26] FICON, "Federal Agency Review of Selected Airport Noise Analysis Issues. August.," 1992.

[27] DOD, "Technical Bulletin, Using Supplemental Noise Metrics and Analysis Tools. March.," 2009.

[28] DoD, "Technical Bulletin, Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics; Guide to Using Supplemental Metrics," December 2009.

[29] K. Larson, R. Mentzer, and J. Czech, "Fort Smith Regional Airport Runway 8-26 Extension Environmental Assessment Noise Technical Report," HMMH Report No. 312400, October 14, 2021.

[30] HQ Air Education Training Command, "Final F-35A Training Basing Environmental Impact Statement," June 2012.

[31] U.S. Air Force. Air Force Civil Engineer Center., "Air Installations Compatible Use Zones Program Final Report," 2017.

[32] U.S. Department of the Navy, "NAS Oceana Strike Fighter Transition Final Environmental Assessment," 2017.

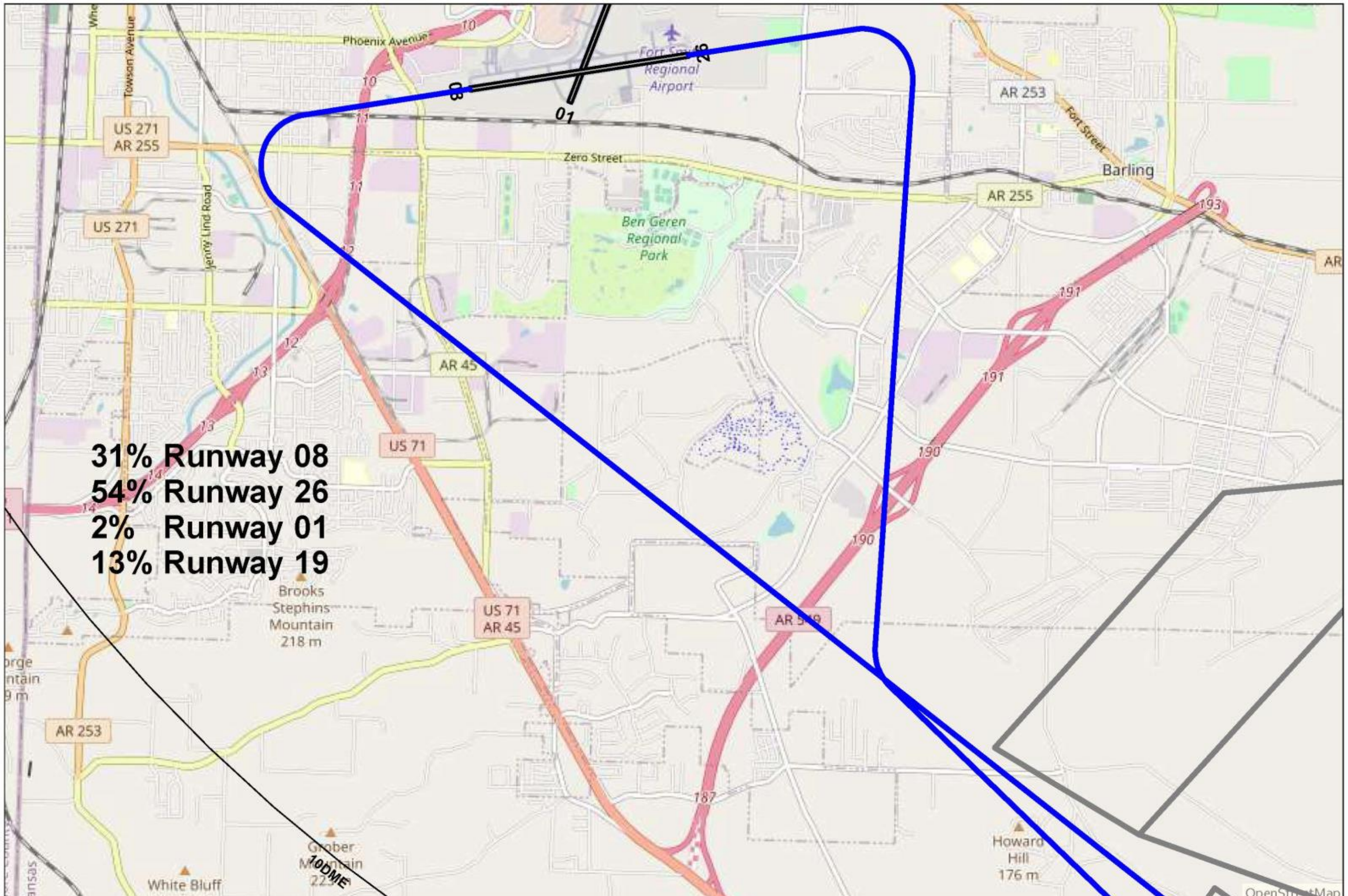
[33] M. P. J. Downing, "BRRC Report 23-29. Updates to Military Operating Area and Range Noise Model: MRNMAP 3.2," December 2023.

1

APPENDIX A SQUADRON/GROUP SUMMARY FLIGHT TRACKS

Appendix A displays the summary flight tracks by squadron or group for all based, transient military, and civil aircraft at FSM / Ebbing ANGB.

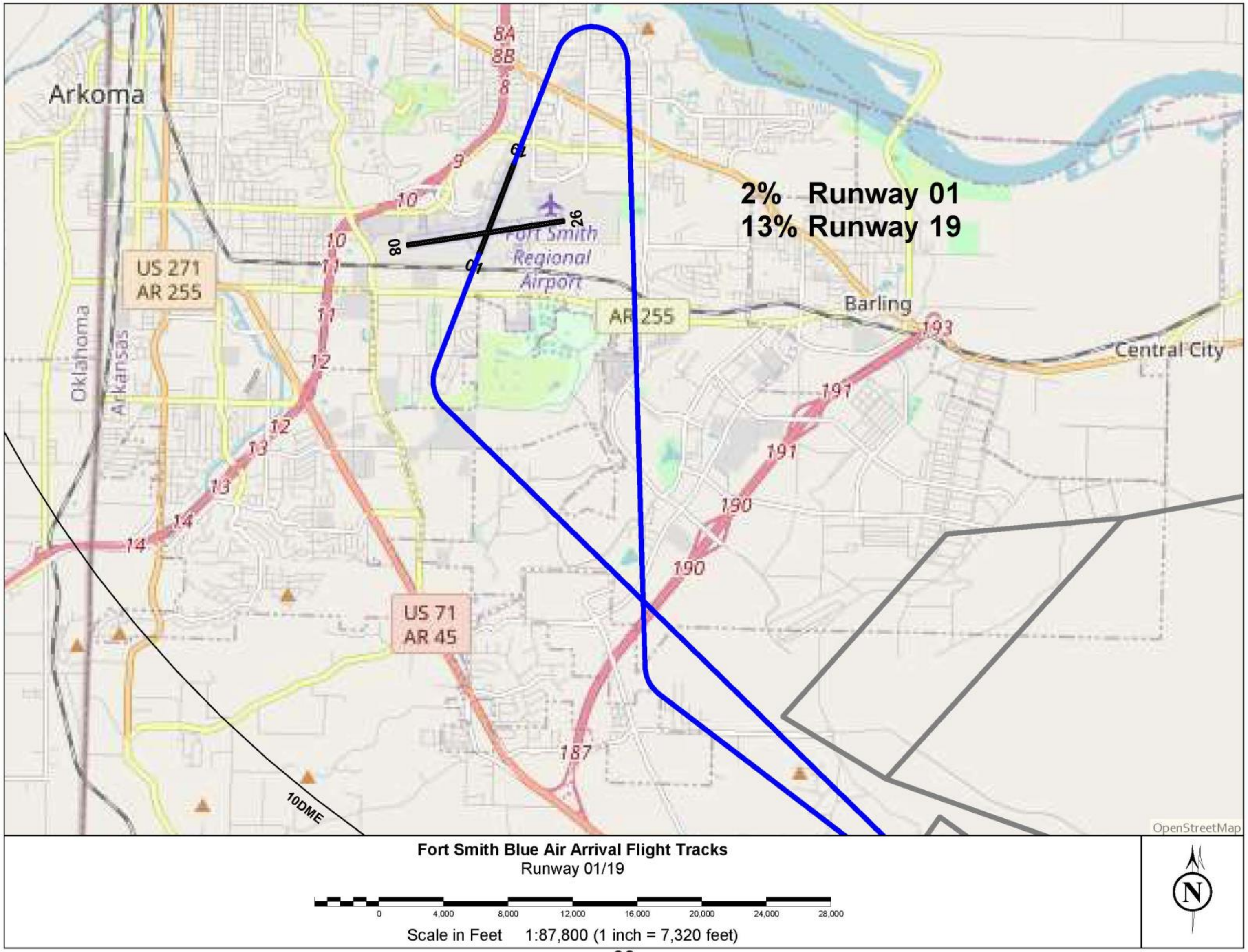
A.1 Based Blue Air Fixed-Wing Aircraft and Helicopter Flight Tracks



Fort Smith Blue Air Arrival Flight Tracks
Runway 08/26

Scale in Feet 1:67,800 (1 inch = 5,650 feet)

95



Fort Smith Blue Air Arrival Flight Tracks
Runway 01/19

Scale in Feet 1:87,800 (1 inch = 7,320 feet)

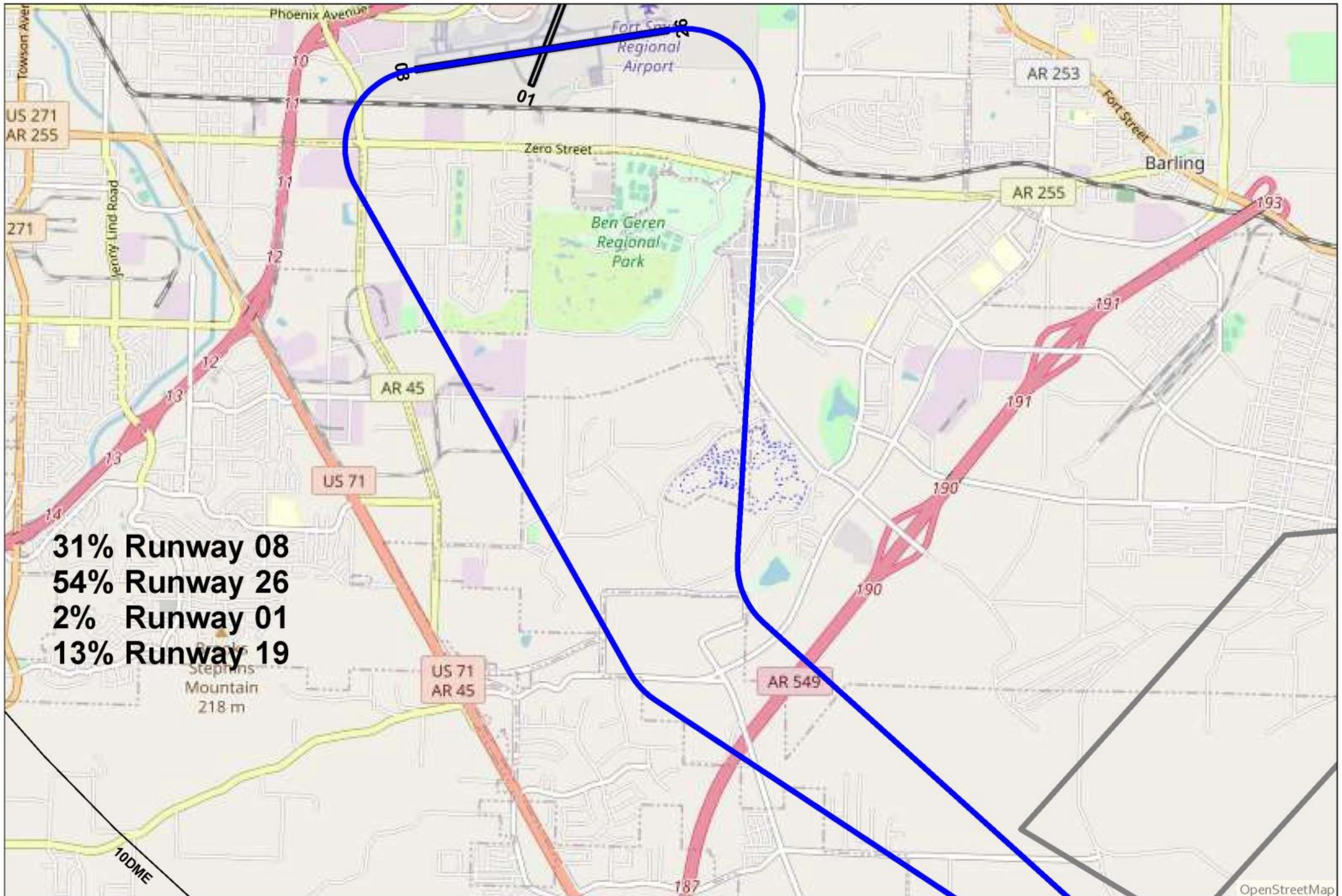
96

Fort Smith Blue Air Bell 206 Arrival Flight Track
Helicopter Track directly to Blue Air Facility

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:69,200 (1 inch = 5,760 feet)

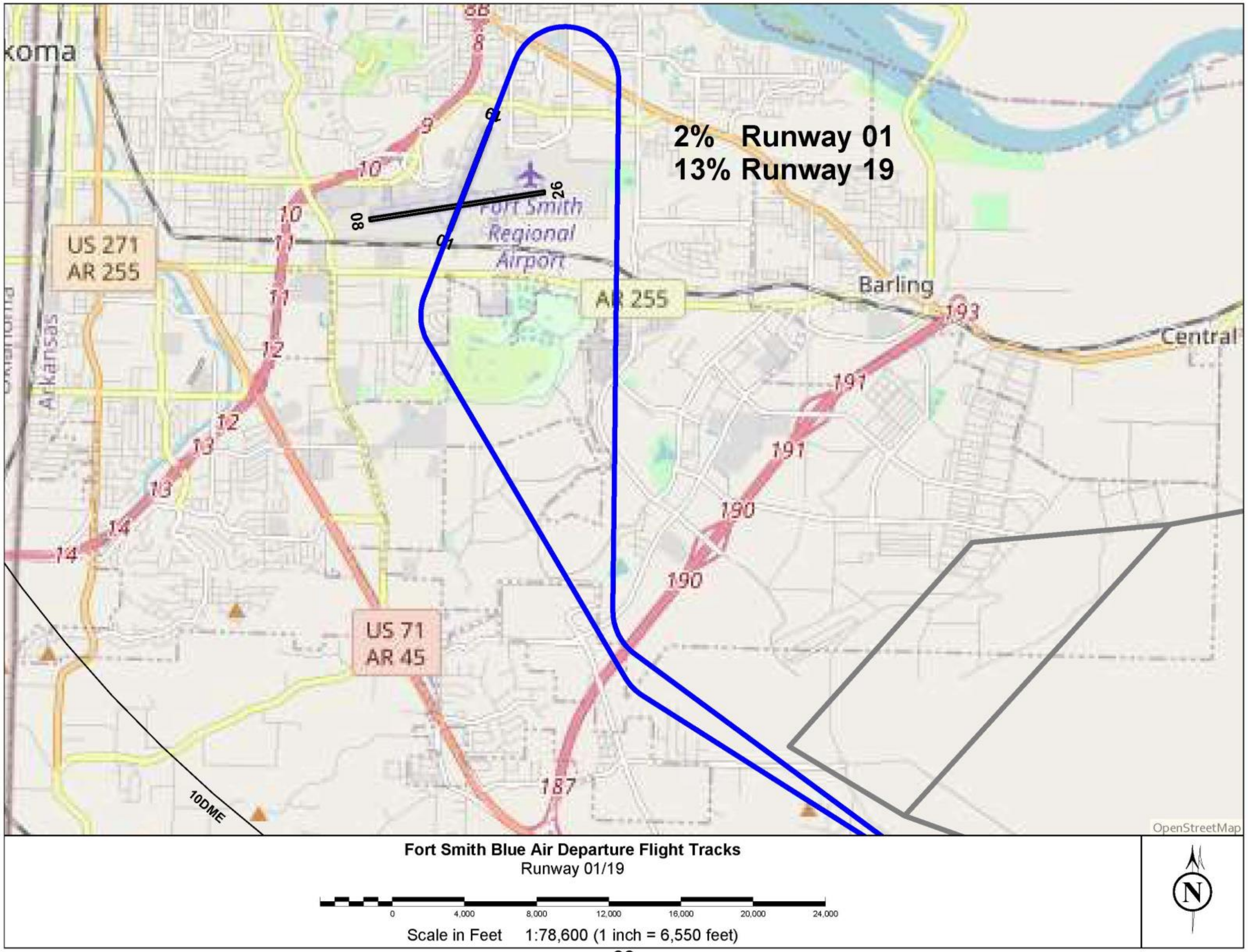
97



Fort Smith Blue Air Departure Flight Tracks
Runway 08/26

Scale in Feet 1:58,600 (1 inch = 4,880 feet)

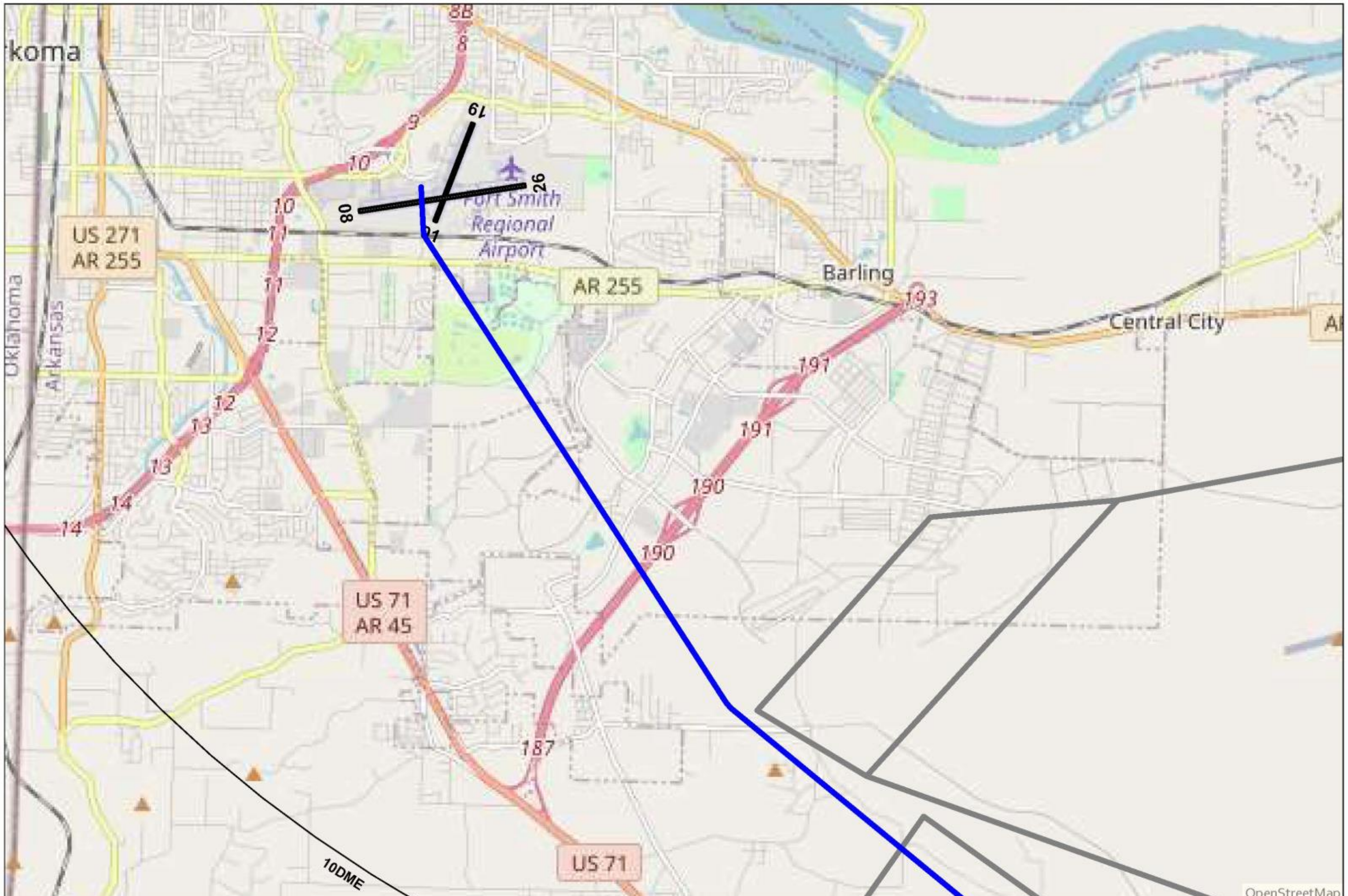
98



Fort Smith Blue Air Departure Flight Tracks
Runway 01/19

Scale in Feet 1:78,600 (1 inch = 6,550 feet)

99

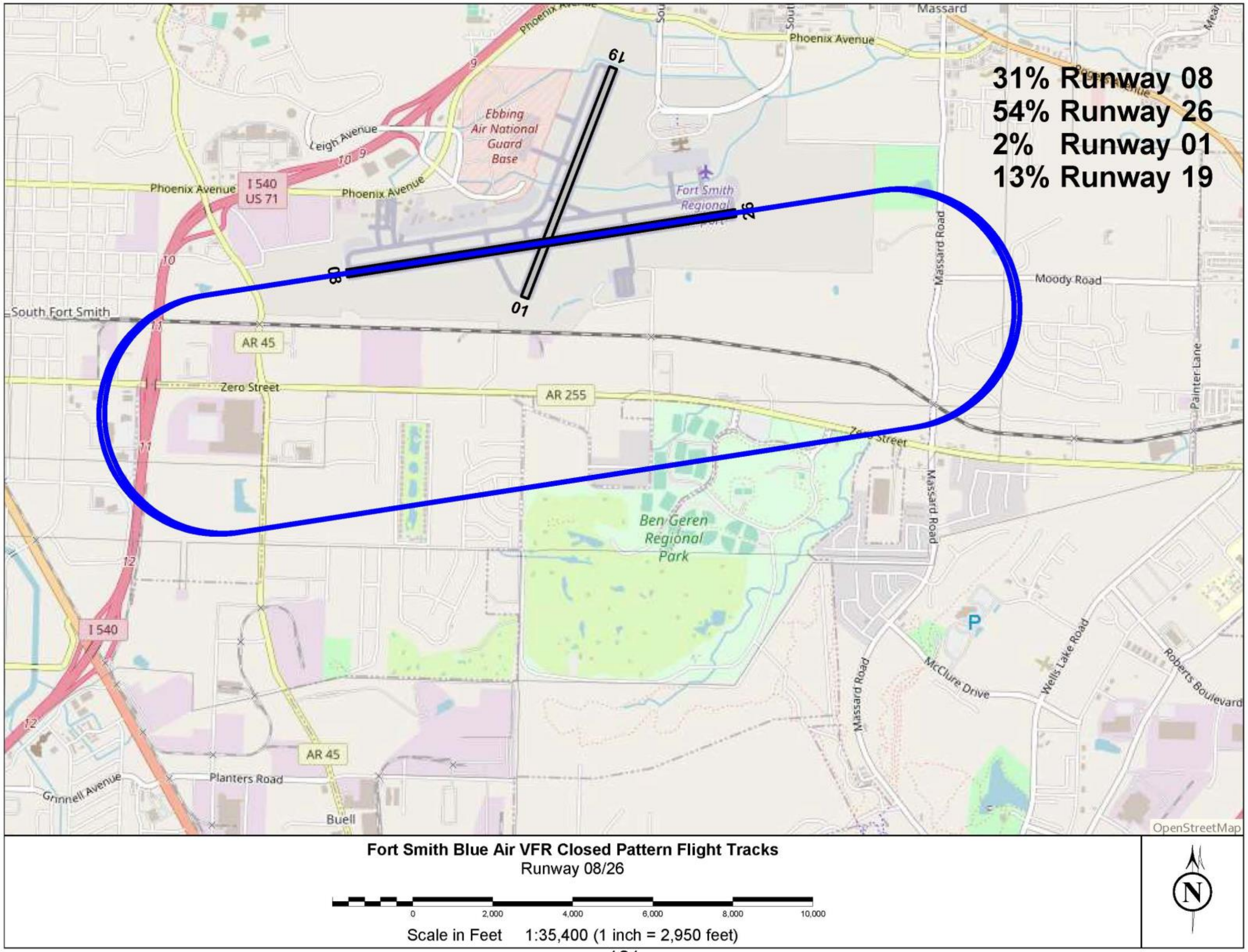


Fort Smith Blue Air Bell 206 Departure Flight Track

Helicopter Track From Blue Air Facility

Scale in Feet 1:89,500 (1 inch = 7,460 feet)

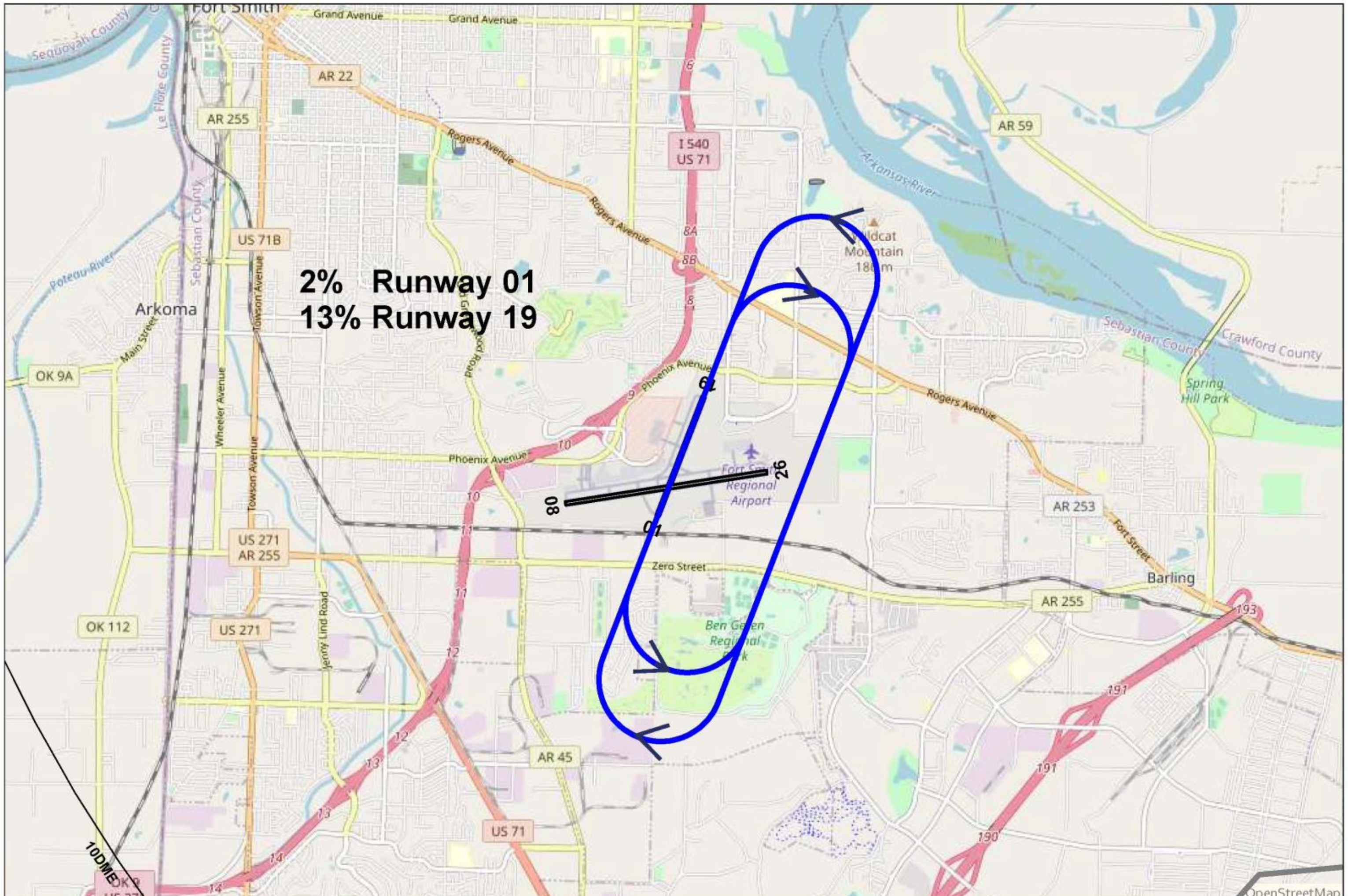
100



Fort Smith Blue Air VFR Closed Pattern Flight Tracks
Runway 08/26

Scale in Feet 1:35,400 (1 inch = 2,950 feet)

101



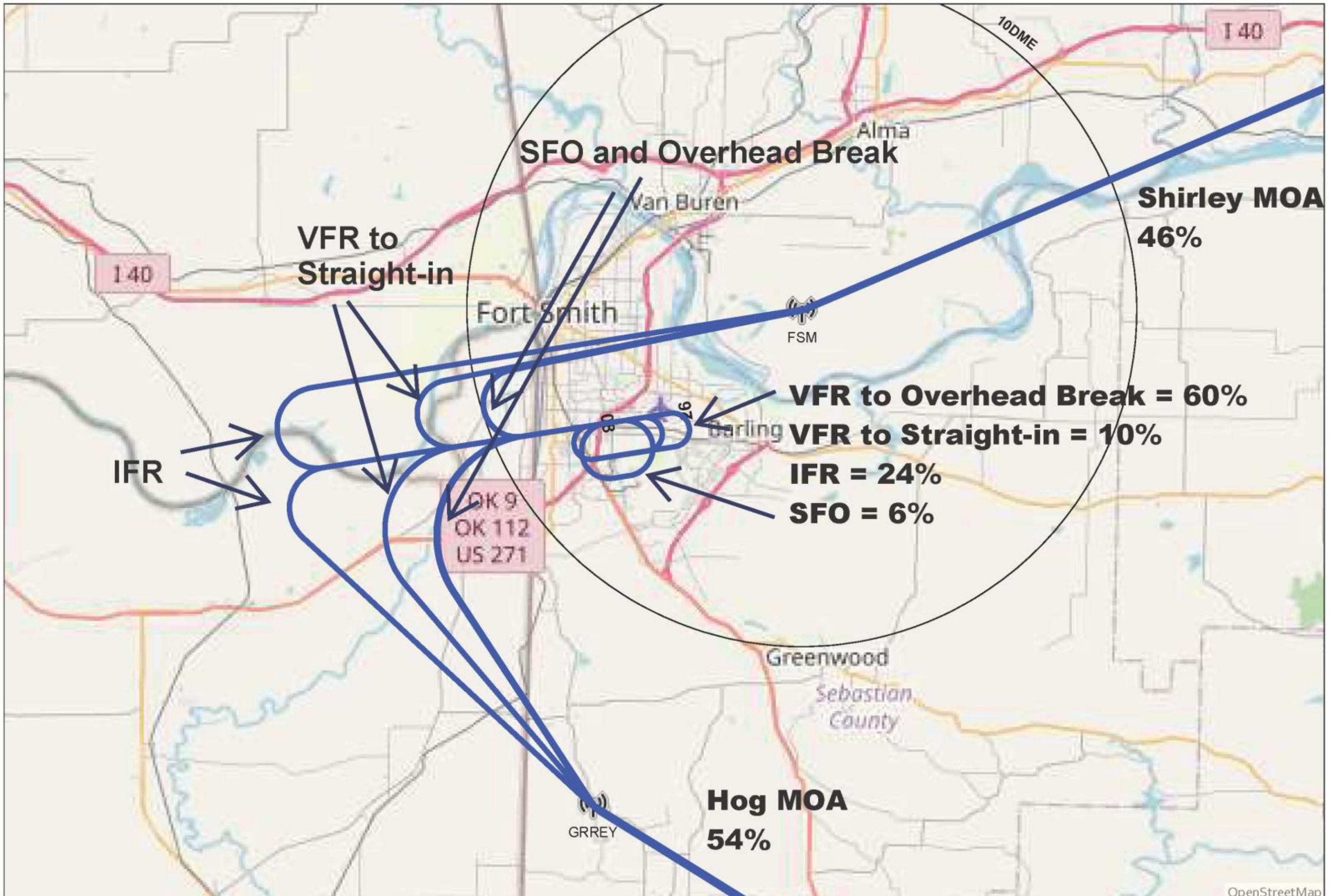
Fort Smith Blue Air VFR Closed Pattern Flight Tracks
Runway 01/19

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:73,700 (1 inch = 6,150 feet)

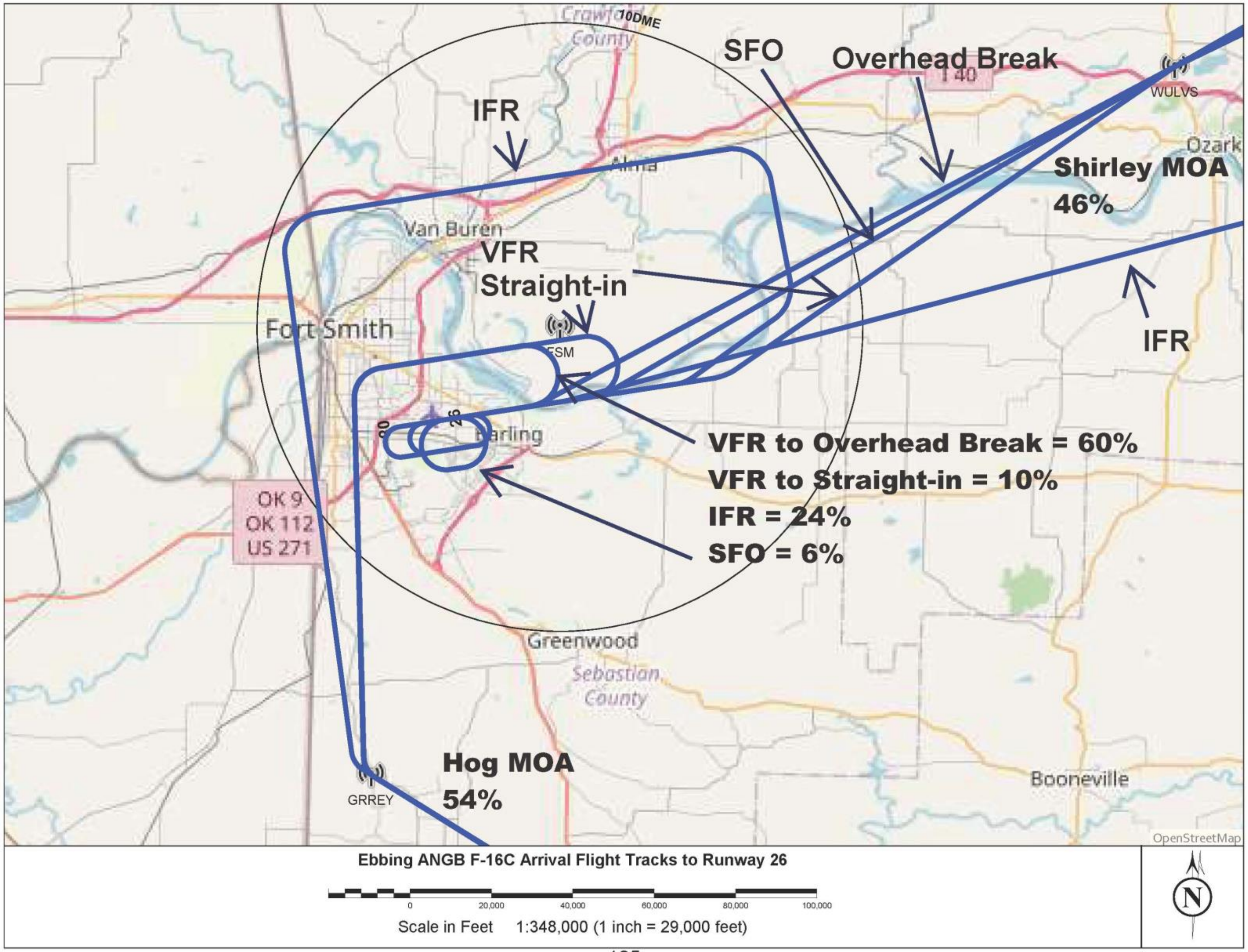
102

A.2 Proposed Action F-16 Flight Tracks



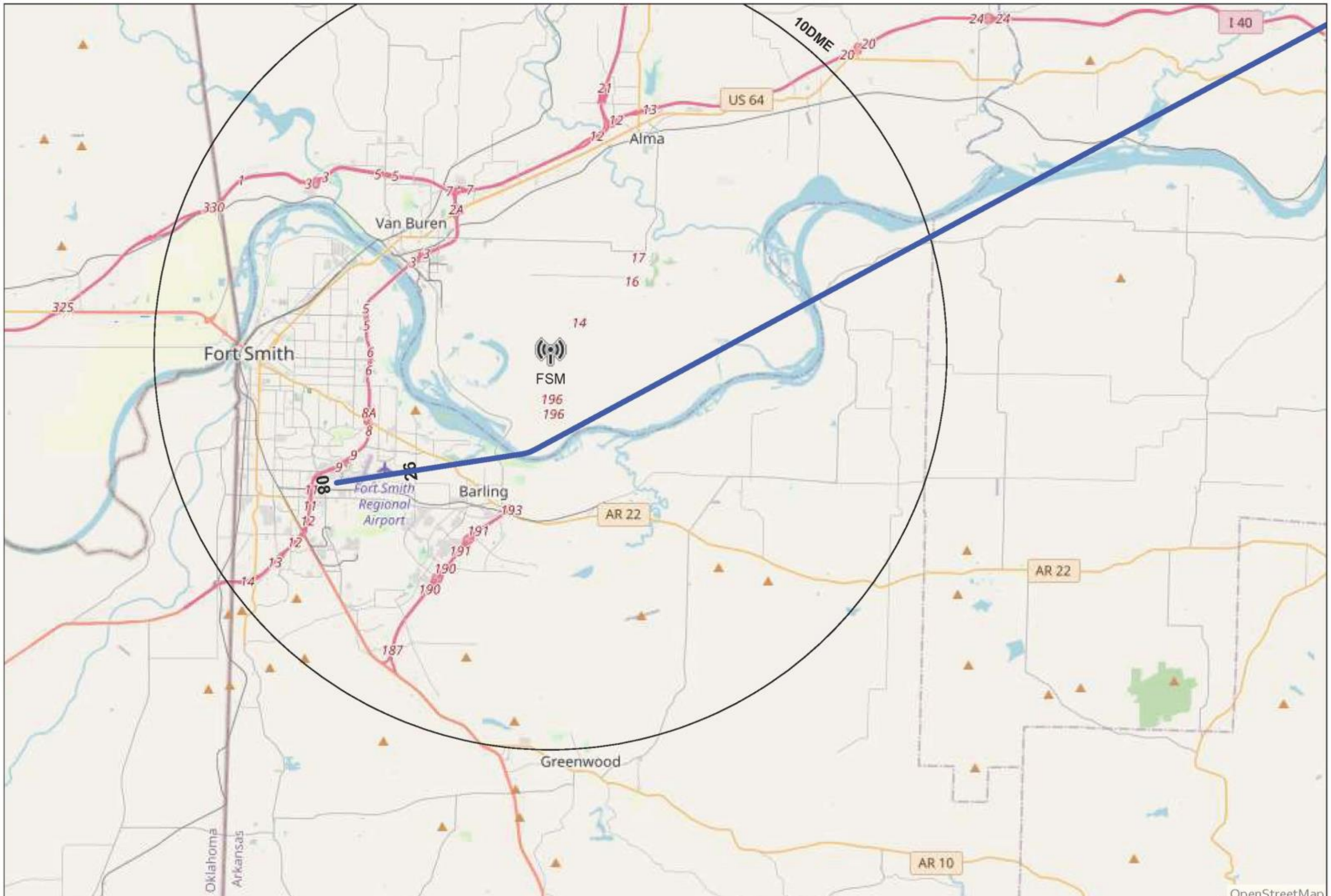
Ebbing ANGB F-16C Arrival Flight Tracks to Runway 08

104



Crawford County
10DME
SFO
Overhead Break
I 40
WULVS
Ozark
Shirley MOA
46%
IFR
Alma
Van Buren
VFR
Straight-in
Fort Smith
FSM
IFR
26
Barling
VFR to Overhead Break = 60%
VFR to Straight-in = 10%
IFR = 24%
SFO = 6%
OK 9
OK 112
US 271
Greenwood
Sebastian County
Hog MOA
54%
GRREY
Booneville
OpenStreetMap
Ebbing ANGB F-16C Arrival Flight Tracks to Runway 26
0
20,000
40,000
60,000
80,000
100,000
Scale in Feet 1:348,000 (1 inch = 29,000 feet)
N

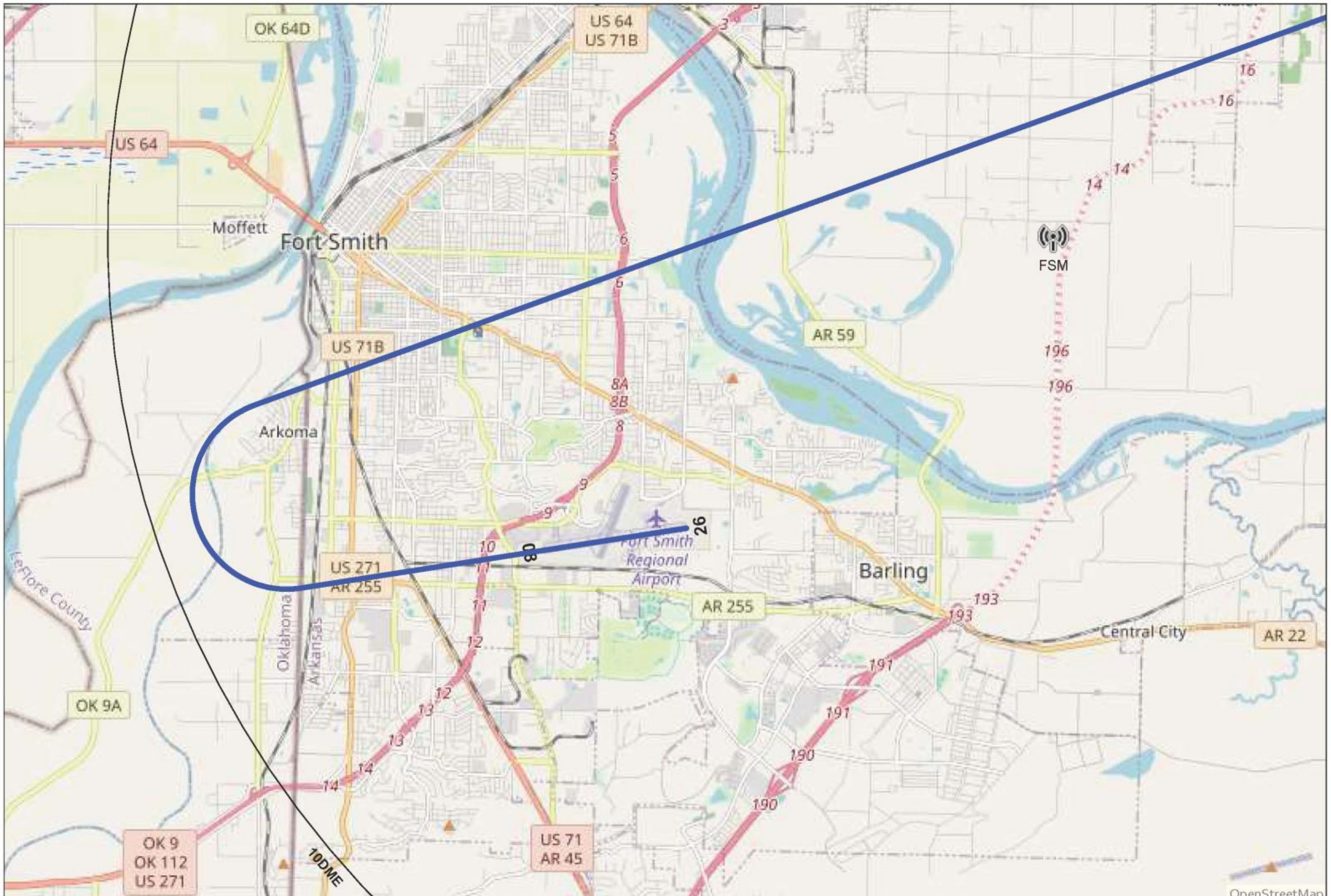
105



Ebbing ANGB F-16C Departure Flight Tracks on Runway 08

Scale in Feet 1:284,000 (1 inch = 23,700 feet)

106

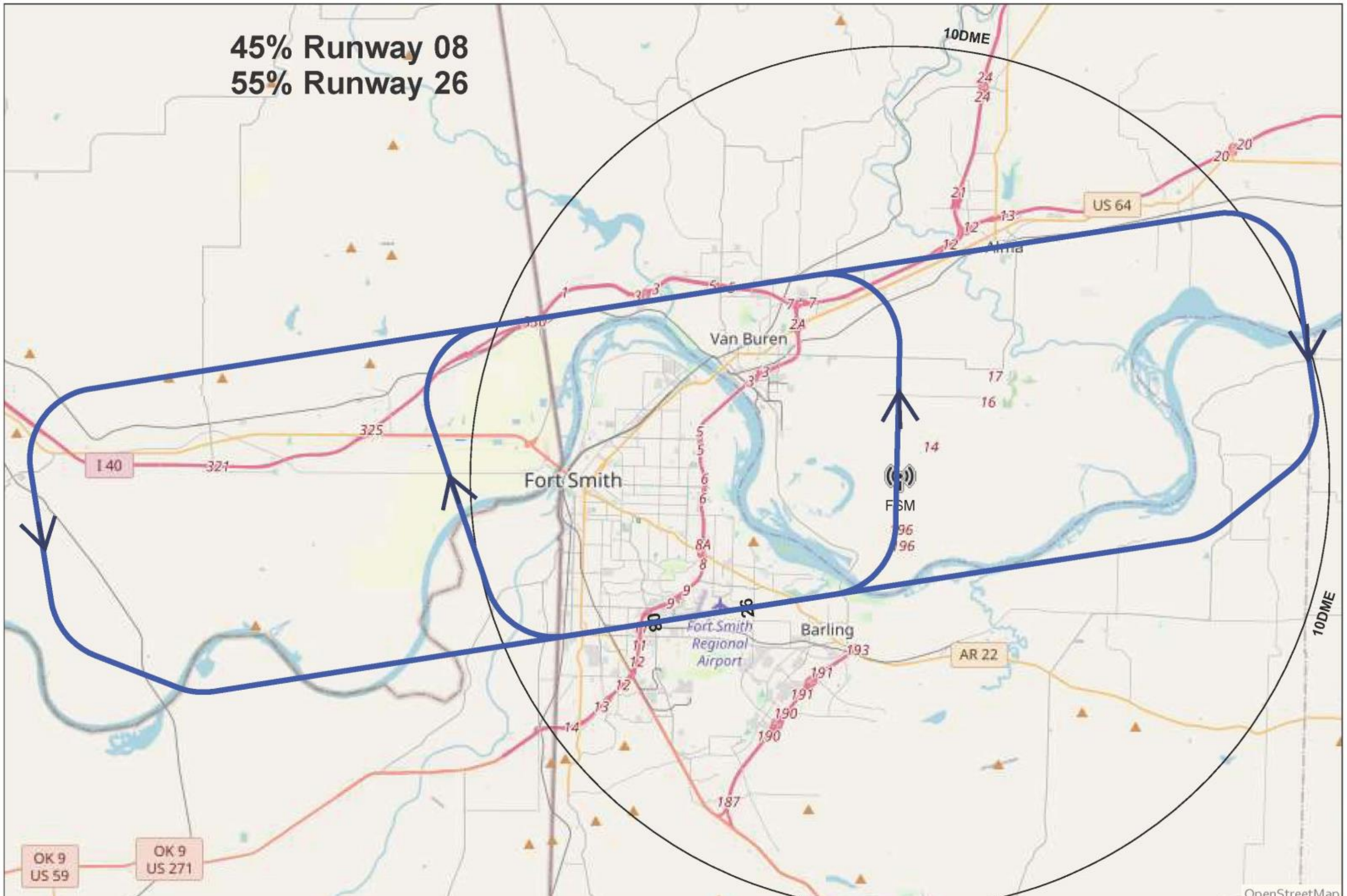


Ebbing ANGB F-16C Departure Flight Tracks on Runway 26

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:119,000 (1 inch = 9,920 feet)

107

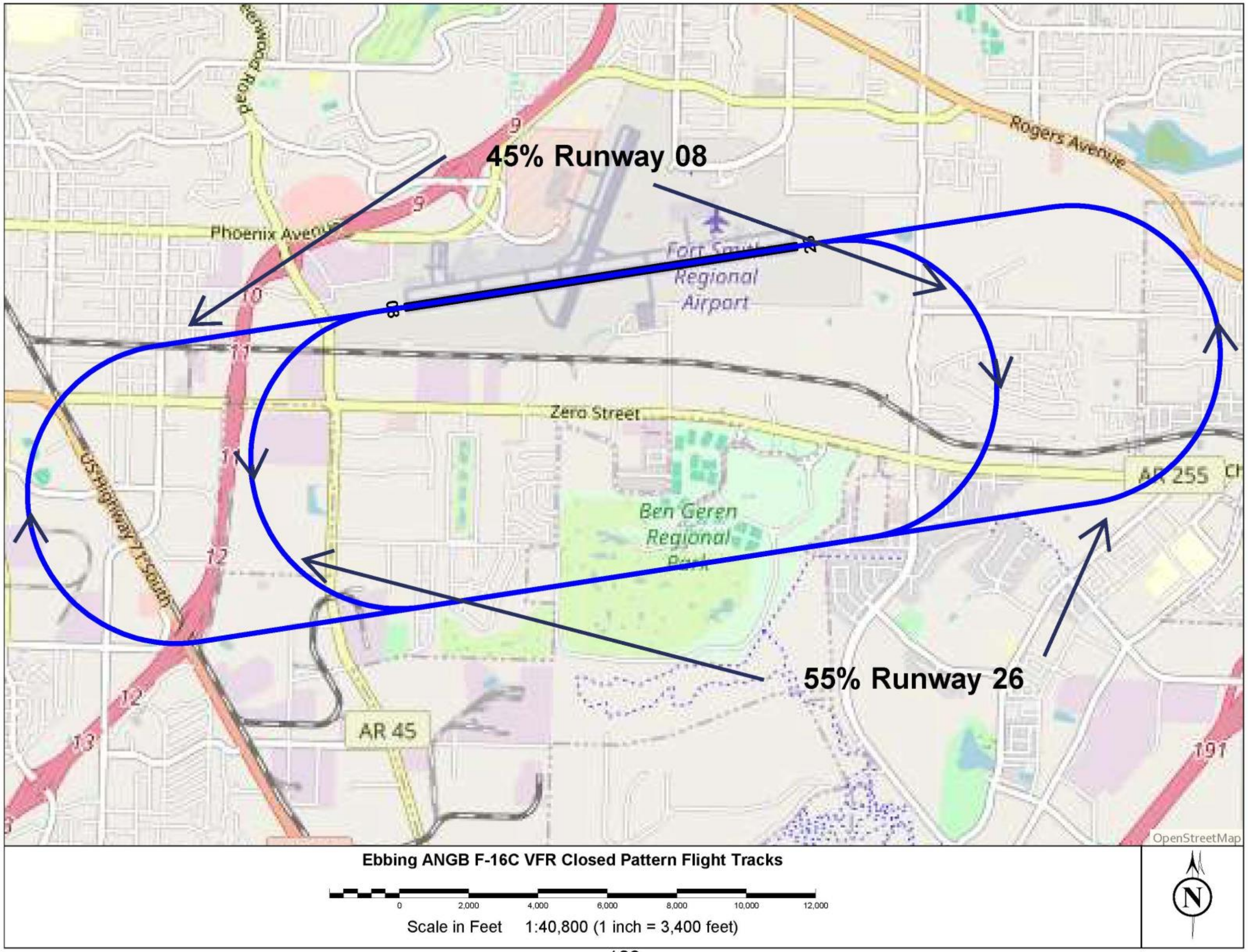


Ebbing ANGB F-16C IFR Pattern Flight Tracks
Runway 08/26

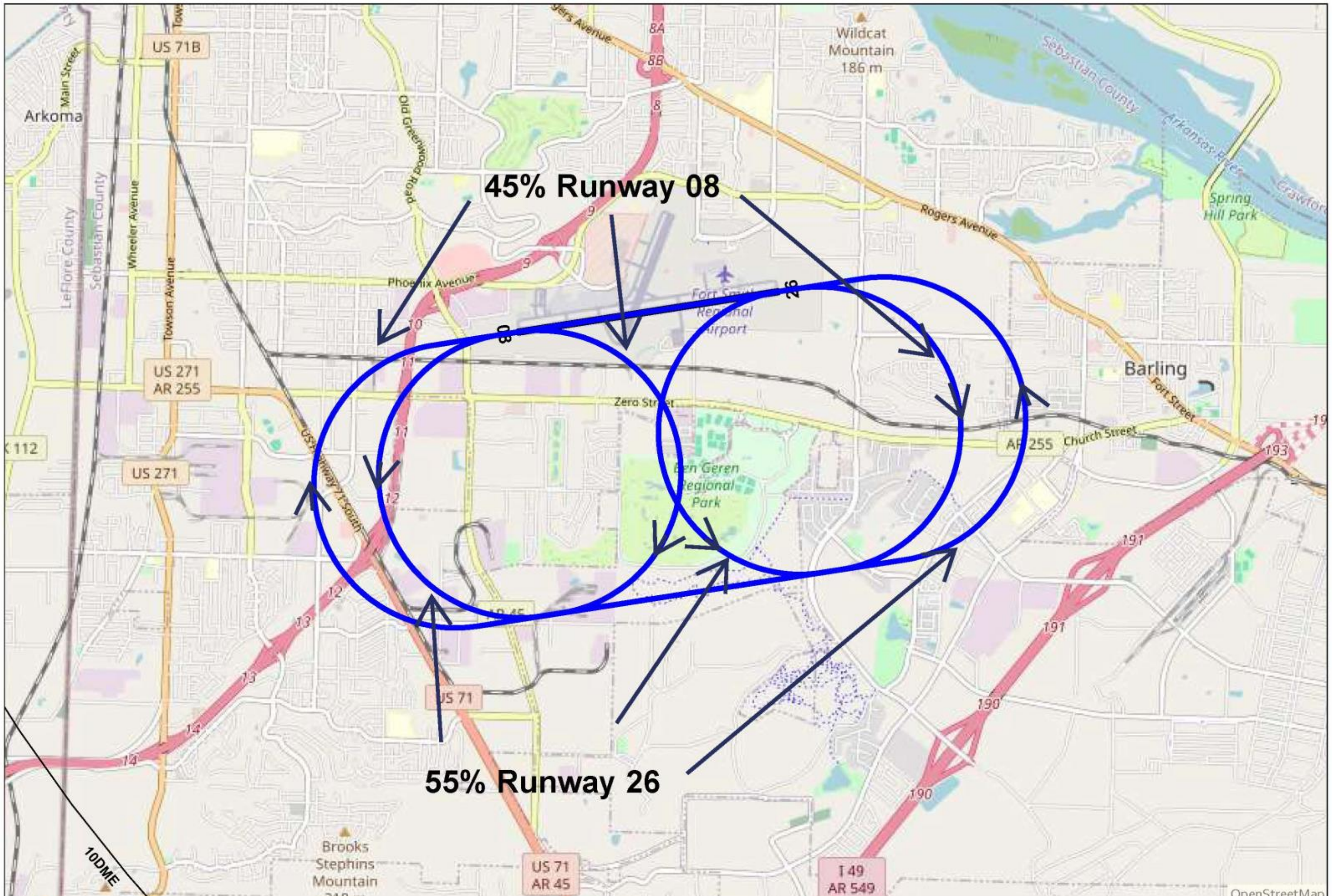
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:265,000 (1 inch = 22,100 feet)

108


45% Runway 08
55% Runway 26
Phoenix Ave
Zero Street
Rogers Avenue
Fort Smith Regional Airport
Ben Geren Regional Park
AR 255
AR 45
US Highway 71 South
OpenStreetMap
Ebbing ANGB F-16C VFR Closed Pattern Flight Tracks
0 2,000 4,000 6,000 8,000 10,000 12,000
Scale in Feet 1:40,800 (1 inch = 3,400 feet)
N

109



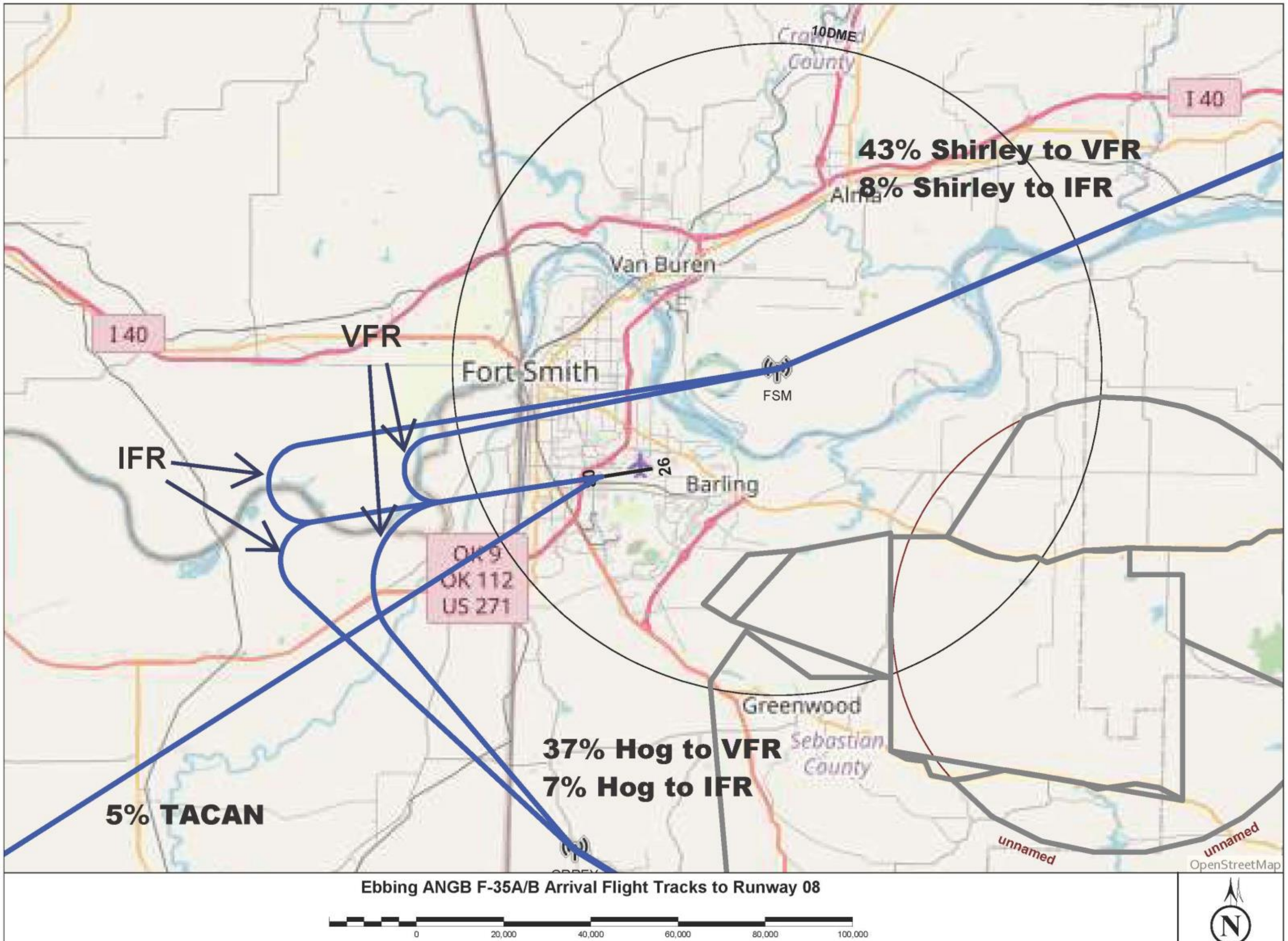
Ebbing ANGB F-16C SFO Pattern Flight Tracks

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:65,400 (1 inch = 5,450 feet)

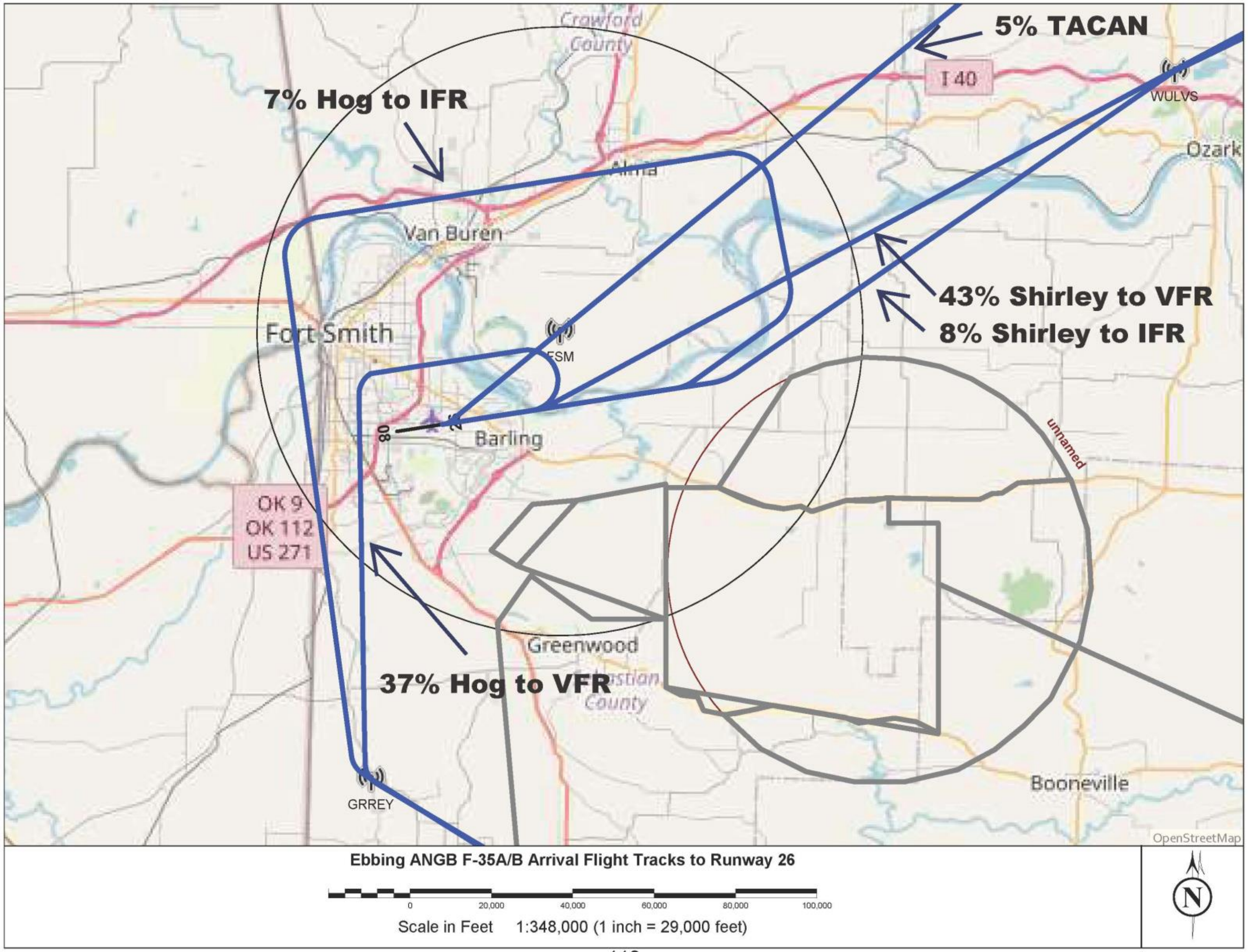
110

A.3 Proposed Action F-35A/B Flight Tracks



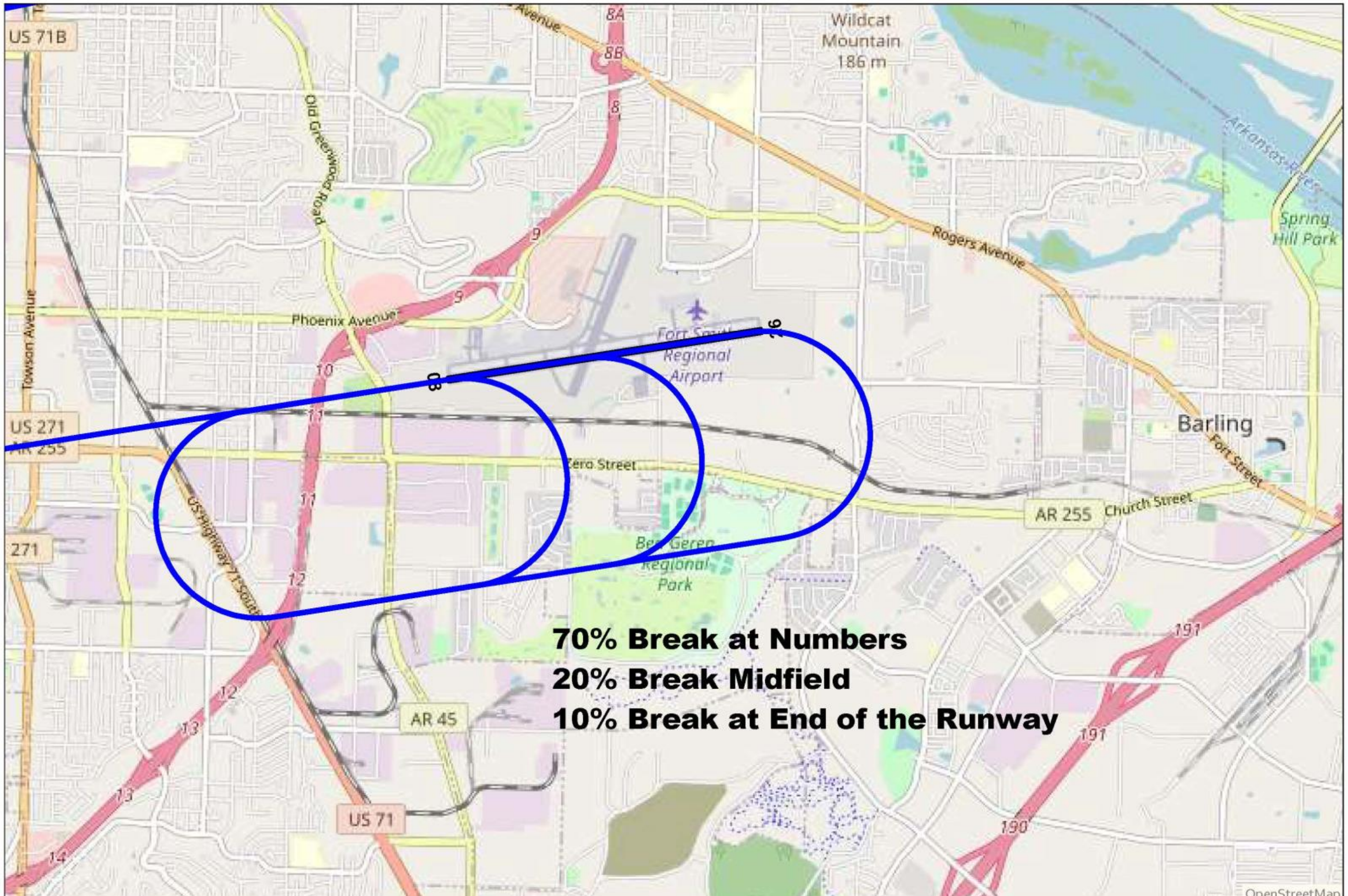
Ebbing ANGB F-35A/B Arrival Flight Tracks to Runway 08

112



Ebbing ANGB F-35A/B Arrival Flight Tracks to Runway 26

113



Ebbing ANGB F-35A/B Overhead Break Arrival Flight Tracks

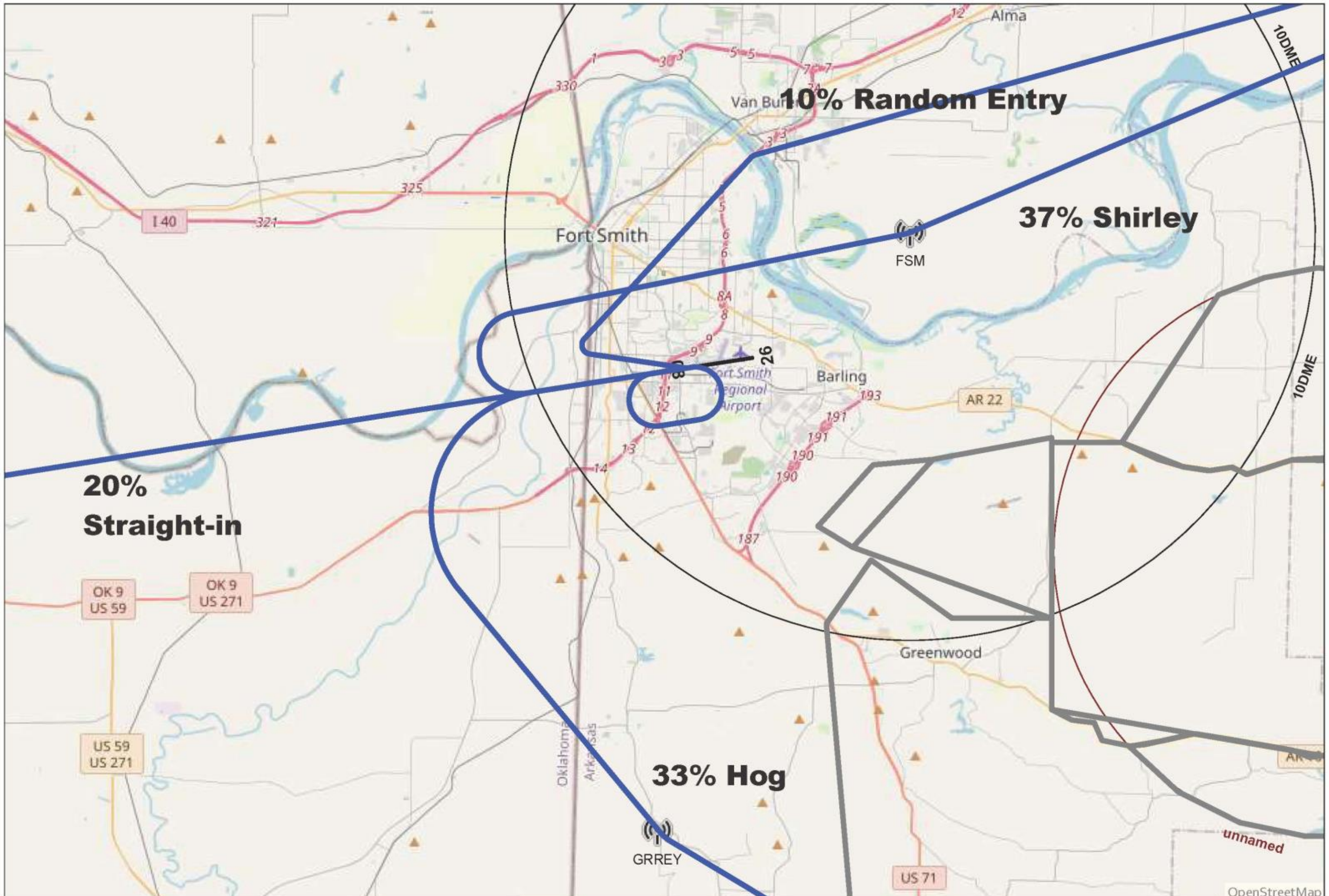
Showing Runway 08 in this map (Runway 26 are identical but from the other end of the runway)

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 = 4,590 feet)

N

114

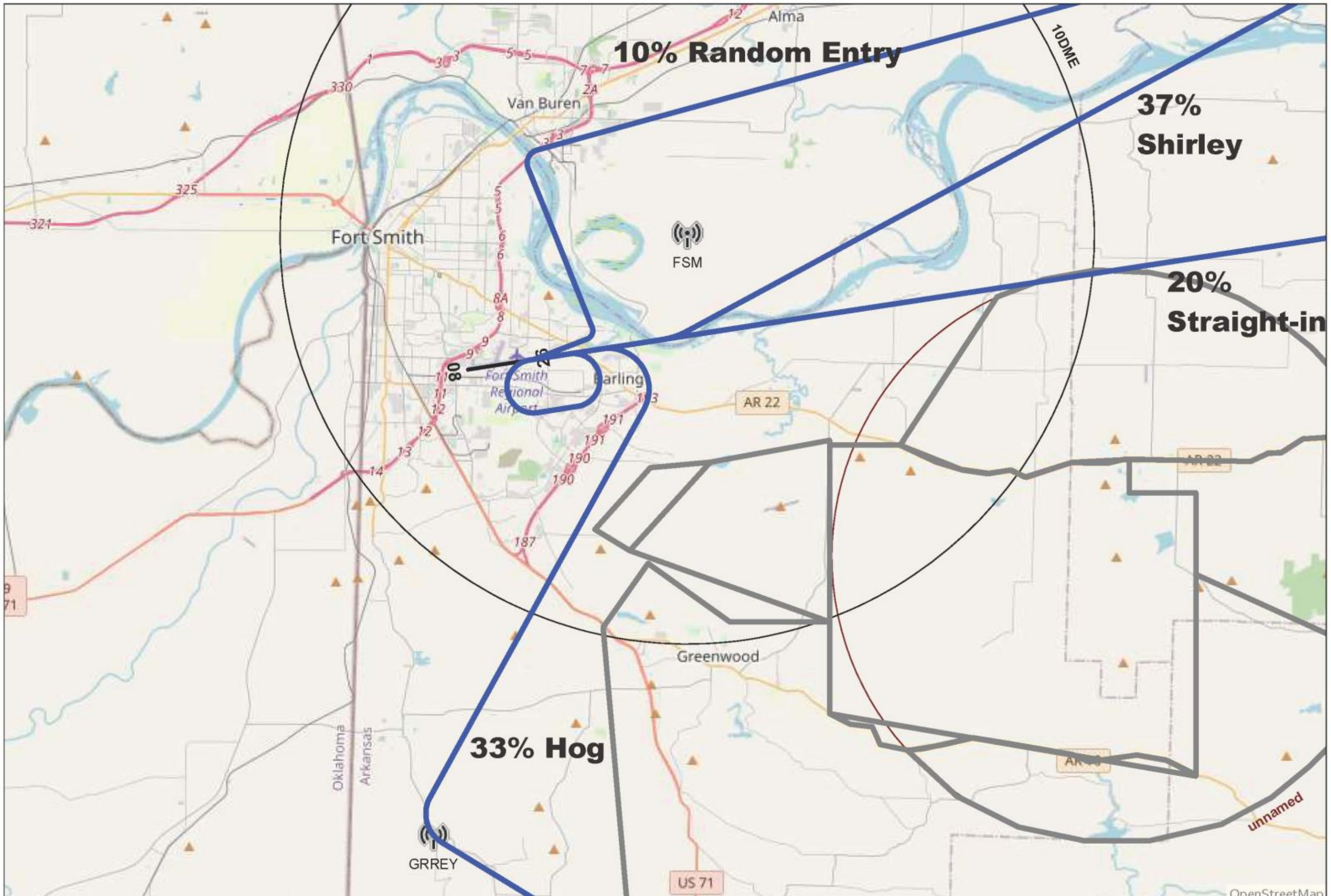


Ebbing ANGB F-35A/B PFO Arrival Flight Tracks on Runway 08

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:277,000 (1 inch = 23,100 feet)

115



Ebbing ANGB F-35A/B PFO Arrival Flight Tracks on Runway 26

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:276,000 (1 inch = 23,000 feet)

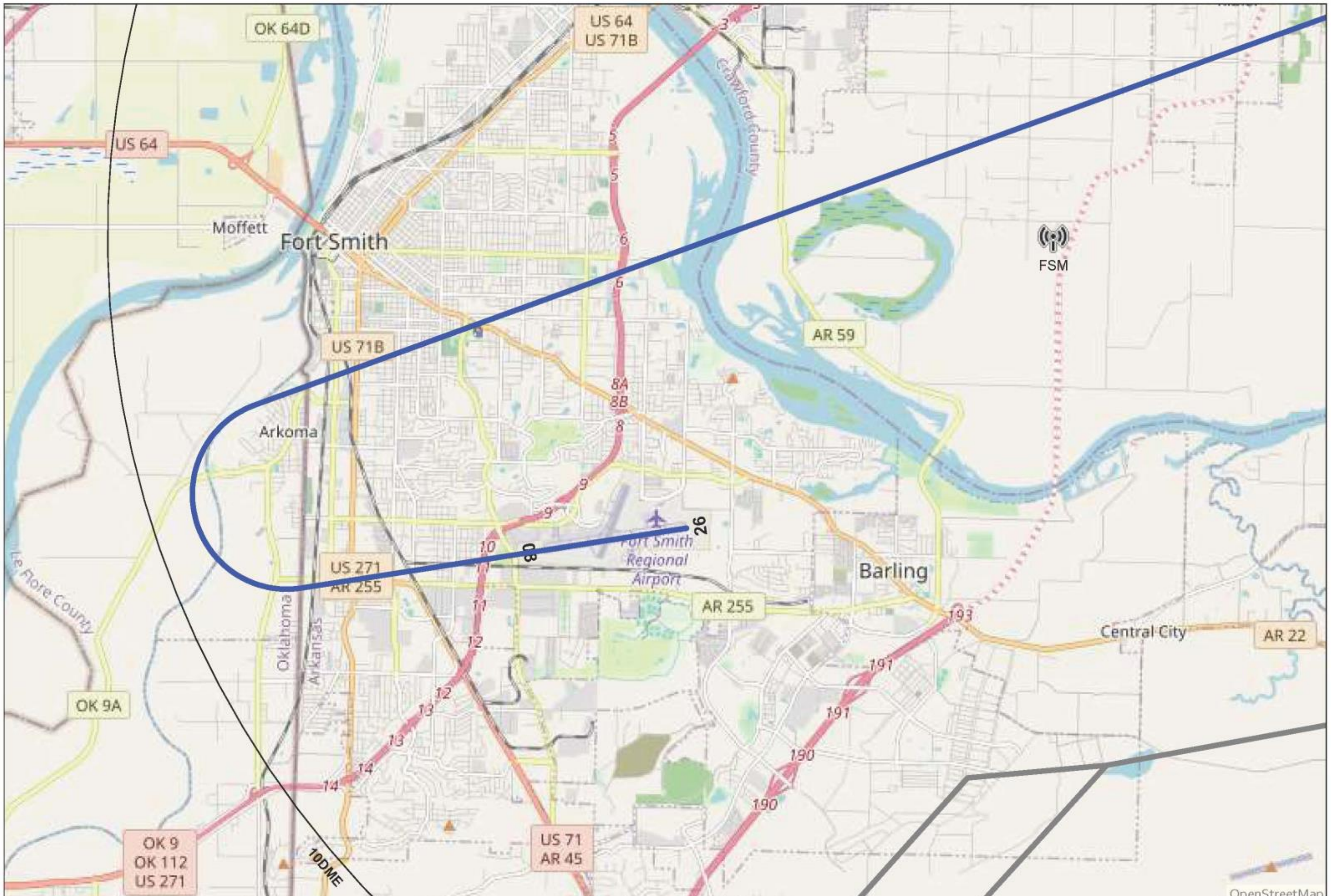
116

Ebbing ANGB F-35A/B Departure Flight Track from Runway 08

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:284,000 (1 inch = 23,700 feet)

117



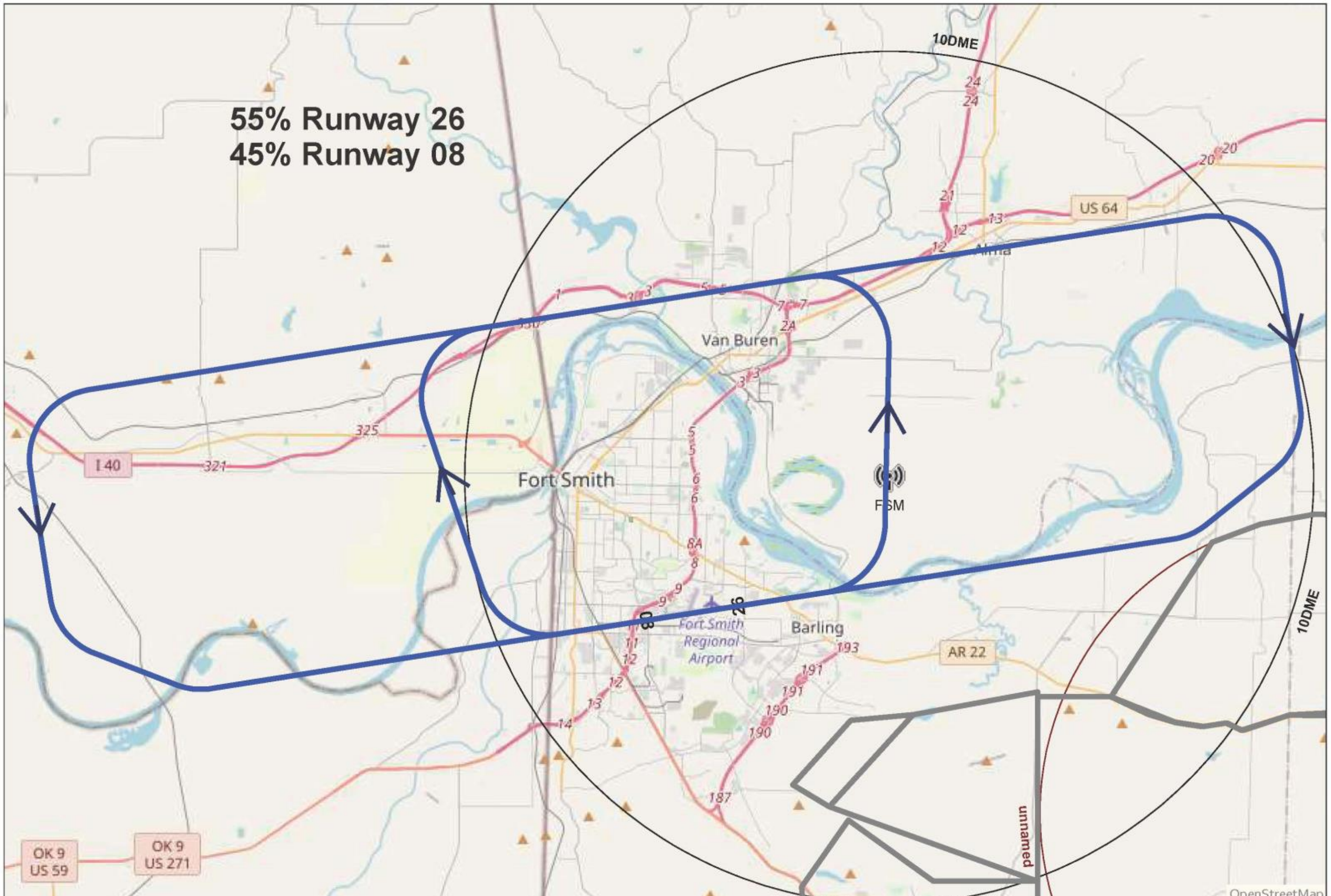
Ebbing ANGB F-35A/B Departure Flight Track from Runway 26

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:119,000 (1 inch = 9,920 feet)

N

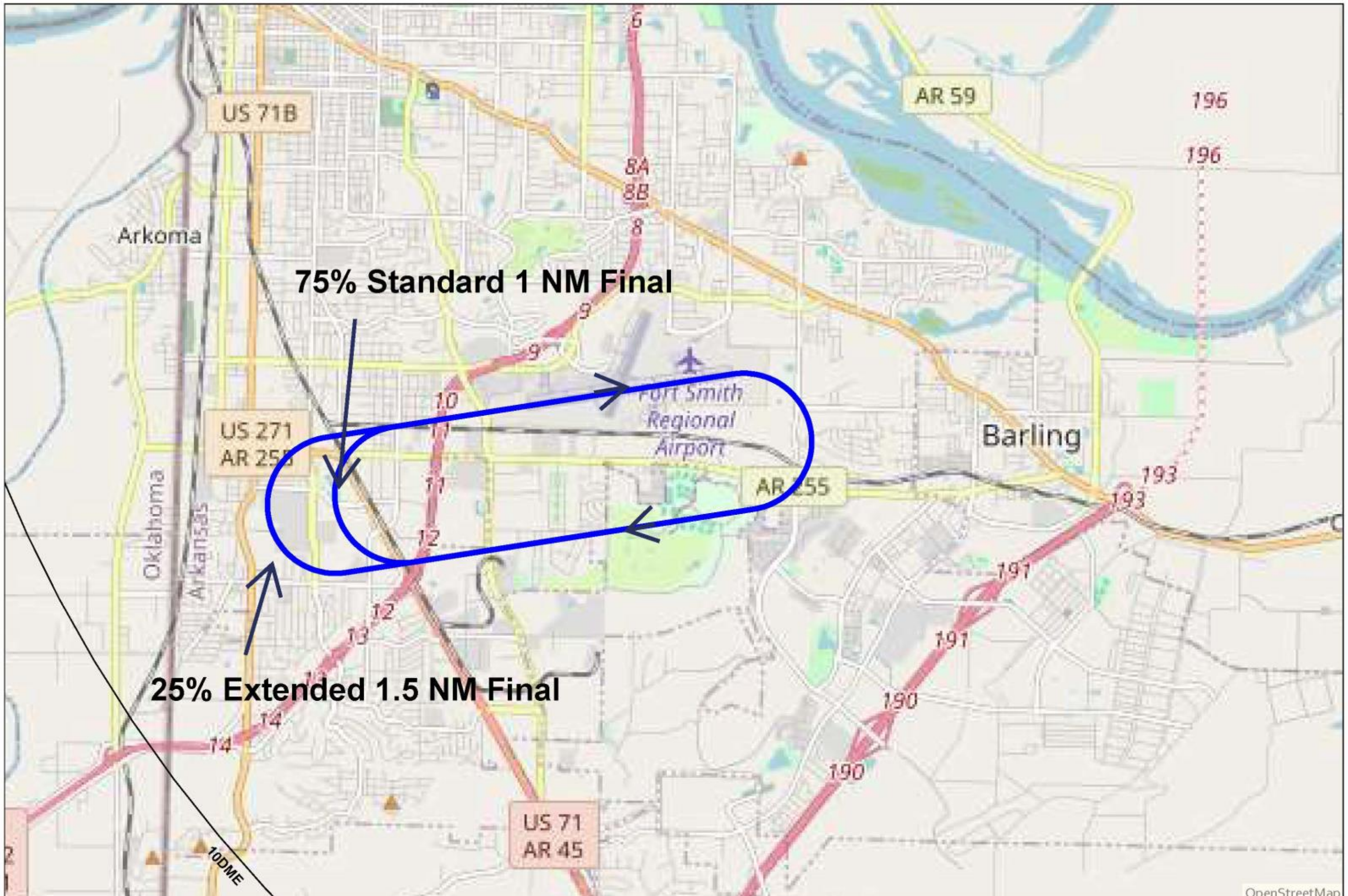
118



Ebbing ANGB F-35A/B IFR Closed Pattern Flight Tracks

Scale in Feet 1:265,000 (1 inch = 22,100 feet)

119



Ebbing ANGB F-35A/B VFR Closed Pattern Flight Tracks on Runway 08

Standard downwind 75% of time and extended downwind 25% of time

Scale in Feet 1:83,600 (1 inch = 6,970 feet)

120

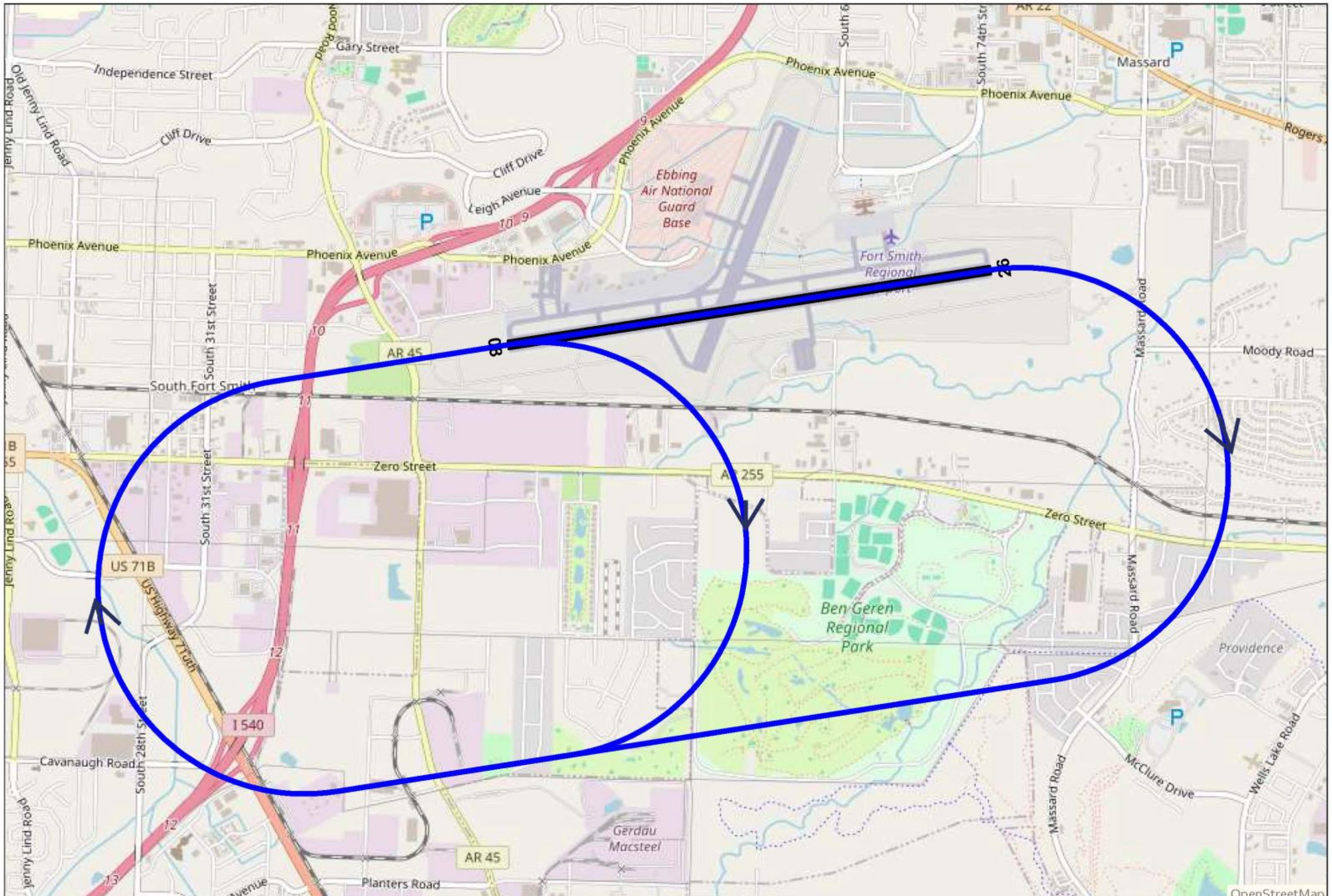
Ebbing ANGB F-35A/B VFR Closed Pattern Flight Tracks on Runway 26

Standard downwind 75% of time and extended downwind 25% of time

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:83,600 (1 inch = 6,970 feet)

121



Ebbing ANGB F-35A/B PFO Pattern Flight Track on Runway 08

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:35,400 (1 inch = 2,950 feet)

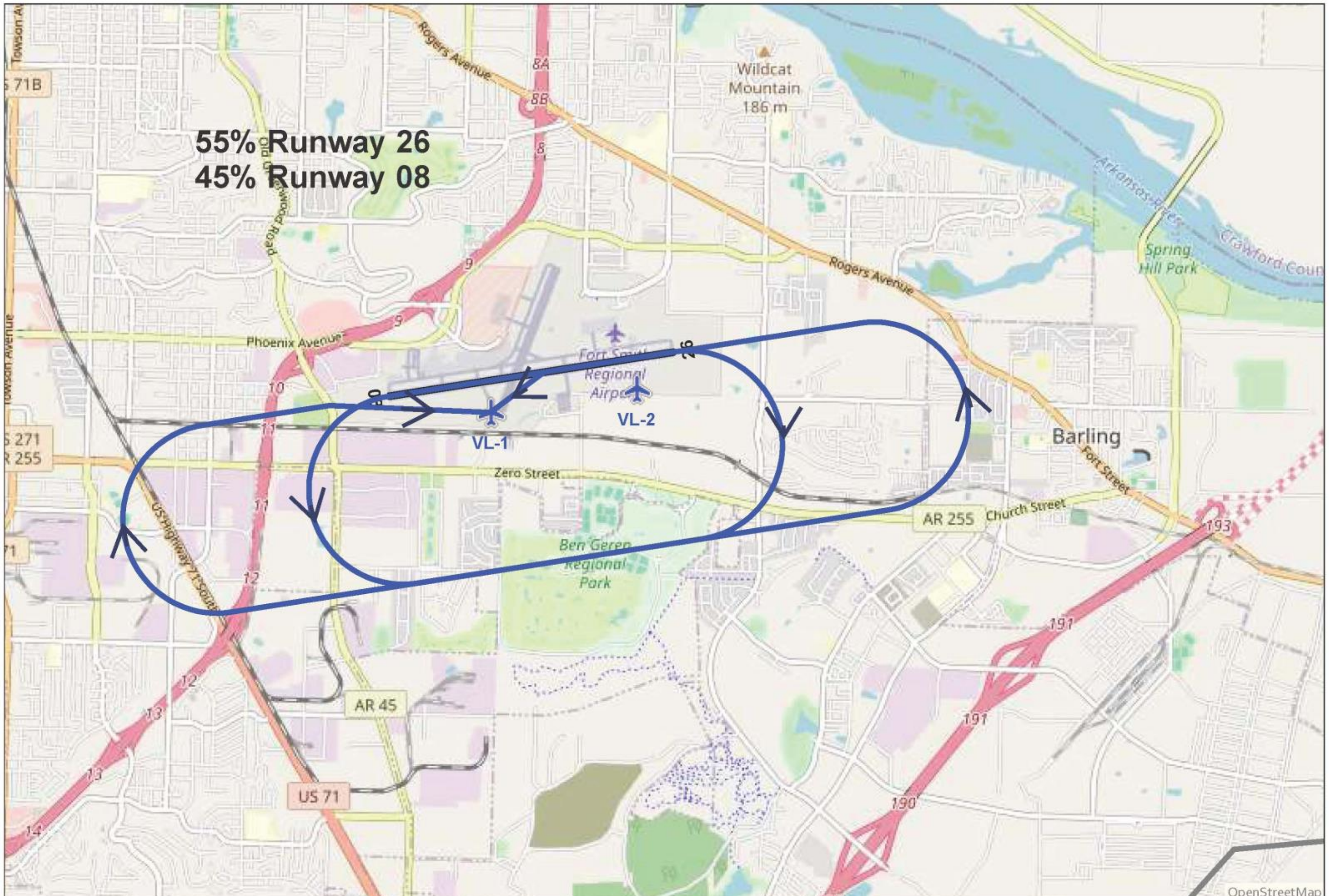
122

Ebbing ANGB F-35A/B PFO Pattern Flight Track on Runway 26

0 4,000 8,000 12,000 16,000 20,000 24,000

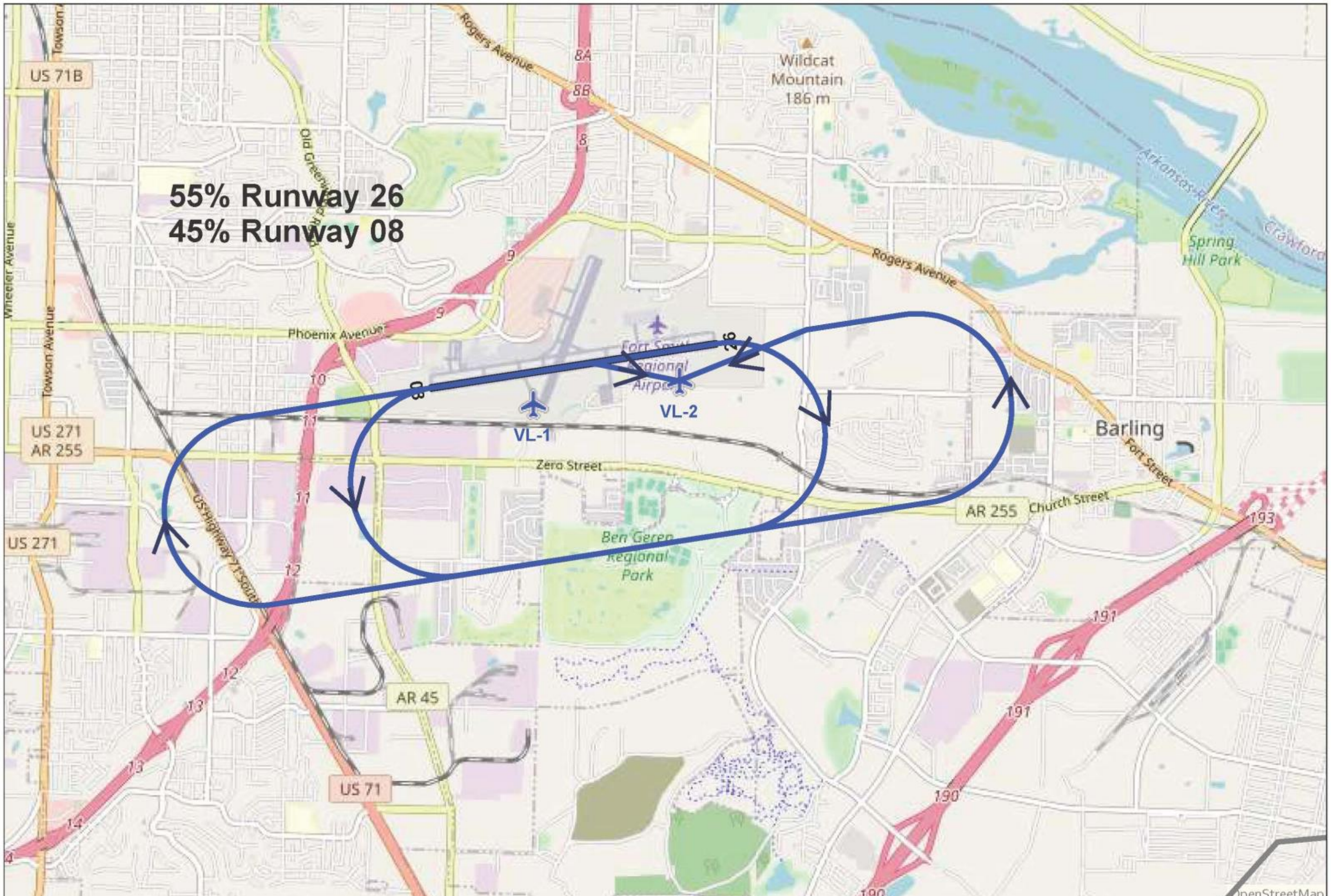
Scale in Feet 1:76,100 (1 inch = 6,340 feet)

123



Ebbing ANGB F-35B Touch and Go to Vertical Landing on Pad 1

Scale in Feet 1:59,600 (1 inch = 4,970 feet)



Ebbing ANGB F-35B Touch and Go to Vertical Landing on Pad 2

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:59,600 (1 inch = 4,970 feet)

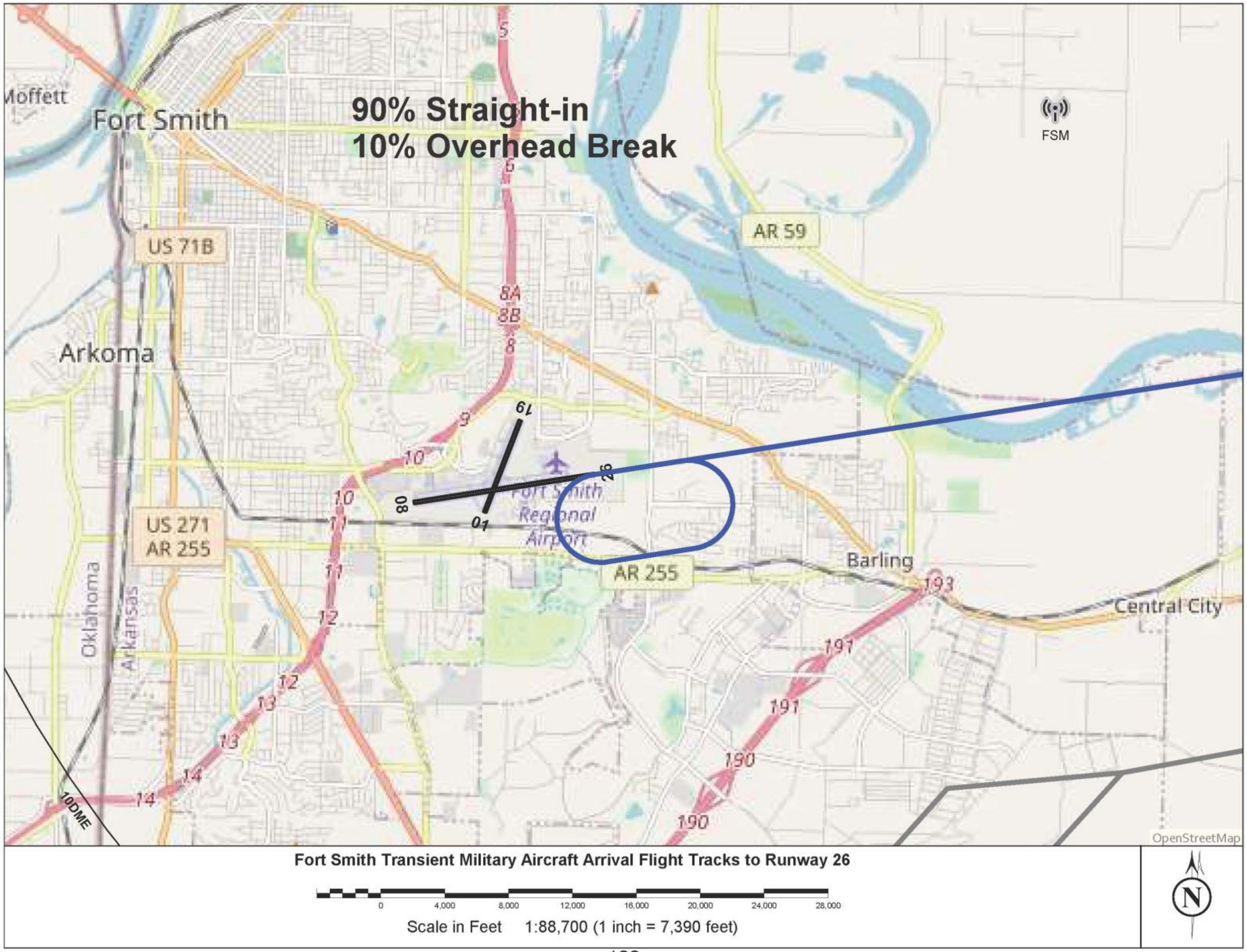
N

A.4 Transient Military Aircraft Flight Tracks

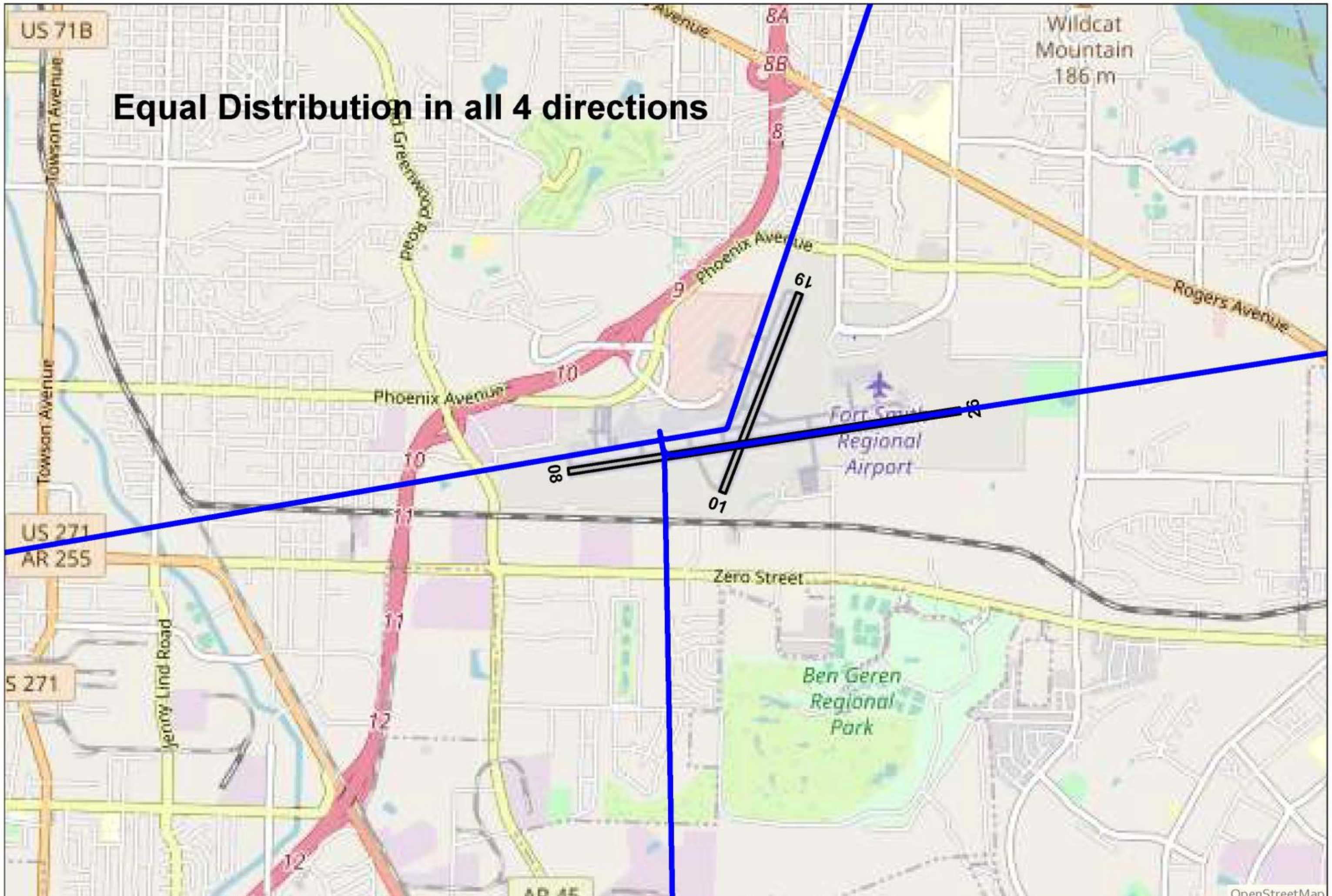
Fort Smith Transient Military Aircraft Arrival Flight Tracks to Runway 08

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

127


90% Straight-in
10% Overhead Break
Fort Smith
Moffett
Arkoma
US 71B
US 271
AR 255
AR 59
AR 255
FSM
Fort Smith Regional Airport
Barling
Central City
Oklahoma
Arkansas
19
01
08
26
10DME
OpenStreetMap
Fort Smith Transient Military Aircraft Arrival Flight Tracks to Runway 26
0
4,000
8,000
12,000
16,000
20,000
24,000
28,000
Scale in Feet 1:88,700 (1 inch = 7,390 feet)
N

128



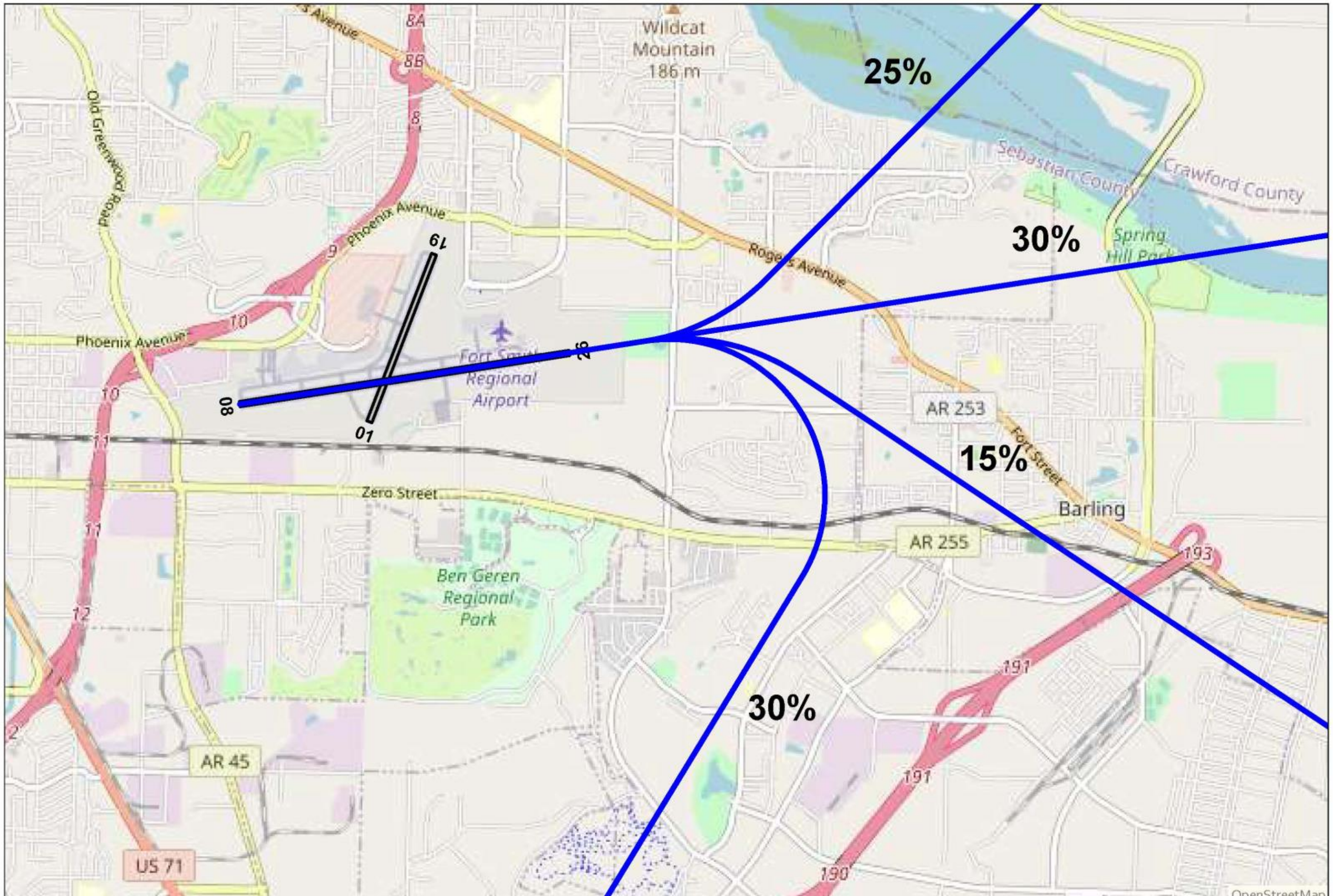
Fort Smith Transient Military Helicopter Arrival Flight Tracks

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:43,600 (1 inch = 3,630 feet)

N

129



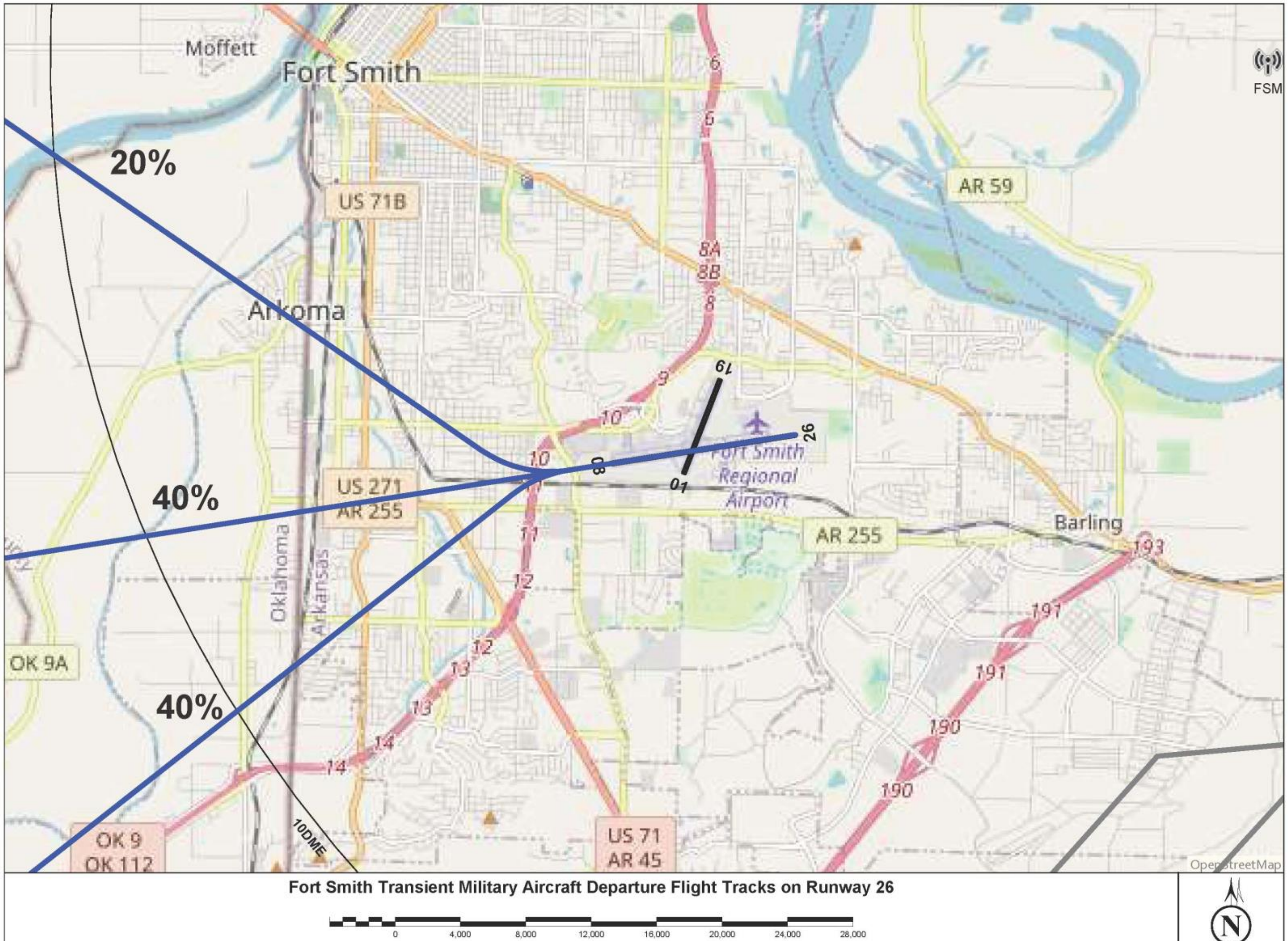
Fort Smith Transient Military Aircraft Departure Flight Tracks on Runway 08

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:51,800 (1 inch = 4,320 feet)

N

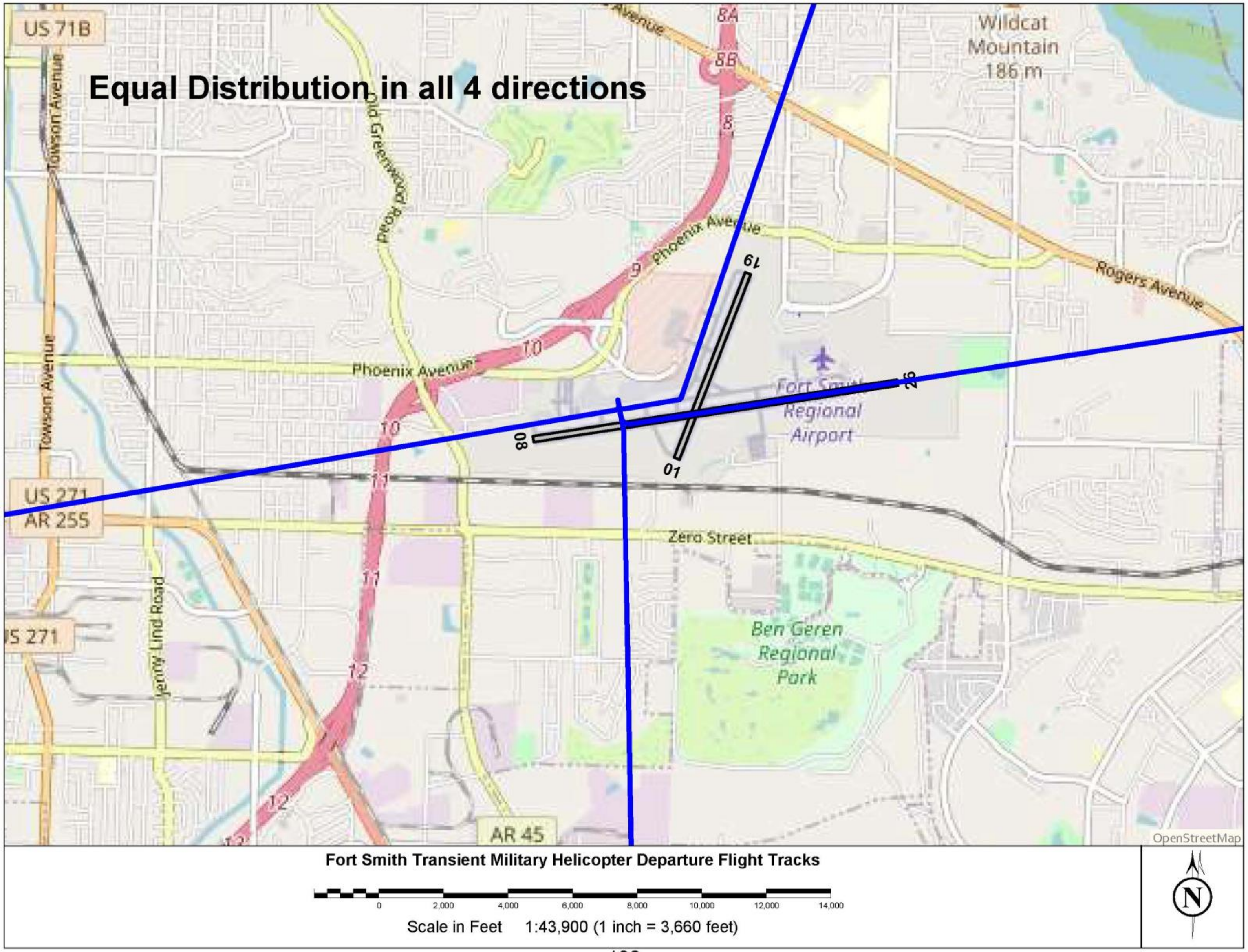
130



Fort Smith Transient Military Aircraft Departure Flight Tracks on Runway 26

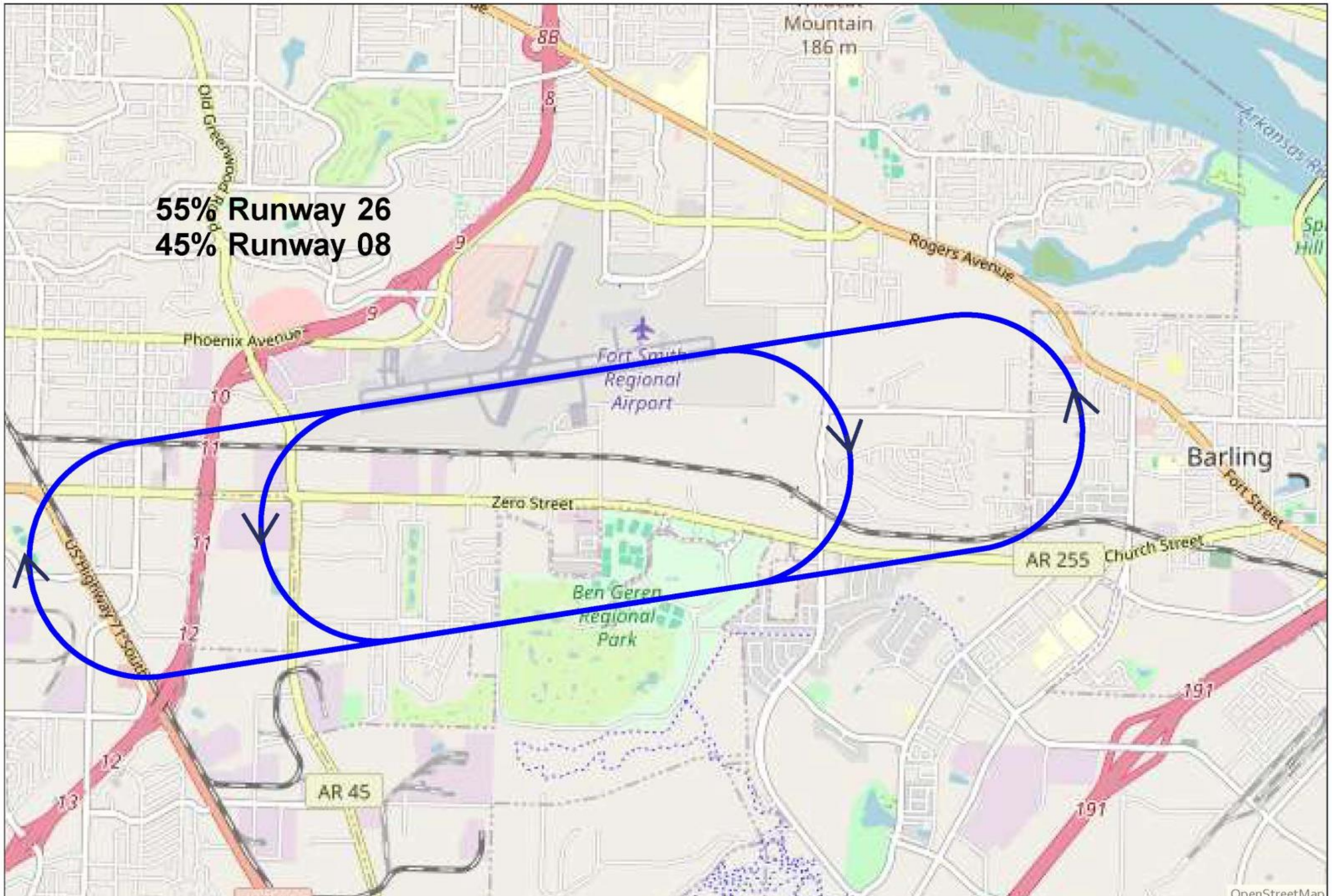
Scale in Feet 1:89,500 (1 inch = 7,460 feet)

131



Fort Smith Transient Military Helicopter Departure Flight Tracks

132



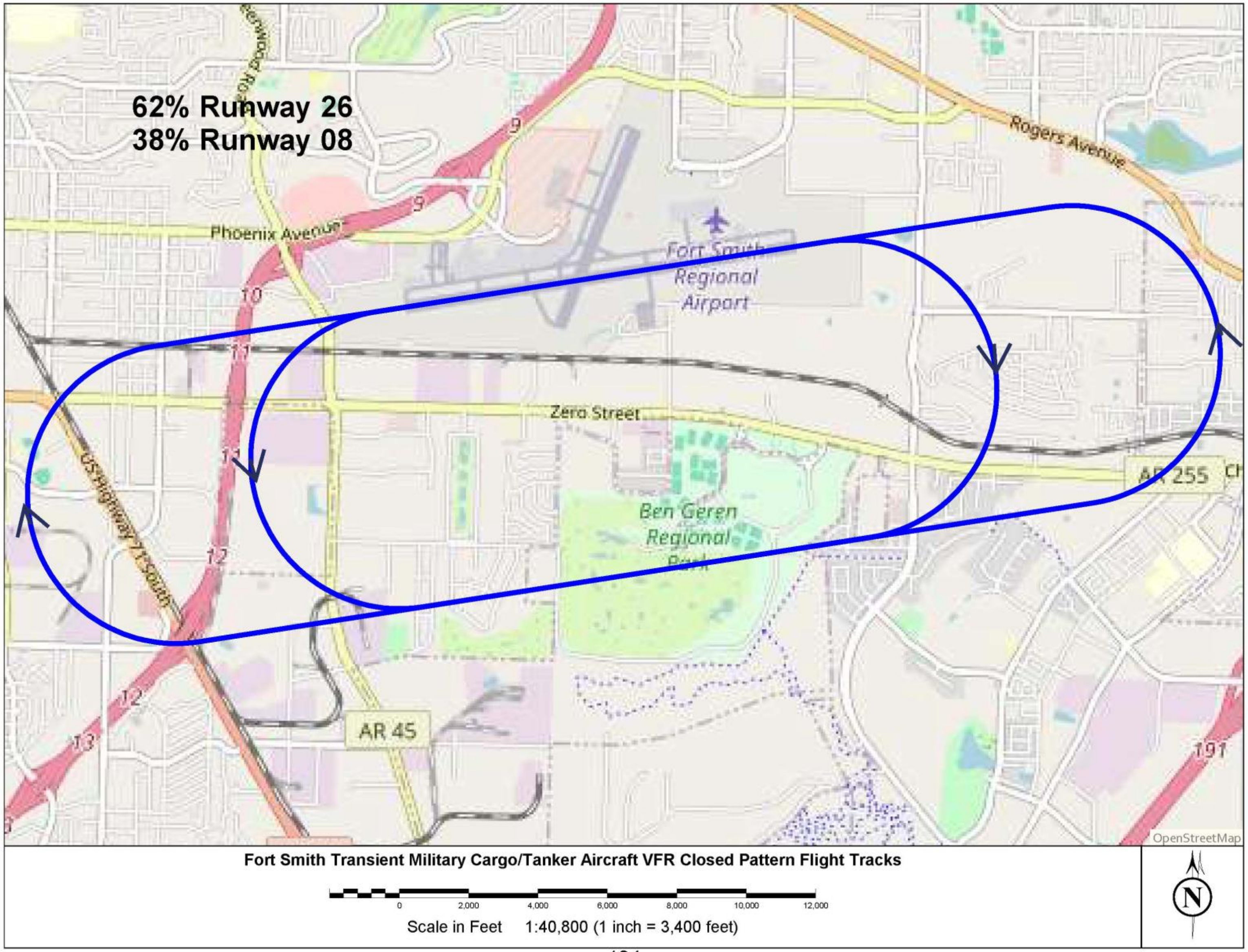
Fort Smith Transient Military Fighter/Trainer Aircraft VFR Closed Pattern Flight Tracks

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,000 (1 inch = 4,000 feet)

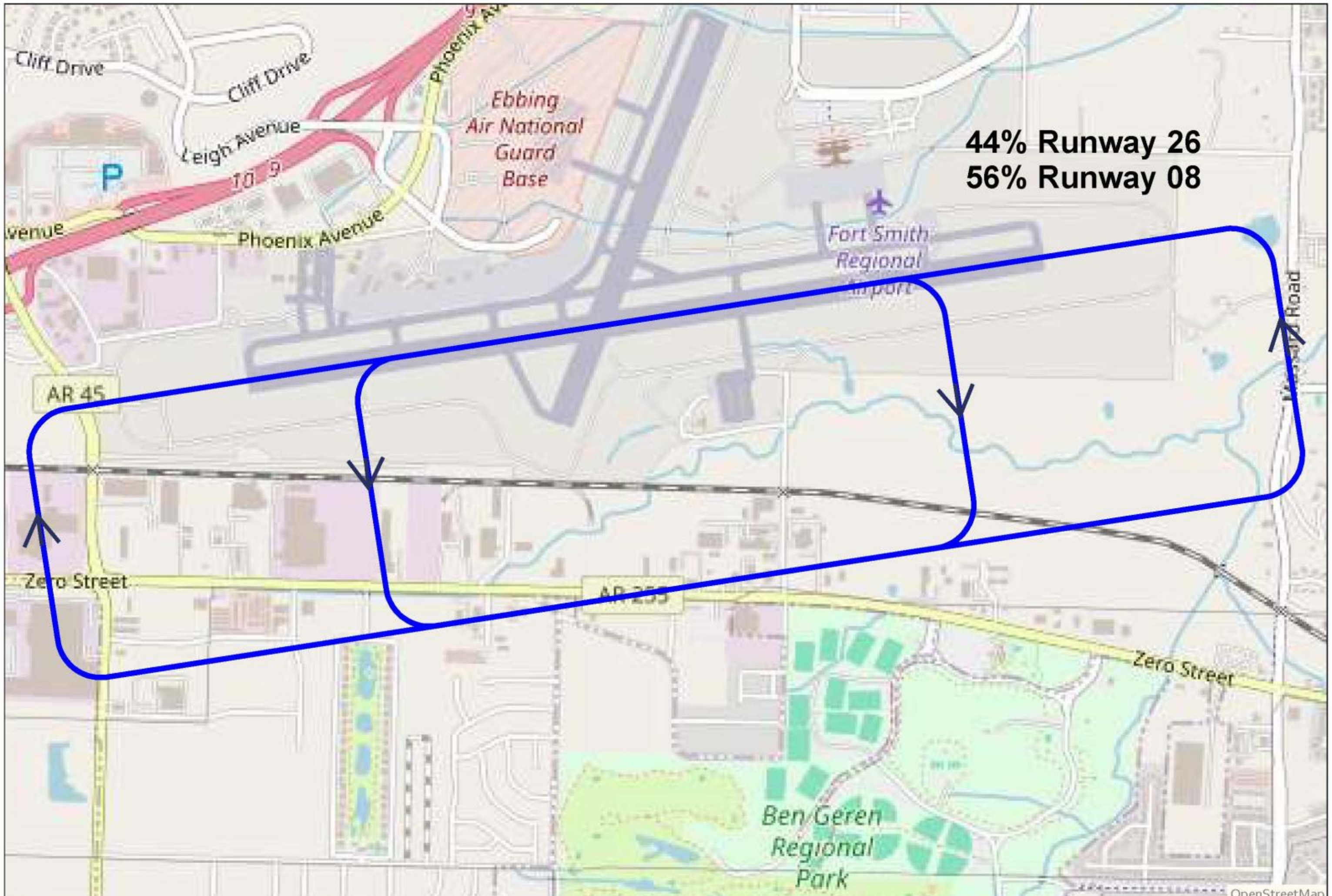
N

133



Fort Smith Transient Military Cargo/Tanker Aircraft VFR Closed Pattern Flight Tracks

Scale in Feet 1:40,800 (1 inch = 3,400 feet)



Fort Smith Transient Military Helicopter VFR Closed Pattern Flight Tracks

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000

Scale in Feet 1:21,400 (1 inch = 1,790 feet)

N

135

A.5 Civilian Aircraft Flight Tracks

Fort Smith Regional Airport Flight Track Utilization of Civil Aircraft by Aircraft Category and Acoustic Day/Night

Departures on Runway 02 Track ID	Air Carrier and Regional Jet Acoustic Day	Air Carrier and Regional Jet Acoustic Night	Business Jet Acoustic Day	Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
D02T010	-	-	33.33%	33.33%	33.33%	33.33%	-	-
D02T020	-	-	66.67%	66.67%	66.67%	66.67%	-	-
D02P010	-	-	-	-	-	-	26.89%	26.89%
D02P011	-	-	-	-	-	-	6.25%	6.25%
D02P012	-	-	-	-	-	-	6.25%	6.25%
D02P020	-	-	-	-	-	-	18.62%	18.62%
D02P021	-	-	-	-	-	-	4.33%	4.33%
D02P022	-	-	-	-	-	-	4.33%	4.33%
D02P030	-	-	-	-	-	-	10.34%	10.34%
D02P031	-	-	-	-	-	-	2.40%	2.40%
D02P032	-	-	-	-	-	-	2.40%	2.40%
D02P040	-	-	-	-	-	-	9.09%	9.09%
D02P050	-	-	-	-	-	-	9.09%	9.09%

Departures on Runway 20 Track ID	Air Carrier and Regional Jet Acoustic Day	Air Carrier and Regional Jet Acoustic Night	Business Jet Acoustic Day	Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
D20J010	-	-	28.57%	28.57%	-	-	-	-
D20J020	-	-	14.29%	14.29%	-	-	-	-
D20J030	-	-	29.25%	29.25%	-	-	-	-
D20J031	-	-	6.80%	6.80%	-	-	-	-
D20J032	-	-	6.80%	6.80%	-	-	-	-
D20J040	-	-	14.29%	14.29%	-	-	-	-
D20T010	-	-	-	-	40.96%	40.96%	-	-
D20T011	-	-	-	-	9.52%	9.52%	-	-
D20T012	-	-	-	-	9.52%	9.52%	-	-
D20T020	-	-	-	-	20.00%	20.00%	-	-
D20T030	-	-	-	-	6.67%	6.67%	-	-
D20T040	-	-	-	-	13.33%	13.33%	-	-
D20P010	-	-	-	-	-	-	14.98%	14.98%
D20P011	-	-	-	-	-	-	3.48%	3.48%
D20P012	-	-	-	-	-	-	3.48%	3.48%
D20P020	-	-	-	-	-	-	7.49%	7.49%
D20P021	-	-	-	-	-	-	1.74%	1.74%
D20P022	-	-	-	-	-	-	1.74%	1.74%
D20P030	-	-	-	-	-	-	12.49%	12.49%
D20P031	-	-	-	-	-	-	2.90%	2.90%
D20P032	-	-	-	-	-	-	2.90%	2.90%
D20P040	-	-	-	-	-	-	8.32%	8.32%
D20P041	-	-	-	-	-	-	1.94%	1.94%
D20P042	-	-	-	-	-	-	1.94%	1.94%
D20P050	-	-	-	-	-	-	19.98%	19.98%
D20P051	-	-	-	-	-	-	4.64%	4.64%
D20P052	-	-	-	-	-	-	4.64%	4.64%
D20P060	-	-	-	-	-	-	4.99%	4.99%
D20P061	-	-	-	-	-	-	1.16%	1.16%
D20P062	-	-	-	-	-	-	1.16%	1.16%

Departures on Runway 08 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
D08J010	4.81%	0.20%	-	-	-	-
D08J011	1.12%	0.05%	-	-	-	-
D08J012	1.12%	0.05%	-	-	-	-
D08J020	5.43%	1.61%	-	-	-	-
D08J021	1.26%	0.37%	-	-	-	-
D08J022	1.26%	0.37%	-	-	-	-
D08J030	27.75%	17.47%	-	-	-	-
D08J031	6.45%	4.06%	-	-	-	-
D08J032	6.45%	4.06%	-	-	-	-
D08J040	10.24%	8.23%	-	-	-	-
D08J041	2.38%	1.91%	-	-	-	-
D08J042	2.38%	1.91%	-	-	-	-
D08J050	4.81%	3.41%	-	-	-	-
D08J051	1.12%	0.79%	-	-	-	-
D08J052	1.12%	0.79%	-	-	-	-
D08J060	15.22%	37.34%	-	-	-	-
D08J061	3.54%	8.68%	-	-	-	-
D08J062	3.54%	8.68%	-	-	-	-
D08T010	-	-	8.67%	5.81%	-	-
D08T011	-	-	2.02%	1.35%	-	-
D08T012	-	-	2.02%	1.35%	-	-
D08T020	-	-	14.79%	20.33%	-	-
D08T021	-	-	3.44%	4.73%	-	-
D08T022	-	-	3.44%	4.73%	-	-
D08T030	-	-	8.77%	2.90%	-	-
D08T031	-	-	2.04%	0.68%	-	-
D08T032	-	-	2.04%	0.68%	-	-
D08T040	-	-	7.14%	5.81%	-	-
D08T041	-	-	1.66%	1.35%	-	-
D08T042	-	-	1.66%	1.35%	-	-
D08T050	-	-	11.02%	17.43%	-	-
D08T051	-	-	2.56%	4.05%	-	-
D08T052	-	-	2.56%	4.05%	-	-
D08T060	-	-	17.86%	15.98%	-	-
D08T061	-	-	4.15%	3.71%	-	-
D08T062	-	-	4.15%	3.71%	-	-
D08P010	-	-	-	-	10.38%	6.44%
D08P011	-	-	-	-	2.41%	1.50%
D08P012	-	-	-	-	2.41%	1.50%
D08P020	-	-	-	-	14.88%	11.59%
D08P021	-	-	-	-	3.46%	2.69%
D08P022	-	-	-	-	3.46%	2.69%
D08P030	-	-	-	-	11.88%	11.59%
D08P031	-	-	-	-	2.76%	2.69%
D08P032	-	-	-	-	2.76%	2.69%
D08P040	-	-	-	-	14.70%	19.32%
D08P041	-	-	-	-	3.42%	4.49%
D08P042	-	-	-	-	3.42%	4.49%
D08P050	-	-	-	-	4.86%	6.44%
D08P051	-	-	-	-	1.13%	1.50%
D08P052	-	-	-	-	1.13%	1.50%
D08P060	-	-	-	-	10.80%	12.88%
D08P061	-	-	-	-	2.51%	2.99%
D08P062	-	-	-	-	2.51%	2.99%
D08P070	-	-	-	-	0.78%	0.00%
D08P071	-	-	-	-	0.18%	0.00%
D08P072	-	-	-	-	0.18%	0.00%

Departures on Runway 26 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
D26J010	4.97%	1.19%	-	-	-	-
D26J011	1.15%	0.28%	-	-	-	-
D26J012	1.15%	0.28%	-	-	-	-
D26J020	5.15%	4.75%	-	-	-	-
D26J021	1.20%	1.10%	-	-	-	-
D26J022	1.20%	1.10%	-	-	-	-
D26J030	4.72%	0.89%	-	-	-	-
D26J031	1.10%	0.21%	-	-	-	-
D26J032	1.10%	0.21%	-	-	-	-
D26J040	9.32%	25.23%	-	-	-	-
D26J041	2.17%	5.86%	-	-	-	-
D26J042	2.17%	5.86%	-	-	-	-
D26J050	39.99%	33.54%	-	-	-	-
D26J051	9.30%	7.80%	-	-	-	-
D26J052	9.30%	7.80%	-	-	-	-
D26J060	4.11%	2.67%	-	-	-	-
D26J061	0.96%	0.62%	-	-	-	-
D26J062	0.96%	0.62%	-	-	-	-
D26T010	-	-	8.10%	10.78%	-	-
D26T011	-	-	1.88%	2.51%	-	-
D26T012	-	-	1.88%	2.51%	-	-
D26T020	-	-	12.23%	10.78%	-	-
D26T021	-	-	2.84%	2.51%	-	-
D26T022	-	-	2.84%	2.51%	-	-
D26T030	-	-	12.23%	10.78%	-	-
D26T031	-	-	2.84%	2.51%	-	-
D26T032	-	-	2.84%	2.51%	-	-
D26T040	-	-	10.58%	17.96%	-	-
D26T041	-	-	2.46%	4.18%	-	-
D26T042	-	-	2.46%	4.18%	-	-
D26T050	-	-	13.88%	14.37%	-	-
D26T051	-	-	3.23%	3.34%	-	-
D26T052	-	-	3.23%	3.34%	-	-
D26T060	-	-	11.24%	3.59%	-	-
D26T061	-	-	2.61%	0.84%	-	-
D26T062	-	-	2.61%	0.84%	-	-
D26P010	-	-	-	-	8.27%	13.13%
D26P011	-	-	-	-	1.92%	3.05%
D26P012	-	-	-	-	1.92%	3.05%
D26P020	-	-	-	-	9.35%	5.25%
D26P021	-	-	-	-	2.17%	1.22%
D26P022	-	-	-	-	2.17%	1.22%
D26P030	-	-	-	-	14.71%	13.13%
D26P031	-	-	-	-	3.42%	3.05%
D26P032	-	-	-	-	3.42%	3.05%
D26P040	-	-	-	-	6.44%	7.88%
D26P041	-	-	-	-	1.50%	1.83%
D26P042	-	-	-	-	1.50%	1.83%
D26P050	-	-	-	-	5.67%	5.25%
D26P051	-	-	-	-	1.32%	1.22%
D26P052	-	-	-	-	1.32%	1.22%
D26P060	-	-	-	-	3.75%	2.63%
D26P061	-	-	-	-	0.87%	0.61%
D26P062	-	-	-	-	0.87%	0.61%
D26P070	-	-	-	-	12.72%	13.13%
D26P071	-	-	-	-	2.96%	3.05%
D26P072	-	-	-	-	2.96%	3.05%
D26P080	-	-	-	-	3.91%	2.63%
D26P081	-	-	-	-	0.91%	0.61%
D26P082	-	-	-	-	0.91%	0.61%
D26P090	-	-	-	-	3.45%	5.25%
D26P091	-	-	-	-	0.80%	1.22%
D26P092	-	-	-	-	0.80%	1.22%

Arrivals on Runway 02 Track ID	Air Carrier and Regional Jet Acoustic Day	Air Carrier and Regional Jet Acoustic Night	Business Jet Acoustic Day	Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
A02J010	-	-	20.00%	-	-	-	-	-
A02J020	-	-	20.00%	-	-	-	-	-
A02J030	-	-	60.00%	-	-	-	-	-
A02T010	-	-	-	-	14.29%	14.29%	-	-
A02T020	-	-	-	-	14.63%	14.63%	-	-
A02T021	-	-	-	-	3.40%	3.40%	-	-
A02T022	-	-	-	-	3.40%	3.40%	-	-
A02T030	-	-	-	-	57.14%	57.14%	-	-
A02T040	-	-	-	-	7.14%	7.14%	-	-
A02P010	-	-	-	-	-	-	19.86%	19.86%
A02P011	-	-	-	-	-	-	4.62%	4.62%
A02P012	-	-	-	-	-	-	4.62%	4.62%
A02P020	-	-	-	-	-	-	18.62%	18.62%
A02P021	-	-	-	-	-	-	4.33%	4.33%
A02P022	-	-	-	-	-	-	4.33%	4.33%
A02P030	-	-	-	-	-	-	16.13%	16.13%
A02P031	-	-	-	-	-	-	3.75%	3.75%
A02P032	-	-	-	-	-	-	3.75%	3.75%
A02P040	-	-	-	-	-	-	11.17%	11.17%
A02P041	-	-	-	-	-	-	2.60%	2.60%
A02P042	-	-	-	-	-	-	2.60%	2.60%
A02P050	-	-	-	-	-	-	3.64%	3.64%

Arrivals on Runway 20 Track ID	Air Carrier and Regional Jet Acoustic Day	Air Carrier and Regional Jet Acoustic Night	Business Jet Acoustic Day	Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
A20J010	-	-	33.33%	-	-	-	-	-
A20J020	-	-	45.51%	-	-	-	-	-
A20J021	-	-	10.58%	-	-	-	-	-
A20J022	-	-	10.58%	-	-	-	-	-
A20T010	-	-	-	-	21.94%	0.00%	-	-
A20T011	-	-	-	-	5.10%	0.00%	-	-
A20T012	-	-	-	-	5.10%	0.00%	-	-
A20T020	-	-	-	-	14.63%	0.00%	-	-
A20T021	-	-	-	-	3.40%	0.00%	-	-
A20T022	-	-	-	-	3.40%	0.00%	-	-
A20T030	-	-	-	-	31.69%	68.26%	-	-
A20T031	-	-	-	-	7.37%	15.87%	-	-
A20T032	-	-	-	-	7.37%	15.87%	-	-
A20P010	-	-	-	-	-	-	25.92%	0.00%
A20P011	-	-	-	-	-	-	6.03%	0.00%
A20P012	-	-	-	-	-	-	6.03%	0.00%
A20P020	-	-	-	-	-	-	16.42%	0.00%
A20P021	-	-	-	-	-	-	3.82%	0.00%
A20P022	-	-	-	-	-	-	3.82%	0.00%
A20P030	-	-	-	-	-	-	14.26%	68.26%
A20P031	-	-	-	-	-	-	3.31%	15.87%
A20P032	-	-	-	-	-	-	3.31%	15.87%
A20P040	-	-	-	-	-	-	4.32%	0.00%
A20P041	-	-	-	-	-	-	1.00%	0.00%
A20P042	-	-	-	-	-	-	1.00%	0.00%
A20P050	-	-	-	-	-	-	2.59%	0.00%
A20P051	-	-	-	-	-	-	0.60%	0.00%
A20P052	-	-	-	-	-	-	0.60%	0.00%
A20P060	-	-	-	-	-	-	4.75%	0.00%
A20P061	-	-	-	-	-	-	1.10%	0.00%
A20P062	-	-	-	-	-	-	1.10%	0.00%

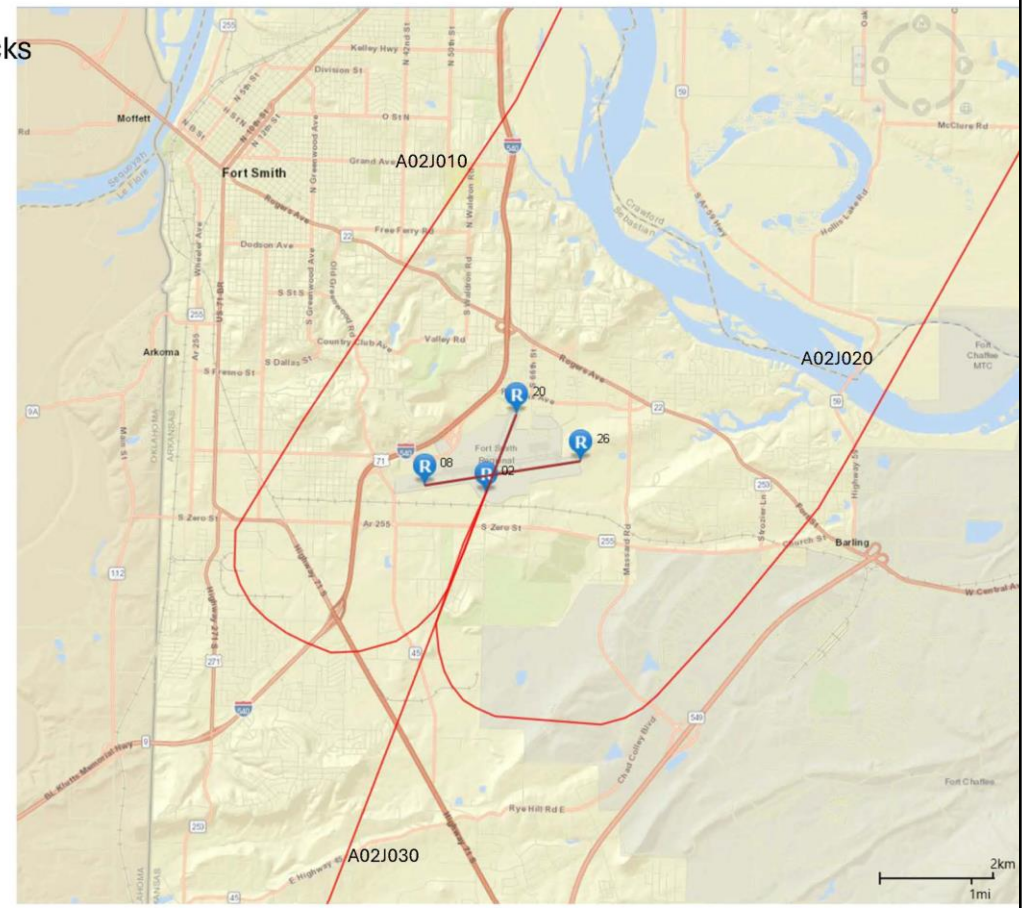
Arrivals on Runway 08 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
A08J010	5.55%	6.31%	-	-	-	-
A08J011	1.29%	1.47%	-	-	-	-
A08J012	1.29%	1.47%	-	-	-	-
A08J020	1.90%	1.85%	-	-	-	-
A08J021	0.44%	0.43%	-	-	-	-
A08J022	0.44%	0.43%	-	-	-	-
A08J030	2.72%	0.00%	-	-	-	-
A08J031	0.63%	0.00%	-	-	-	-
A08J032	0.63%	0.00%	-	-	-	-
A08J040	7.14%	18.55%	-	-	-	-
A08J041	1.66%	4.31%	-	-	-	-
A08J042	1.66%	4.31%	-	-	-	-
A08J050	2.16%	5.94%	-	-	-	-
A08J051	0.50%	1.38%	-	-	-	-
A08J052	0.50%	1.38%	-	-	-	-
A08J060	3.39%	2.23%	-	-	-	-
A08J061	0.79%	0.52%	-	-	-	-
A08J062	0.79%	0.52%	-	-	-	-
A08J070	41.50%	31.90%	-	-	-	-
A08J071	9.65%	7.42%	-	-	-	-
A08J072	9.65%	7.42%	-	-	-	-
A08J080	3.90%	1.48%	-	-	-	-
A08J081	0.91%	0.34%	-	-	-	-
A08J082	0.91%	0.34%	-	-	-	-
A08T010	-	-	7.64%	1.95%	-	-
A08T011	-	-	1.78%	0.45%	-	-
A08T012	-	-	1.78%	0.45%	-	-
A08T020	-	-	1.11%	0.00%	-	-
A08T021	-	-	0.26%	0.00%	-	-
A08T022	-	-	0.26%	0.00%	-	-
A08T030	-	-	7.89%	17.55%	-	-
A08T031	-	-	1.83%	4.08%	-	-
A08T032	-	-	1.83%	4.08%	-	-
A08T040	-	-	6.65%	7.80%	-	-
A08T041	-	-	1.55%	1.81%	-	-
A08T042	-	-	1.55%	1.81%	-	-
A08T050	-	-	7.76%	3.90%	-	-
A08T051	-	-	1.80%	0.91%	-	-
A08T052	-	-	1.80%	0.91%	-	-
A08T060	-	-	5.67%	1.95%	-	-
A08T061	-	-	1.32%	0.45%	-	-
A08T062	-	-	1.32%	0.45%	-	-
A08T070	-	-	10.72%	5.85%	-	-
A08T071	-	-	2.49%	1.36%	-	-
A08T072	-	-	2.49%	1.36%	-	-
A08T080	-	-	20.82%	29.25%	-	-
A08T081	-	-	4.84%	6.80%	-	-
A08T082	-	-	4.84%	6.80%	-	-
A08P010	-	-	-	-	8.14%	4.27%
A08P011	-	-	-	-	1.89%	0.99%
A08P012	-	-	-	-	1.89%	0.99%
A08P020	-	-	-	-	7.54%	2.13%
A08P021	-	-	-	-	1.75%	0.50%
A08P022	-	-	-	-	1.75%	0.50%
A08P030	-	-	-	-	8.47%	0.00%
A08P031	-	-	-	-	1.97%	0.00%
A08P032	-	-	-	-	1.97%	0.00%
A08P040	-	-	-	-	6.87%	2.13%
A08P041	-	-	-	-	1.60%	0.50%
A08P042	-	-	-	-	1.60%	0.50%
A08P050	-	-	-	-	3.00%	2.13%
A08P051	-	-	-	-	0.70%	0.50%
A08P052	-	-	-	-	0.70%	0.50%
A08P060	-	-	-	-	11.14%	27.73%
A08P061	-	-	-	-	2.59%	6.45%
A08P062	-	-	-	-	2.59%	6.45%
A08P070	-	-	-	-	3.74%	10.67%
A08P071	-	-	-	-	0.87%	2.48%
A08P072	-	-	-	-	0.87%	2.48%
A08P080	-	-	-	-	17.95%	19.20%
A08P081	-	-	-	-	4.17%	4.46%
A08P082	-	-	-	-	4.17%	4.46%
A08P090	-	-	-	-	1.40%	0.00%
A08P091	-	-	-	-	0.33%	0.00%
A08P092	-	-	-	-	0.33%	0.00%

Arrivals on Runway 26 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
A26J010	14.72%	2.86%	-	-	-	-
A26J011	3.42%	0.66%	-	-	-	-
A26J012	3.42%	0.66%	-	-	-	-
A26J020	5.72%	0.29%	-	-	-	-
A26J021	1.33%	0.07%	-	-	-	-
A26J022	1.33%	0.07%	-	-	-	-
A26J030	5.85%	0.86%	-	-	-	-
A26J031	1.36%	0.20%	-	-	-	-
A26J032	1.36%	0.20%	-	-	-	-
A26J040	3.54%	1.14%	-	-	-	-
A26J041	0.82%	0.27%	-	-	-	-
A26J042	0.82%	0.27%	-	-	-	-
A26J050	4.24%	0.86%	-	-	-	-
A26J051	0.99%	0.20%	-	-	-	-
A26J052	0.99%	0.20%	-	-	-	-
A26J060	3.86%	1.14%	-	-	-	-
A26J061	0.90%	0.27%	-	-	-	-
A26J062	0.90%	0.27%	-	-	-	-
A26J070	30.34%	61.12%	-	-	-	-
A26J071	7.05%	14.21%	-	-	-	-
A26J072	7.05%	14.21%	-	-	-	-
A26T010	-	-	5.23%	0.00%	-	-
A26T011	-	-	1.22%	0.00%	-	-
A26T012	-	-	1.22%	0.00%	-	-
A26T020	-	-	7.26%	2.20%	-	-
A26T021	-	-	1.69%	0.51%	-	-
A26T022	-	-	1.69%	0.51%	-	-
A26T030	-	-	8.86%	13.21%	-	-
A26T031	-	-	2.06%	3.07%	-	-
A26T032	-	-	2.06%	3.07%	-	-
A26T040	-	-	6.39%	4.40%	-	-
A26T041	-	-	1.49%	1.02%	-	-
A26T042	-	-	1.49%	1.02%	-	-
A26T050	-	-	5.23%	4.40%	-	-
A26T051	-	-	1.22%	1.02%	-	-
A26T052	-	-	1.22%	1.02%	-	-
A26T060	-	-	35.29%	44.04%	-	-
A26T061	-	-	8.21%	10.24%	-	-
A26T062	-	-	8.21%	10.24%	-	-
A26P010	-	-	-	-	10.16%	14.63%
A26P011	-	-	-	-	2.36%	3.40%
A26P012	-	-	-	-	2.36%	3.40%
A26P020	-	-	-	-	7.12%	4.88%
A26P021	-	-	-	-	1.66%	1.13%
A26P022	-	-	-	-	1.66%	1.13%
A26P030	-	-	-	-	9.68%	4.88%
A26P031	-	-	-	-	2.25%	1.13%
A26P032	-	-	-	-	2.25%	1.13%
A26P040	-	-	-	-	6.48%	4.88%
A26P041	-	-	-	-	1.51%	1.13%
A26P042	-	-	-	-	1.51%	1.13%
A26P050	-	-	-	-	15.68%	14.63%
A26P051	-	-	-	-	3.65%	3.40%
A26P052	-	-	-	-	3.65%	3.40%
A26P060	-	-	-	-	19.13%	24.38%
A26P061	-	-	-	-	4.45%	5.67%
A26P062	-	-	-	-	4.45%	5.67%

Closed Patterns on Runway 02 and Runway 20 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
C02P010	-	-	-	-	100.00%	-
C20P010	-	-	-	-	57.14%	-
C20P020	-	-	-	-	42.86%	-

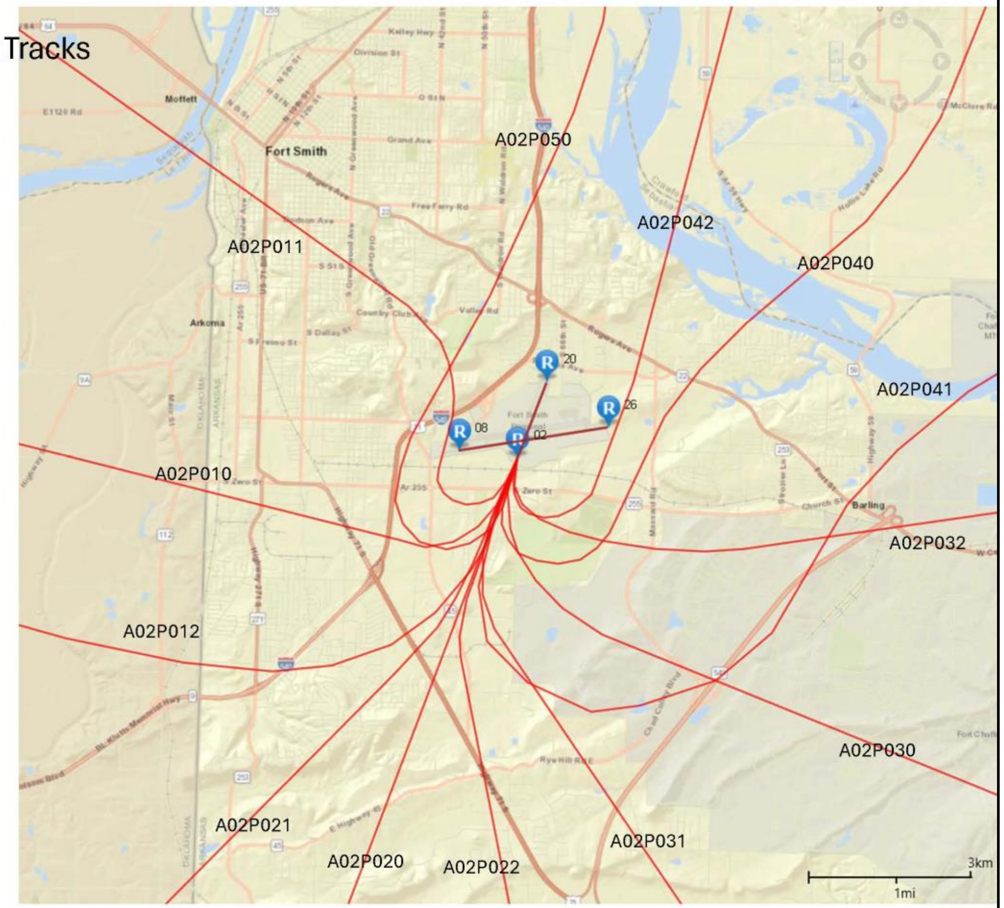
Closed Patterns on Runway 08 and Runway 26 Track ID	Air Carrier, Regional Jet, and Business Jet Acoustic Day	Air Carrier, Regional Jet, and Business Jet Acoustic Night	GA Twin-Engine and Turboprop Acoustic Day	GA Twin-Engine and Turboprop Acoustic Night	GA Single Engine Piston Prop Acoustic Daytime	GA Single Engine Piston Prop Acoustic Nighttime
C08P010	-	-	-	-	37.74%	-
C08P011	-	-	-	-	8.77%	-
C08P012	-	-	-	-	8.77%	-
C08P020	-	-	-	-	30.52%	-
C08P021	-	-	-	-	7.10%	-
C08P022	-	-	-	-	7.10%	-
C26P010	-	-	-	-	32.23%	-
C26P011	-	-	-	-	7.49%	-
C26P012	-	-	-	-	7.49%	-
C26P020	-	-	-	-	36.03%	-
C26P021	-	-	-	-	8.38%	-
C26P022	-	-	-	-	8.38%	-

Runway 02 Business Jet Arrival Flight Tracks



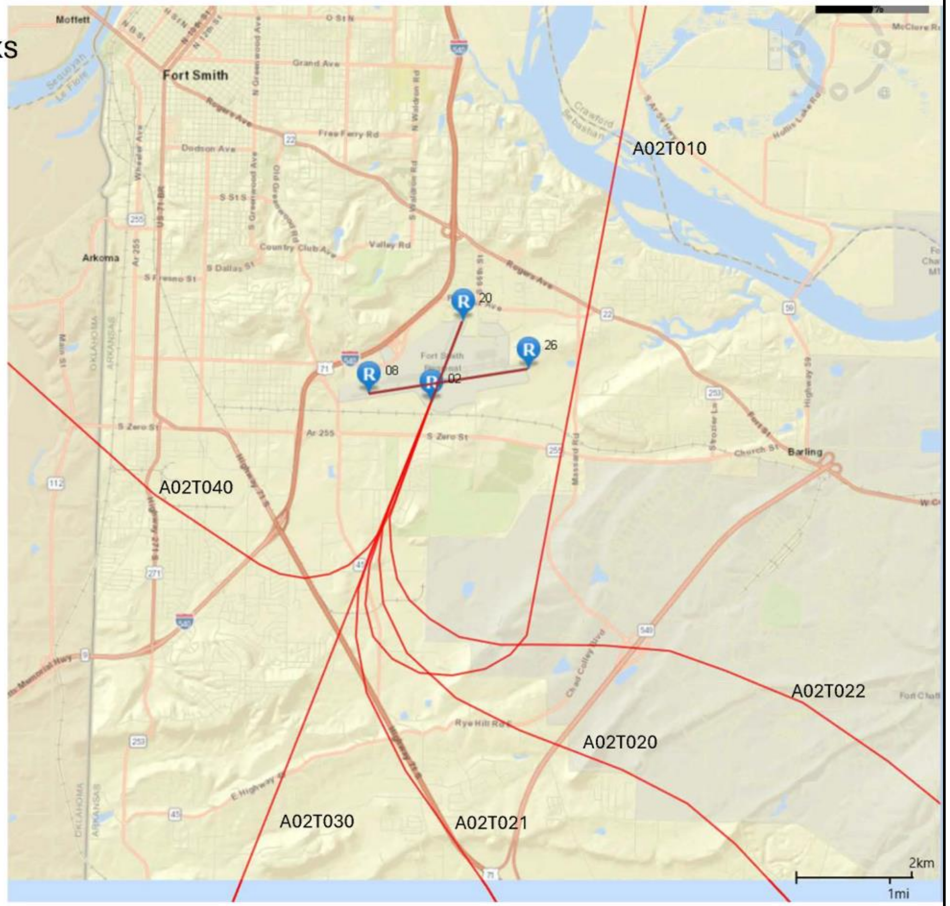
144

Runway 02 Single Engine Prop Arrival Flight Tracks

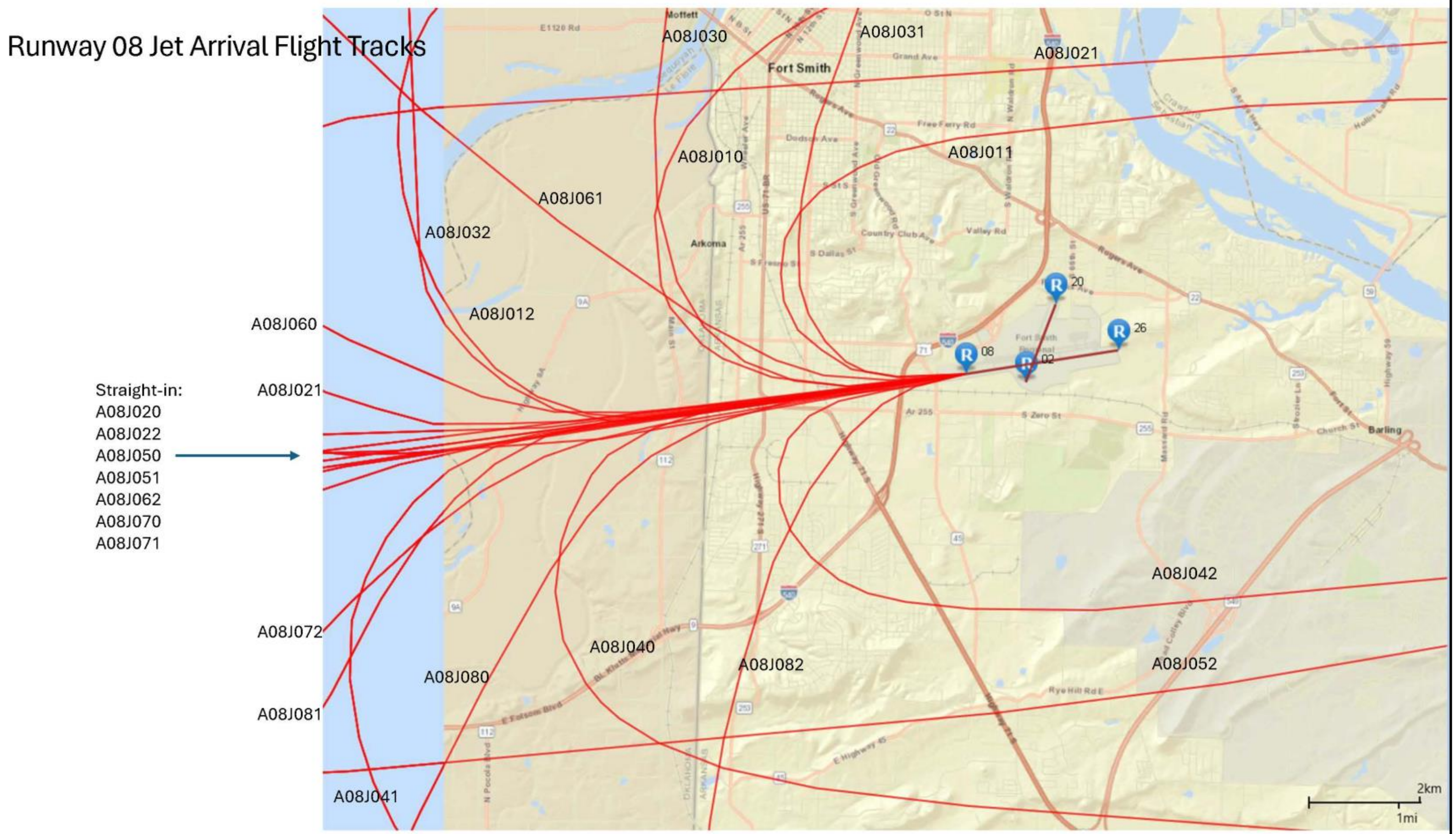


145

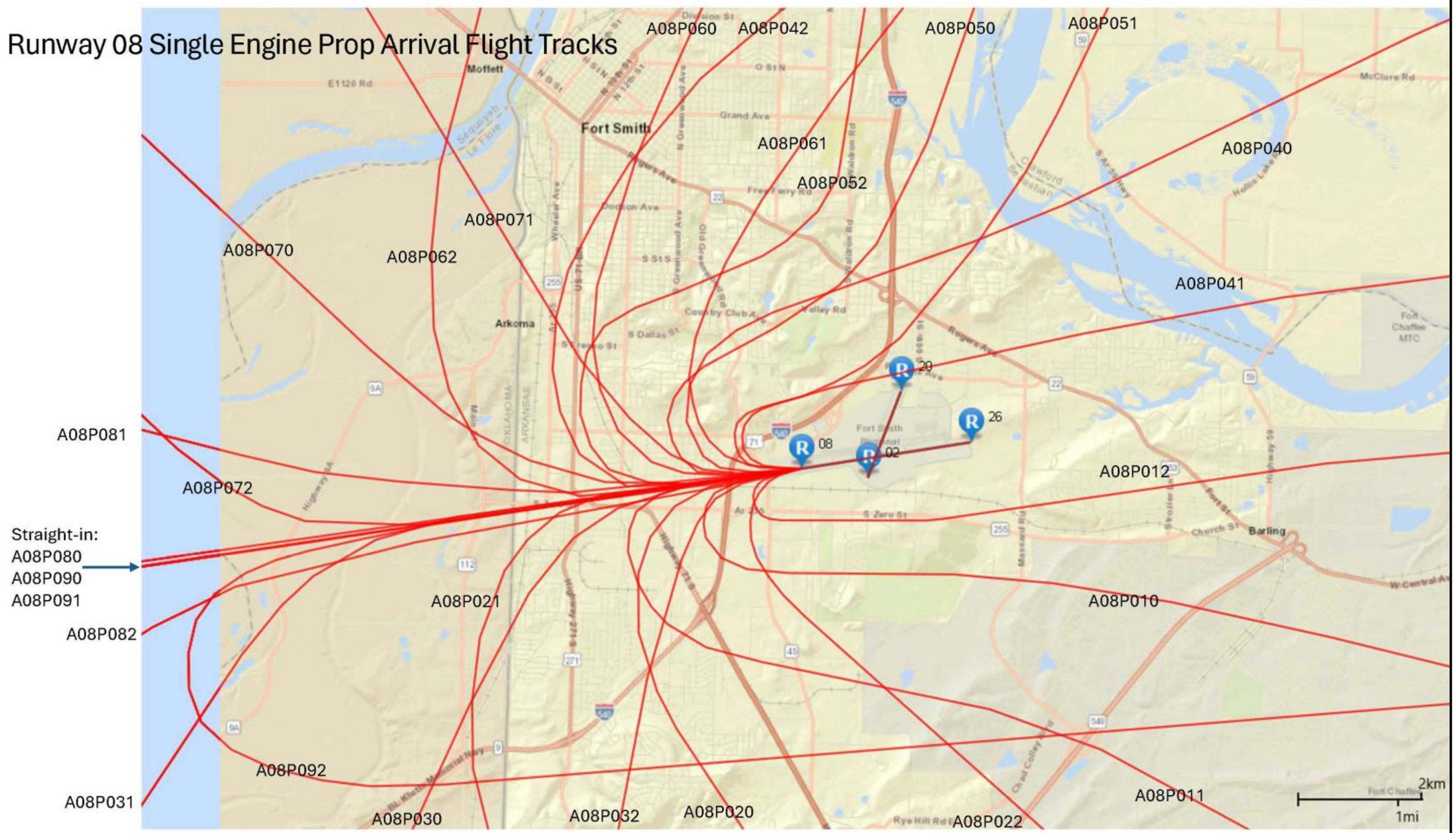
Runway 02 Twin Engine Prop Arrival Flight Tracks

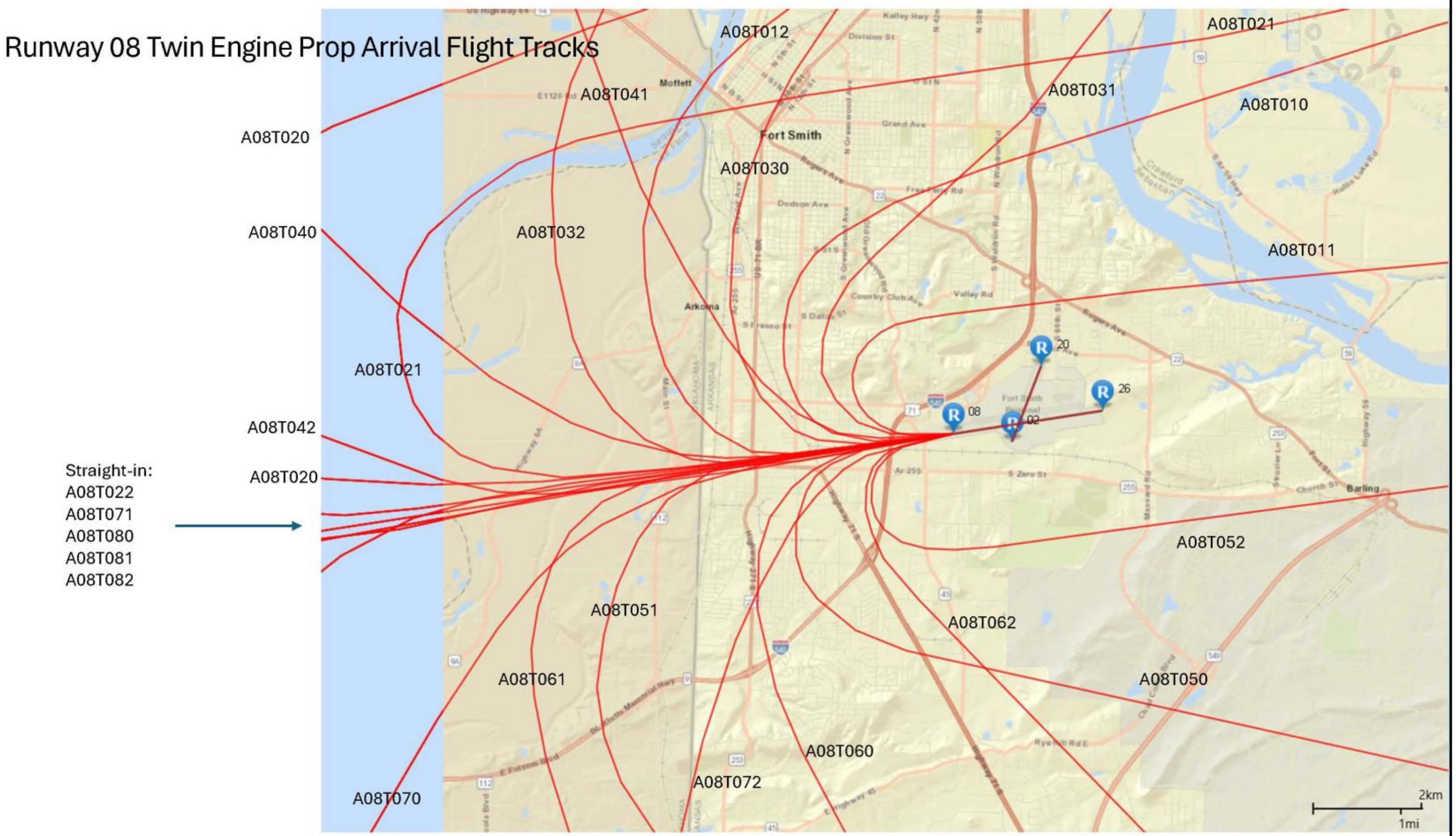


146


Runway 08 Jet Arrival Flight Tracks
A08J030
A08J031
A08J021
Fort Smith
A08J010
A08J011
A08J061
A08J032
A08J012
A08J060
Straight-in:
A08J020
A08J022
A08J050
A08J051
A08J062
A08J070
A08J071
A08J021
08
02
20
26
A08J042
A08J072
A08J040
A08J082
A08J052
A08J080
A08J081
A08J041
2km
1mi

147

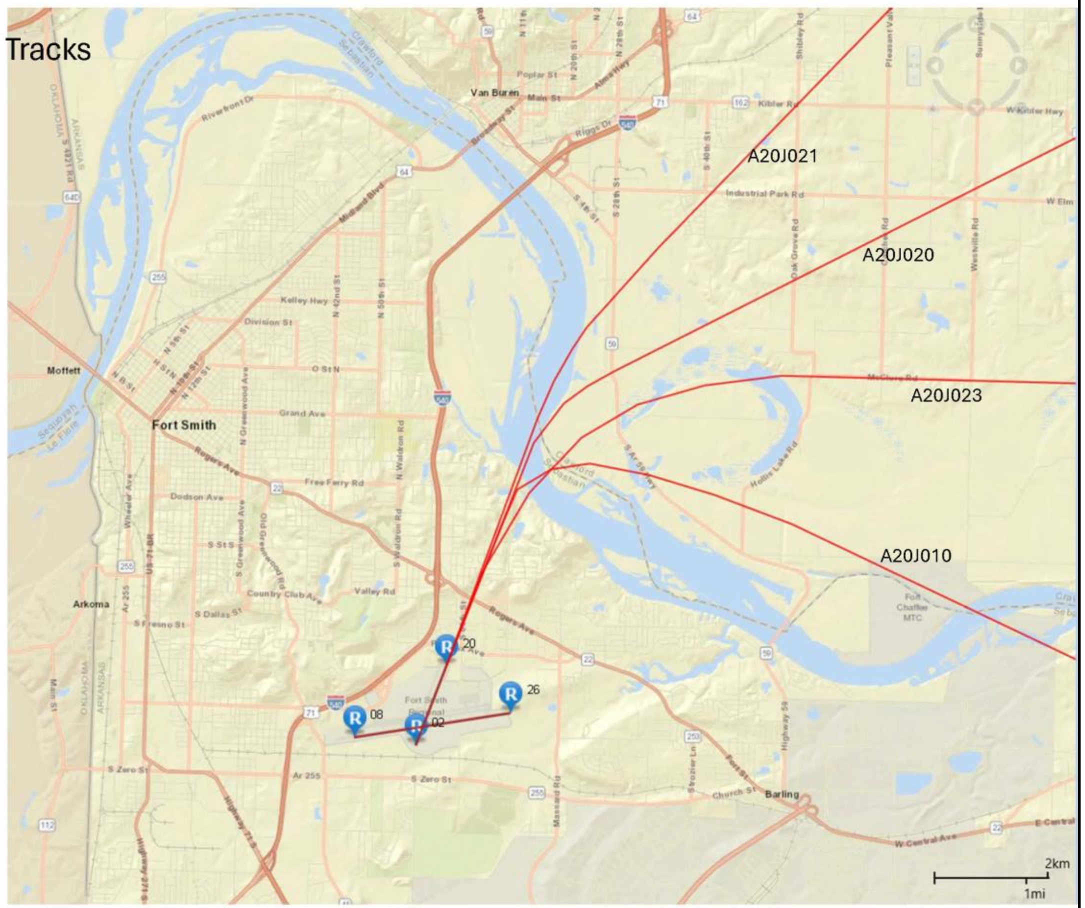

Runway 08 Single Engine Prop Arrival Flight Tracks
A08P060
A08P042
A08P050
A08P051
A08P061
A08P040
A08P052
A08P071
A08P070
A08P062
A08P041
A08P081
A08P072
A08P012
Straight-in:
A08P080
A08P090
A08P091
A08P082
A08P021
A08P010
A08P092
A08P031
A08P030
A08P032
A08P020
A08P022
A08P011
08
02
20
26
Fort Smith
2km
1mi



Runway 08 Twin Engine Prop Arrival Flight Tracks
A08T012
A08T021
A08T041
A08T031
A08T010
A08T020
Fort Smith
A08T030
A08T040
A08T032
A08T011
Arkoma
A08T021
A08T042
A08T020
Straight-in:
A08T022
A08T071
A08T080
A08T081
A08T082
Barling
A08T052
A08T051
A08T062
A08T061
A08T050
A08T060
A08T072
A08T070
2km
1mi

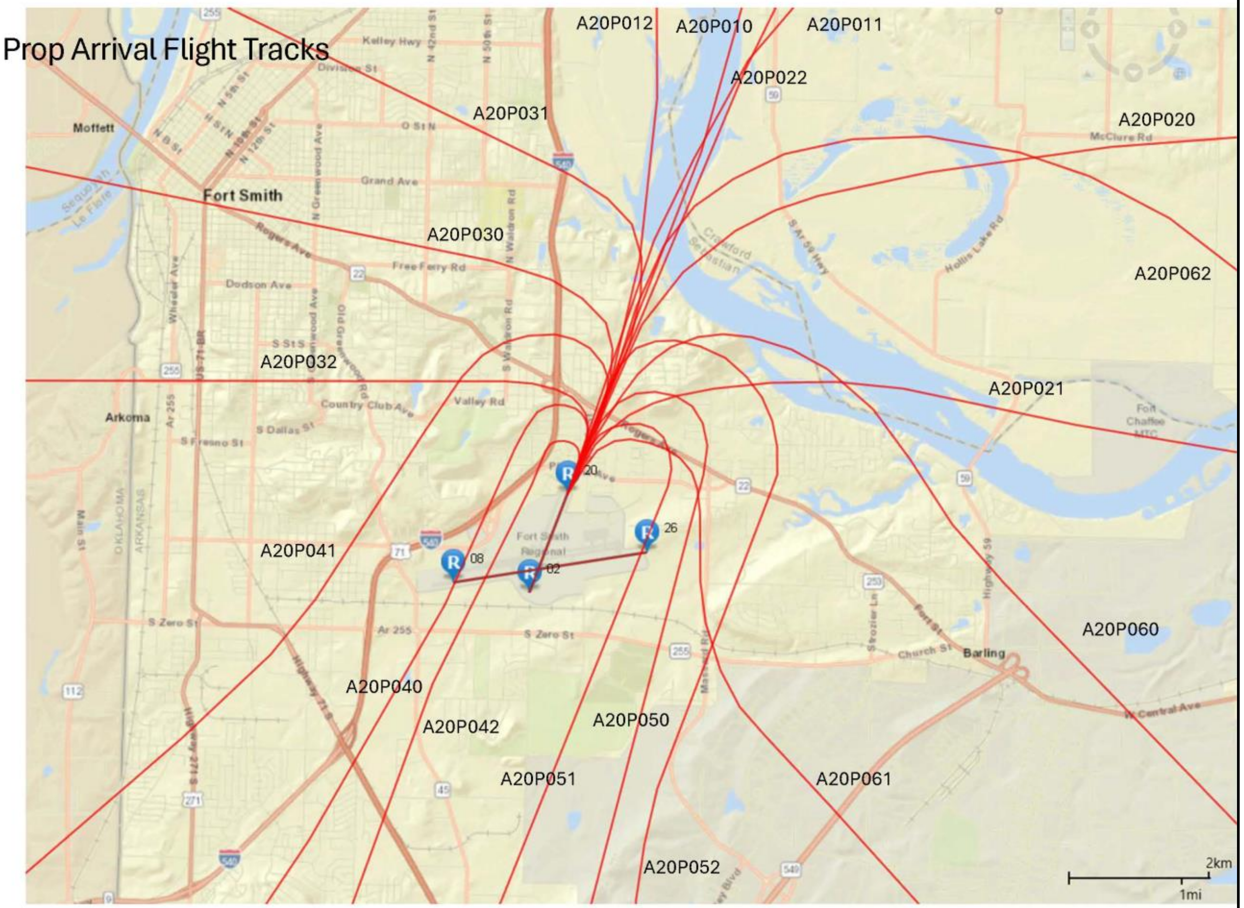
149

Runway 20 Business Jet Arrival Flight Tracks



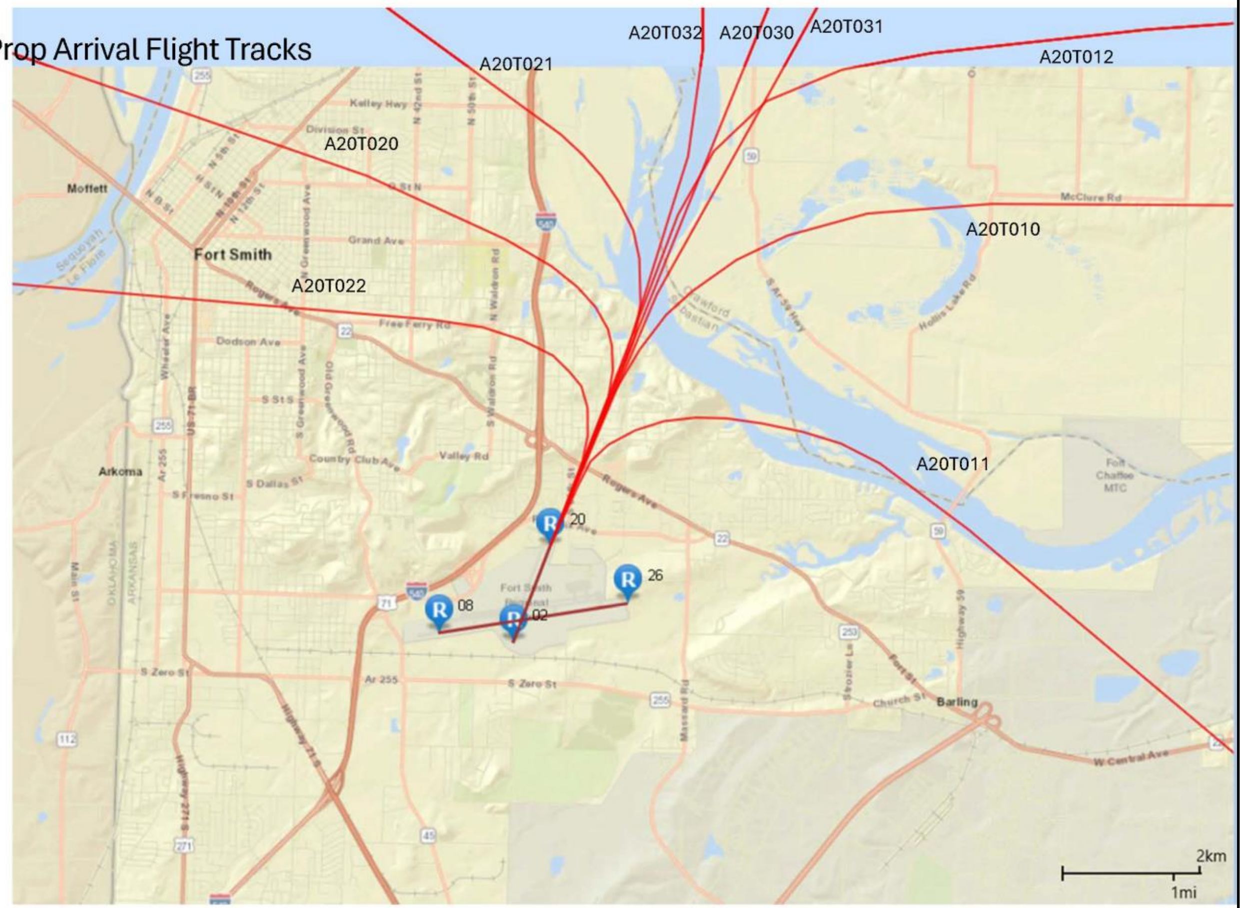
150

Runway 20 Single Engine Prop Arrival Flight Tracks

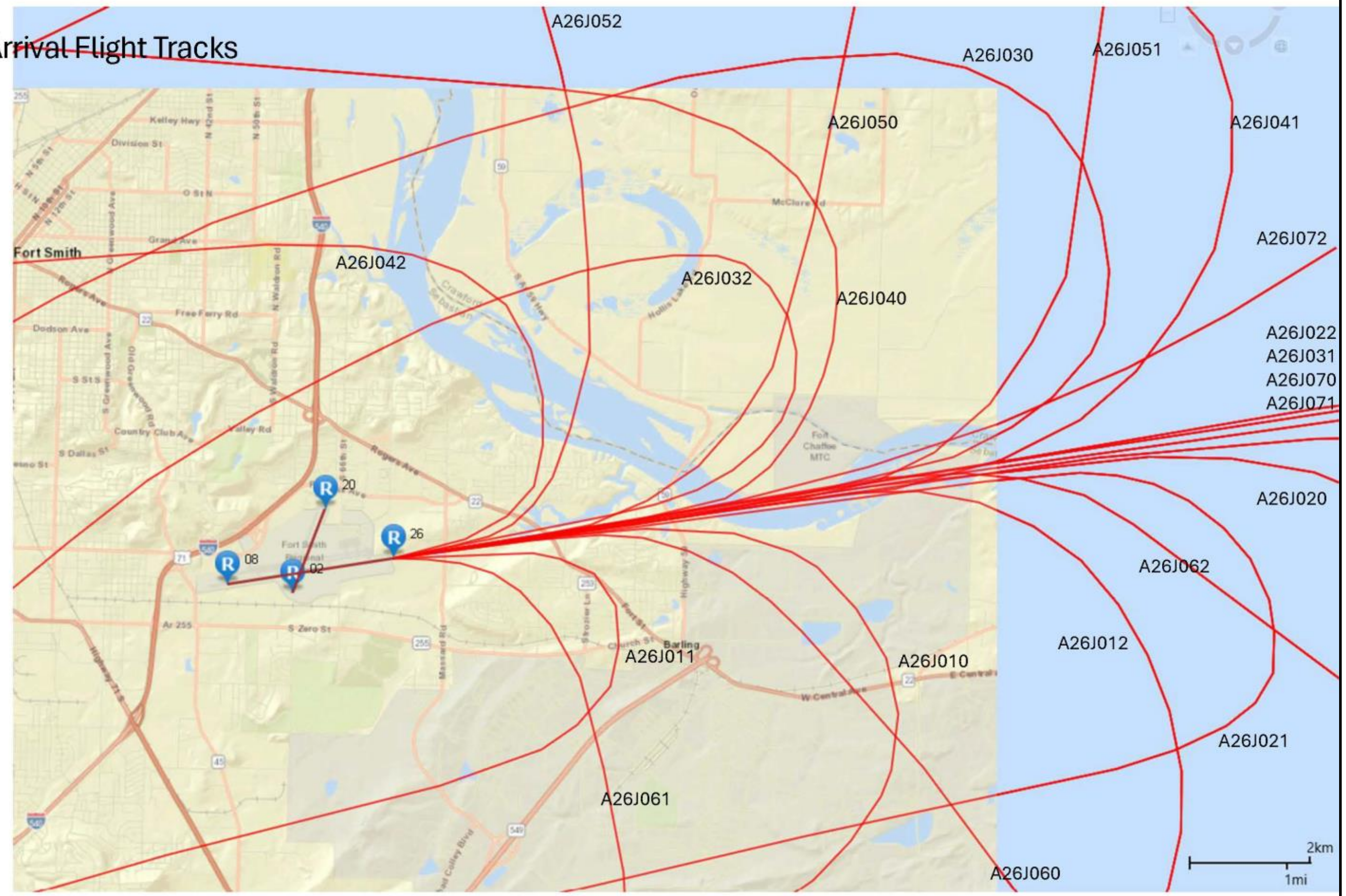


151

Runway 20 Twin Engine Prop Arrival Flight Tracks

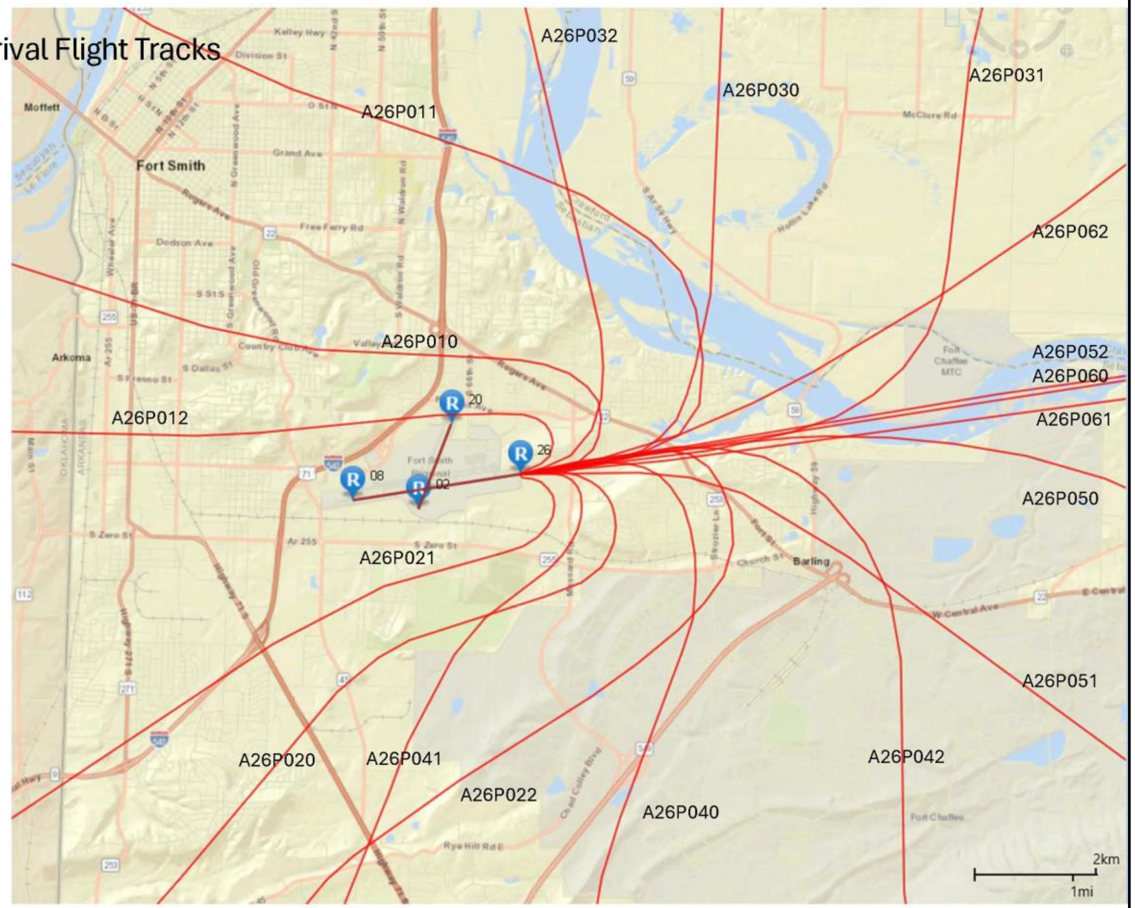


Runway 26 Jet Arrival Flight Tracks



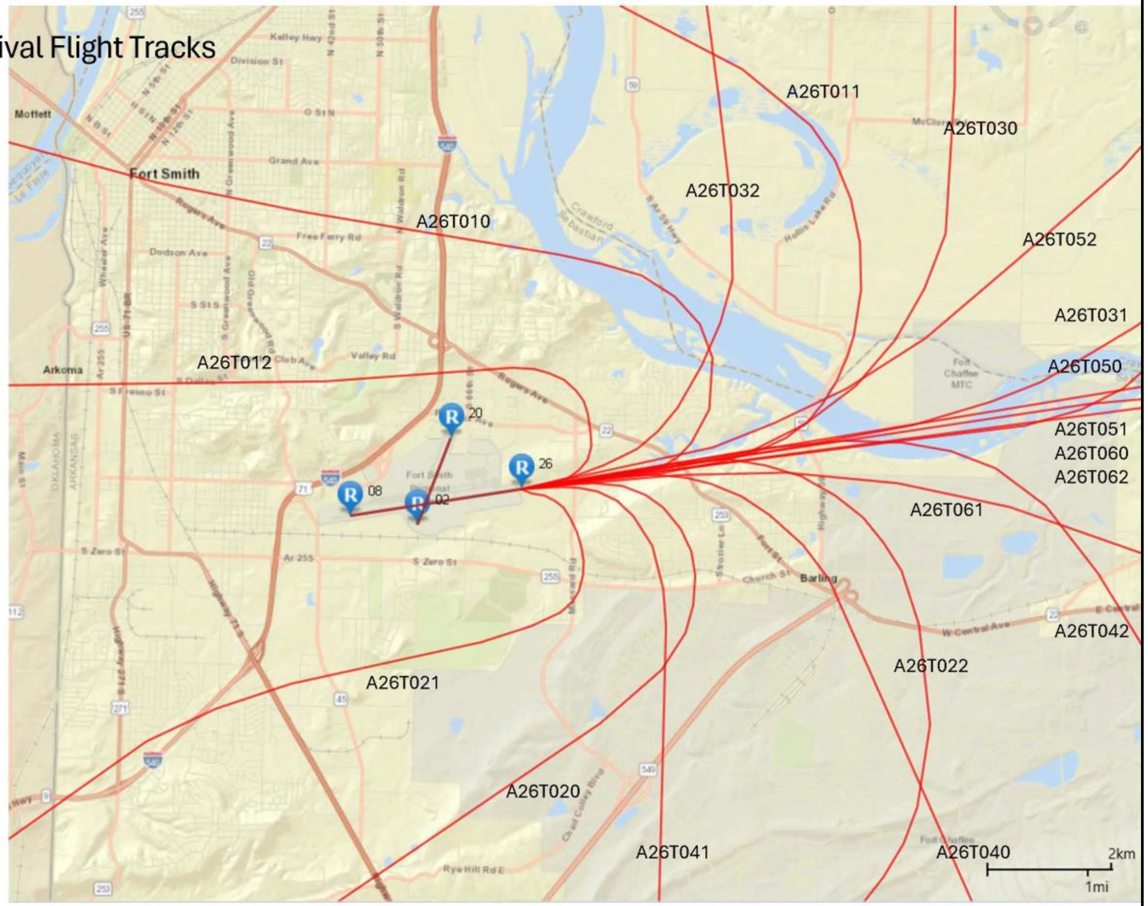
153

Runway 26 Single Engine Prop Arrival Flight Tracks



154

Runway 26 Twin Engine Prop Arrival Flight Tracks

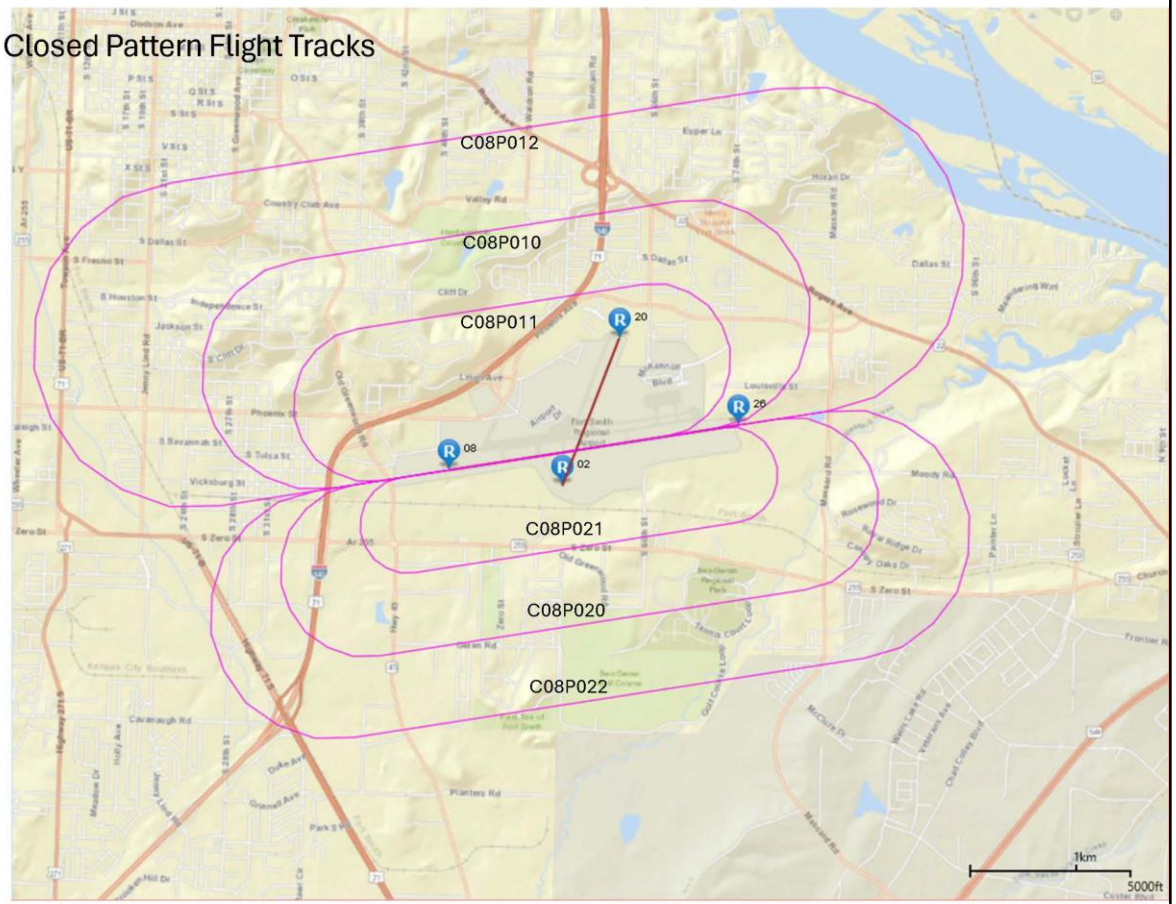


155

Runway 02 Single Engine Prop Closed Pattern Flight Track

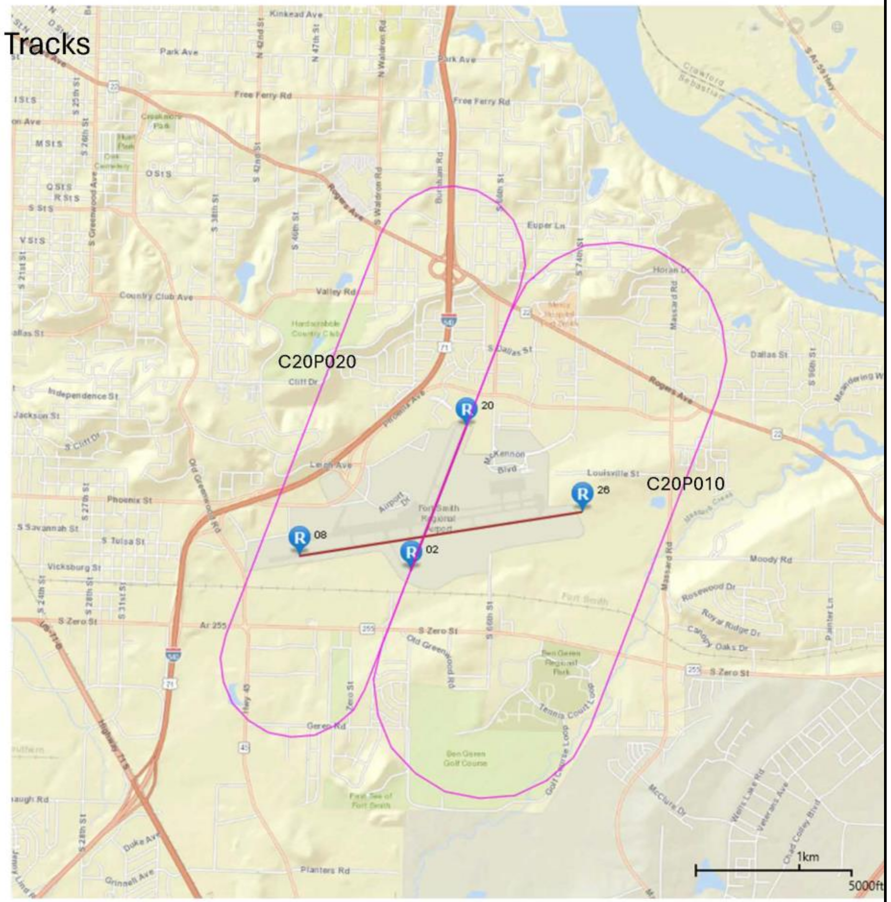
156

Runway 08 Single Engine Prop Closed Pattern Flight Tracks

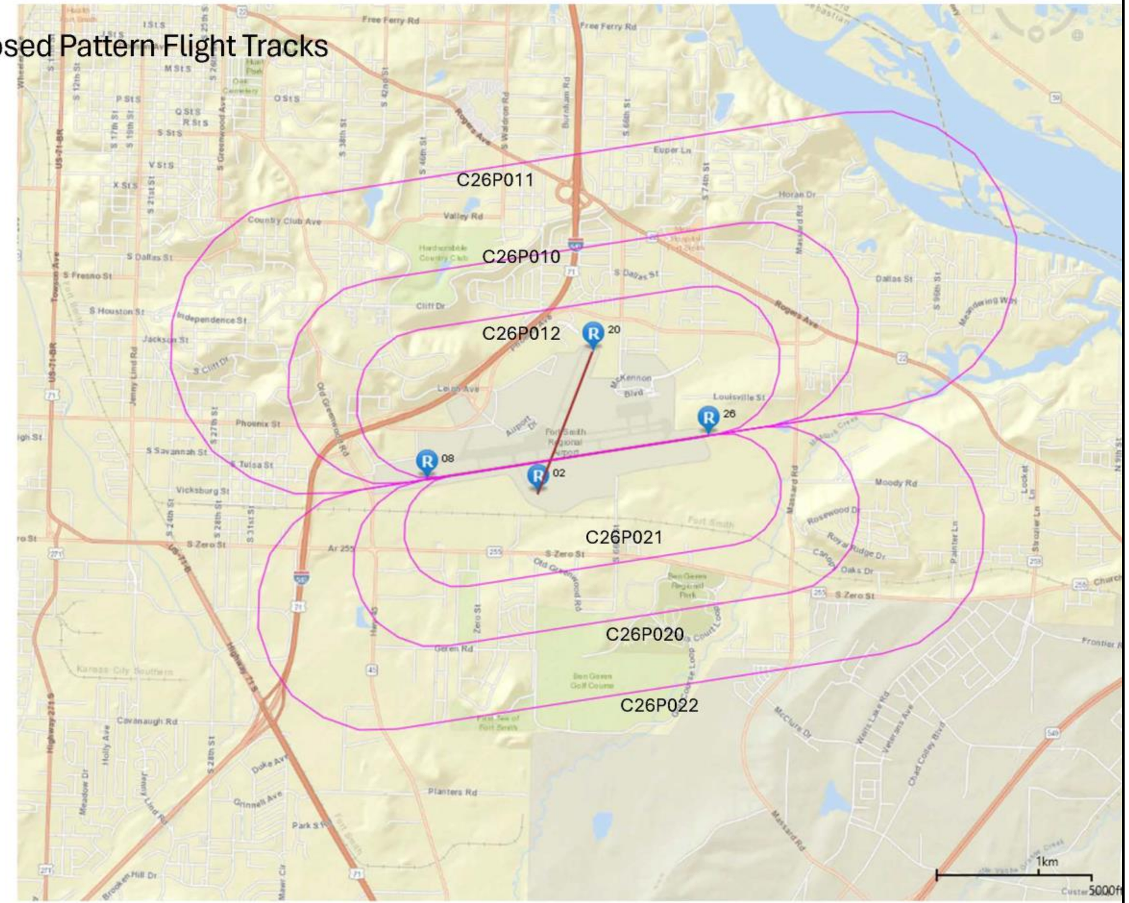


157

Runway 20 Single Engine Prop Closed Pattern Flight Tracks

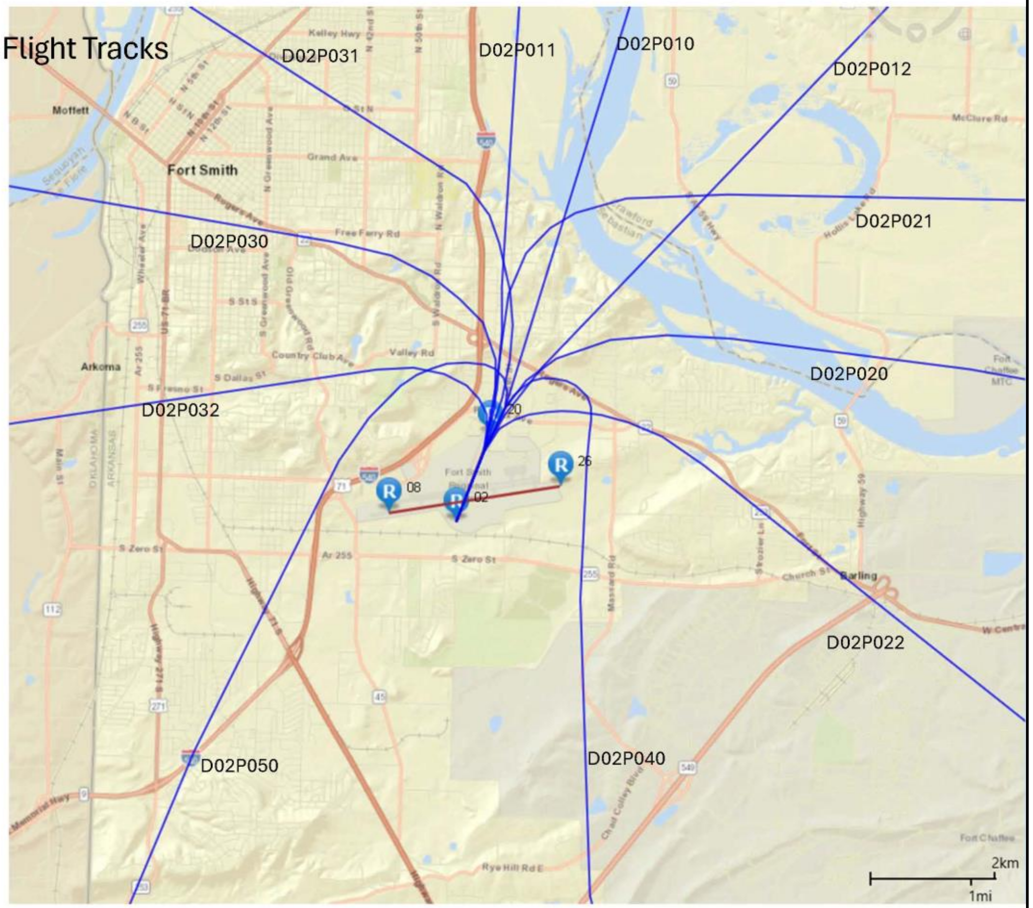


Runway 26 Single Engine Prop Closed Pattern Flight Tracks



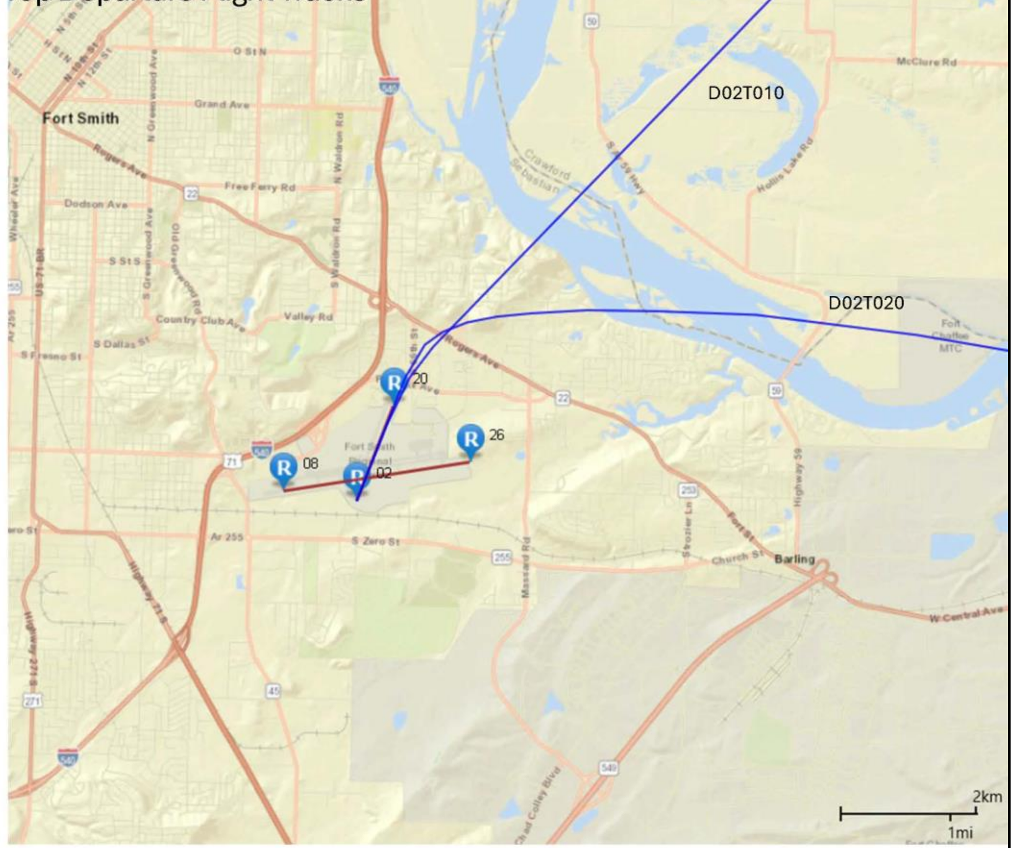
159

Runway 02 Single Engine Prop Departure Flight Tracks



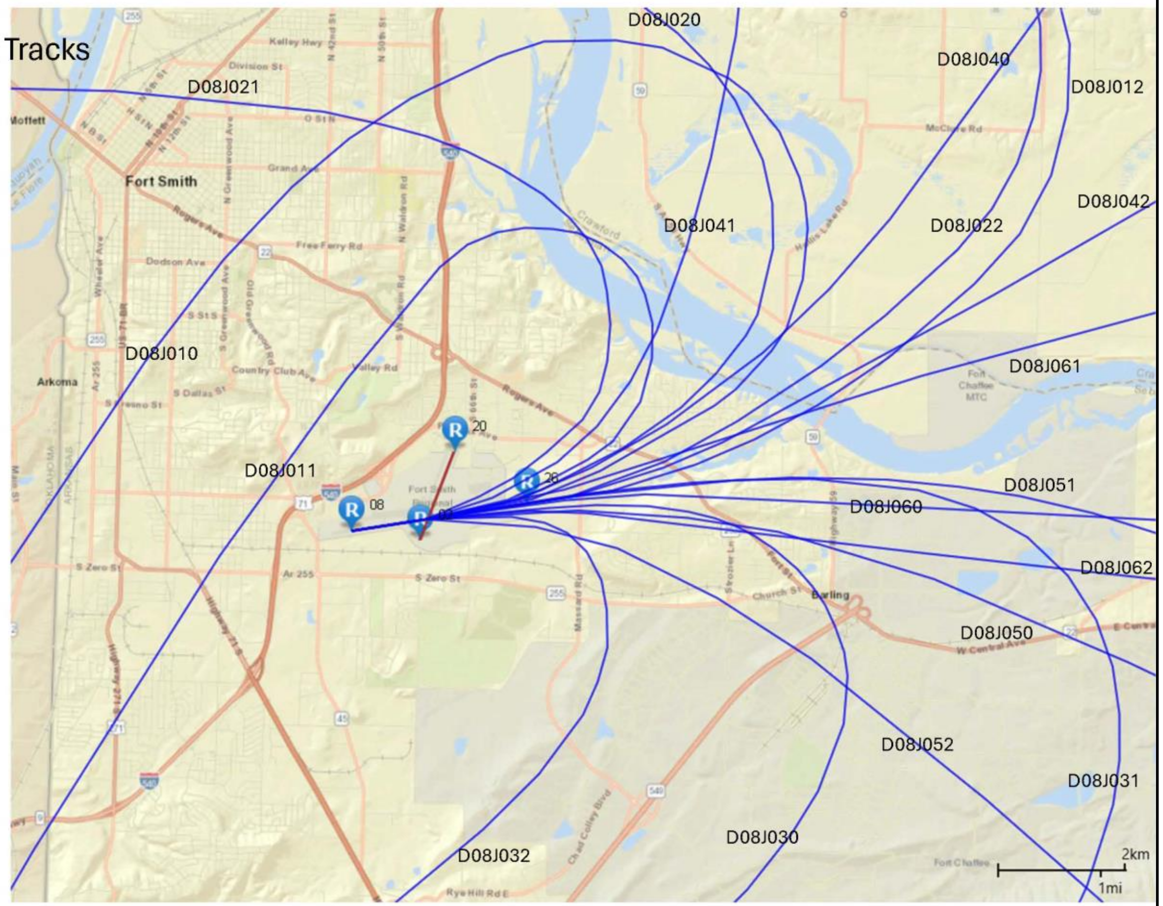
160

Runway 02 Business Jet and Twin-Engine Prop Departure Flight Tracks



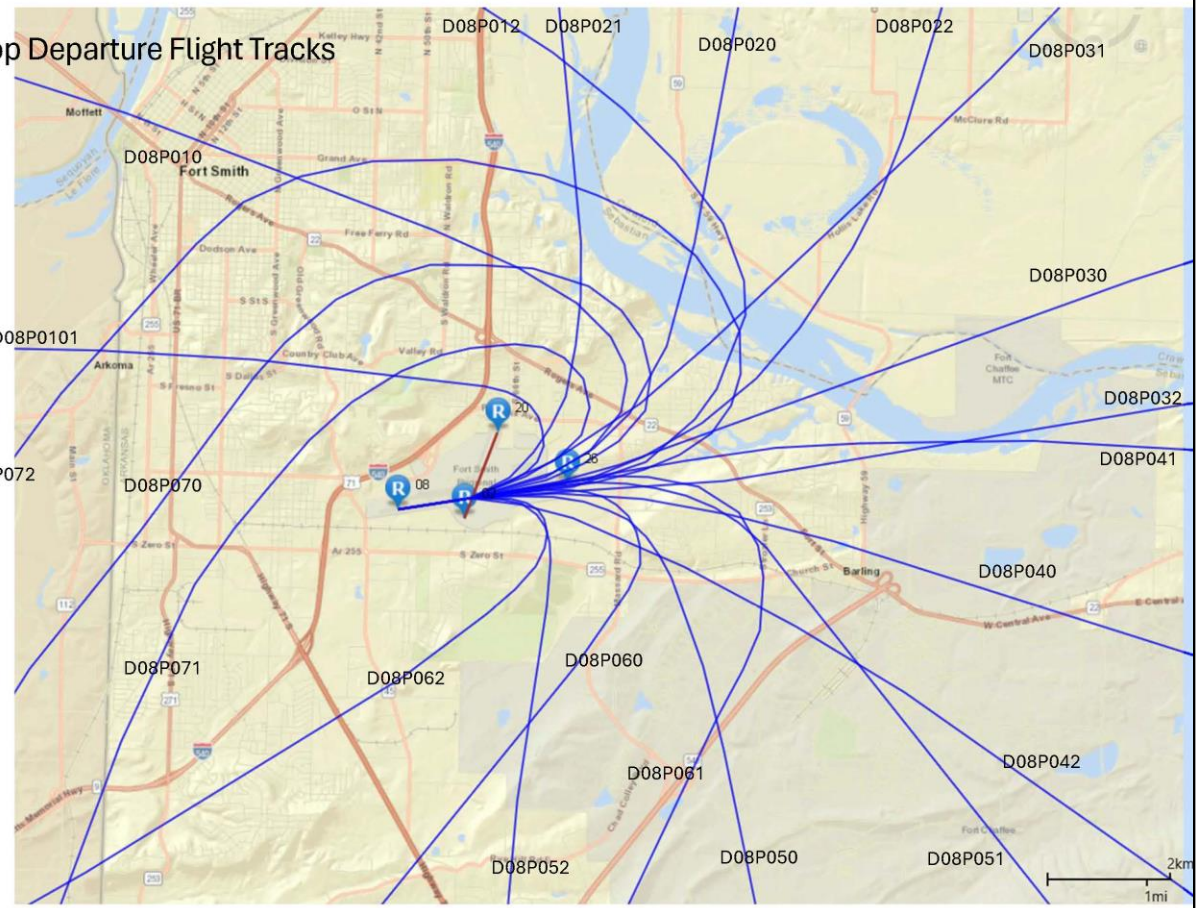
161

Runway 08 Jet Departure Flight Tracks



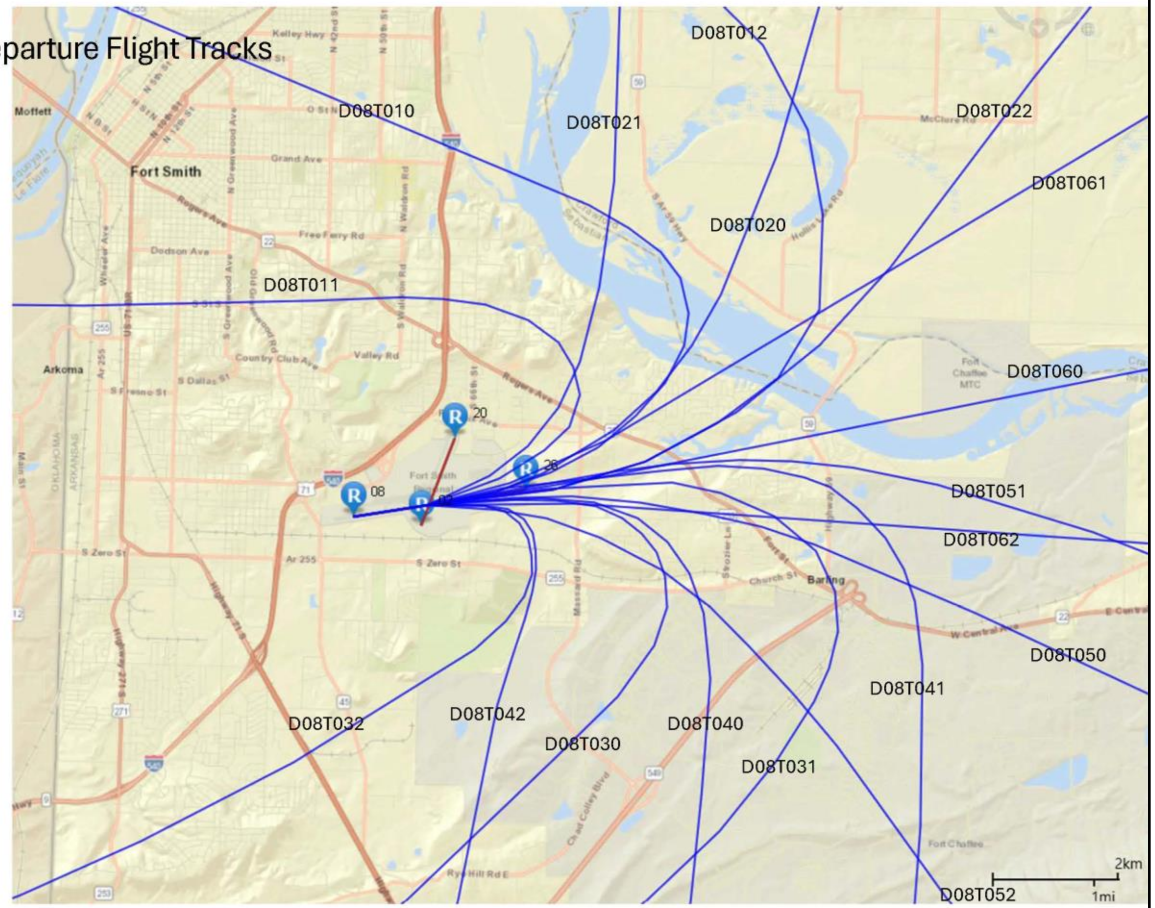
162

Runway 08 Single Engine Prop Departure Flight Tracks



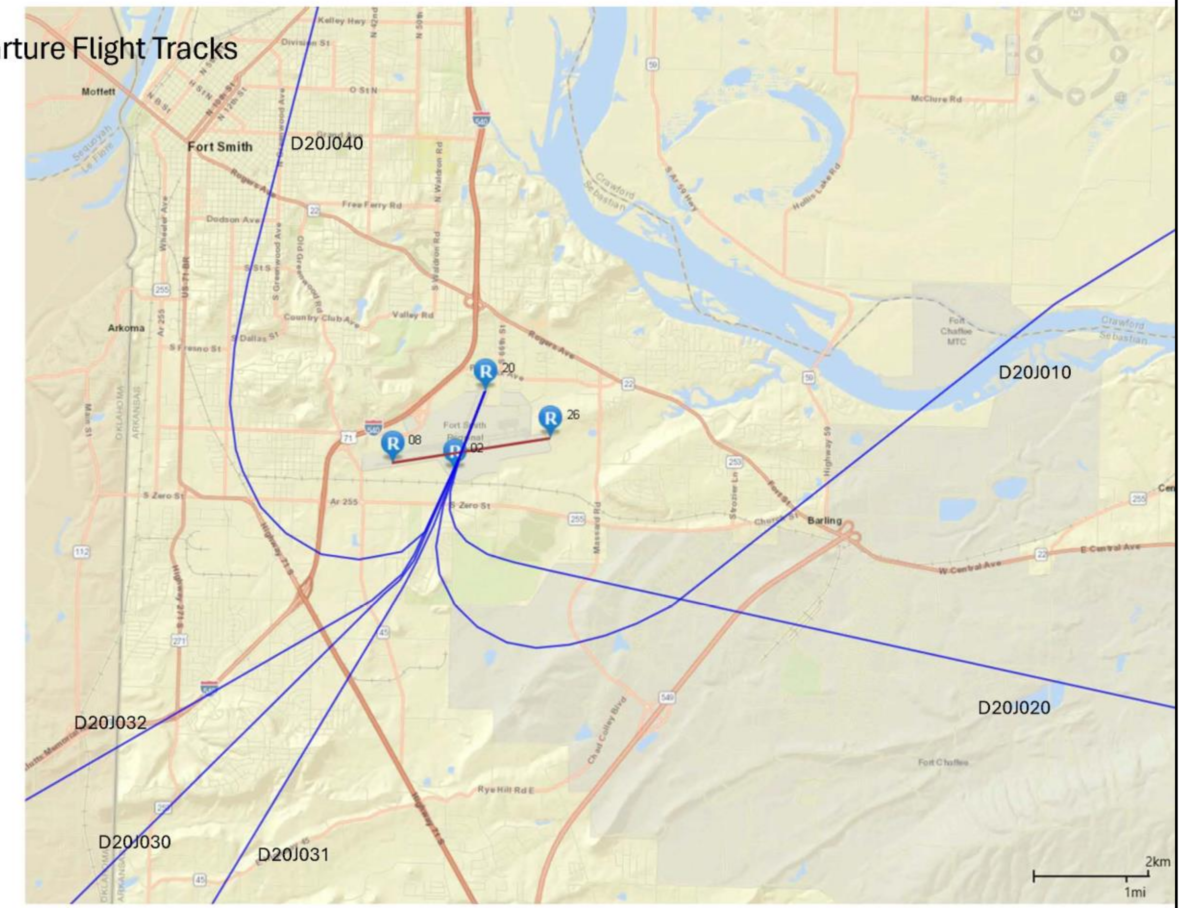
163

Runway 08 Twin Engine Prop Departure Flight Tracks



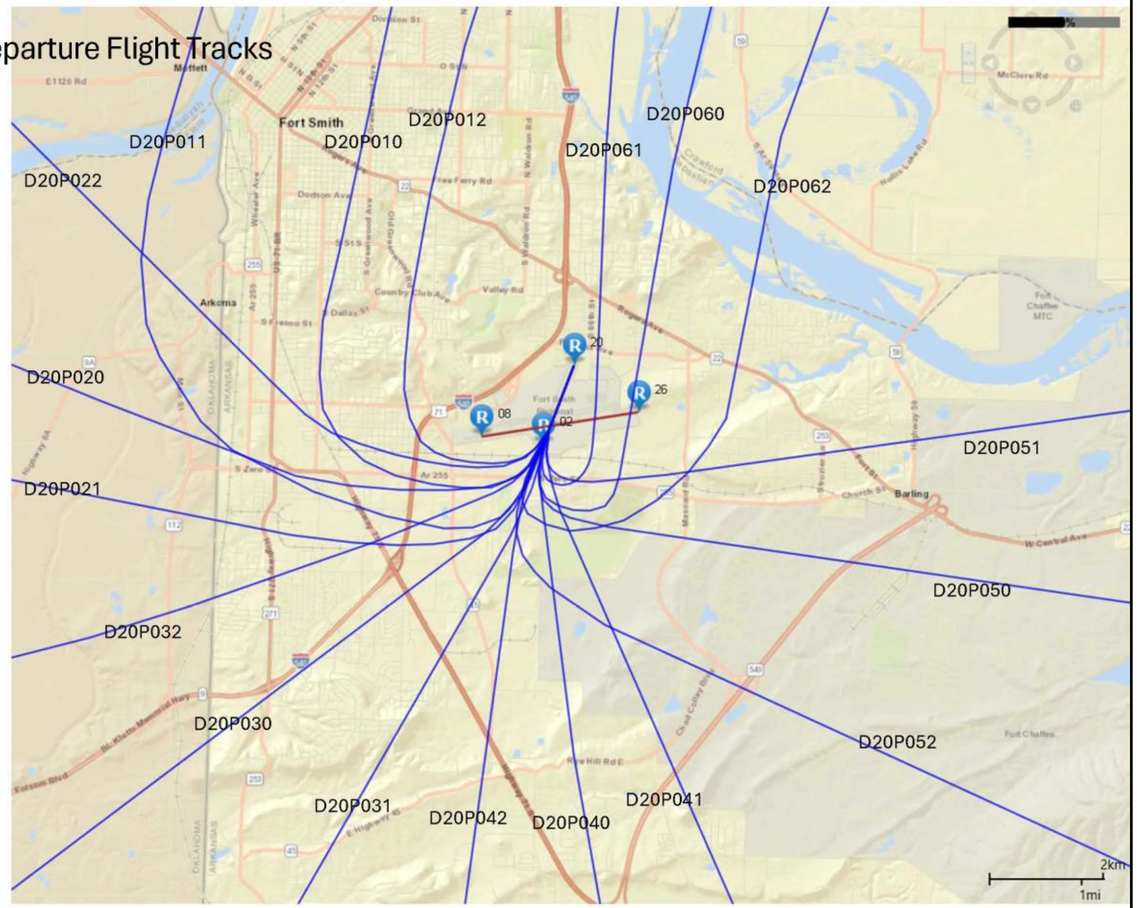
164

Runway 20 Business Jet Departure Flight Tracks



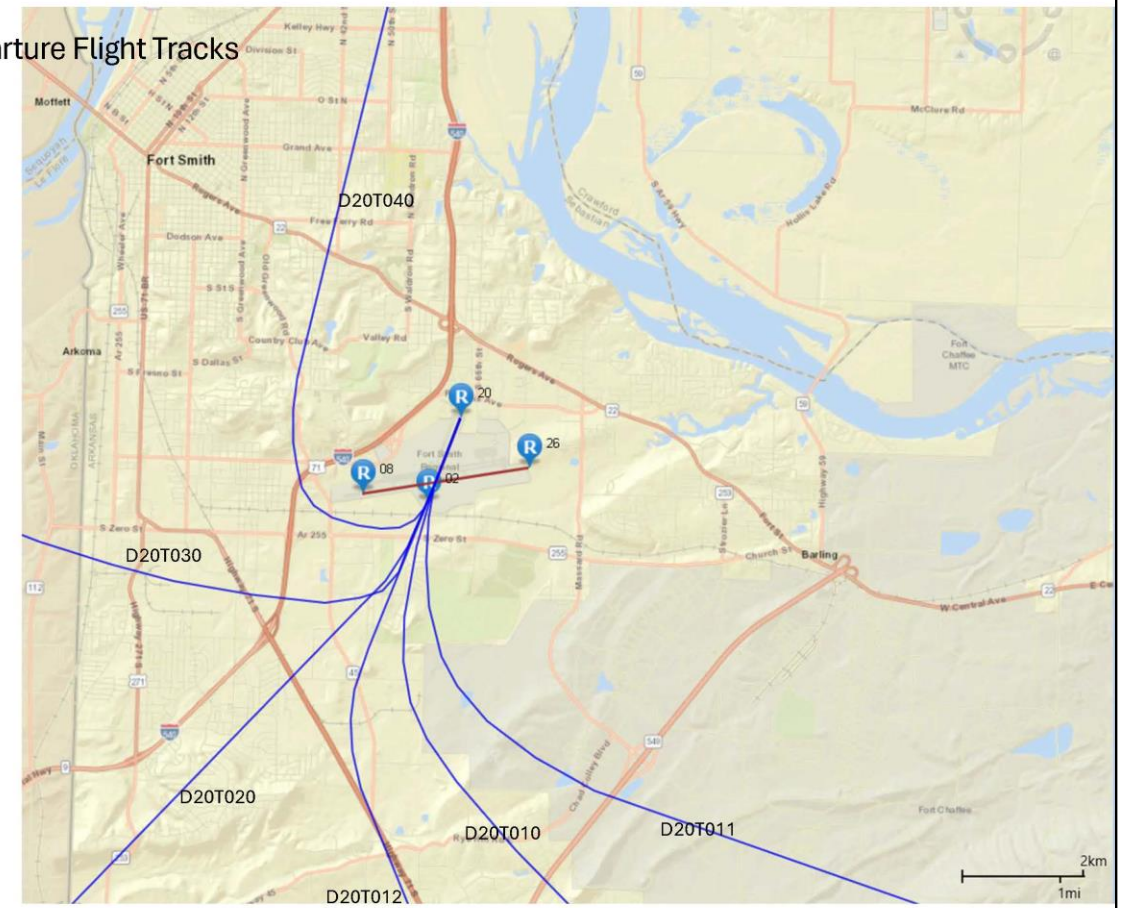
165

Runway 20 Single Engine Prop Departure Flight Tracks

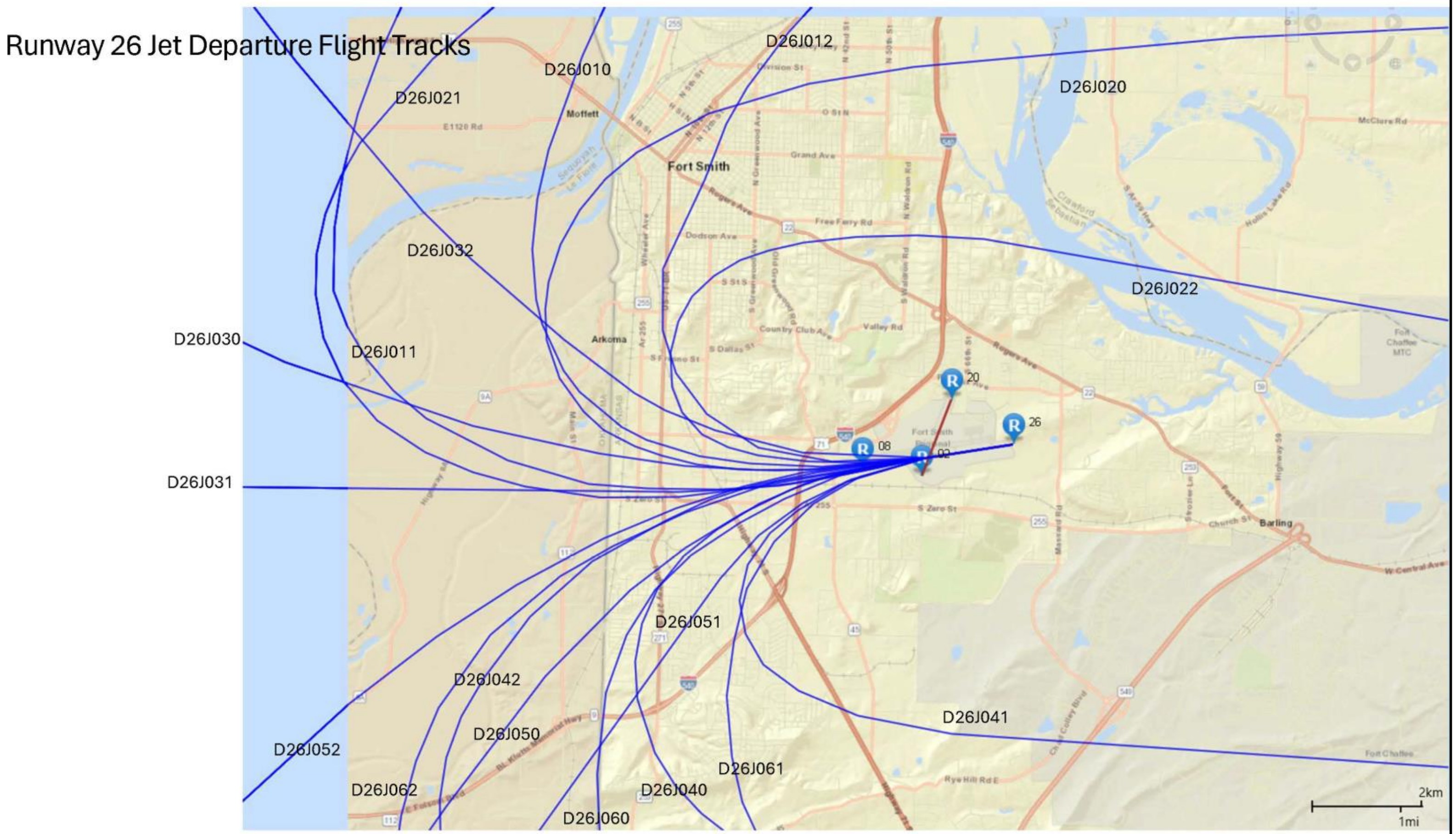


166

Runway 20 Twin Engine Prop Departure Flight Tracks

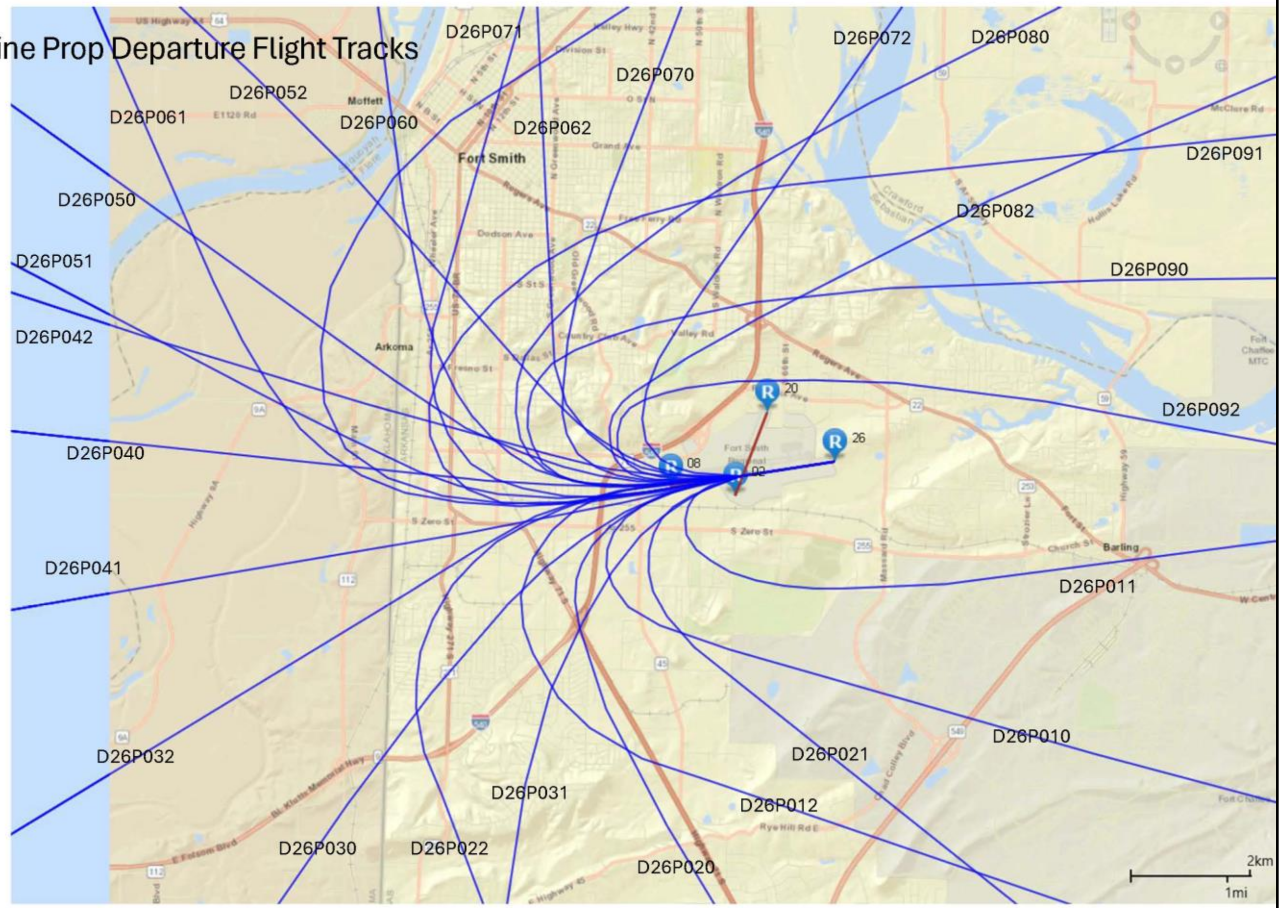


167


Runway 26 Jet Departure Flight Tracks
D26J010
D26J012
D26J020
D26J021
D26J022
D26J030
D26J031
D26J032
D26J011
D26J041
D26J042
D26J050
D26J051
D26J052
D26J060
D26J061
D26J062
D26J040
Fort Smith
Arkoma
Moffett
Barling
20
26
08
02
2km
1mi

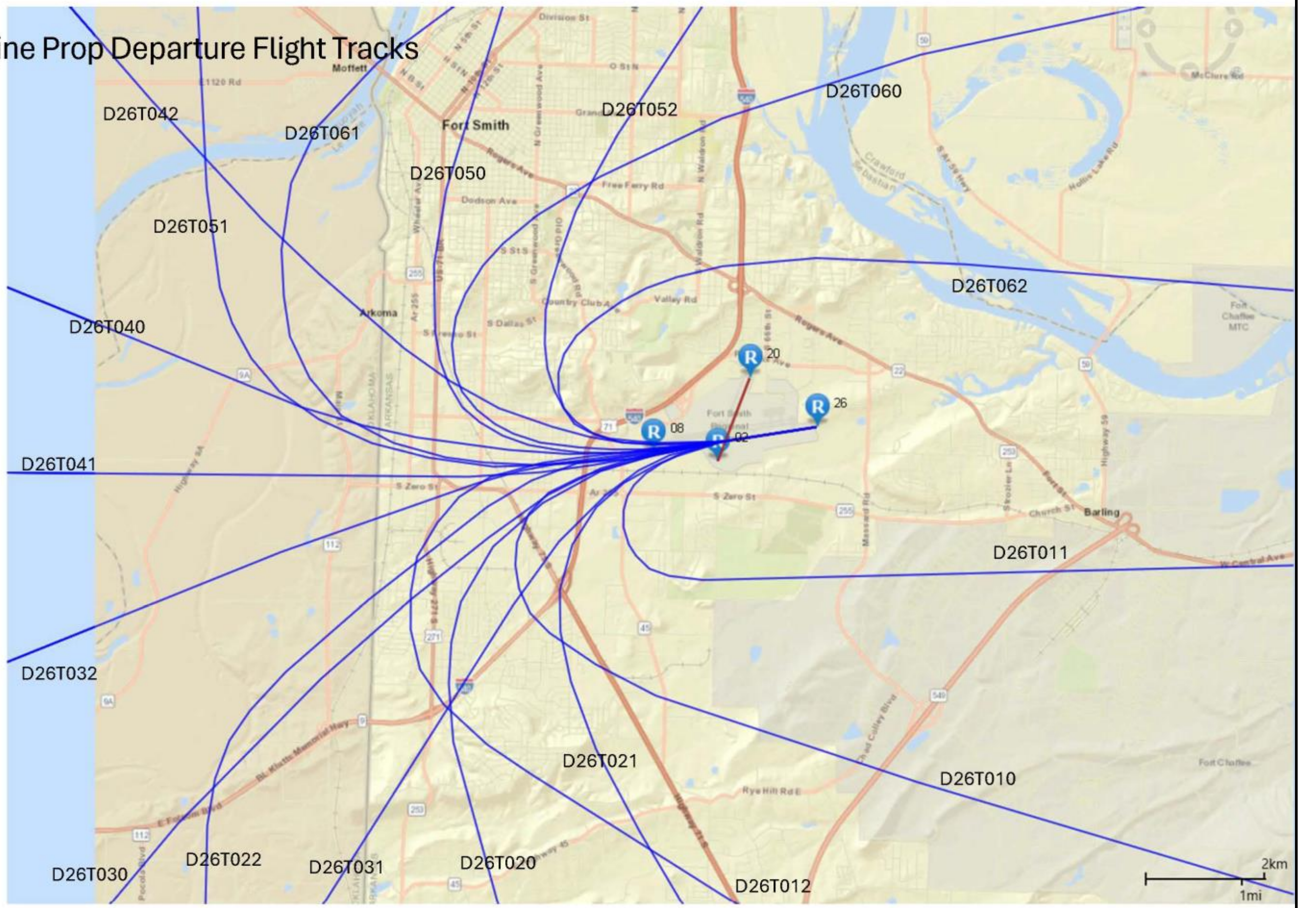
168

Runway 26 Single Engine Prop Departure Flight Tracks



169

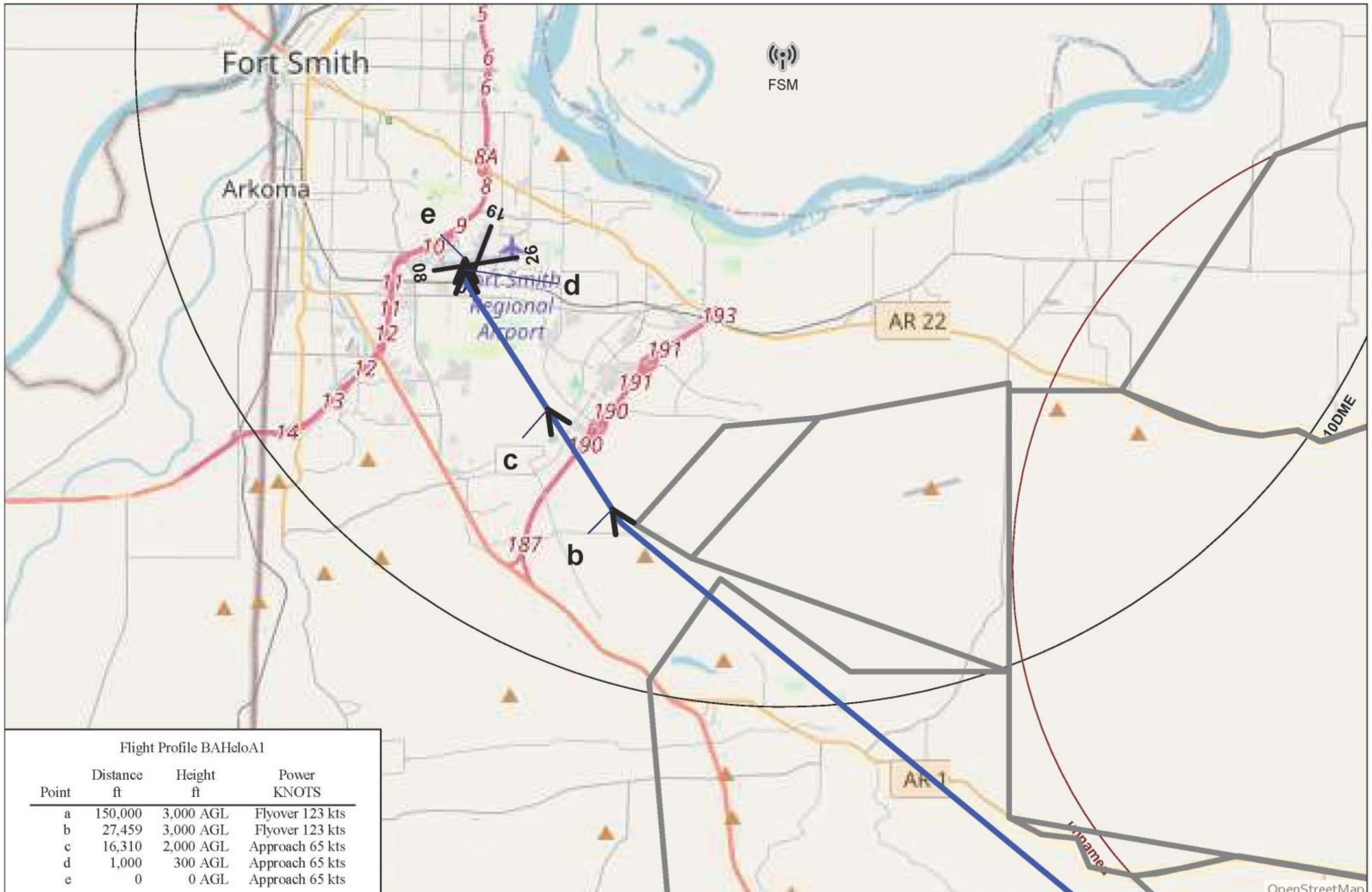
Runway 26 Twin Engine Prop Departure Flight Tracks



170

APPENDIX B REPRESENTATIVE FLIGHT PROFILES

Appendix B shows one representative profile of each operation type modeled for all based aircraft at FSM / Ebbing ANGB.



Flight Profile BAHeloA1

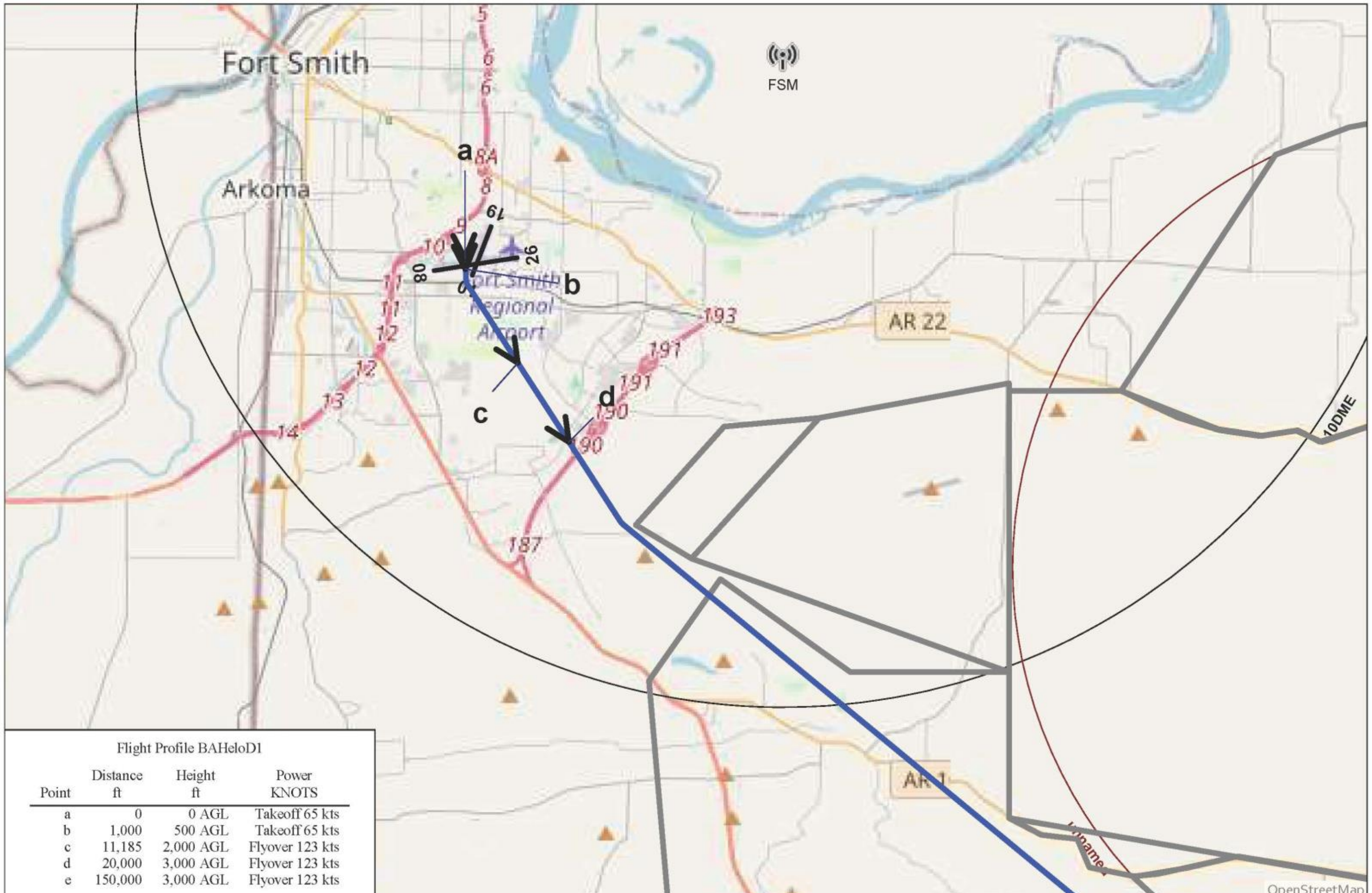
Point	Distance ft	Height ft	Power KNOTS
a	150,000	3,000 AGL	Flyover 123 kts
b	27,459	3,000 AGL	Flyover 123 kts
c	16,310	2,000 AGL	Approach 65 kts
d	1,000	300 AGL	Approach 65 kts
e	0	0 AGL	Approach 65 kts

Blue Air BL222 Flight Profile BAHeloA1
Blue Air Bell206 Arrival
Modeled as Bell 222

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:179,000 (1 inch = 14,900 feet)

172



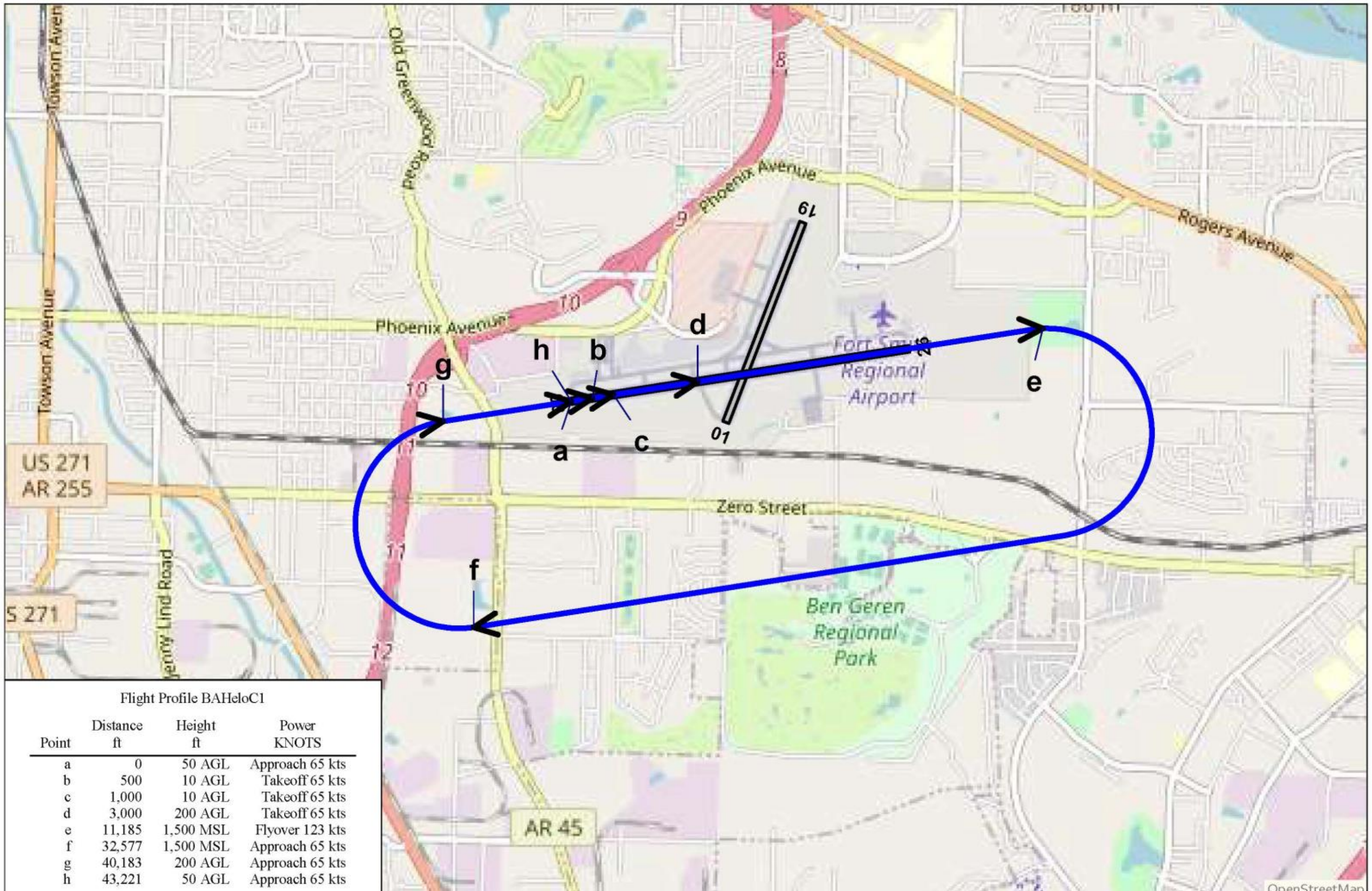
Flight Profile BAHeloD1

Point	Distance ft	Height ft	Power KNOTS
a	0	0 AGL	Takeoff 65 kts
b	1,000	500 AGL	Takeoff 65 kts
c	11,185	2,000 AGL	Flyover 123 kts
d	20,000	3,000 AGL	Flyover 123 kts
e	150,000	3,000 AGL	Flyover 123 kts

Blue Air BL222 Flight Profile BAHeloD1
Blue Air Bell206 Departure
Modeled as Bell 222

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:179,000 (1 inch = 14,900 feet)

173



Flight Profile BAHeloC1

Point	Distance ft	Height ft	Power KNOTS
a	0	50 AGL	Approach 65 kts
b	500	10 AGL	Takeoff 65 kts
c	1,000	10 AGL	Takeoff 65 kts
d	3,000	200 AGL	Takeoff 65 kts
e	11,185	1,500 MSL	Flyover 123 kts
f	32,577	1,500 MSL	Approach 65 kts
g	40,183	200 AGL	Approach 65 kts
h	43,221	50 AGL	Approach 65 kts

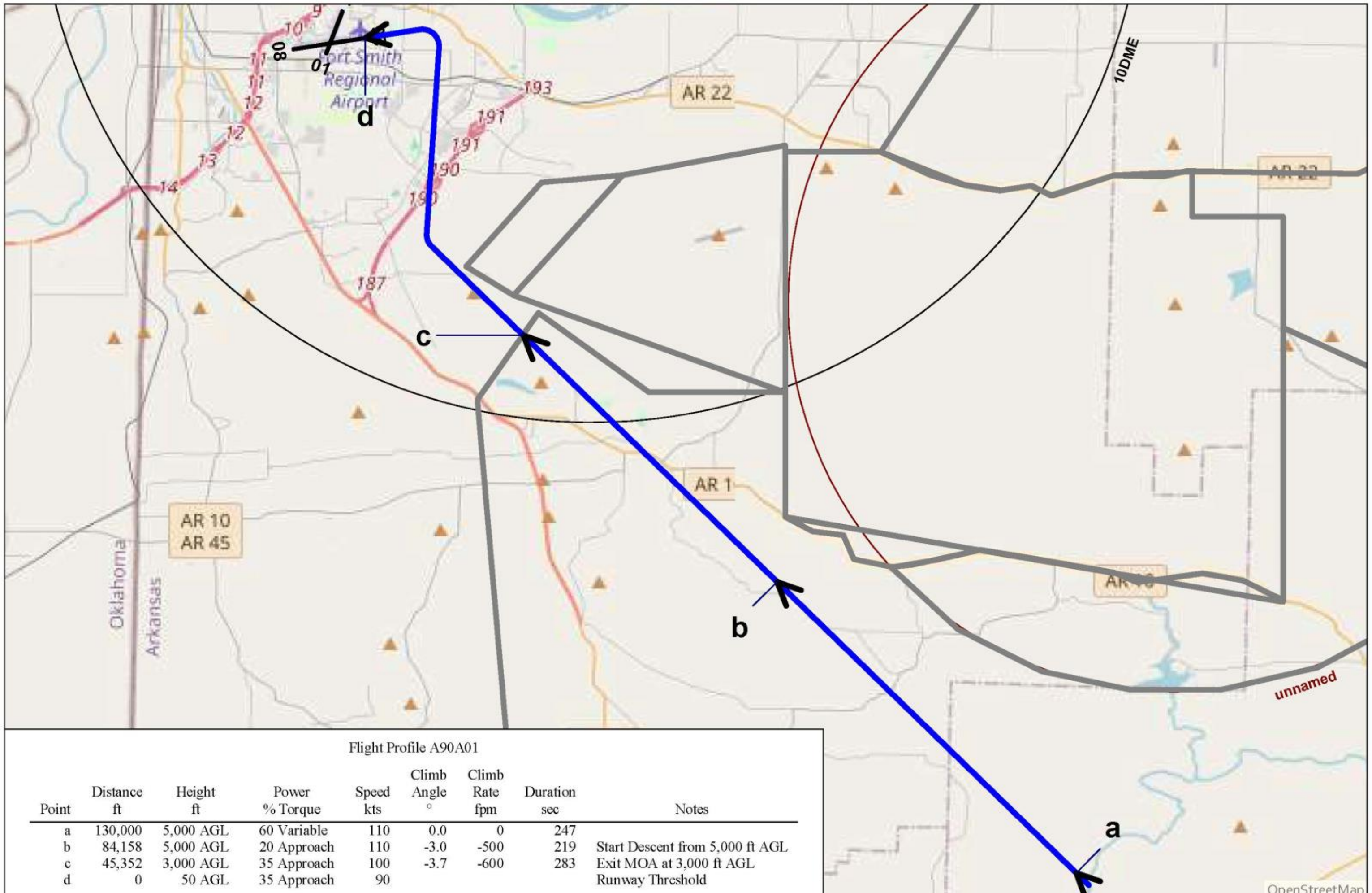
Blue Air BL222 Flight Profile BAHeloC1
Blue Air Bell206 Pattern
Modeled as Bell 222

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,700 (1 inch = 3,730 feet)

N

174



Flight Profile A90A01

Point	Distance ft	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	130,000	5,000 AGL	60 Variable	110	0.0	0	247	
b	84,158	5,000 AGL	20 Approach	110	-3.0	-500	219	Start Descent from 5,000 ft AGL
c	45,352	3,000 AGL	35 Approach	100	-3.7	-600	283	Exit MOA at 3,000 ft AGL
d	0	50 AGL	35 Approach	90				Runway Threshold

Blue Air Blue Air A-90 Flight Profile A90A01
Blue Air A-90 and IAR-823 Arrival
Modeled as T-6

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

Scale in Feet 1:210,000 (1 inch = 17,500 feet)

175

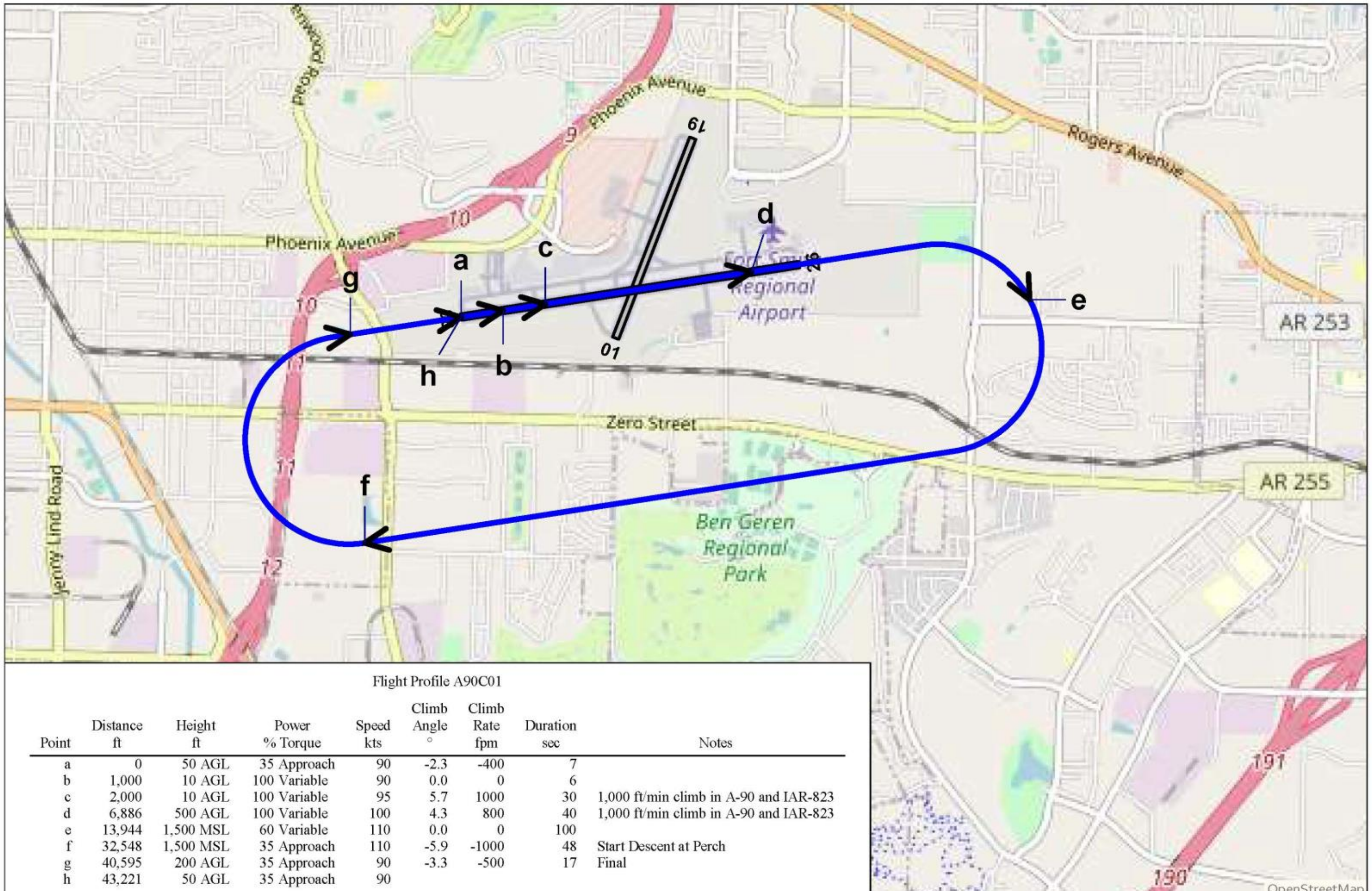
Flight Profile A90D01

Point	Distance ft	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	100 Variable	0	0.0	0	26	
b	2,000	0 AGL	100 Variable	90	5.7	1000	31	1,000 ft/min climb in A-90 and IAR-823
c	6,998	500 AGL	100 Variable	100	5.6	1000	259	1,000 ft/min climb in A-90 and IAR-823
d	52,887	5,000 AGL	60 Variable	110	0.0	0	523	
e	150,000	5,000 AGL	60 Variable	110				

Blue Air Blue Air A-90 Flight Profile A90D01
Blue Air A-90 and IAR-823 Departure
Modeled as T-6

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:179,000 (1 inch = 14,900 feet)

176



Flight Profile A90C01

Point	Distance ft	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	35 Approach	90	-2.3	-400	7	
b	1,000	10 AGL	100 Variable	90	0.0	0	6	
c	2,000	10 AGL	100 Variable	95	5.7	1000	30	1,000 ft/min climb in A-90 and IAR-823
d	6,886	500 AGL	100 Variable	100	4.3	800	40	1,000 ft/min climb in A-90 and IAR-823
e	13,944	1,500 MSL	60 Variable	110	0.0	0	100	
f	32,548	1,500 MSL	35 Approach	110	-5.9	-1000	48	Start Descent at Perch
g	40,595	200 AGL	35 Approach	90	-3.3	-500	17	Final
h	43,221	50 AGL	35 Approach	90				

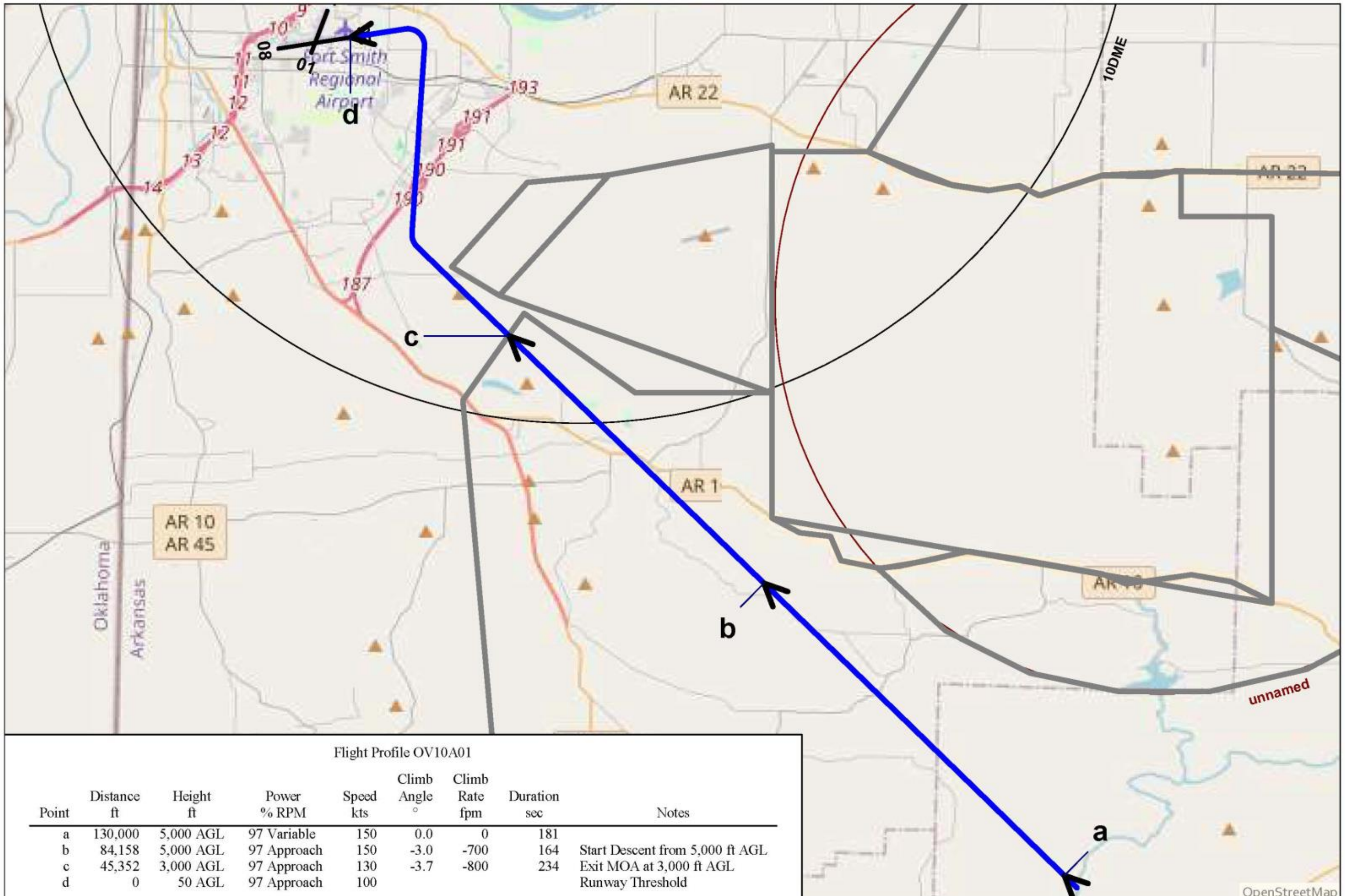
Blue Air Blue Air A-90 Flight Profile A90C01
Blue Air A-90 and IAR-823 Closed Pattern
Modeled as T-6

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,700 (1 inch = 3,730 feet)

N

177



Flight Profile OV10A01

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	130,000	5,000 AGL	97 Variable	150	0.0	0	181	
b	84,158	5,000 AGL	97 Approach	150	-3.0	-700	164	Start Descent from 5,000 ft AGL
c	45,352	3,000 AGL	97 Approach	130	-3.7	-800	234	Exit MOA at 3,000 ft AGL
d	0	50 AGL	97 Approach	100				Runway Threshold

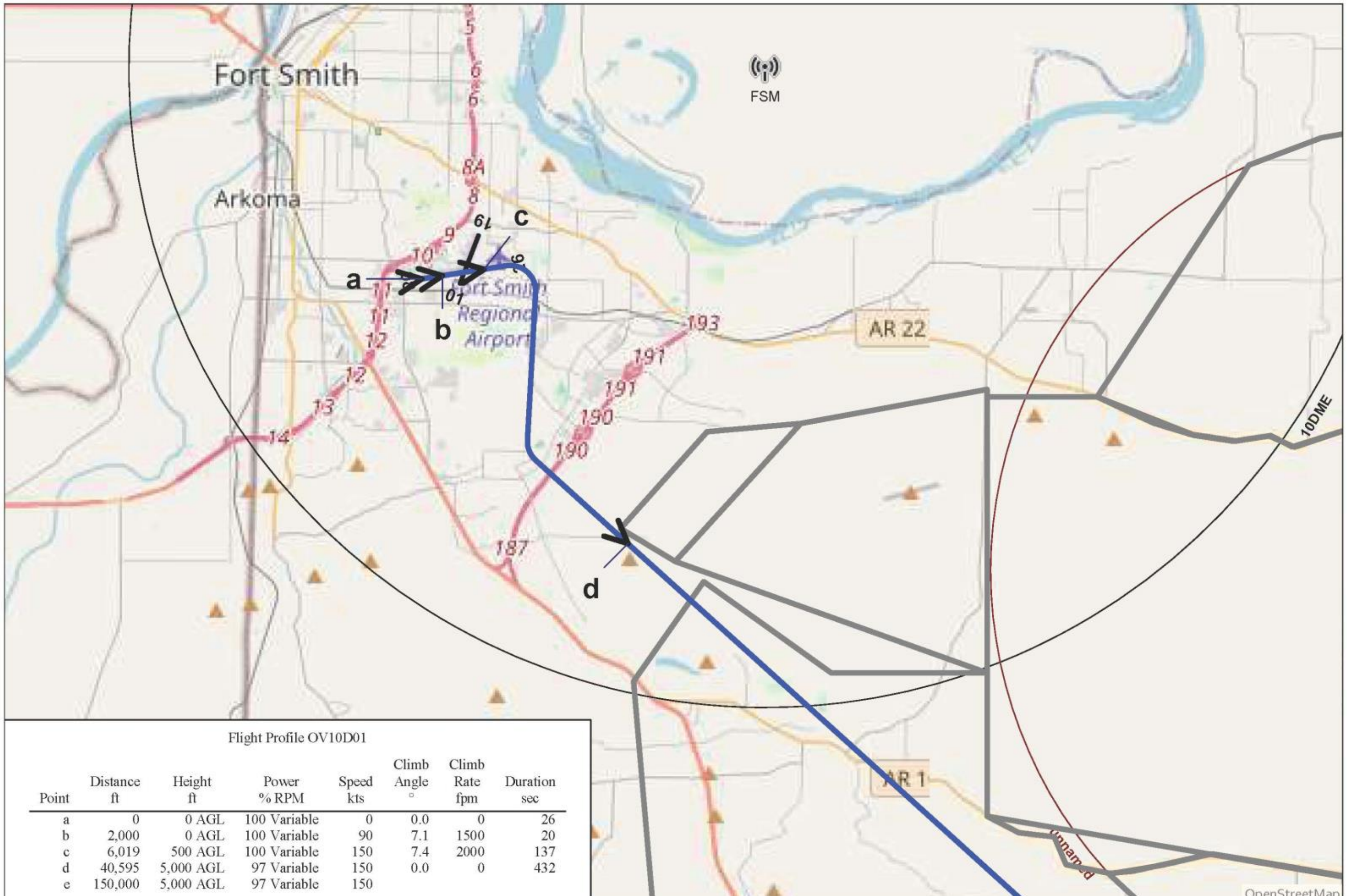
Blue Air OV-10A Flight Profile OV10A01
Blue Air OV-10 Arrival

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:205,000 (1 inch = 17,000 feet)

N

178



Flight Profile OV10D01

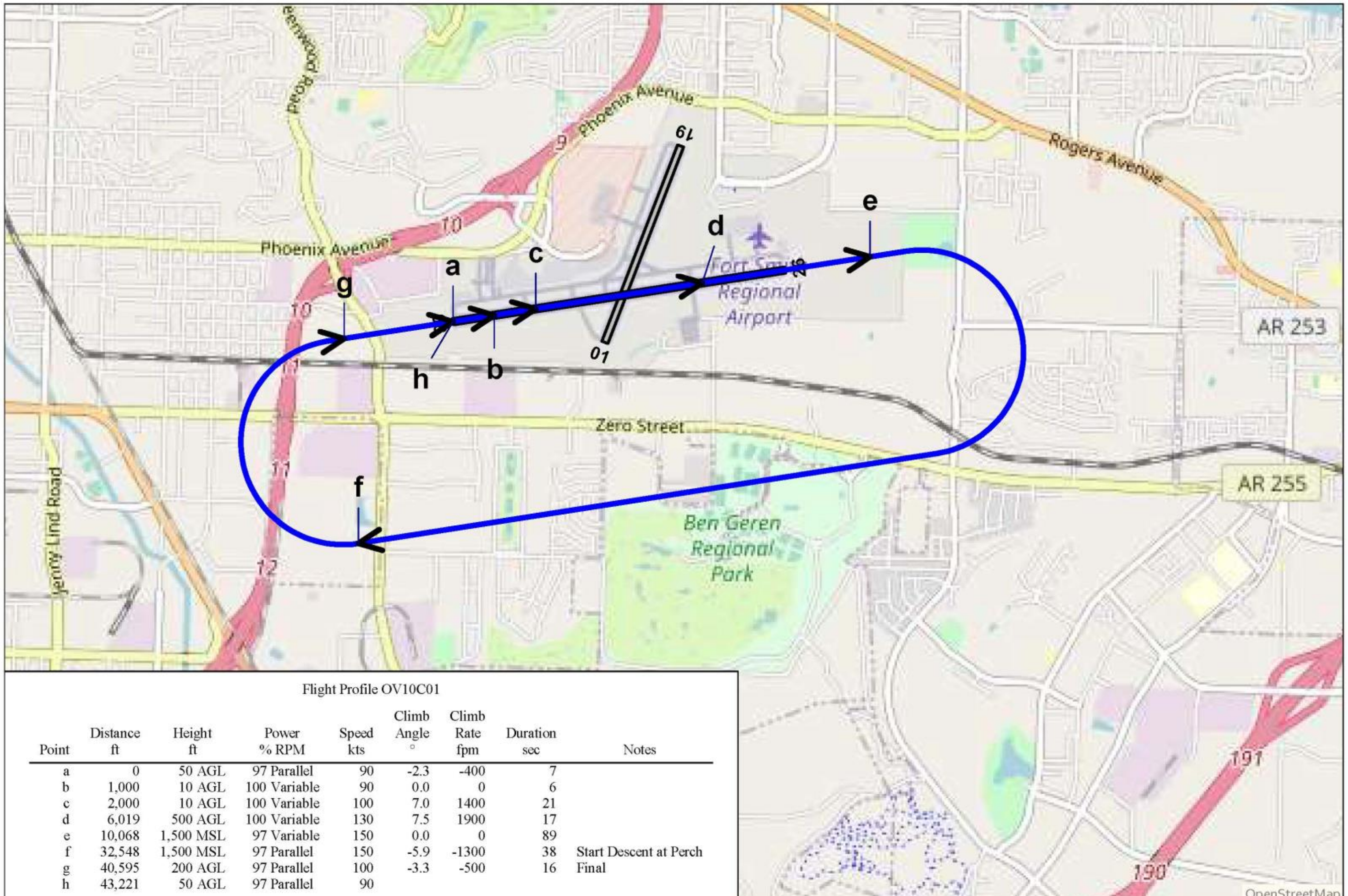
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Variable	0	0.0	0	26
b	2,000	0 AGL	100 Variable	90	7.1	1500	20
c	6,019	500 AGL	100 Variable	150	7.4	2000	137
d	40,595	5,000 AGL	97 Variable	150	0.0	0	432
e	150,000	5,000 AGL	97 Variable	150			

Blue Air OV-10A Flight Profile OV10D01
Blue Air OV-10 Departure

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:179,000 (1 inch = 14,900 feet)

179



Flight Profile OV10C01

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	97 Parallel	90	-2.3	-400	7	
b	1,000	10 AGL	100 Variable	90	0.0	0	6	
c	2,000	10 AGL	100 Variable	100	7.0	1400	21	
d	6,019	500 AGL	100 Variable	130	7.5	1900	17	
e	10,068	1,500 MSL	97 Variable	150	0.0	0	89	
f	32,548	1,500 MSL	97 Parallel	150	-5.9	-1300	38	Start Descent at Perch
g	40,595	200 AGL	97 Parallel	100	-3.3	-500	16	Final
h	43,221	50 AGL	97 Parallel	90				

Blue Air OV-10A Flight Profile OV10C01
Blue Air OV-10 Closed Pattern

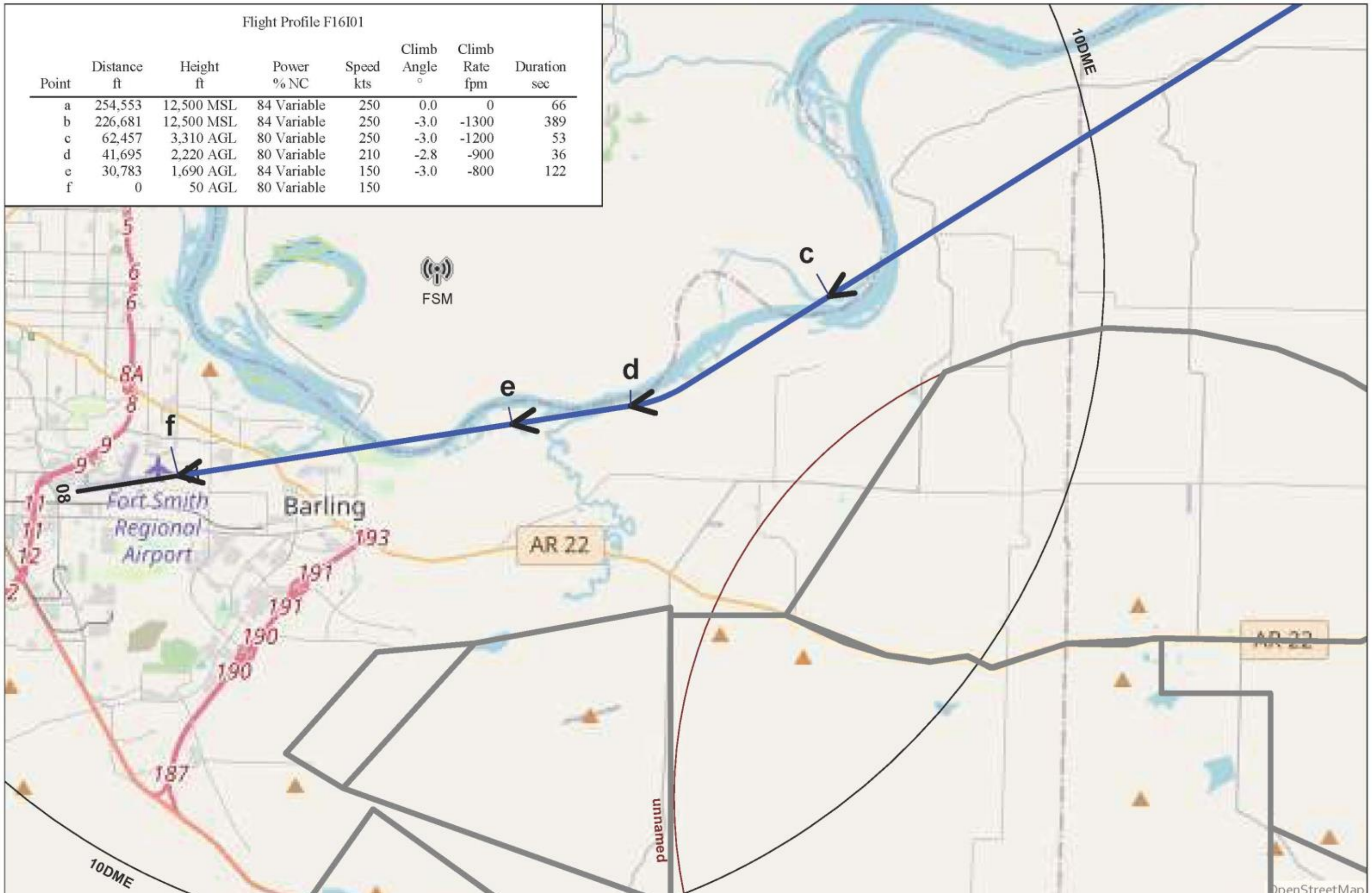
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,700 (1 inch = 3,730 feet)

180

Flight Profile F16I01

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	254,553	12,500 MSL	84 Variable	250	0.0	0	66
b	226,681	12,500 MSL	84 Variable	250	-3.0	-1300	389
c	62,457	3,310 AGL	80 Variable	250	-3.0	-1200	53
d	41,695	2,220 AGL	80 Variable	210	-2.8	-900	36
e	30,783	1,690 AGL	84 Variable	150	-3.0	-800	122
f	0	50 AGL	80 Variable	150			



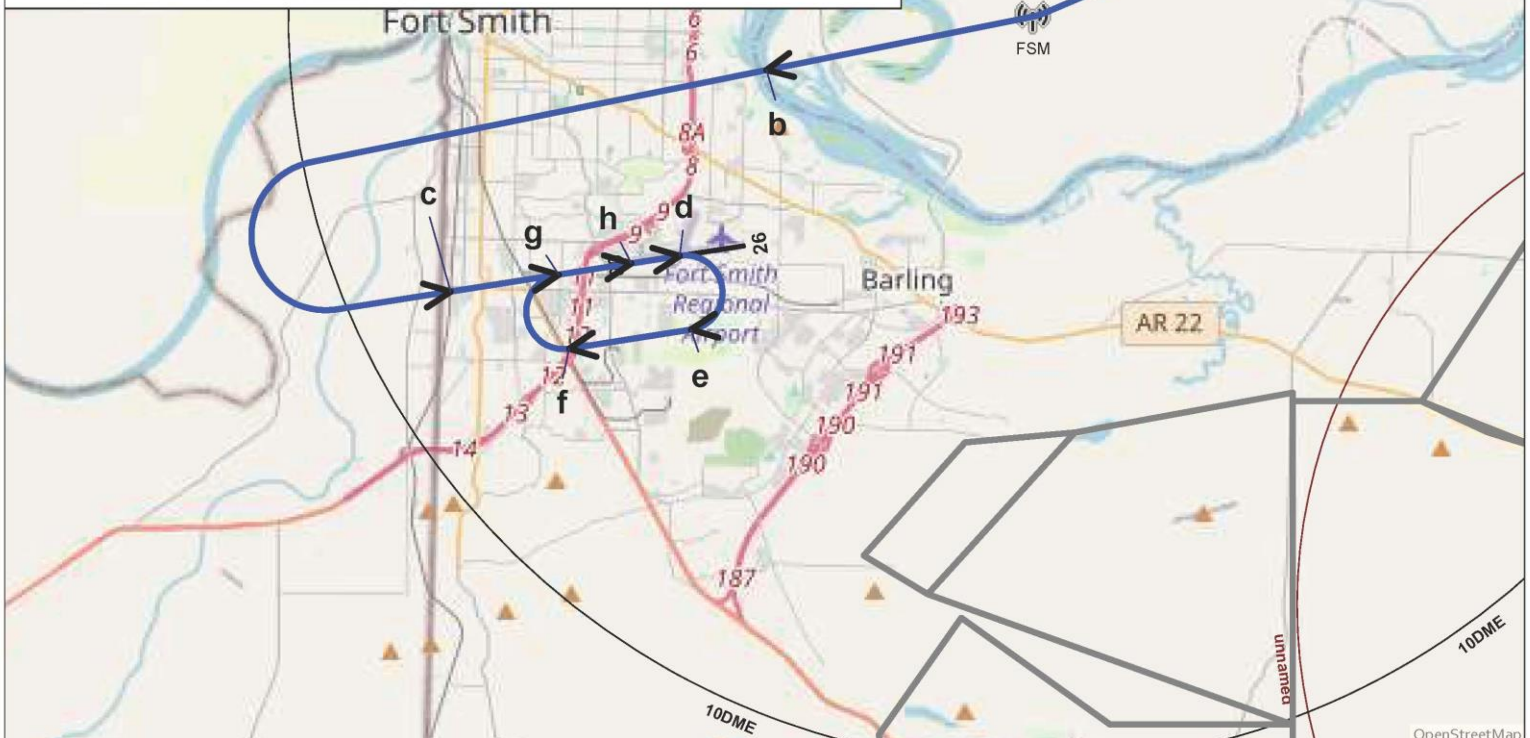
Ebbing ANGB F-16C Representative Flight Profile F16I01
IFR ARRIVAL South on Runway 26
F100-PW-229 Engine

Scale in Feet 1:174,000 (1 inch = 14,500 feet)

181

Flight Profile F16O11

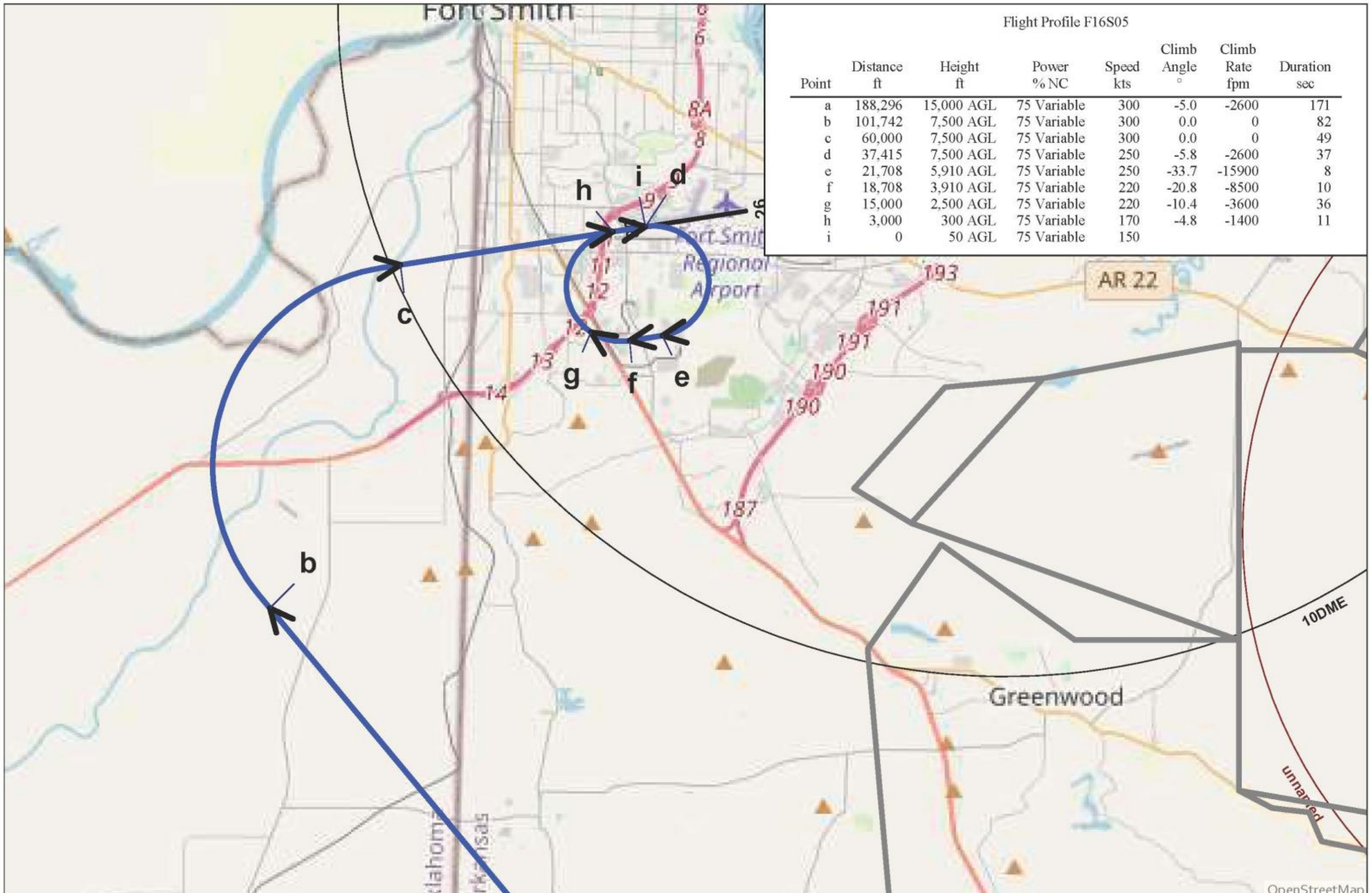
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	362,559	14,000 AGL	82 Variable	300	-2.0	-1100	478	
b	120,278	6,000 MSL	82 Variable	300	-3.0	-1600	131	start descent from 6,000 ft MSL
c	54,179	2,500 MSL	82 Variable	300	0.0	0	37	Initial
d	35,241	2,500 MSL	75 Variable	300	-4.2	-1900	22	break
e	25,697	1,800 MSL	80 Variable	210	-1.7	-600	31	
f	15,620	1,500 MSL	80 Variable	170	-4.0	-1100	36	
g	6,000	350 AGL	84 Variable	150	-2.9	-800	24	
h	0	50 AGL	80 Variable	150				



Ebbing ANGB F-16C Representative Flight Profile F16O11
Overhead Break Arrival from Shirley - Break at Midfield on Runway 08
F100-PW-229 Engine

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:174,000 (1 inch = 14,500 feet)

182



Flight Profile F16S05

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	188,296	15,000 AGL	75 Variable	300	-5.0	-2600	171
b	101,742	7,500 AGL	75 Variable	300	0.0	0	82
c	60,000	7,500 AGL	75 Variable	300	0.0	0	49
d	37,415	7,500 AGL	75 Variable	250	-5.8	-2600	37
e	21,708	5,910 AGL	75 Variable	250	-33.7	-15900	8
f	18,708	3,910 AGL	75 Variable	220	-20.8	-8500	10
g	15,000	2,500 AGL	75 Variable	220	-10.4	-3600	36
h	3,000	300 AGL	75 Variable	170	-4.8	-1400	11
i	0	50 AGL	75 Variable	150			

Ebbing ANGB F-16C Representative Flight Profile F16S05
SFO Arrival from Hog West on Runway 08
F100-PW-229 Engine

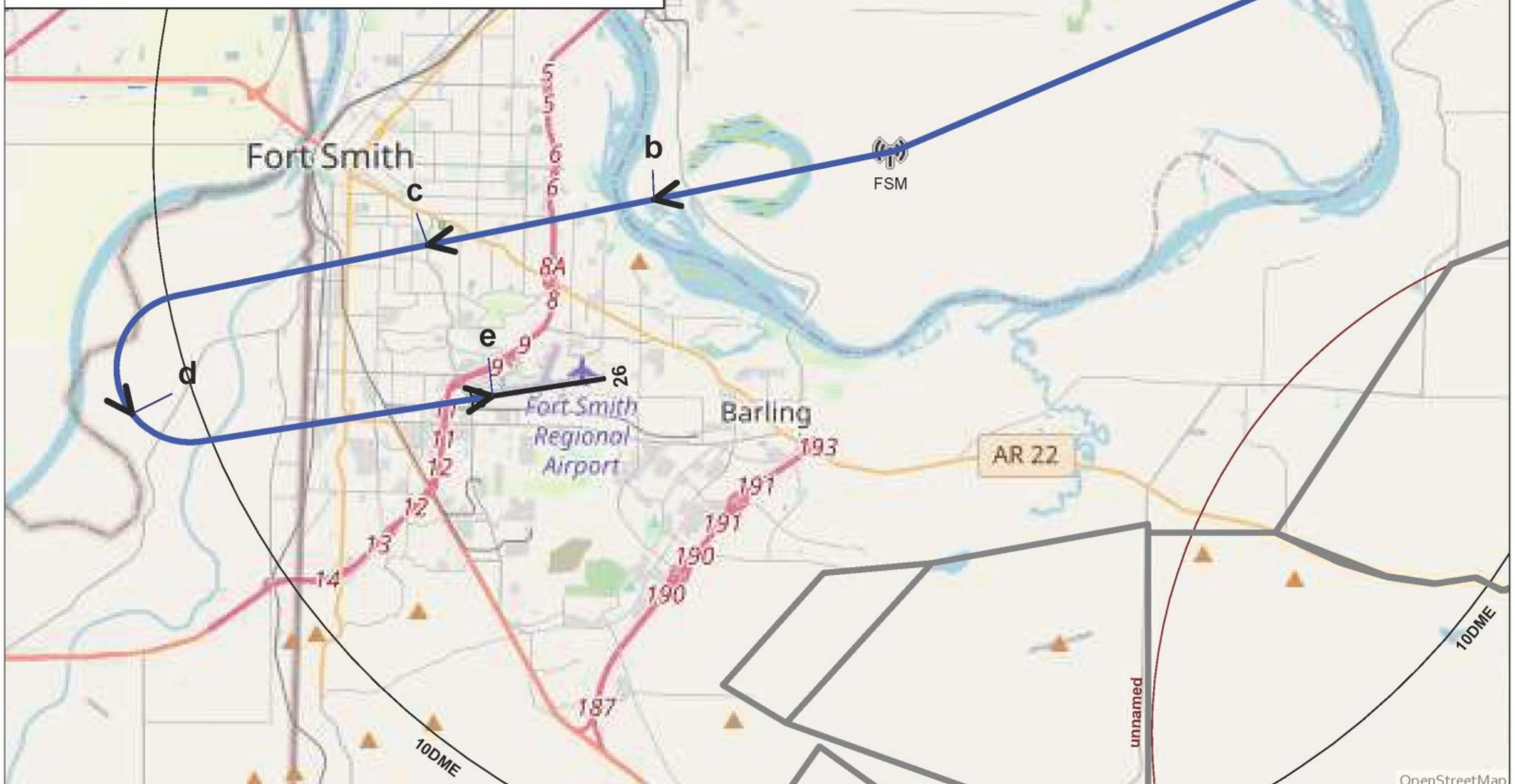
0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:174,000 (1 inch = 14,500 feet)

183

Flight Profile F16V06

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	369,639	14,000 AGL	84 Variable	300	-2.2	-1200	565
b	83,346	3,000 AGL	80 Variable	300	-3.0	-1500	41
c	64,326	2,000 AGL	80 Variable	250	-0.5	-200	99
d	30,783	1,685 AGL	84 Variable	150	-3.0	-800	122
e	0	50 AGL	80 Variable	150			



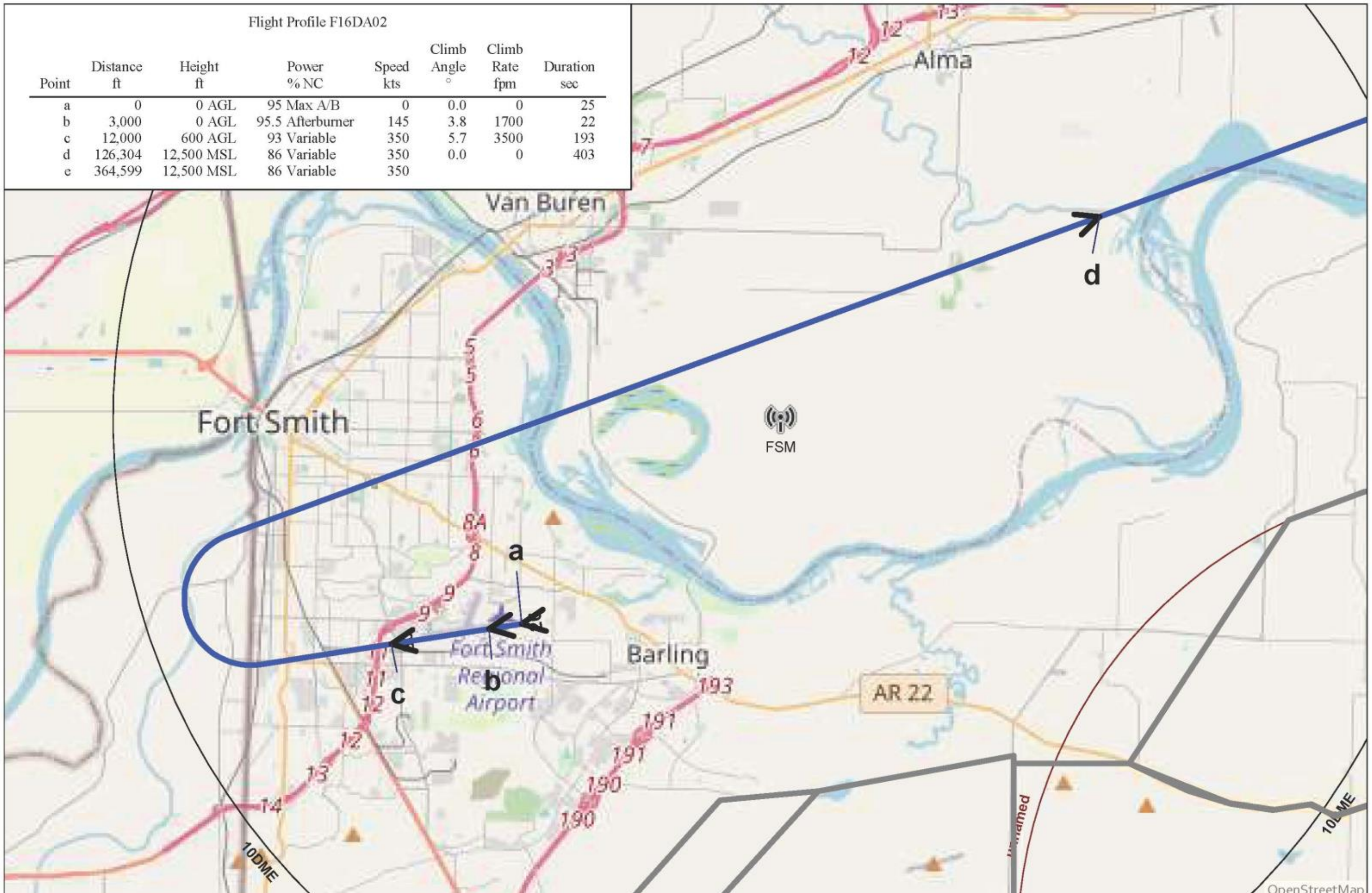
Ebbing ANGB F-16C Representative Flight Profile F16V06
VFR Straight-in Arrival from Shirley on Runway 08
F100-PW-229 Engine

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:174,000 (1 inch = 14,500 feet)

N

184



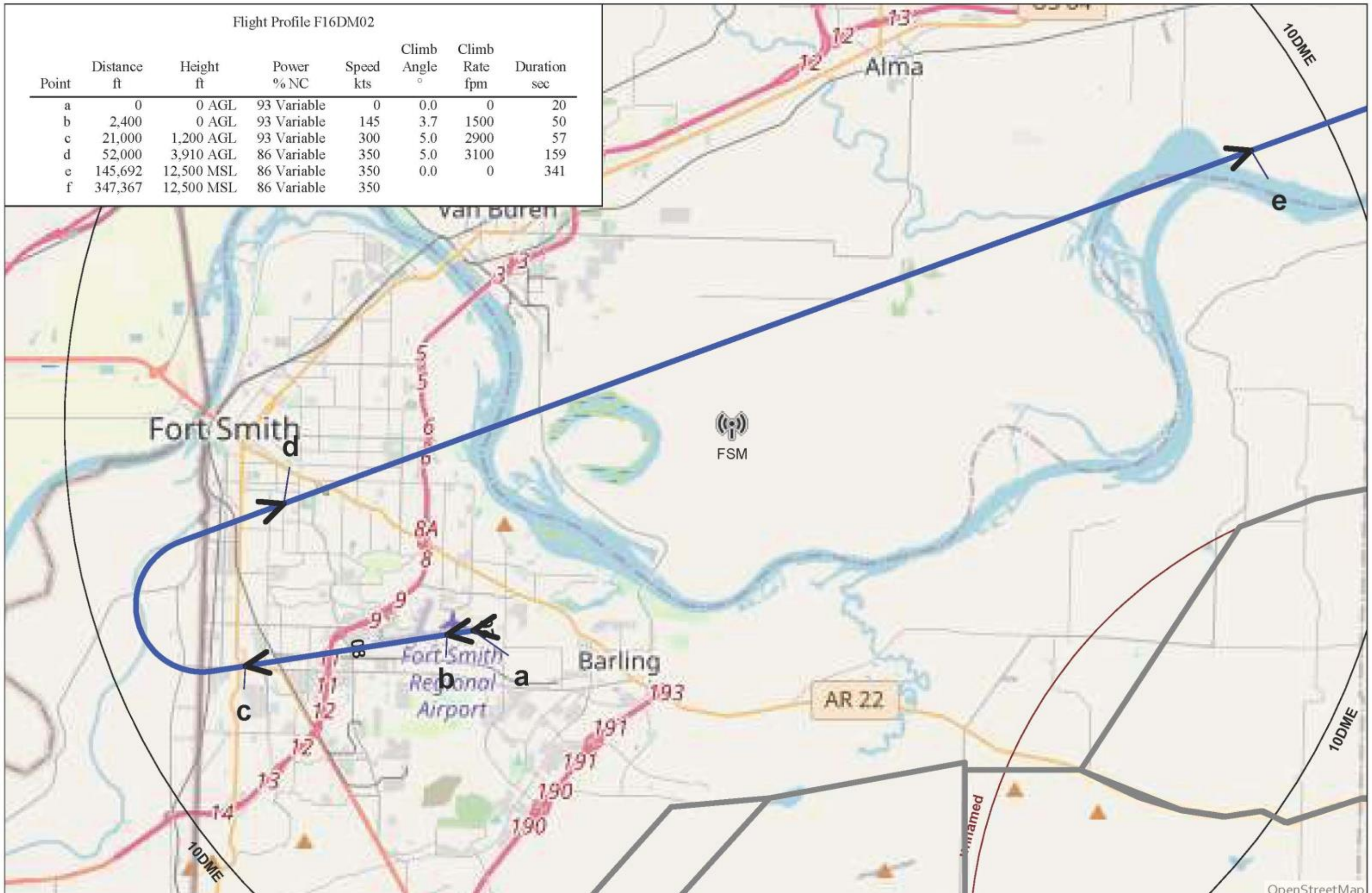
Flight Profile F16DA02

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	95 Max A/B	0	0.0	0	25
b	3,000	0 AGL	95.5 Afterburner	145	3.8	1700	22
c	12,000	600 AGL	93 Variable	350	5.7	3500	193
d	126,304	12,500 MSL	86 Variable	350	0.0	0	403
e	364,599	12,500 MSL	86 Variable	350			

Ebbing ANGB F-16C Representative Flight Profile F16DA02
AB Departure to Shirley and Hog on Runway 26
F100-PW-229 Engine

Scale in Feet 1:174,000 (1 inch = 14,500 feet)

185



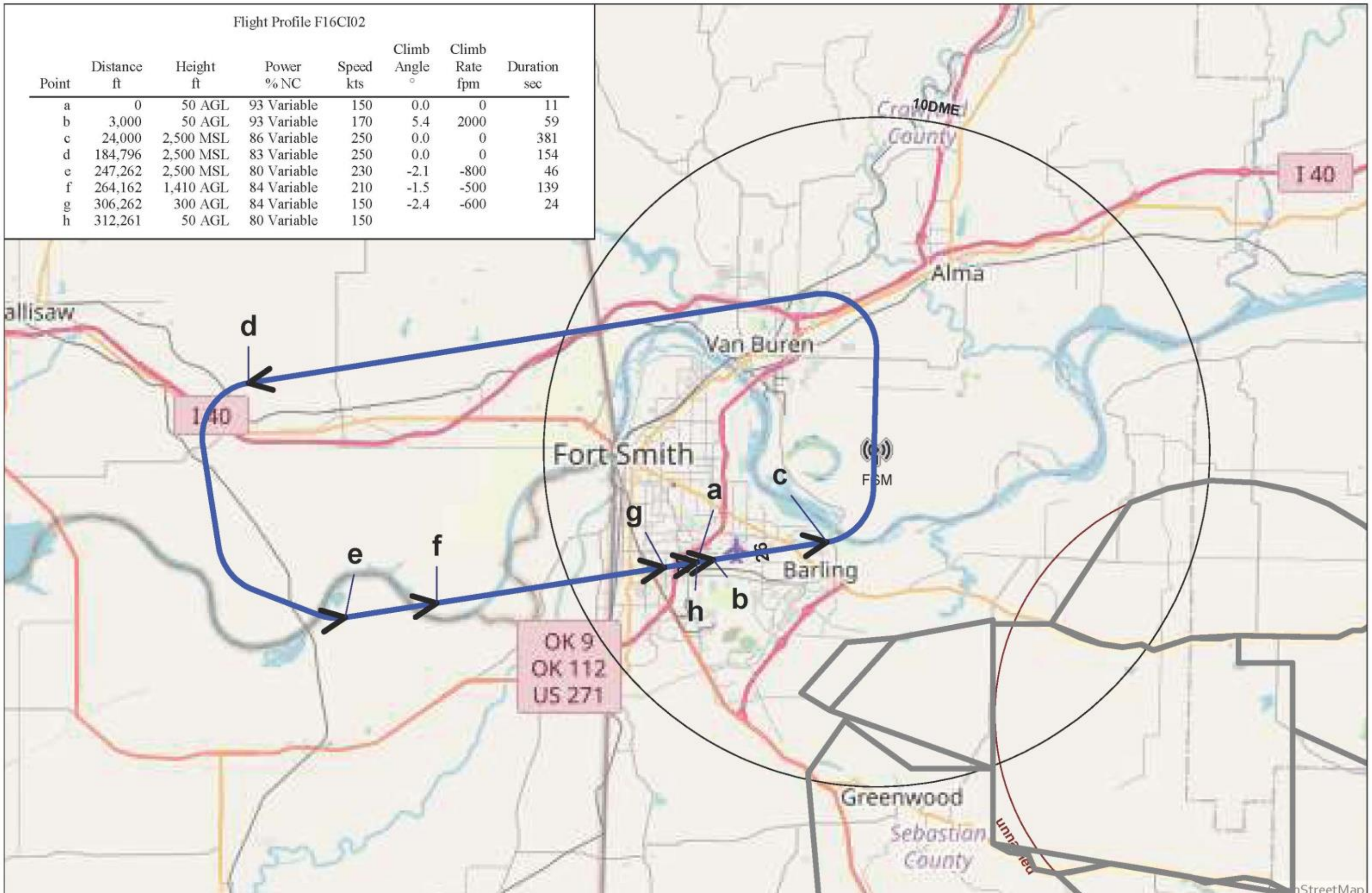
Flight Profile F16DM02

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	93 Variable	0	0.0	0	20
b	2,400	0 AGL	93 Variable	145	3.7	1500	50
c	21,000	1,200 AGL	93 Variable	300	5.0	2900	57
d	52,000	3,910 AGL	86 Variable	350	5.0	3100	159
e	145,692	12,500 MSL	86 Variable	350	0.0	0	341
f	347,367	12,500 MSL	86 Variable	350			

Ebbing ANGB F-16C Representative Flight Profile F16DM02
MIL Deparutre to Shirley and Hog on Runway 26
F100-PW-229 Engine

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:174,000 (1 inch = 14,500 feet)

186



Flight Profile F16CI02

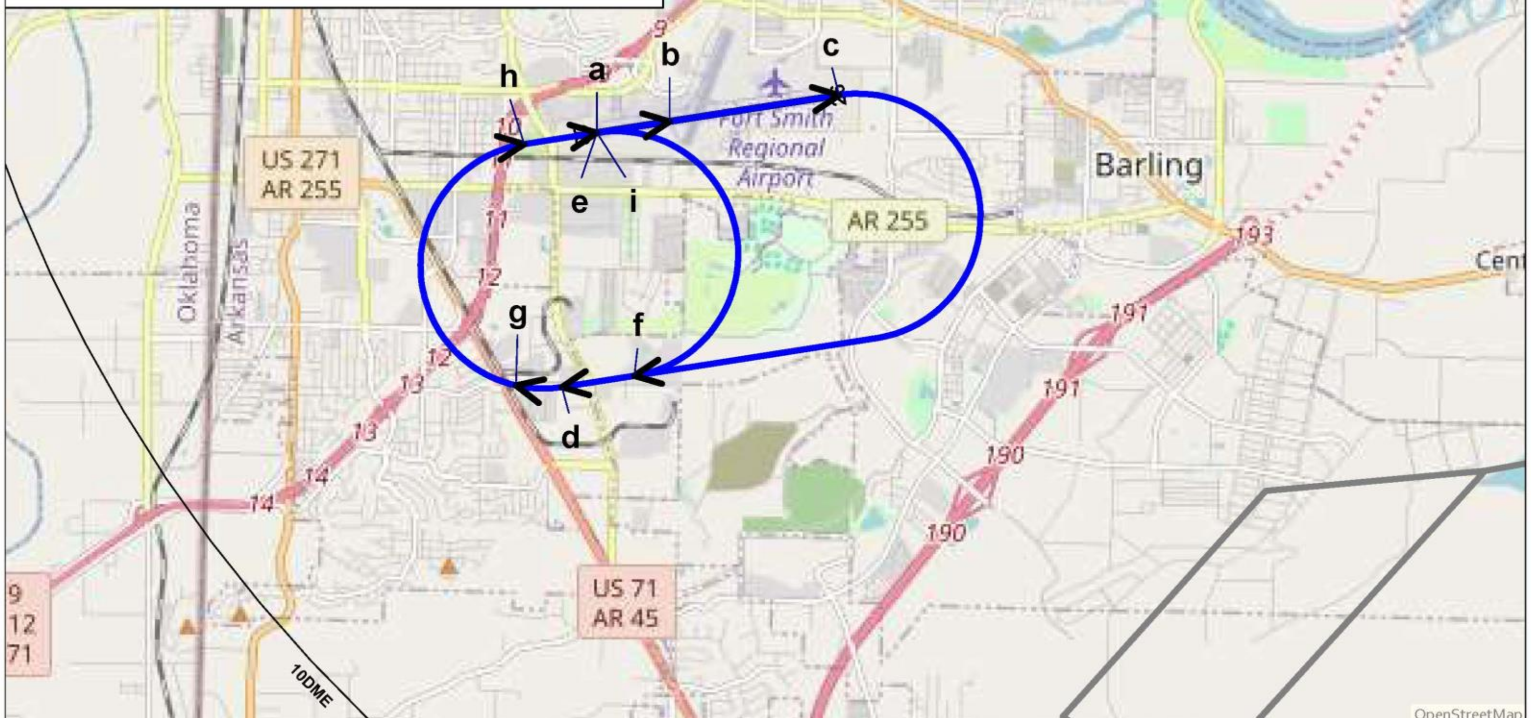
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	93 Variable	150	0.0	0	11
b	3,000	50 AGL	93 Variable	170	5.4	2000	59
c	24,000	2,500 MSL	86 Variable	250	0.0	0	381
d	184,796	2,500 MSL	83 Variable	250	0.0	0	154
e	247,262	2,500 MSL	80 Variable	230	-2.1	-800	46
f	264,162	1,410 AGL	84 Variable	210	-1.5	-500	139
g	306,262	300 AGL	84 Variable	150	-2.4	-600	24
h	312,261	50 AGL	80 Variable	150			

Ebbing ANGB F-16C Representative Flight Profile F16CI02
Radar Pattern on Runway 08
F100-PW-229 Engine

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:348,000 (1 inch = 29,000 feet)

187



Flight Profile F16CSF2

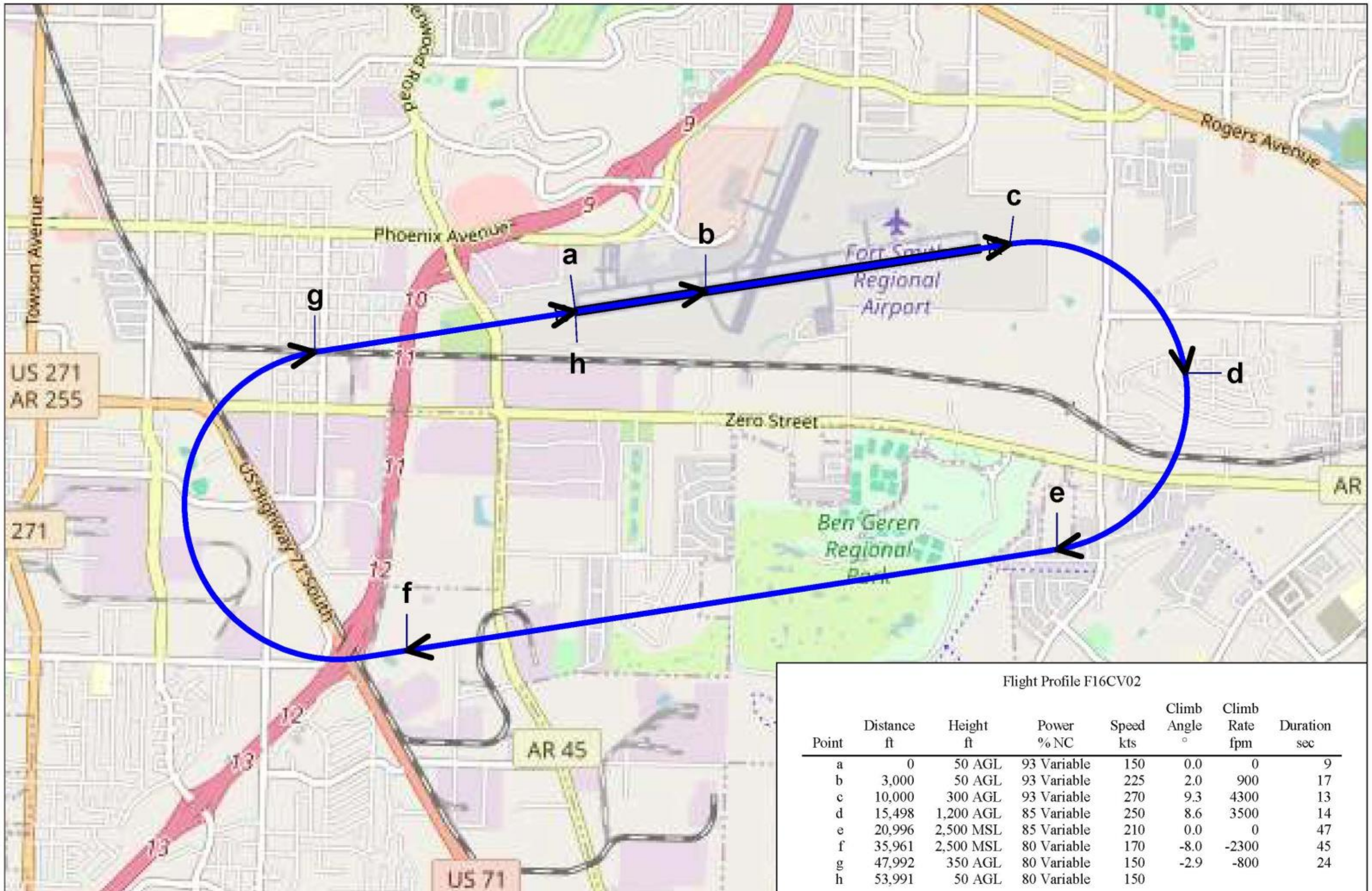
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	93 Variable	150	0.0	0	11
b	3,000	50 AGL	93 Variable	170	1.2	500	20
c	10,000	200 AGL	93 Variable	250	15.0	6400	72
d	38,708	7,910 AGL	80 Variable	220	0.0	0	50
e	57,416	7,910 AGL	75 Variable	220	-14.3	-5700	42
f	73,124	3,910 AGL	75 Variable	220	-21.4	-8700	13
g	78,000	2,000 AGL	75 Variable	220	-7.0	-2400	42
h	91,832	300 AGL	75 Variable	170	-4.8	-1400	11
i	94,831	50 AGL	75 Variable	150			

Ebbing ANGB F-16C Representative Flight Profile F16CSF2
SFO PATTERN on Runway 08
F100-PW-229 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:86,800 (1 inch = 7,240 feet)

188



Flight Profile F16CV02

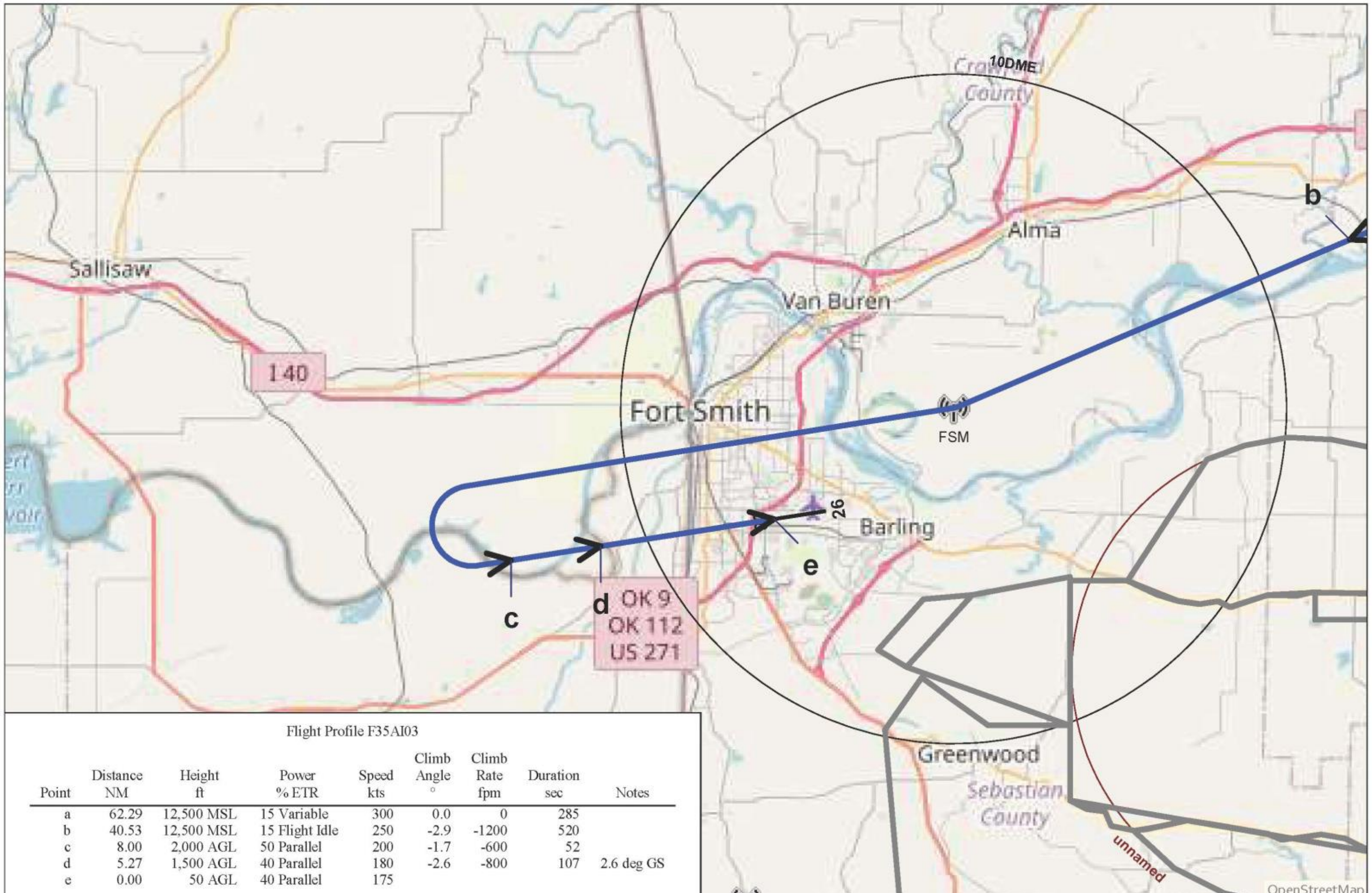
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	93 Variable	150	0.0	0	9
b	3,000	50 AGL	93 Variable	225	2.0	900	17
c	10,000	300 AGL	93 Variable	270	9.3	4300	13
d	15,498	1,200 AGL	85 Variable	250	8.6	3500	14
e	20,996	2,500 MSL	85 Variable	210	0.0	0	47
f	35,961	2,500 MSL	80 Variable	170	-8.0	-2300	45
g	47,992	350 AGL	80 Variable	150	-2.9	-800	24
h	53,991	50 AGL	80 Variable	150			

Ebbing ANGB F-16C Representative Flight Profile F16CV02
VFR CLOSED PATTERN on Runway 08
F100-PW-229 Engine

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000
Scale in Feet 1:43,400 (1 inch = 3,620 feet)

N

189



Flight Profile F35AI03

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	62.29	12,500 MSL	15 Variable	300	0.0	0	285	
b	40.53	12,500 MSL	15 Flight Idle	250	-2.9	-1200	520	
c	8.00	2,000 AGL	50 Parallel	200	-1.7	-600	52	
d	5.27	1,500 AGL	40 Parallel	180	-2.6	-800	107	2.6 deg GS
e	0.00	50 AGL	40 Parallel	175				

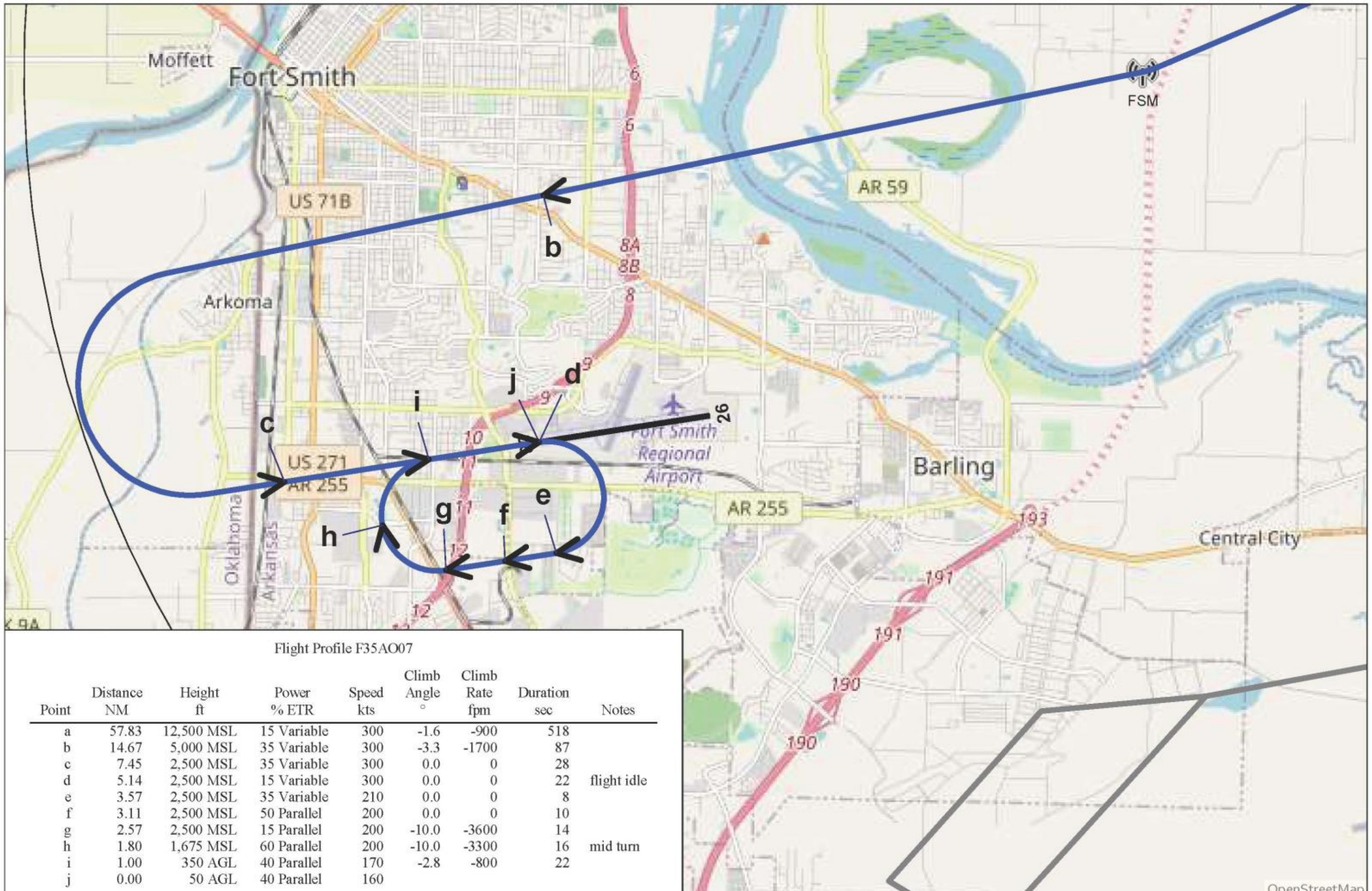
Fort Smith F-35A Flight Profile F35AI03
IFR Arrival - ILS on Runway 08
F-135-PW-100 Engine

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:348,000 (1 inch = 29,000 feet)

N

190



Flight Profile F35AO07

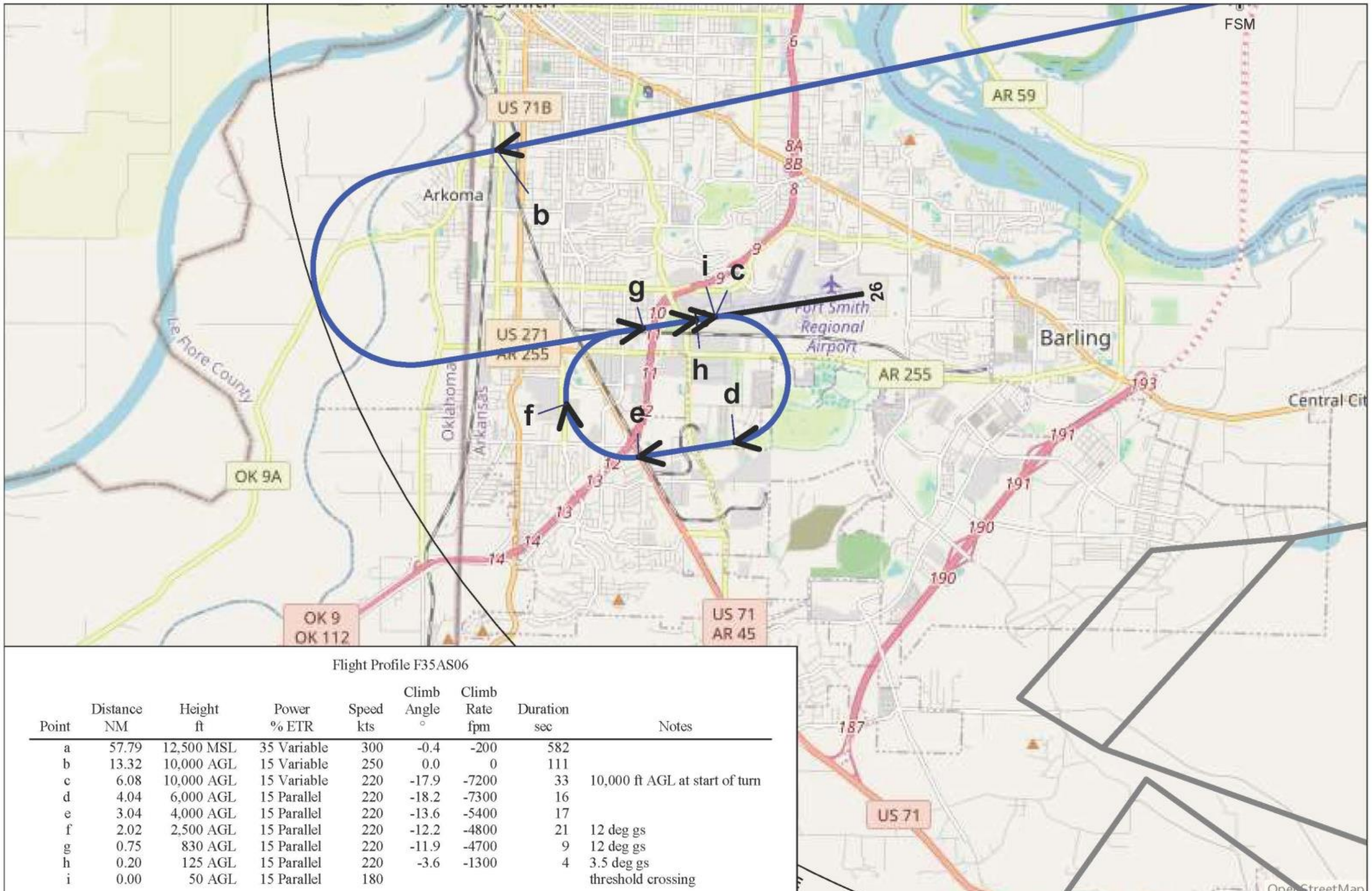
Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.83	12,500 MSL	15 Variable	300	-1.6	-900	518	
b	14.67	5,000 MSL	35 Variable	300	-3.3	-1700	87	
c	7.45	2,500 MSL	35 Variable	300	0.0	0	28	
d	5.14	2,500 MSL	15 Variable	300	0.0	0	22	flight idle
e	3.57	2,500 MSL	35 Variable	210	0.0	0	8	
f	3.11	2,500 MSL	50 Parallel	200	0.0	0	10	
g	2.57	2,500 MSL	15 Parallel	200	-10.0	-3600	14	
h	1.80	1,675 MSL	60 Parallel	200	-10.0	-3300	16	mid turn
i	1.00	350 AGL	40 Parallel	170	-2.8	-800	22	
j	0.00	50 AGL	40 Parallel	160				

Fort Smith F-35A Flight Profile F35AO07
Overhead Break Arrival - Break at Numbers on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000
Scale in Feet 1:104,000 (1 inch = 8,640 feet)

N

191



Flight Profile F35AS06

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.79	12,500 MSL	35 Variable	300	-0.4	-200	582	
b	13.32	10,000 AGL	15 Variable	250	0.0	0	111	
c	6.08	10,000 AGL	15 Variable	220	-17.9	-7200	33	10,000 ft AGL at start of turn
d	4.04	6,000 AGL	15 Parallel	220	-18.2	-7300	16	
e	3.04	4,000 AGL	15 Parallel	220	-13.6	-5400	17	
f	2.02	2,500 AGL	15 Parallel	220	-12.2	-4800	21	12 deg gs
g	0.75	830 AGL	15 Parallel	220	-11.9	-4700	9	12 deg gs
h	0.20	125 AGL	15 Parallel	220	-3.6	-1300	4	3.5 deg gs
i	0.00	50 AGL	15 Parallel	180				threshold crossing

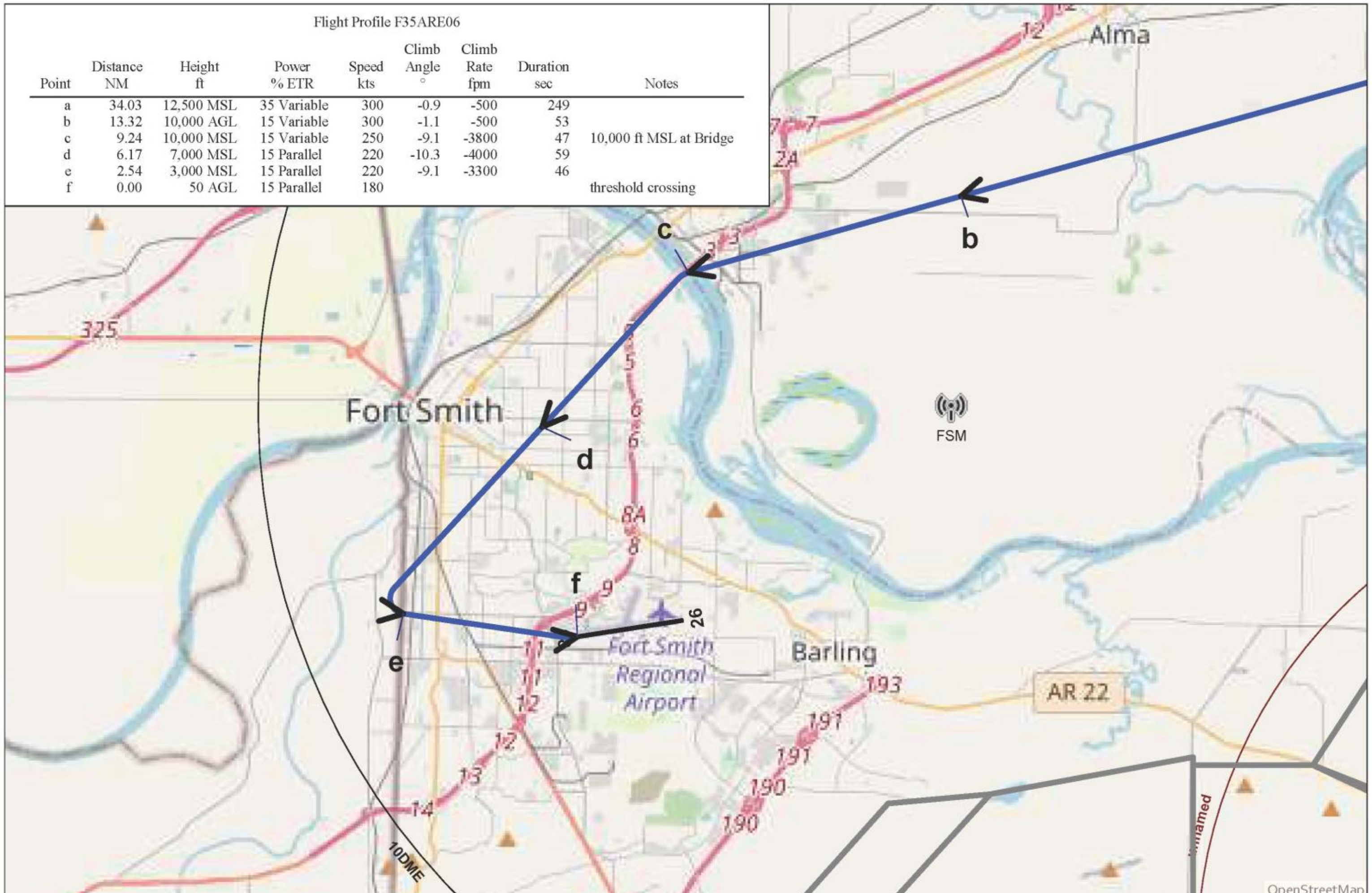
Fort Smith F-35A Flight Profile F35AS06
PFO Break Arrival on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:119,000 (1 inch = 9,940 feet)

N

192



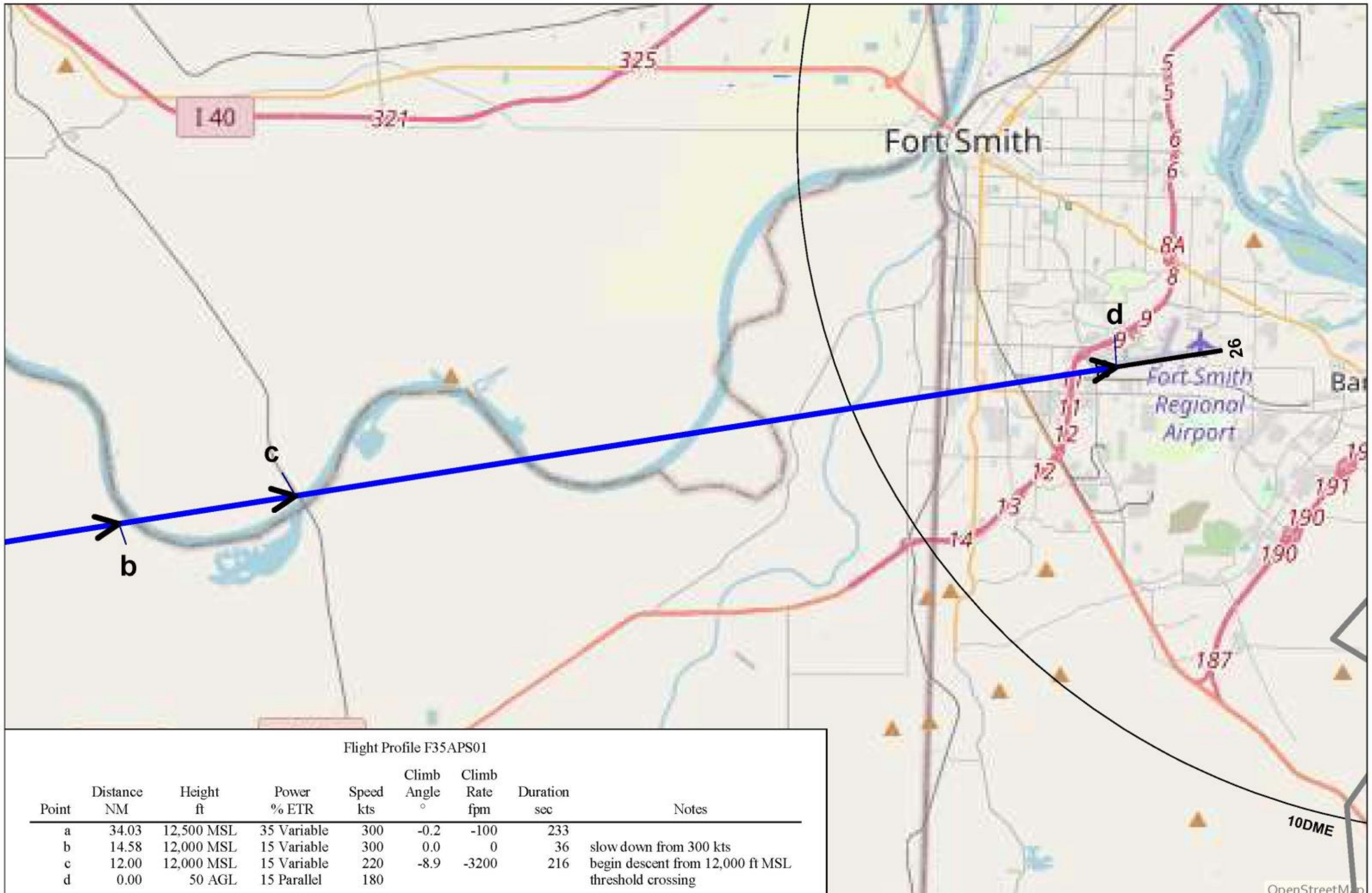
Flight Profile F35ARE06

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	34.03	12,500 MSL	35 Variable	300	-0.9	-500	249	
b	13.32	10,000 AGL	15 Variable	300	-1.1	-500	53	
c	9.24	10,000 MSL	15 Variable	250	-9.1	-3800	47	10,000 ft MSL at Bridge
d	6.17	7,000 MSL	15 Parallel	220	-10.3	-4000	59	
e	2.54	3,000 MSL	15 Parallel	220	-9.1	-3300	46	
f	0.00	50 AGL	15 Parallel	180				threshold crossing

Fort Smith F-35A Flight Profile F35ARE06
PFO Random Entry Arrival on Runway 08
F-135-PW-100 Engine

Scale in Feet 1:167,000 (1 inch = 14,000 feet)

193



Flight Profile F35APS01

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	34.03	12,500 MSL	35 Variable	300	-0.2	-100	233	
b	14.58	12,000 MSL	15 Variable	300	0.0	0	36	slow down from 300 kts
c	12.00	12,000 MSL	15 Variable	220	-8.9	-3200	216	begin descent from 12,000 ft MSL
d	0.00	50 AGL	15 Parallel	180				threshold crossing

Fort Smith F-35A Flight Profile F35APS01

PFO Straight-in Arrival on Runway 08

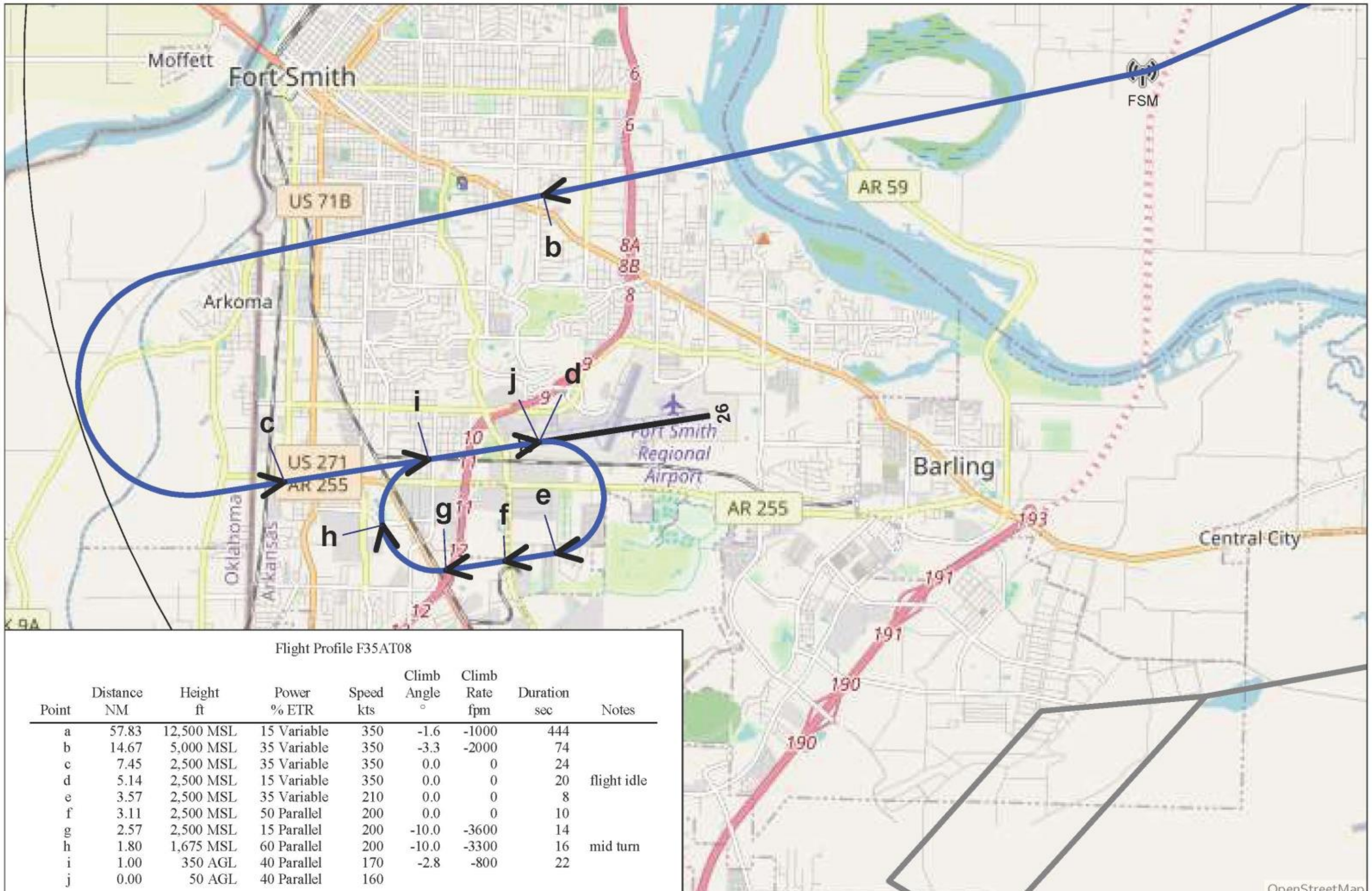
F-135-PW-100 Engine

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:167,000 (1 inch = 14,000 feet)

N

194



Flight Profile F35AT08

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.83	12,500 MSL	15 Variable	350	-1.6	-1000	444	
b	14.67	5,000 MSL	35 Variable	350	-3.3	-2000	74	
c	7.45	2,500 MSL	35 Variable	350	0.0	0	24	
d	5.14	2,500 MSL	15 Variable	350	0.0	0	20	flight idle
e	3.57	2,500 MSL	35 Variable	210	0.0	0	8	
f	3.11	2,500 MSL	50 Parallel	200	0.0	0	10	
g	2.57	2,500 MSL	15 Parallel	200	-10.0	-3600	14	
h	1.80	1,675 MSL	60 Parallel	200	-10.0	-3300	16	mid turn
i	1.00	350 AGL	40 Parallel	170	-2.8	-800	22	
j	0.00	50 AGL	40 Parallel	160				

Fort Smith F-35A Flight Profile F35AT08
TAC Initial Lead Overhead Break on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

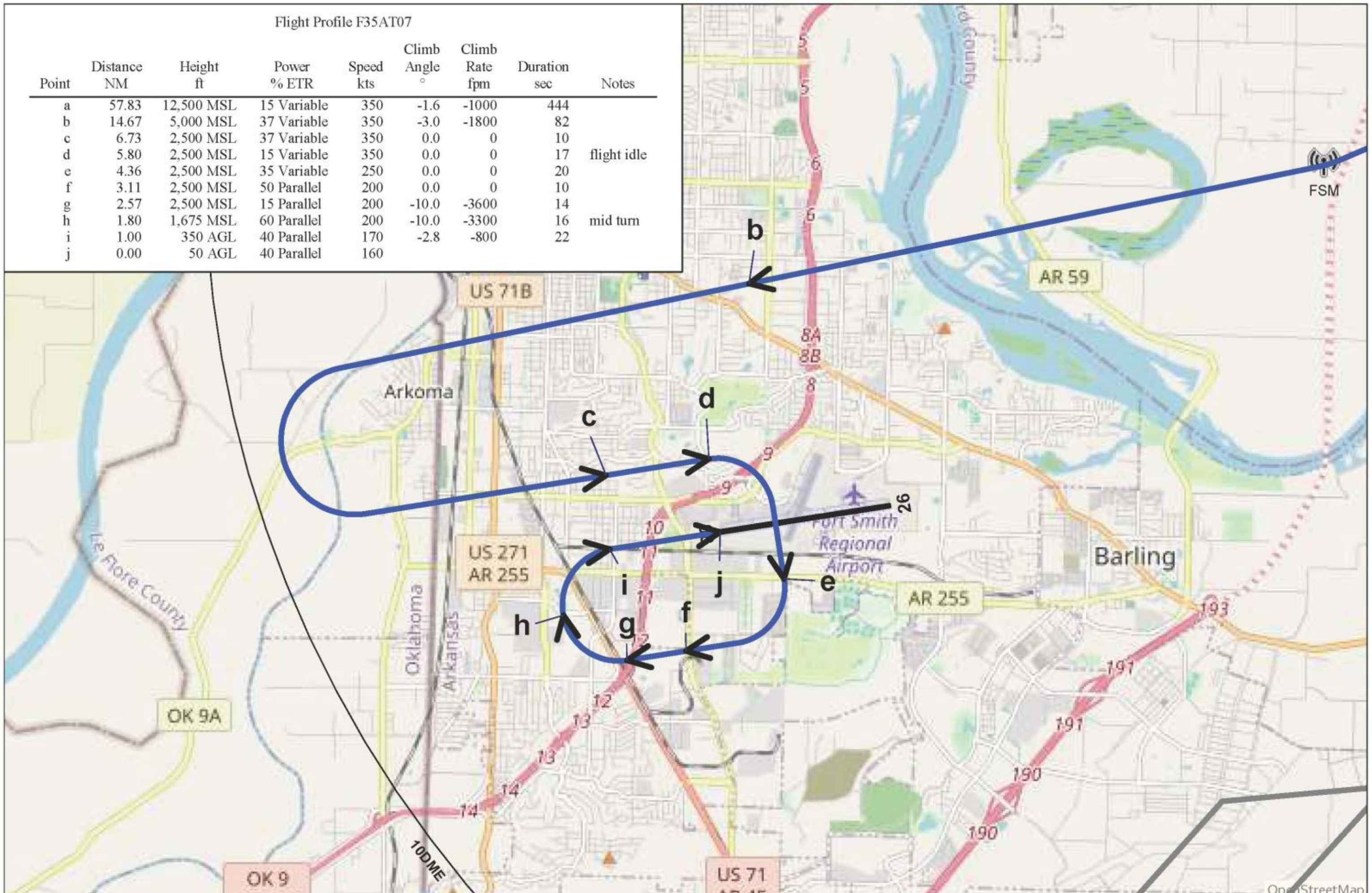
Scale in Feet 1:104,000 (1 inch = 8,640 feet)

N

195

Flight Profile F35AT07

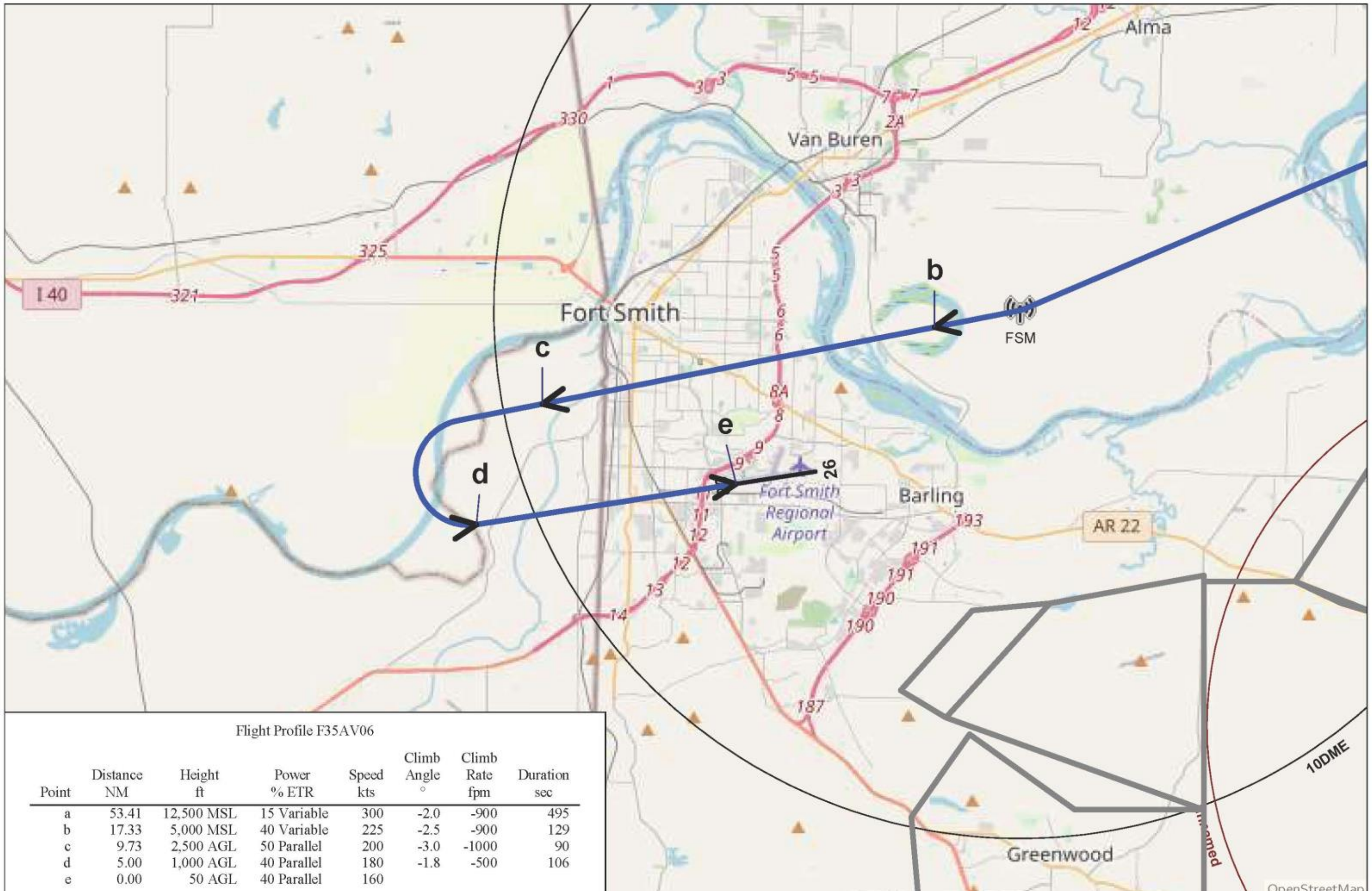
Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.83	12,500 MSL	15 Variable	350	-1.6	-1000	444	
b	14.67	5,000 MSL	37 Variable	350	-3.0	-1800	82	
c	6.73	2,500 MSL	37 Variable	350	0.0	0	10	
d	5.80	2,500 MSL	15 Variable	350	0.0	0	17	flight idle
e	4.36	2,500 MSL	35 Variable	250	0.0	0	20	
f	3.11	2,500 MSL	50 Parallel	200	0.0	0	10	
g	2.57	2,500 MSL	15 Parallel	200	-10.0	-3600	14	
h	1.80	1,675 MSL	60 Parallel	200	-10.0	-3300	16	mid turn
i	1.00	350 AGL	40 Parallel	170	-2.8	-800	22	
j	0.00	50 AGL	40 Parallel	160				



Fort Smith F-35A Flight Profile F35AT07
TAC Initial Wingman Overhead Break Arrival on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000
Scale in Feet 1:104,000 (1 inch = 8,640 feet)

196



Flight Profile F35AV06

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	53.41	12,500 MSL	15 Variable	300	-2.0	-900	495
b	17.33	5,000 MSL	40 Variable	225	-2.5	-900	129
c	9.73	2,500 AGL	50 Parallel	200	-3.0	-1000	90
d	5.00	1,000 AGL	40 Parallel	180	-1.8	-500	106
e	0.00	50 AGL	40 Parallel	160			

Fort Smith F-35A Flight Profile F35AV06
VFR Straight-in Arrival from Shirley on Runway 08
F-135-PW-100 Engine

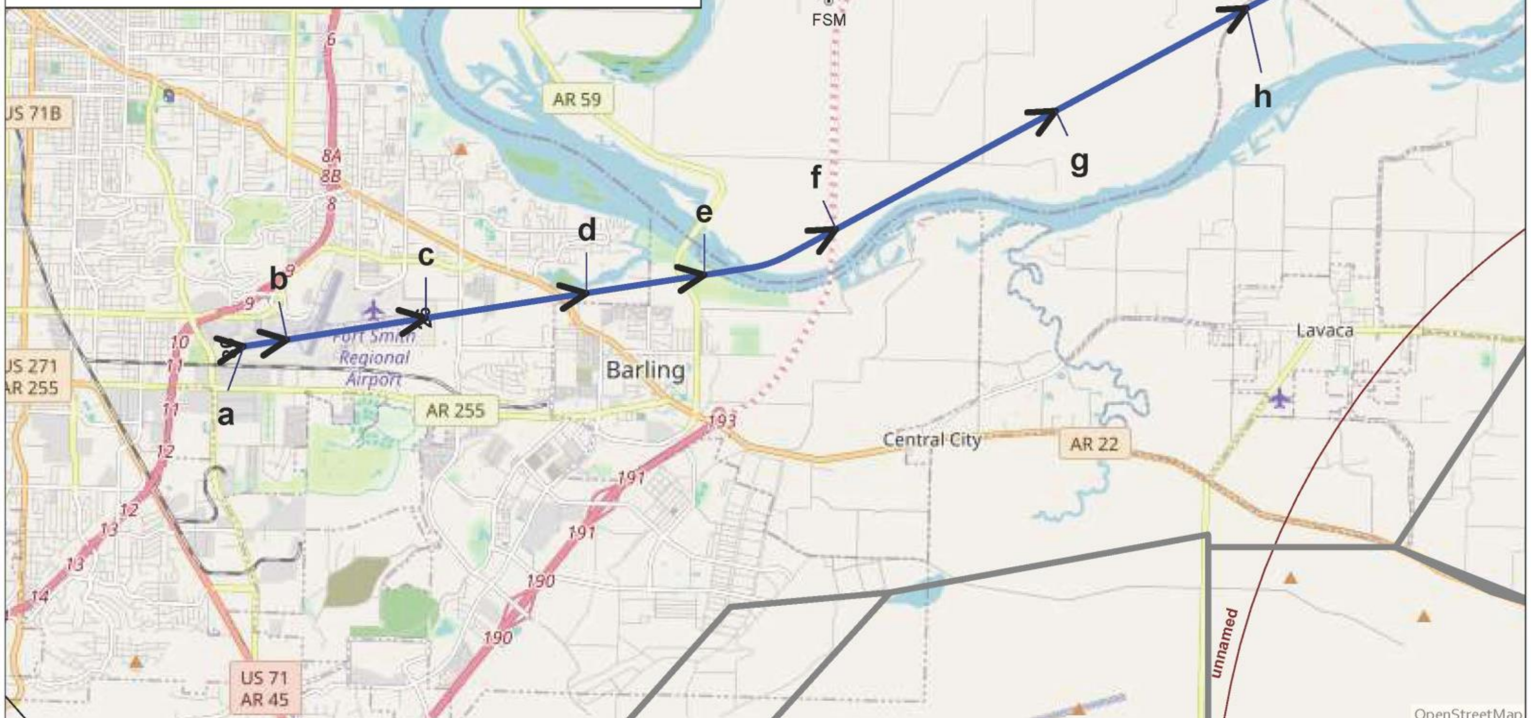
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

Scale in Feet 1:220,000 (1 inch = 18,400 feet)

197

Flight Profile F35ADA01

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	0 AGL	50 Variable	0	0.0	0	16
b	0.40	0 AGL	150 Afterburner	183	5.1	2400	18
c	1.70	700 AGL	100 Variable	350	11.4	7100	15
d	3.20	3,000 MSL	100 Variable	350	24.2	15900	11
e	4.30	6,000 MSL	100 Variable	350	20.8	13500	13
f	5.60	9,000 MSL	100 Variable	350	12.1	7600	24
g	7.90	12,000 MSL	100 Variable	350	11.6	7300	21
h	9.90	14,500 MSL	35 Variable	350	0.0	0	349
i	43.79	14,500 MSL	35 Variable	350			



Fort Smith F-35A Flight Profile F35ADA01
Afterburner Departure to 350 kts, Mil climb at 100% ETR to altitude on Runway 08
F-135-PW-100 Engine

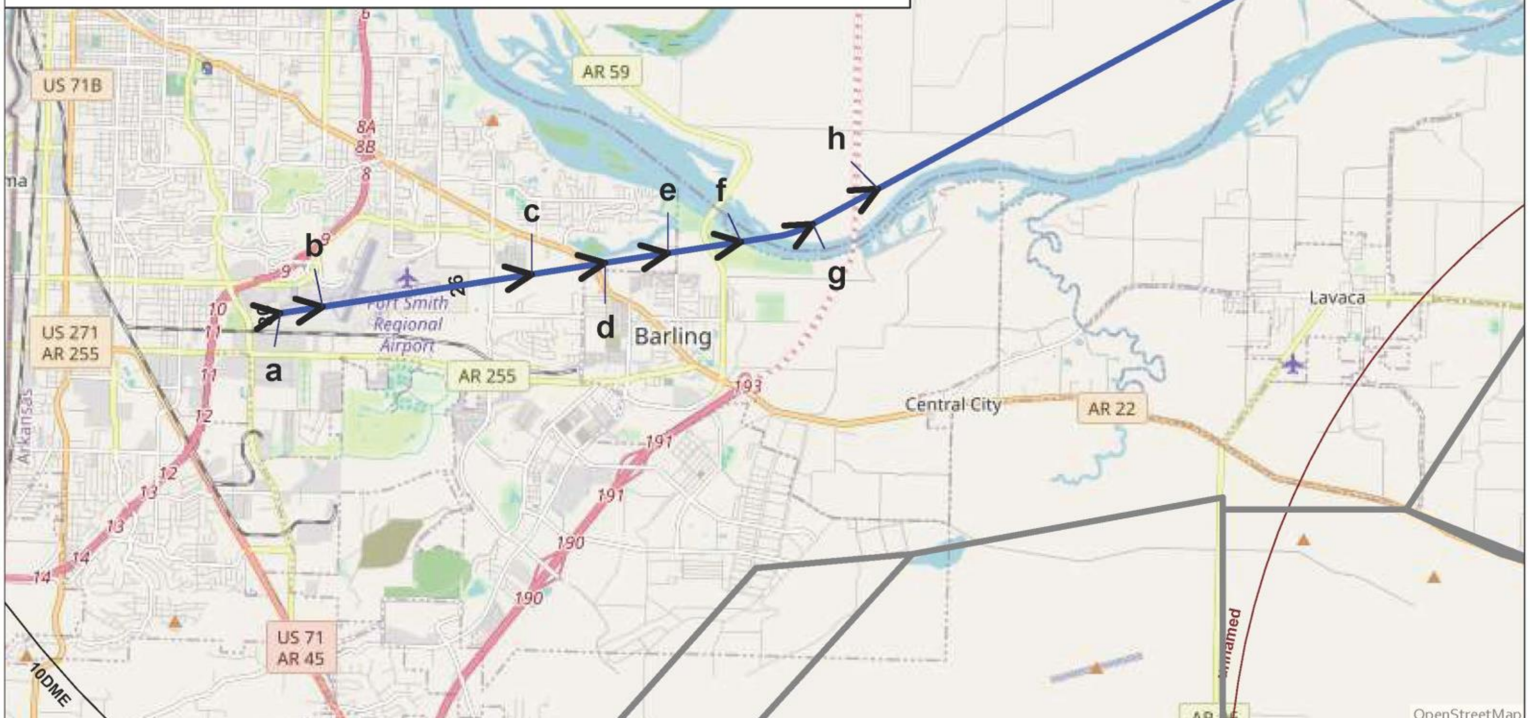
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:119,000 (1 inch = 9,940 feet)

198

Flight Profile F35ADC01

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	50 Variable	0	0.0	0	16	
b	0.40	0 AGL	150 Afterburner	183	6.7	3800	23	
c	2.40	1,420 AGL	150 Afterburner	450	14.6	11900	6	
d	3.10	3,000 MSL	150 Afterburner	450	39.5	37500	5	
e	3.70	6,000 MSL	150 Afterburner	450	35.2	32100	6	
f	4.40	9,000 MSL	150 Afterburner	450	35.2	32100	6	
g	5.10	12,000 MSL	80 Variable	450	30.4	23800	6	start to slow down to 350 kts
h	5.80	14,500 MSL	35 Variable	350	0.0	0	342	350 kts and level off
i	43.79	14,500 MSL	35 Variable	450				



Fort Smith F-35A Flight Profile F35ADC01
Combat Departure AB to 450 kts, AB Climb to altitude on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:122,000 (1 inch = 10,200 feet)

199

Flight Profile F35ADM03

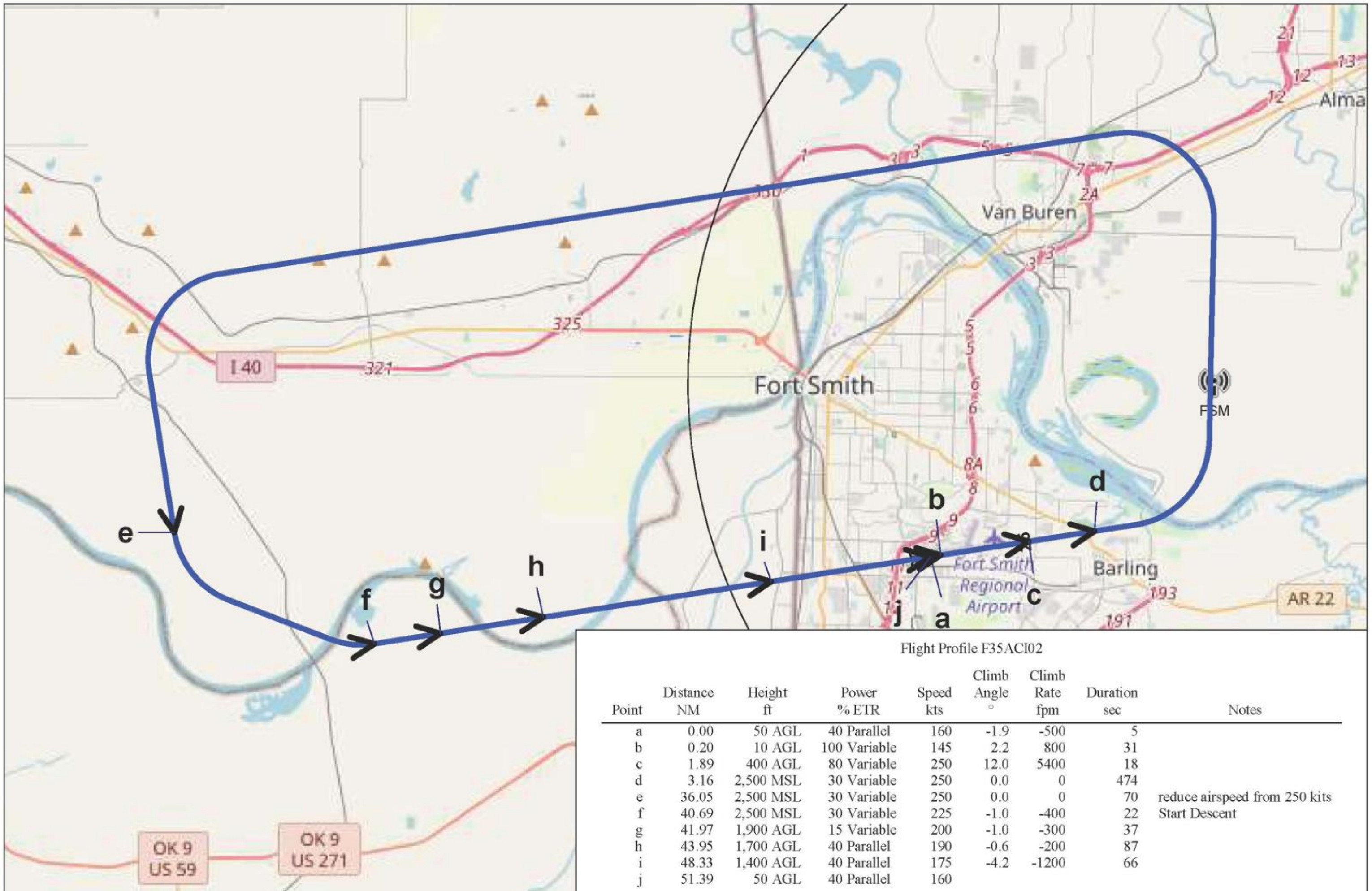
Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	50 Variable	0	0.0	0	24	
b	0.58	0 AGL	100 Variable	173	4.2	1400	8	
c	1.00	190 AGL	100 Variable	197	2.1	900	22	
d	2.50	1,000 MSL	100 Variable	300	6.1	3500	9	drop power to 85% ETR at 350 kts
e	3.30	1,520 MSL	100 Variable	350	19.7	12700	16	
f	4.90	5,000 MSL	100 Variable	350	16.0	10100	24	
g	7.20	9,000 MSL	100 Variable	350	13.9	8700	21	
h	9.20	12,000 MSL	100 Variable	350	14.4	9100	16	
i	10.80	14,500 MSL	35 Variable	350	0.0	0	421	level off
j	51.68	14,500 MSL	35 Variable	350				

Fort Smith F-35A Flight Profile F35ADM03
Mil power to 350 kts and Mil climb to altitude on Runway 08
F-135-PW-100 Engine

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000

Scale in Feet 1:130,000 (1 inch = 10,900 feet)

200



Flight Profile F35ACI02

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	40 Parallel	160	-1.9	-500	5	
b	0.20	10 AGL	100 Variable	145	2.2	800	31	
c	1.89	400 AGL	80 Variable	250	12.0	5400	18	
d	3.16	2,500 MSL	30 Variable	250	0.0	0	474	
e	36.05	2,500 MSL	30 Variable	250	0.0	0	70	reduce airspeed from 250 kits
f	40.69	2,500 MSL	30 Variable	225	-1.0	-400	22	Start Descent
g	41.97	1,900 AGL	15 Variable	200	-1.0	-300	37	
h	43.95	1,700 AGL	40 Parallel	190	-0.6	-200	87	
i	48.33	1,400 AGL	40 Parallel	175	-4.2	-1200	66	
j	51.39	50 AGL	40 Parallel	160				

Fort Smith F-35A Flight Profile F35ACI02
IFR ILS/LOC Pattern on Runway 08
F-135-PW-100 Engine

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

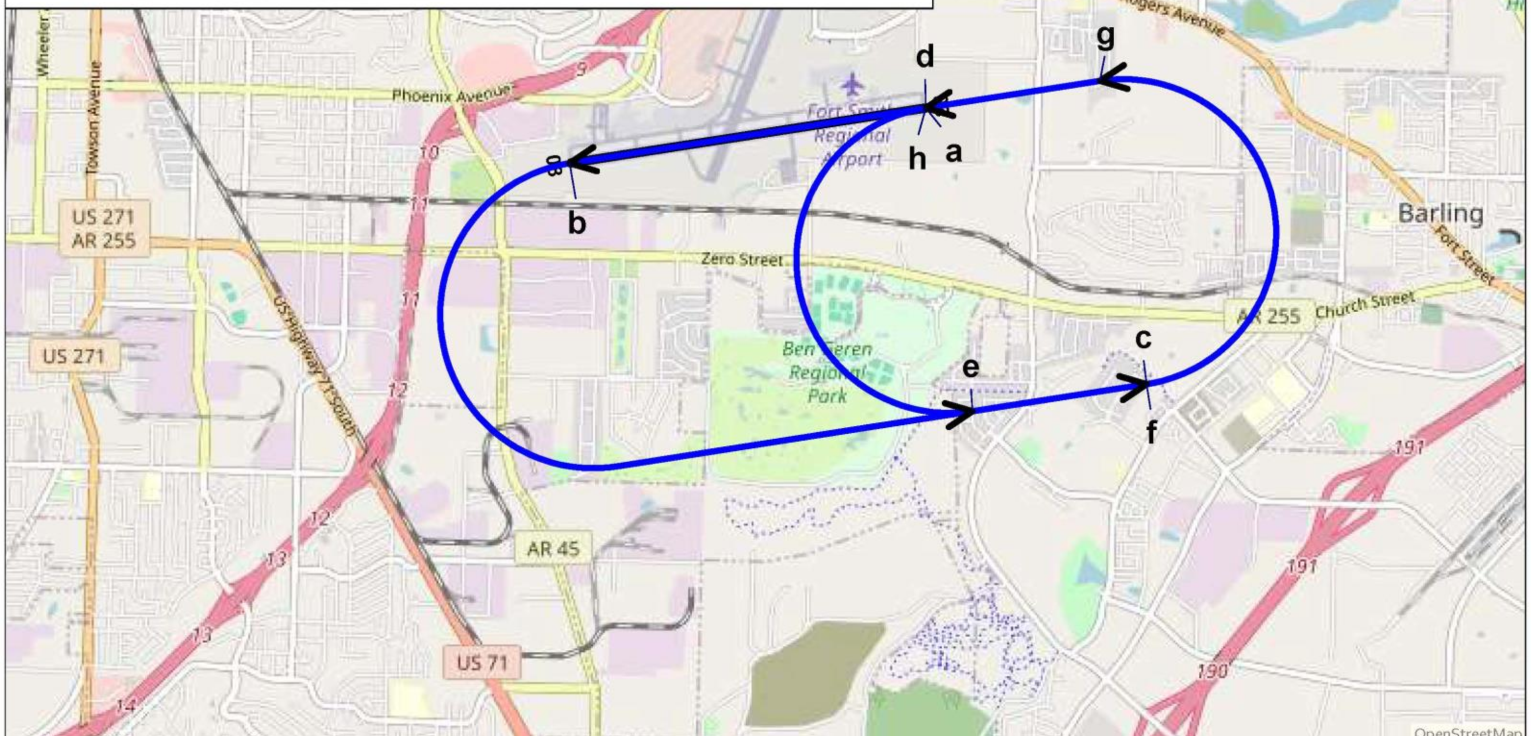
Scale in Feet 1:220,000 (1 inch = 18,400 feet)

N

201

Flight Profile F35ACSF1_mod

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	100 AGL	100 Variable	200	2.5	1100	22	
b	1.53	500 AGL	100 Variable	300	19.9	10100	57	climb to pattern altitude
c	5.86	10,000 AGL	35 Variable	250	0.0	0	40	reach pattern altitude; reduce thrust
d	8.65	10,000 AGL	15 Variable	250	-18.3	-7900	31	start descent
e	10.69	5,900 AGL	15 Parallel	220	-18.2	-7300	12	
f	11.44	4,400 AGL	15 Parallel	220	-14.9	-5900	33	
g	13.48	1,100 AGL	15 Parallel	220	-12.4	-4700	13	
h	14.23	100 AGL	15 Parallel	200				

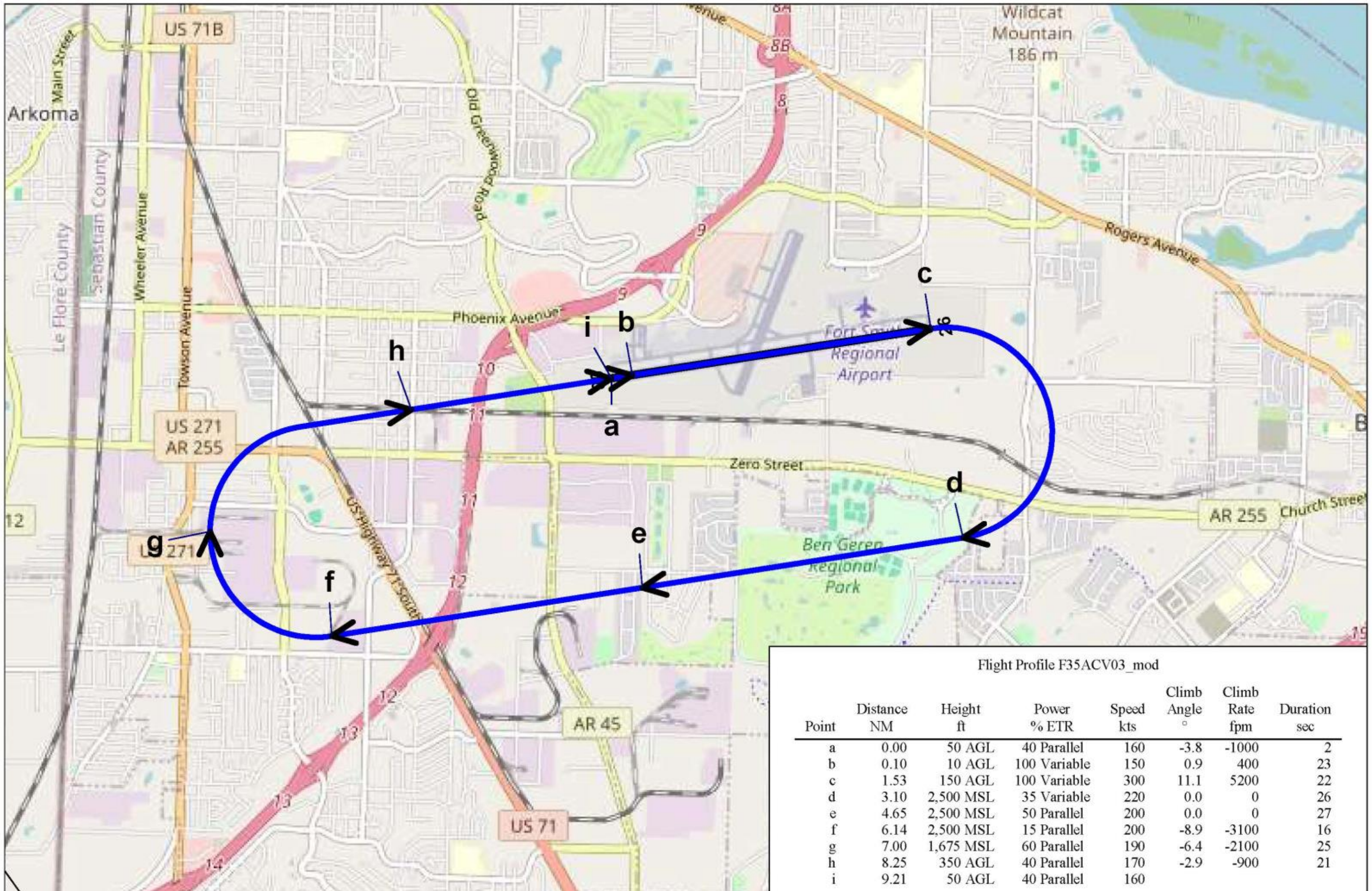


Fort Smith F-35A Flight Profile F35ACSF1_mod
Multiple SFO Pattern Modified on Runway 26
F-135-PW-100 Engine

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 = 4,590 feet)

202



Flight Profile F35ACV03_mod

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	50 AGL	40 Parallel	160	-3.8	-1000	2
b	0.10	10 AGL	100 Variable	150	0.9	400	23
c	1.53	150 AGL	100 Variable	300	11.1	5200	22
d	3.10	2,500 MSL	35 Variable	220	0.0	0	26
e	4.65	2,500 MSL	50 Parallel	200	0.0	0	27
f	6.14	2,500 MSL	15 Parallel	200	-8.9	-3100	16
g	7.00	1,675 MSL	60 Parallel	190	-6.4	-2100	25
h	8.25	350 AGL	40 Parallel	170	-2.9	-900	21
i	9.21	50 AGL	40 Parallel	160			

Fort Smith F-35A Flight Profile F35ACV03_mod

VFR Extended downwind Touch and Go Pattern on Runway 08

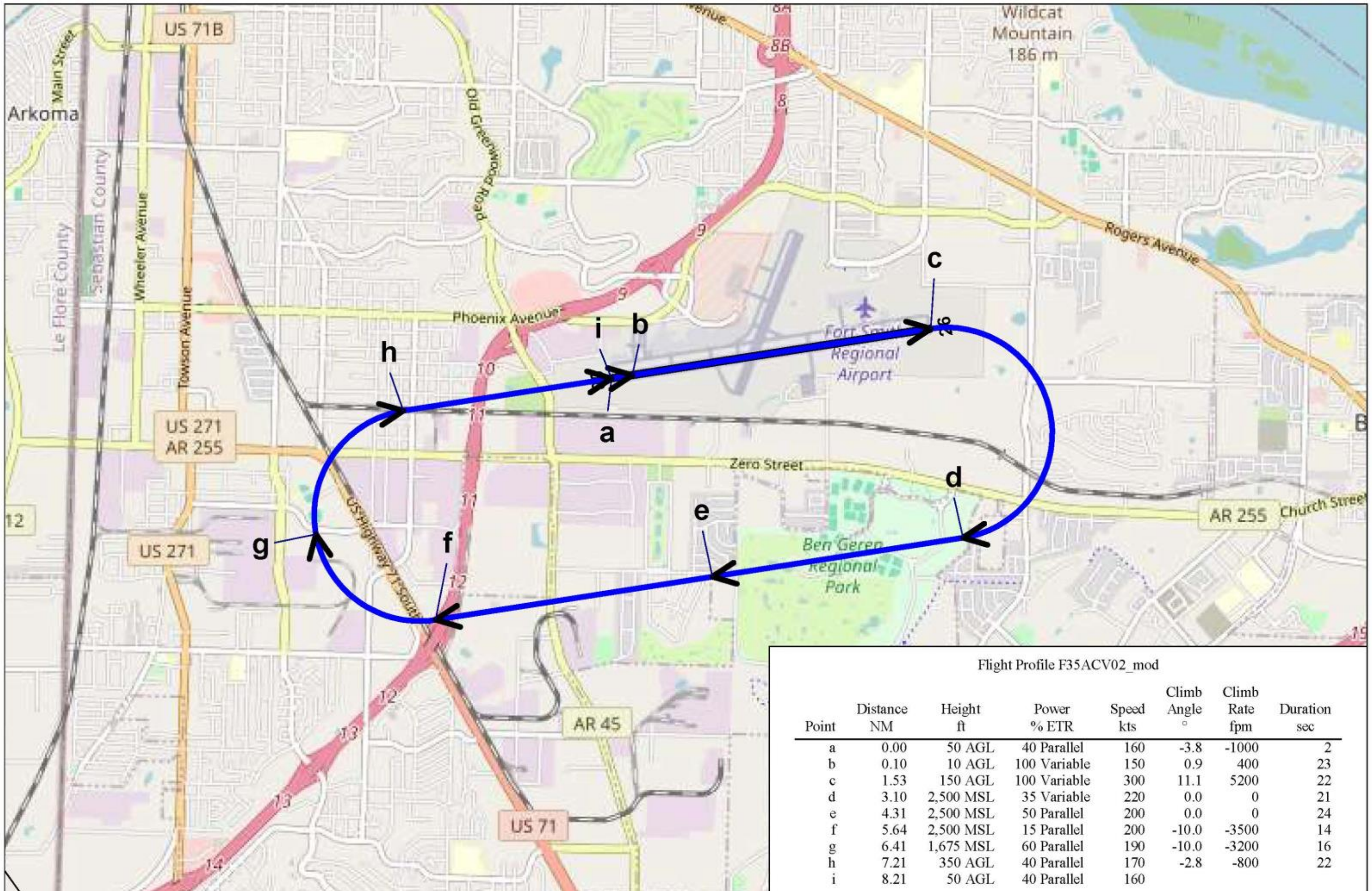
F-135-PW-100 Engine

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 = 4,590 feet)

N

203



Flight Profile F35ACV02_mod

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	50 AGL	40 Parallel	160	-3.8	-1000	2
b	0.10	10 AGL	100 Variable	150	0.9	400	23
c	1.53	150 AGL	100 Variable	300	11.1	5200	22
d	3.10	2,500 MSL	35 Variable	220	0.0	0	21
e	4.31	2,500 MSL	50 Parallel	200	0.0	0	24
f	5.64	2,500 MSL	15 Parallel	200	-10.0	-3500	14
g	6.41	1,675 MSL	60 Parallel	190	-10.0	-3200	16
h	7.21	350 AGL	40 Parallel	170	-2.8	-800	22
i	8.21	50 AGL	40 Parallel	160			

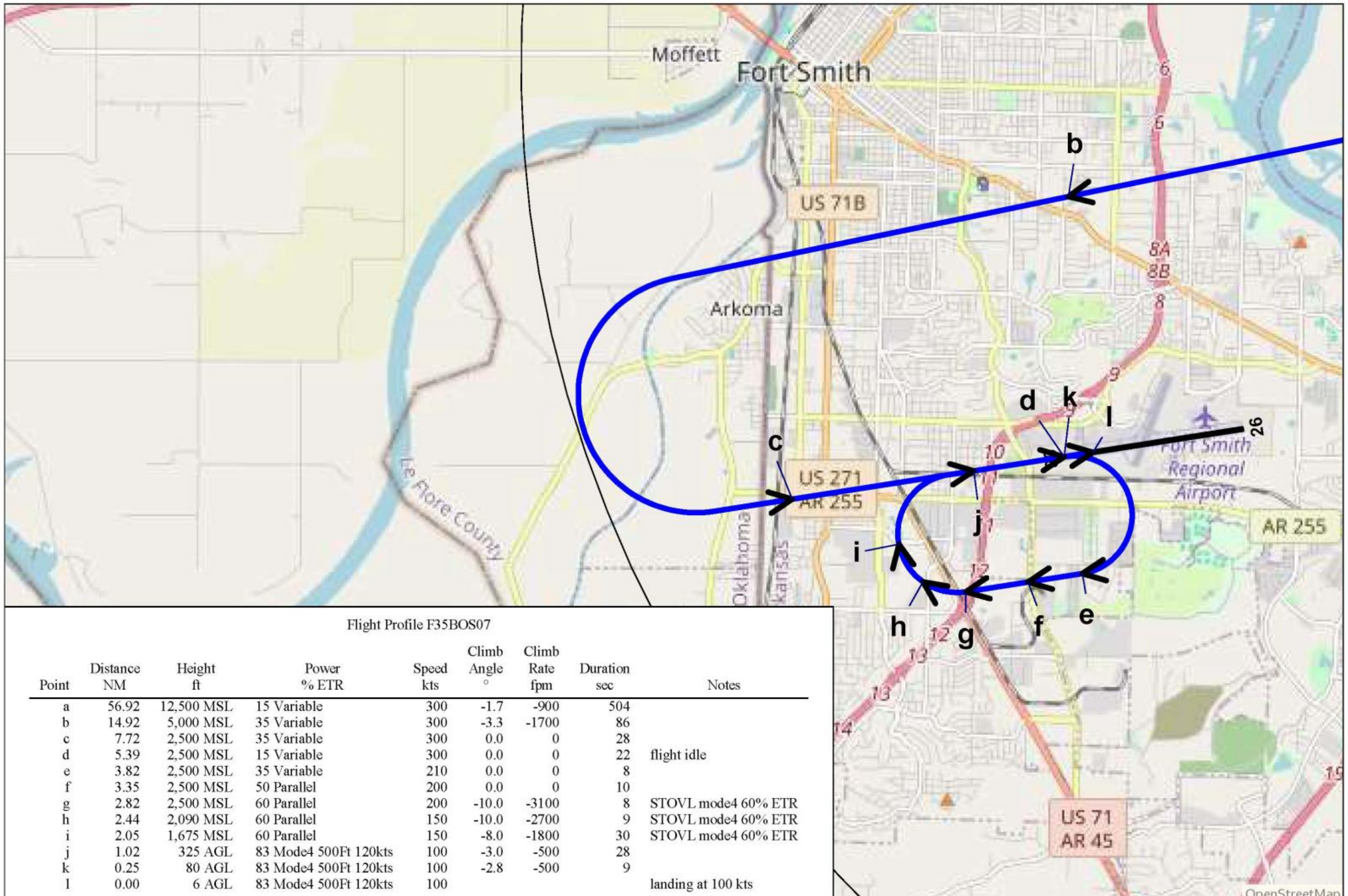
Fort Smith F-35A Flight Profile F35ACV02_mod
VFR Touch and Go Pattern on Runway 08
F-135-PW-100 Engine

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 = 4,590 feet)

N

204



Flight Profile F35BOS07

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	56.92	12,500 MSL	15 Variable	300	-1.7	-900	504	
b	14.92	5,000 MSL	35 Variable	300	-3.3	-1700	86	
c	7.72	2,500 MSL	35 Variable	300	0.0	0	28	
d	5.39	2,500 MSL	15 Variable	300	0.0	0	22	flight idle
e	3.82	2,500 MSL	35 Variable	210	0.0	0	8	
f	3.35	2,500 MSL	50 Parallel	200	0.0	0	10	
g	2.82	2,500 MSL	60 Parallel	200	-10.0	-3100	8	STOVL mode4 60% ETR
h	2.44	2,090 MSL	60 Parallel	150	-10.0	-2700	9	STOVL mode4 60% ETR
i	2.05	1,675 MSL	60 Parallel	150	-8.0	-1800	30	STOVL mode4 60% ETR
j	1.02	325 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	28	
k	0.25	80 AGL	83 Mode4 500Ft 120kts	100	-2.8	-500	9	
l	0.00	6 AGL	83 Mode4 500Ft 120kts	100				landing at 100 kts

Ebbing ANGB F-35B Flight Profile F35BOS07

Overhead Break Arrival to Slow Landing

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

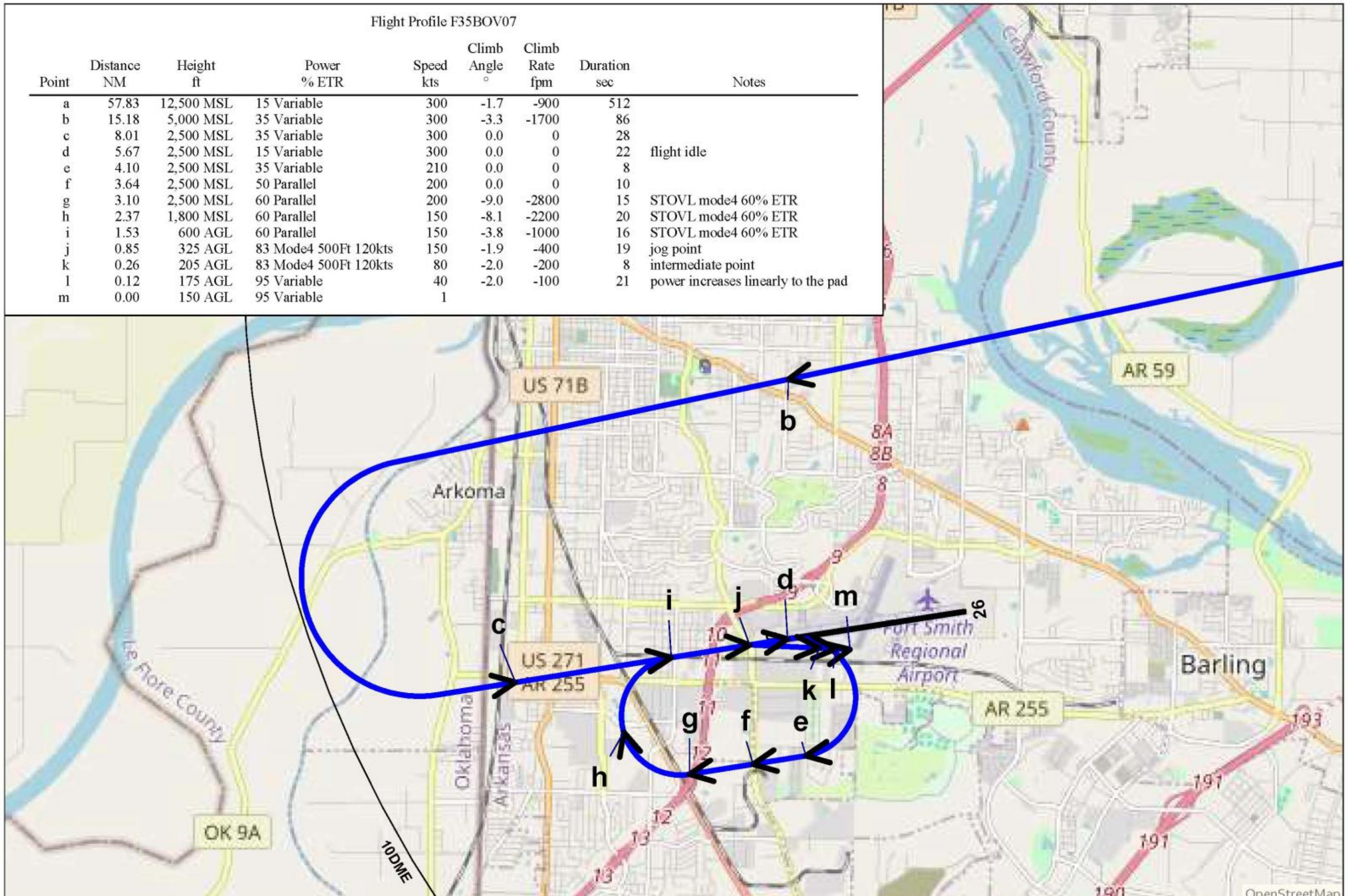
Scale in Feet 1:96,700 (1 inch = 8,060 feet)

N

205

Flight Profile F35BOV07

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.83	12,500 MSL	15 Variable	300	-1.7	-900	512	
b	15.18	5,000 MSL	35 Variable	300	-3.3	-1700	86	
c	8.01	2,500 MSL	35 Variable	300	0.0	0	28	
d	5.67	2,500 MSL	15 Variable	300	0.0	0	22	flight idle
e	4.10	2,500 MSL	35 Variable	210	0.0	0	8	
f	3.64	2,500 MSL	50 Parallel	200	0.0	0	10	
g	3.10	2,500 MSL	60 Parallel	200	-9.0	-2800	15	STOVL mode4 60% ETR
h	2.37	1,800 MSL	60 Parallel	150	-8.1	-2200	20	STOVL mode4 60% ETR
i	1.53	600 AGL	60 Parallel	150	-3.8	-1000	16	STOVL mode4 60% ETR
j	0.85	325 AGL	83 Mode4 500Ft 120kts	150	-1.9	-400	19	jog point
k	0.26	205 AGL	83 Mode4 500Ft 120kts	80	-2.0	-200	8	intermediate point
l	0.12	175 AGL	95 Variable	40	-2.0	-100	21	power increases linearly to the pad
m	0.00	150 AGL	95 Variable	1				



Ebbing ANGB F-35B Flight Profile F35BOV07

Overhead Break Arrival to Vertical Landing on Pad #1

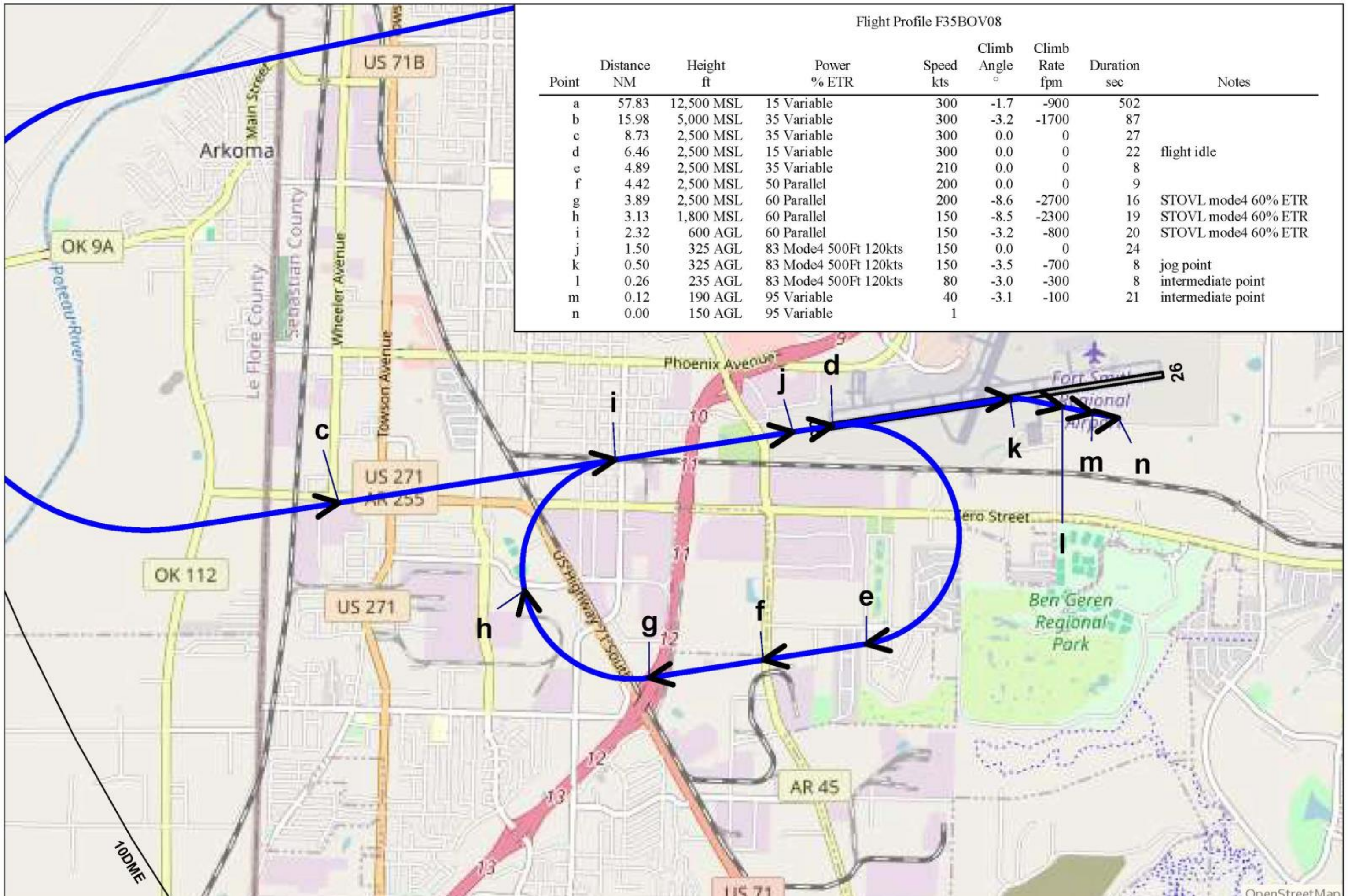
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:96,700 (1 inch = 8,060 feet)

206

Flight Profile F35BOV08

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	57.83	12,500 MSL	15 Variable	300	-1.7	-900	502	
b	15.98	5,000 MSL	35 Variable	300	-3.2	-1700	87	
c	8.73	2,500 MSL	35 Variable	300	0.0	0	27	
d	6.46	2,500 MSL	15 Variable	300	0.0	0	22	flight idle
e	4.89	2,500 MSL	35 Variable	210	0.0	0	8	
f	4.42	2,500 MSL	50 Parallel	200	0.0	0	9	
g	3.89	2,500 MSL	60 Parallel	200	-8.6	-2700	16	STOVL mode4 60% ETR
h	3.13	1,800 MSL	60 Parallel	150	-8.5	-2300	19	STOVL mode4 60% ETR
i	2.32	600 AGL	60 Parallel	150	-3.2	-800	20	STOVL mode4 60% ETR
j	1.50	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	24	
k	0.50	325 AGL	83 Mode4 500Ft 120kts	150	-3.5	-700	8	jog point
l	0.26	235 AGL	83 Mode4 500Ft 120kts	80	-3.0	-300	8	intermediate point
m	0.12	190 AGL	95 Variable	40	-3.1	-100	21	intermediate point
n	0.00	150 AGL	95 Variable	1				

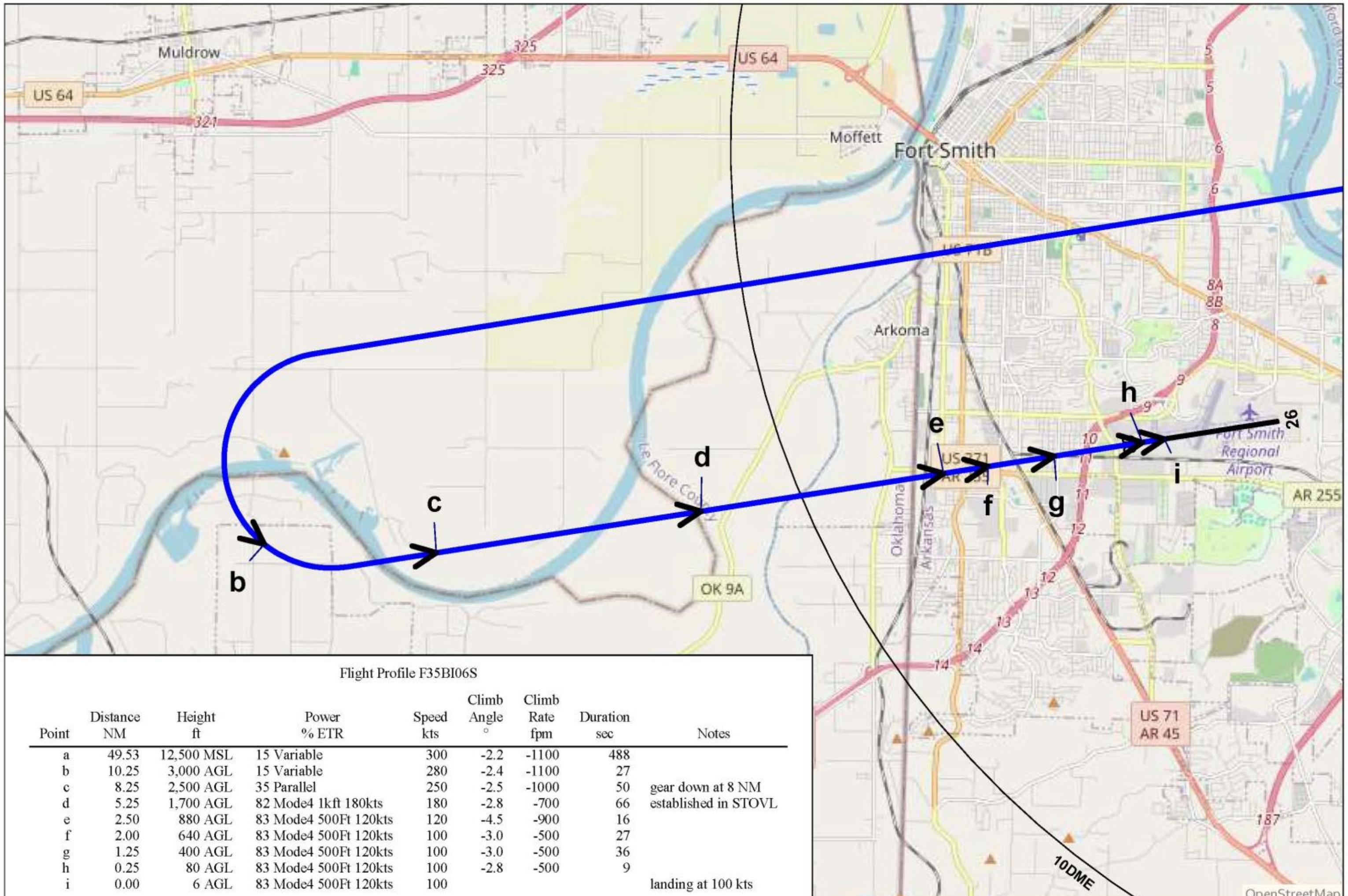


Ebbing ANGB F-35B Flight Profile F35BOV08
Overhead Break Arrival to Vertical Landing on Pad #2

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:51,800 (1 inch = 4,320 feet)

207



Flight Profile F35BI06S

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	49.53	12,500 MSL	15 Variable	300	-2.2	-1100	488	
b	10.25	3,000 AGL	15 Variable	280	-2.4	-1100	27	
c	8.25	2,500 AGL	35 Parallel	250	-2.5	-1000	50	gear down at 8 NM
d	5.25	1,700 AGL	82 Mode4 1kft 180kts	180	-2.8	-700	66	established in STOVL
e	2.50	880 AGL	83 Mode4 500Ft 120kts	120	-4.5	-900	16	
f	2.00	640 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	27	
g	1.25	400 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	36	
h	0.25	80 AGL	83 Mode4 500Ft 120kts	100	-2.8	-500	9	
i	0.00	6 AGL	83 Mode4 500Ft 120kts	100				landing at 100 kts

Ebbing ANGB F-35B Flight Profile F35BI06S
Straight-in IFR to Mode4 Slow Landing

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000

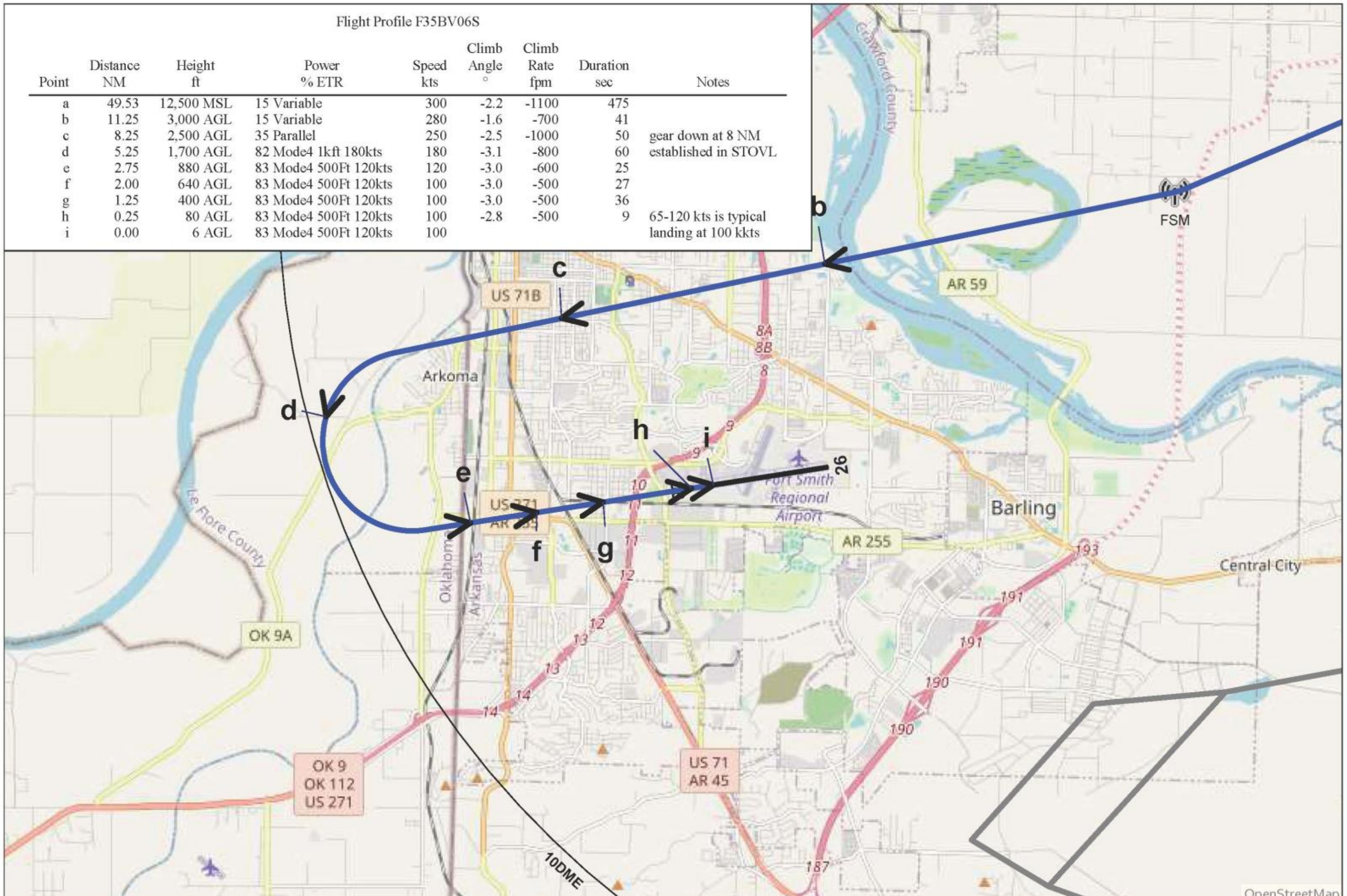
Scale in Feet 1:127,000 (1 inch = 10,600 feet)

N

208

Flight Profile F35BV06S

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	49.53	12,500 MSL	15 Variable	300	-2.2	-1100	475	
b	11.25	3,000 AGL	15 Variable	280	-1.6	-700	41	
c	8.25	2,500 AGL	35 Parallel	250	-2.5	-1000	50	gear down at 8 NM
d	5.25	1,700 AGL	82 Mode4 1kft 180kts	180	-3.1	-800	60	established in STOVL
e	2.75	880 AGL	83 Mode4 500Ft 120kts	120	-3.0	-600	25	
f	2.00	640 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	27	
g	1.25	400 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	36	
h	0.25	80 AGL	83 Mode4 500Ft 120kts	100	-2.8	-500	9	65-120 kts is typical
i	0.00	6 AGL	83 Mode4 500Ft 120kts	100				landing at 100 kkts



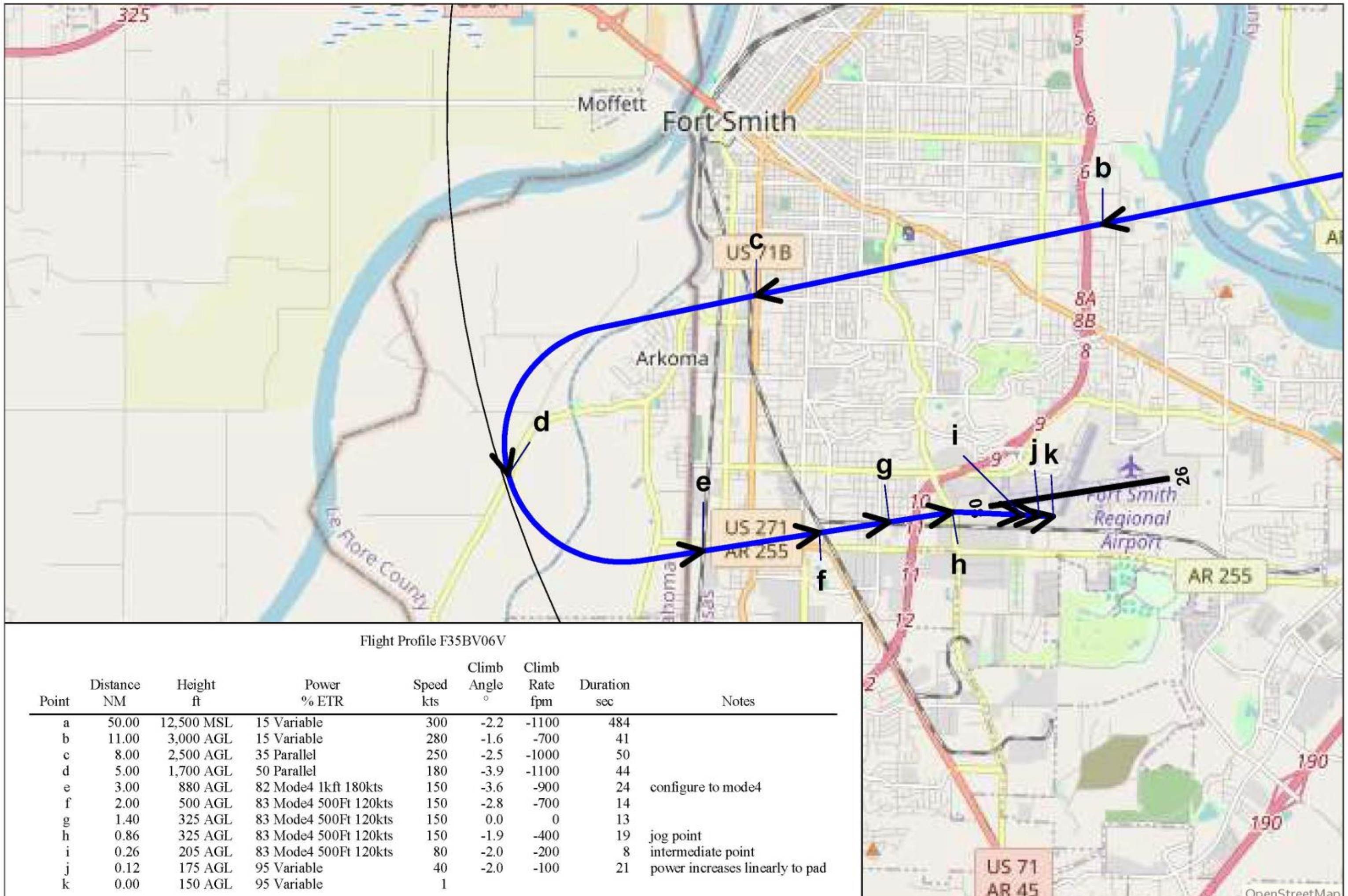
Ebbing ANGB F-35B Flight Profile F35BV06S
Straight-in VFR to Mode4 Slow Landing

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000

Scale in Feet 1:127,000 (1 inch = 10,600 feet)

N

209



Flight Profile F35BV06V

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	50.00	12,500 MSL	15 Variable	300	-2.2	-1100	484	
b	11.00	3,000 AGL	15 Variable	280	-1.6	-700	41	
c	8.00	2,500 AGL	35 Parallel	250	-2.5	-1000	50	
d	5.00	1,700 AGL	50 Parallel	180	-3.9	-1100	44	
e	3.00	880 AGL	82 Mode4 1kft 180kts	150	-3.6	-900	24	configure to mode4
f	2.00	500 AGL	83 Mode4 500Ft 120kts	150	-2.8	-700	14	
g	1.40	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	13	
h	0.86	325 AGL	83 Mode4 500Ft 120kts	150	-1.9	-400	19	jog point
i	0.26	205 AGL	83 Mode4 500Ft 120kts	80	-2.0	-200	8	intermediate point
j	0.12	175 AGL	95 Variable	40	-2.0	-100	21	power increases linearly to pad
k	0.00	150 AGL	95 Variable	1				

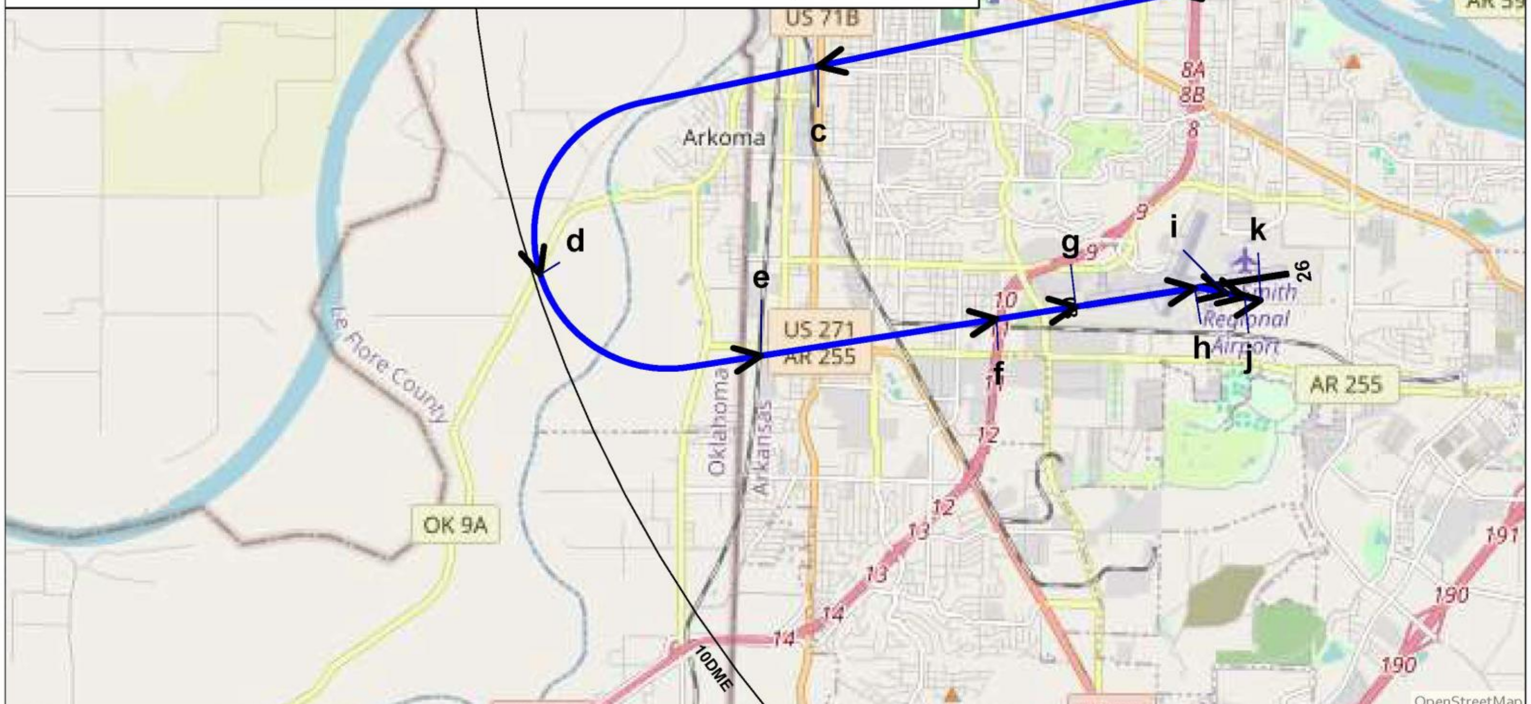
Ebbing ANGB F-35B Flight Profile F35BV06V
VFR Straight-in Arrival to Vertical Landing on Pad #1

Scale in Feet 1:96,700 (1 inch = 8,060 feet)

210

Flight Profile F35BV07V

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	50.00	12,500 MSL	15 Variable	300	-2.2	-1100	478	
b	11.49	3,000 AGL	15 Variable	280	-1.7	-800	37	
c	8.77	2,500 AGL	35 Parallel	250	-2.5	-900	51	
d	5.75	1,700 AGL	50 Parallel	180	-3.9	-1100	43	
e	3.78	880 AGL	82 Mode4 1kft 180kts	150	-2.0	-500	43	configure to mode4
f	2.00	500 AGL	83 Mode4 500Ft 120kts	150	-2.8	-700	14	
g	1.40	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	22	
h	0.50	325 AGL	83 Mode4 500Ft 120kts	150	-3.5	-700	8	jog point
i	0.26	235 AGL	83 Mode4 500Ft 120kts	80	-3.0	-300	8	intermediate point
j	0.12	190 AGL	95 Variable	40	-3.1	-100	21	power increases linearly to pad
k	0.00	150 AGL	95 Variable	1				over the pad



Ebbing ANGB F-35B Flight Profile F35BV07V
VFR Straight-in Arrival to Vertical Landing on Pad #2

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

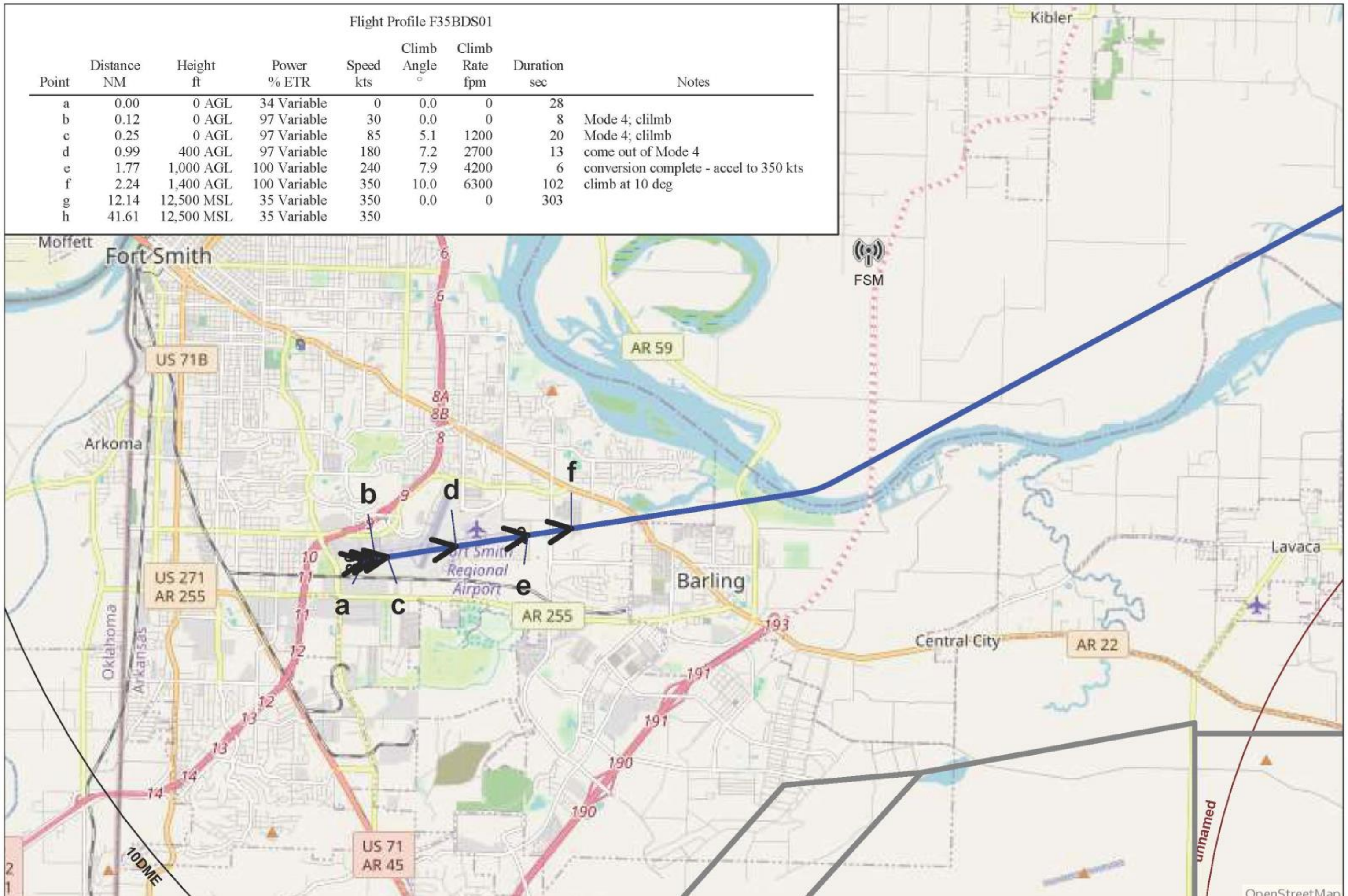
Scale in Feet 1:96,700 (1 inch = 8,060 feet)

N

211

Flight Profile F35BDS01

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	34 Variable	0	0.0	0	28	
b	0.12	0 AGL	97 Variable	30	0.0	0	8	Mode 4; clilmb
c	0.25	0 AGL	97 Variable	85	5.1	1200	20	Mode 4; clilmb
d	0.99	400 AGL	97 Variable	180	7.2	2700	13	come out of Mode 4
e	1.77	1,000 AGL	100 Variable	240	7.9	4200	6	conversion complete - accel to 350 kts
f	2.24	1,400 AGL	100 Variable	350	10.0	6300	102	climb at 10 deg
g	12.14	12,500 MSL	35 Variable	350	0.0	0	303	
h	41.61	12,500 MSL	35 Variable	350				



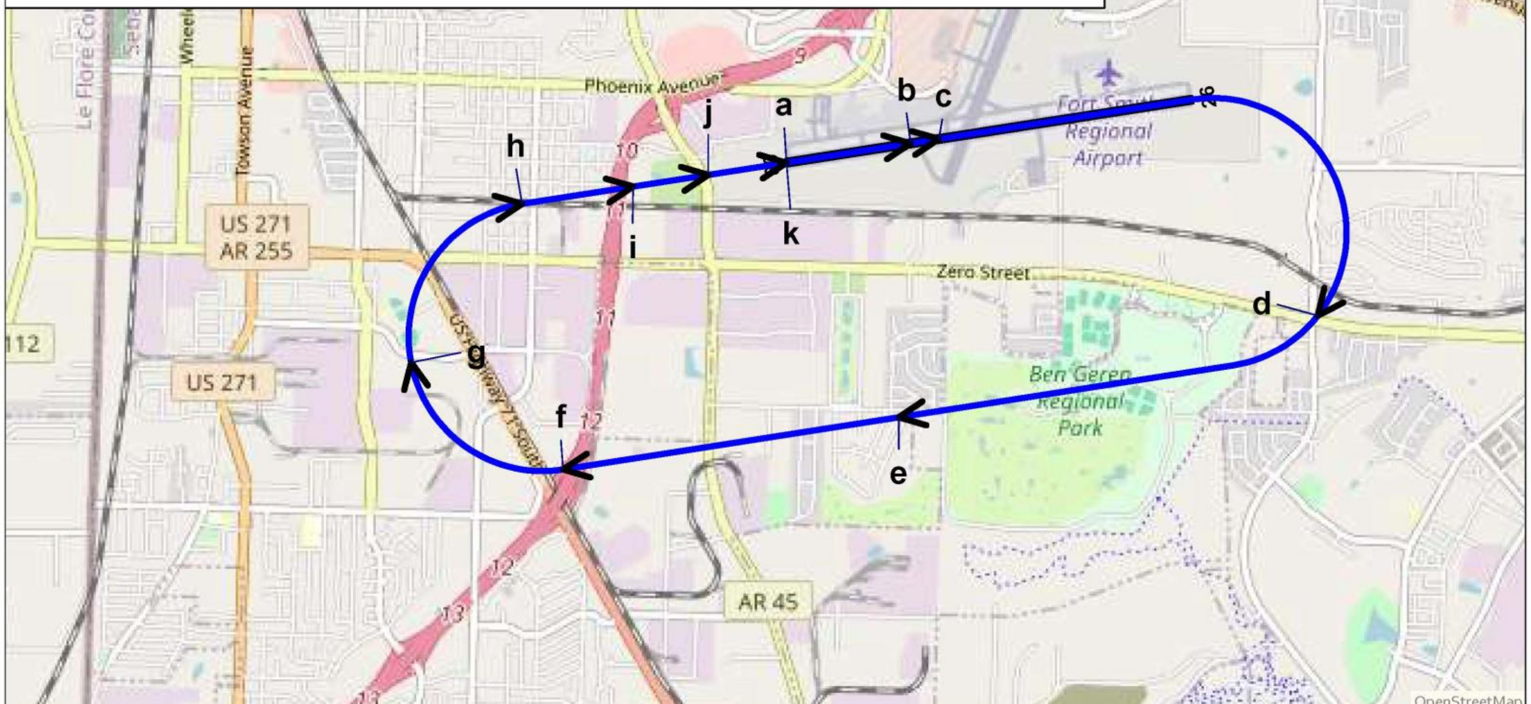
Ebbing ANGB F-35B Flight Profile F35BDS01
Short Takeoff Departure

Scale in Feet 1:122,000 (1 inch = 10,200 feet)

212

Flight Profile VX35BCR1

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	200 AGL	83 Mode4 500Ft 120kts	80	-4.0	-600	21	
b	0.47	0 AGL	97 Mil	80	0.0	0	5	Stay in STOVL Mode throughout pattern
c	0.58	0 AGL	97 Mil	90	8.8	2300	53	
d	2.73	2,500 MSL	60 Parallel	200	0.0	0	30	mode 4
e	4.37	2,500 MSL	60 Parallel	200	0.0	0	23	mid downwind; mode 4
f	5.64	2,500 MSL	60 Parallel	200	-8.5	-2700	16	end downwind; begin descent; mode 4 at 60% ETR
g	6.40	1,800 MSL	60 Parallel	150	-8.5	-2300	19	mid turn; mode 4 60% ETR
h	7.21	600 AGL	60 Parallel	150	-6.1	-1600	10	final; mode 4 60% ETR
i	7.63	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	7	level at 325 ft AGL
j	7.91	325 AGL	83 Mode4 500Ft 120kts	150	-4.0	-800	9	4 deg intercept
k	8.21	200 AGL	83 Mode4 500Ft 120kts	80				



Ebbing ANGB F-35B Flight Profile VX35BCR1
Touch and Go Pattern to Rolling Vertical Landing

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,300 (1 inch = 4,030 feet)

213

Flight Profile F35BCS20

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	34 Variable	0	0.0	0	28	Stay in STOVL mode throughout pattern
b	0.12	0 AGL	97 Variable	30	0.0	0	8	
c	0.25	0 AGL	97 Variable	85	5.1	1200	20	
d	0.99	400 AGL	97 Variable	180	8.0	2700	36	
e	2.90	2,500 MSL	60 Parallel	200	0.0	0	25	mode 4 60% ETR
f	4.28	2,500 MSL	60 Parallel	200	0.0	0	24	mode 4 60% ETR
g	5.64	2,500 MSL	60 Parallel	200	-10.0	-3200	8	end downwind; begin descent; mode 4 60% ETR
h	6.02	2,090 MSL	60 Parallel	160	-9.9	-2500	10	mode 4 60% ETR
i	6.41	1,675 MSL	60 Parallel	120	-9.4	-1800	26	midturn; mode 4 60% ETR
j	7.21	400 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	36	final; mode 4
k	8.21	80 AGL	83 Mode4 500Ft 120kts	100	-2.8	-500	9	runway threshold
l	8.45	6 AGL	83 Mode4 500Ft 120kts	100				touchdown on the runway

Ebbing ANGB F-35B Flight Profile F35BCS20
Short Takeoff Pattern to Slow Landing

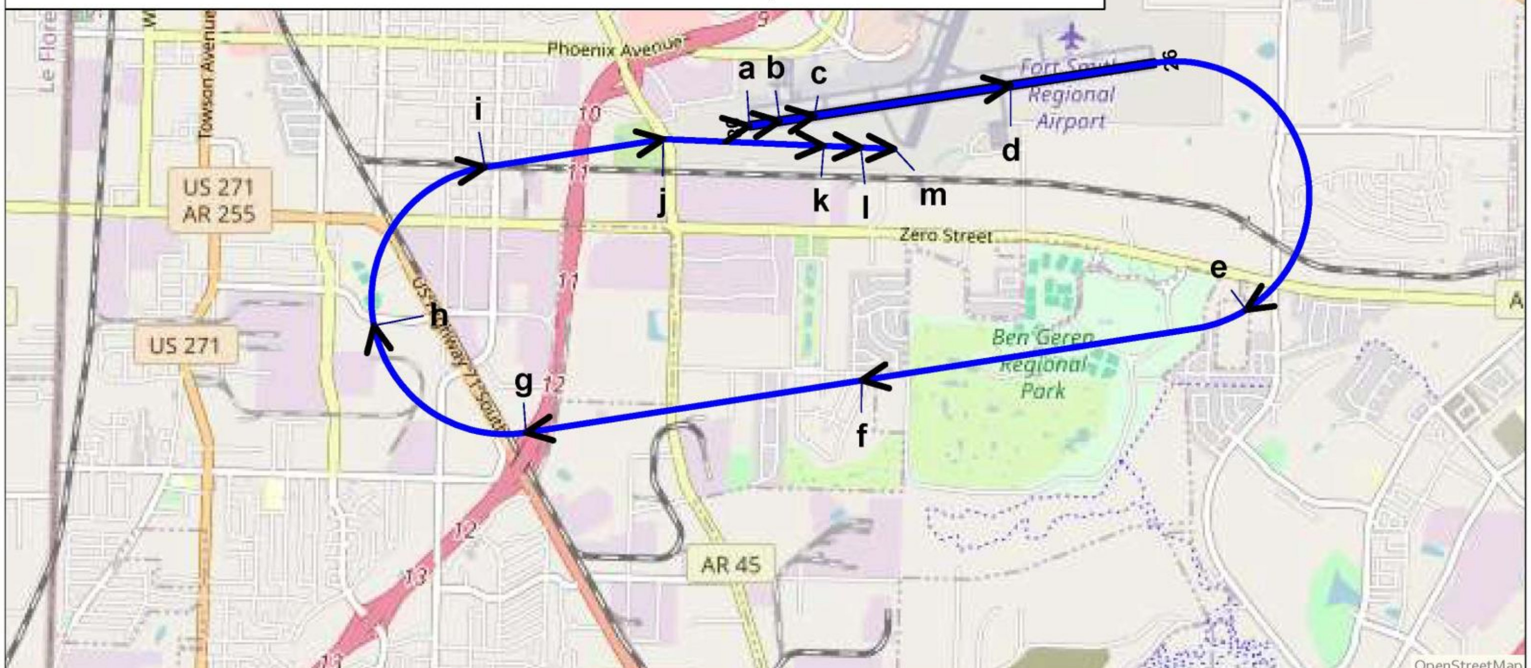
0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:40,300 (1 inch = 3,360 feet)

214

Flight Profile VX35BSV1

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	34 Variable	0	0.0	0	28	Stay in STOVL mode throughout pattern
b	0.12	0 AGL	97 Mil	30	0.0	0	8	
c	0.25	0 AGL	97 Mil	85	5.1	1200	20	
d	0.99	400 AGL	97 Mil	180	8.0	2700	36	
e	2.90	2,500 MSL	60 Parallel	200	0.0	0	26	mode 4
f	4.37	2,500 MSL	60 Parallel	200	0.0	0	23	mid downwind; mode 4
g	5.64	2,500 MSL	60 Parallel	200	-8.5	-2700	16	end downwind; begin descent; mode 4 at 60% ETR
h	6.40	1,800 MSL	60 Parallel	150	-8.5	-2300	19	mid turn; mode 4 60% ETR
i	7.21	600 AGL	60 Parallel	150	-3.8	-1000	16	final; mode 4 60% ETR
j	7.88	325 AGL	83 Mode4 500Ft 120kts	150	-1.9	-400	19	jog point
k	8.48	205 AGL	83 Mode4 500Ft 120kts	80	-2.0	-200	8	intermediate point
l	8.62	175 AGL	95 Variable	40	-1.9	-100	22	power increases linearly to pad
m	8.75	150 AGL	95 Variable	1				reach pad



Ebbing ANGB F-35B Flight Profile VX35BSV1
Short Takeoff Pattern to Vertical Landing on Pad #1

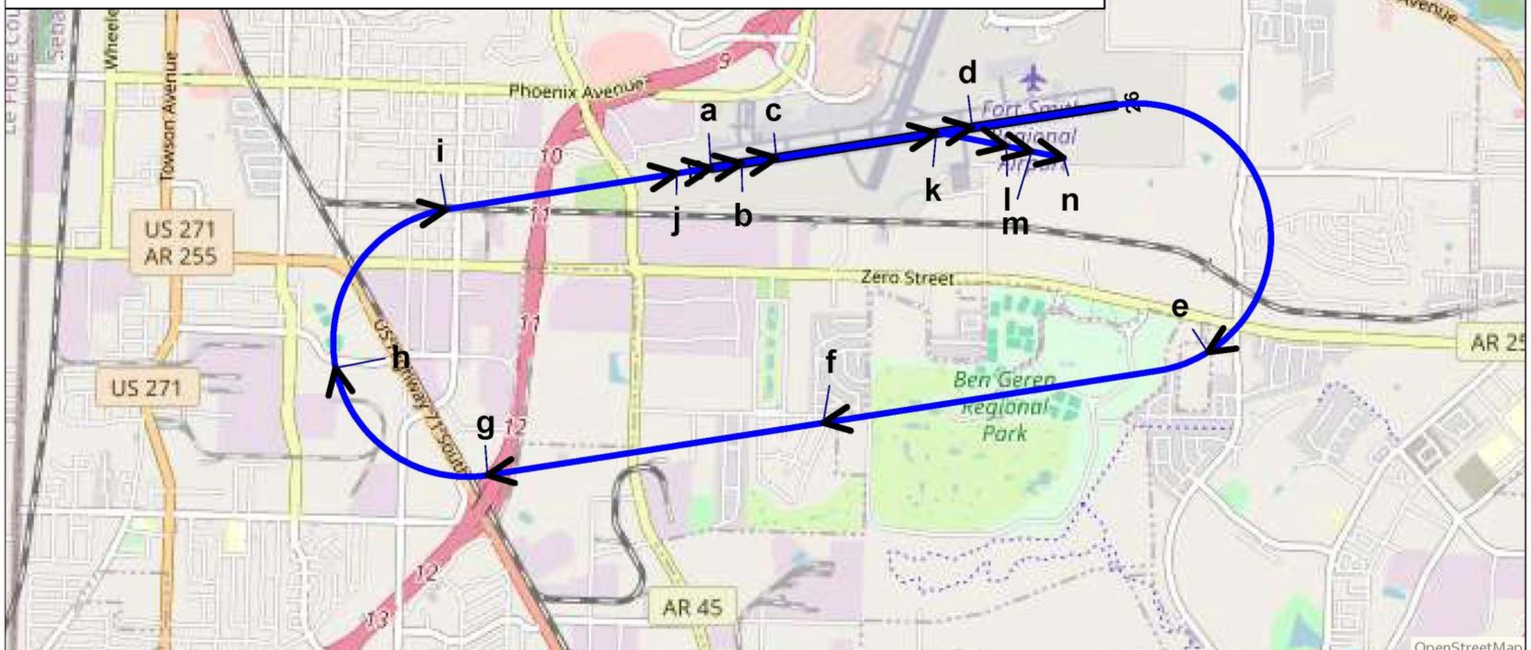
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,300 (1 inch = 4,030 feet)

215

Flight Profile VX35BSV2

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	34 Variable	0	0.0	0	28	Stay in STOVL mode throughout pattern
b	0.12	0 AGL	97 Mil	30	0.0	0	8	
c	0.25	0 AGL	97 Mil	85	5.1	1200	20	
d	0.99	400 AGL	97 Mil	180	8.0	2700	36	
e	2.90	2,500 MSL	60 Parallel	200	0.0	0	26	mode 4
f	4.37	2,500 MSL	60 Parallel	200	0.0	0	23	mid downwind; mode 4
g	5.64	2,500 MSL	60 Parallel	200	-8.5	-2700	16	end downwind; begin descent; mode 4 at 60% ETR
h	6.40	1,800 MSL	60 Parallel	150	-8.5	-2300	19	mid turn; mode 4 60% ETR
i	7.21	600 AGL	60 Parallel	150	-3.0	-800	21	final; mode 4 60% ETR
j	8.08	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	24	level at 325 ft AGL
k	9.06	325 AGL	83 Mode4 500Ft 120kts	150	-3.5	-700	8	jog point
l	9.33	225 AGL	83 Mode4 500Ft 120kts	80	-3.4	-400	6	intermediate point
m	9.42	190 AGL	95 Variable	40	-3.1	-100	21	power increases linearly to pad
n	9.54	150 AGL	95 Variable	1				reach pad



Ebbing ANGB F-35B Flight Profile VX35BSV2
Short Takeoff Pattern to Vertical Landing on Pad #2

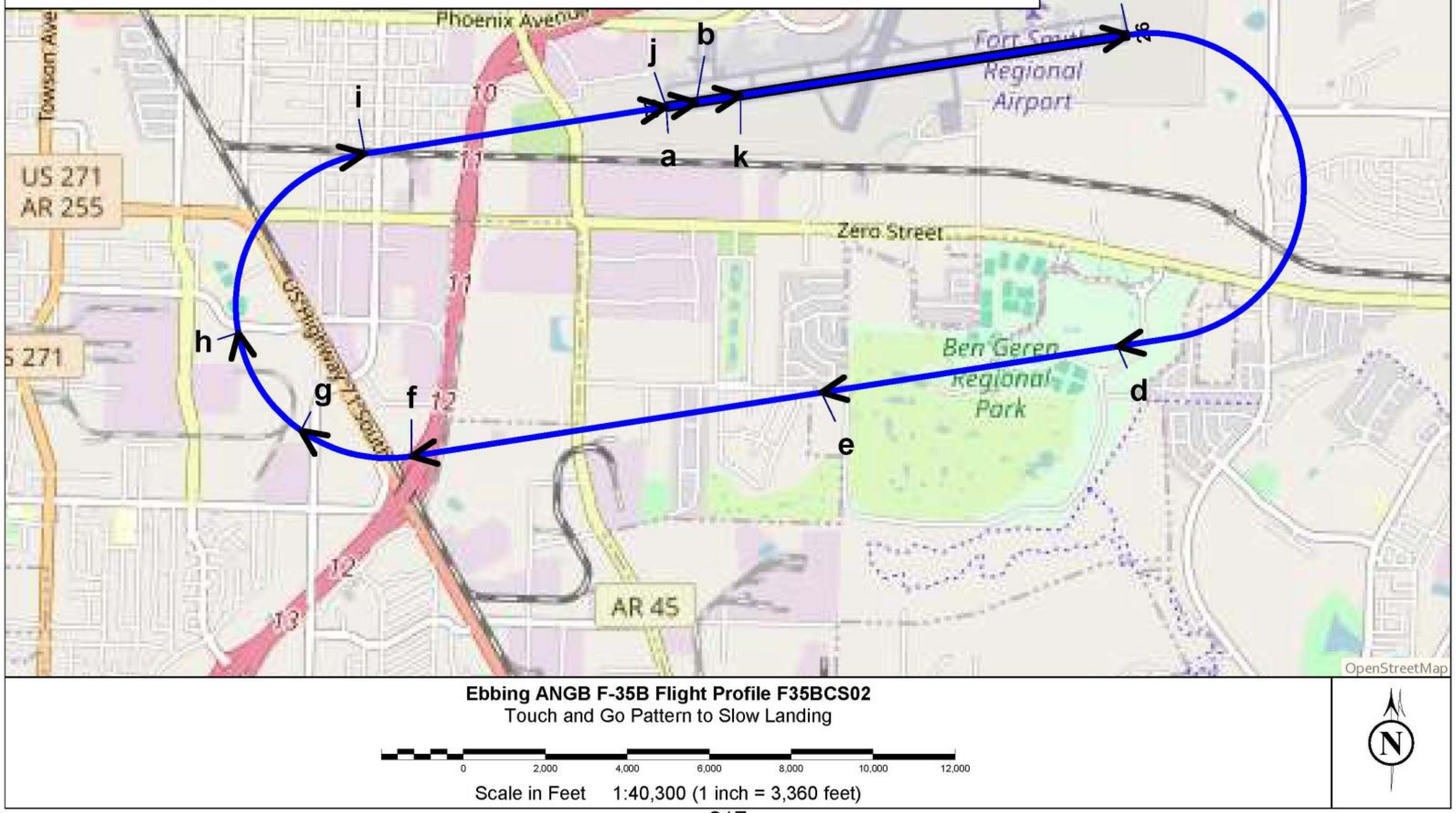
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,300 (1 inch = 4,030 feet)

216

Flight Profile F35BCS02

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	40 Parallel	160	-3.8	-1000	2	CTOL mode in beginning
b	0.10	10 AGL	100 Variable	150	0.9	300	24	
c	1.53	150 AGL	100 Variable	275	10.0	4200	27	
d	3.29	2,500 MSL	35 Variable	200	0.0	0	18	
e	4.28	2,500 MSL	60 Parallel	200	0.0	0	24	mode 4 60% ETR
f	5.64	2,500 MSL	60 Parallel	200	-10.0	-3200	8	end downwind; begin descent; mode 4 60% ETR
g	6.02	2,090 MSL	60 Parallel	160	-9.9	-2500	10	mode 4 60% ETR
h	6.41	1,675 MSL	60 Parallel	120	-9.4	-1800	26	midturn; mode 4 60% ETR
i	7.21	400 AGL	83 Mode4 500Ft 120kts	100	-3.0	-500	36	final; mode 4
j	8.21	80 AGL	83 Mode4 500Ft 120kts	100	-2.8	-500	9	runway threshold
k	8.45	6 AGL	83 Mode4 500Ft 120kts	100				touchdown on the runway



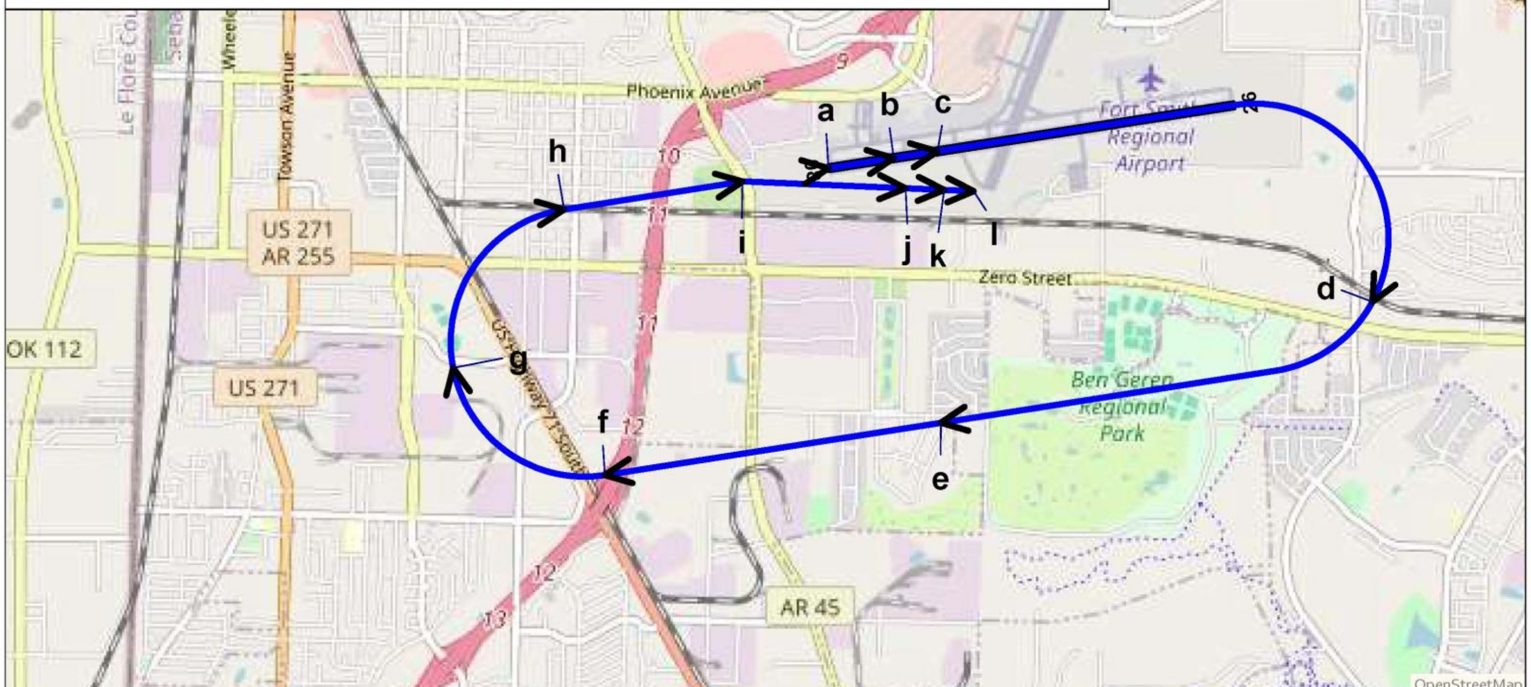
Ebbing ANGB F-35B Flight Profile F35BCS02
Touch and Go Pattern to Slow Landing

Scale in Feet 1:40,300 (1 inch = 3,360 feet)

217

Flight Profile VX35BCV1

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	35 Parallel	160	-1.9	-500	6	Start CTOL
b	0.25	0 AGL	100 Mil	150	0.0	0	4	
c	0.41	0 AGL	100 Mil	160	8.5	2700	45	
d	2.64	2,500 MSL	40 Parallel	200	0.0	0	31	
e	4.37	2,500 MSL	60 Parallel	200	0.0	0	23	mid downwind; convert to mode 4
f	5.64	2,500 MSL	60 Parallel	200	-8.5	-2700	16	end downwind; begin descent; mode 4 at 60% ETR
g	6.40	1,800 MSL	60 Parallel	150	-8.5	-2300	19	mid turn; mode 4 60% ETR
h	7.21	600 AGL	60 Parallel	150	-3.8	-1000	16	final; mode 4 60% ETR
i	7.88	325 AGL	83 Mode4 500Ft 120kts	150	-1.9	-400	19	jog point
j	8.49	205 AGL	83 Mode4 500Ft 120kts	80	-2.0	-200	9	intermediate point
k	8.64	175 AGL	95 Variable	40	-2.1	-100	19	power increases linearly to pad
l	8.75	150 AGL	95 Variable	1				reach pad



Ebbing ANGB F-35B Flight Profile VX35BCV1
Touch and Go Pattern to Vertical Landing on Pad #1

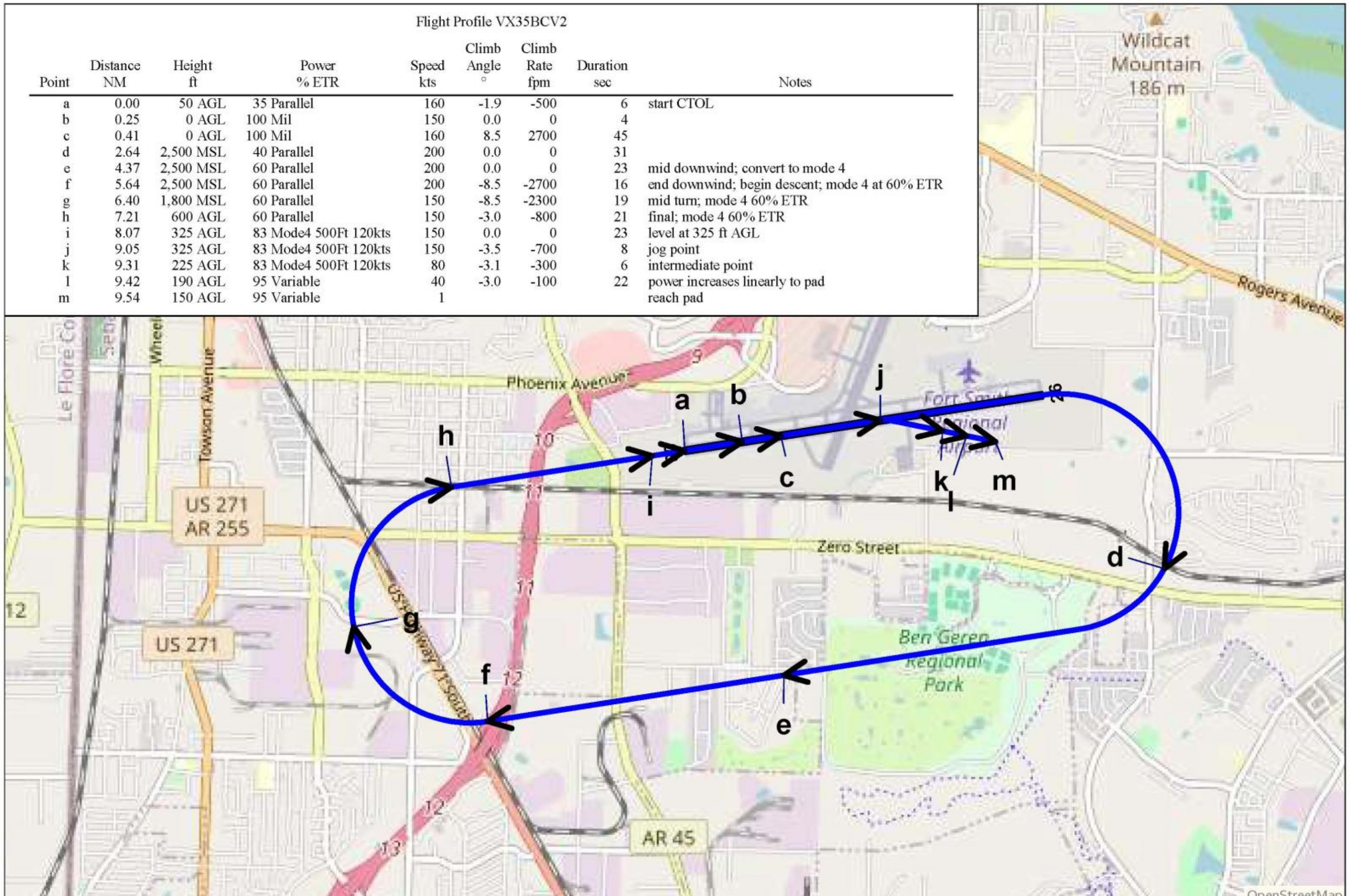
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:48,300 (1 inch = 4,030 feet)

N

218

Flight Profile VX35BCV2

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	35 Parallel	160	-1.9	-500	6	start CTOL
b	0.25	0 AGL	100 Mil	150	0.0	0	4	
c	0.41	0 AGL	100 Mil	160	8.5	2700	45	
d	2.64	2,500 MSL	40 Parallel	200	0.0	0	31	
e	4.37	2,500 MSL	60 Parallel	200	0.0	0	23	mid downwind; convert to mode 4
f	5.64	2,500 MSL	60 Parallel	200	-8.5	-2700	16	end downwind; begin descent; mode 4 at 60% ETR
g	6.40	1,800 MSL	60 Parallel	150	-8.5	-2300	19	mid turn; mode 4 60% ETR
h	7.21	600 AGL	60 Parallel	150	-3.0	-800	21	final; mode 4 60% ETR
i	8.07	325 AGL	83 Mode4 500Ft 120kts	150	0.0	0	23	level at 325 ft AGL
j	9.05	325 AGL	83 Mode4 500Ft 120kts	150	-3.5	-700	8	jog point
k	9.31	225 AGL	83 Mode4 500Ft 120kts	80	-3.1	-300	6	intermediate point
l	9.42	190 AGL	95 Variable	40	-3.0	-100	22	power increases linearly to pad
m	9.54	150 AGL	95 Variable	1				reach pad



Ebbing ANGB F-35B Flight Profile VX35BCV2

Touch and Go Pattern to Vertical Landing on Pad #2

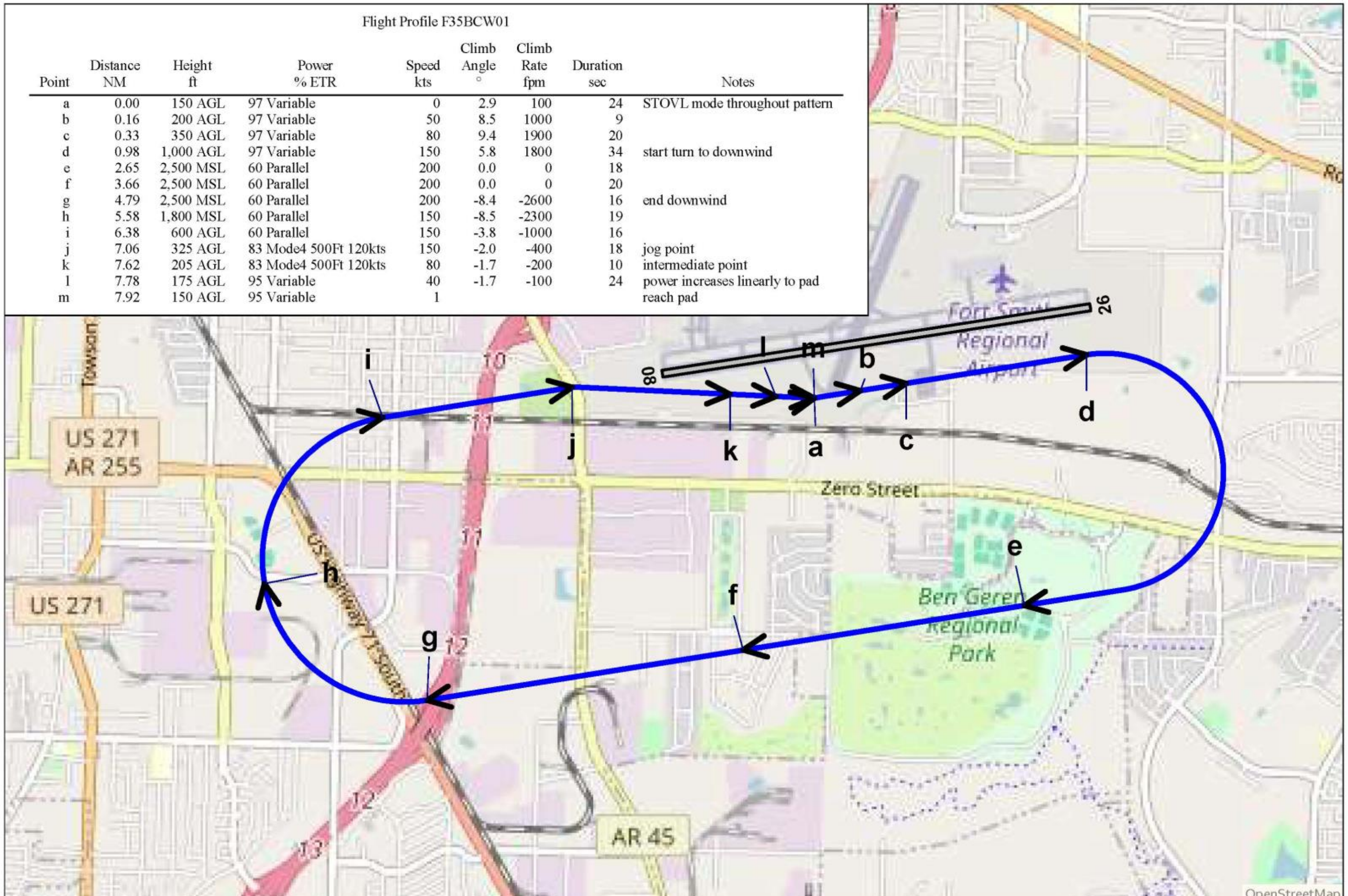
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,300 (1 inch = 4,030 feet)

219

Flight Profile F35BCW01

Point	Distance NM	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	150 AGL	97 Variable	0	2.9	100	24	STOVL mode throughout pattern
b	0.16	200 AGL	97 Variable	50	8.5	1000	9	
c	0.33	350 AGL	97 Variable	80	9.4	1900	20	
d	0.98	1,000 AGL	97 Variable	150	5.8	1800	34	start turn to downwind
e	2.65	2,500 MSL	60 Parallel	200	0.0	0	18	
f	3.66	2,500 MSL	60 Parallel	200	0.0	0	20	
g	4.79	2,500 MSL	60 Parallel	200	-8.4	-2600	16	end downwind
h	5.58	1,800 MSL	60 Parallel	150	-8.5	-2300	19	
i	6.38	600 AGL	60 Parallel	150	-3.8	-1000	16	
j	7.06	325 AGL	83 Mode4 500Ft 120kts	150	-2.0	-400	18	jog point
k	7.62	205 AGL	83 Mode4 500Ft 120kts	80	-1.7	-200	10	intermediate point
l	7.78	175 AGL	95 Variable	40	-1.7	-100	24	power increases linearly to pad
m	7.92	150 AGL	95 Variable	1				reach pad

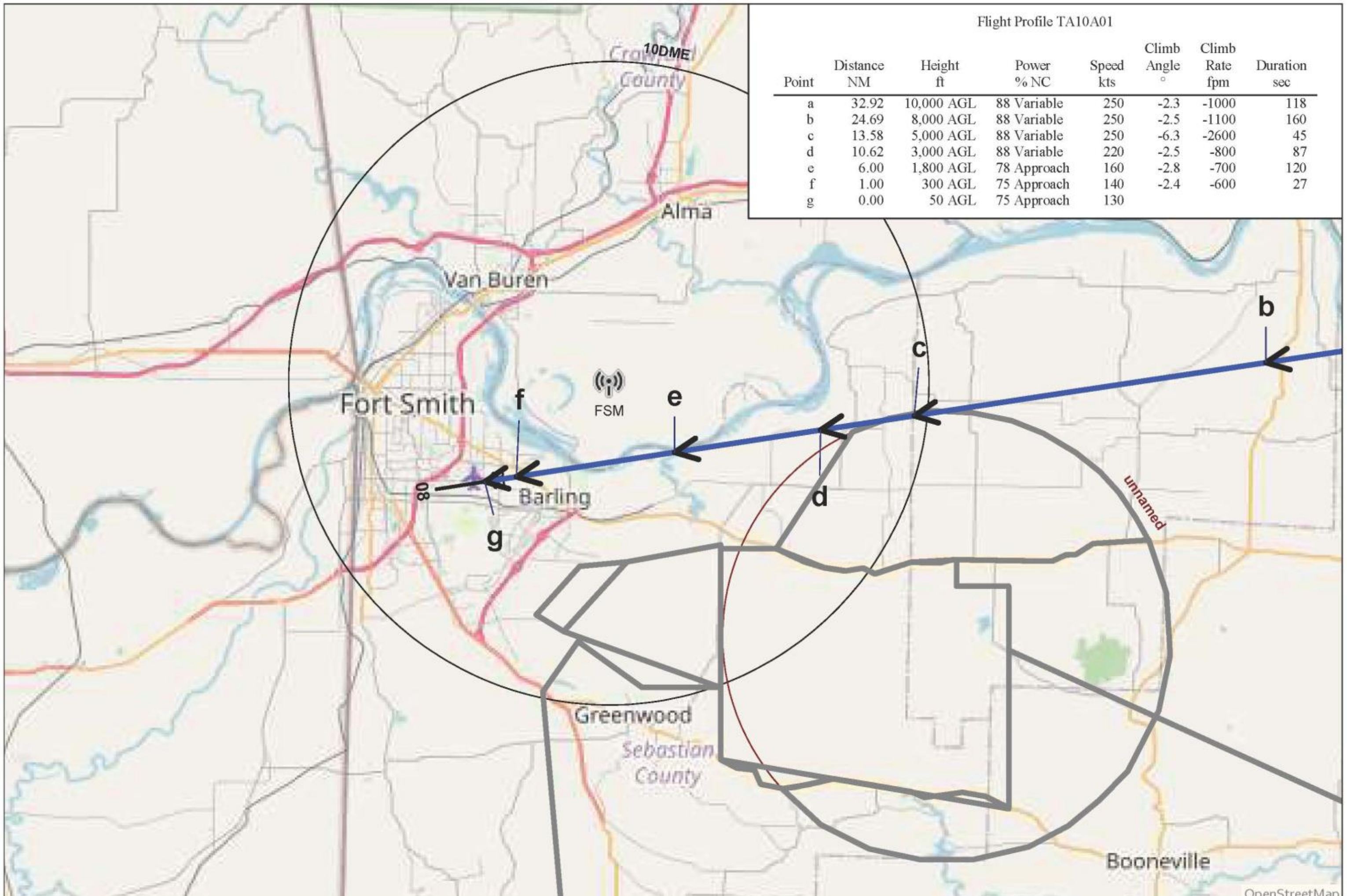


Ebbing ANGB F-35B Flight Profile F35BCW01
Vertical Landing Wave Off Pattern to Conventional Landing

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:40,300 (1 inch = 3,360 feet)

220



Flight Profile TA10A01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	32.92	10,000 AGL	88 Variable	250	-2.3	-1000	118
b	24.69	8,000 AGL	88 Variable	250	-2.5	-1100	160
c	13.58	5,000 AGL	88 Variable	250	-6.3	-2600	45
d	10.62	3,000 AGL	88 Variable	220	-2.5	-800	87
e	6.00	1,800 AGL	78 Approach	160	-2.8	-700	120
f	1.00	300 AGL	75 Approach	140	-2.4	-600	27
g	0.00	50 AGL	75 Approach	130			

Fort Smith Transient A-10A Flight Profile TA10A01
Transient Arrival

0 20,000 40,000 60,000 80,000 100,000

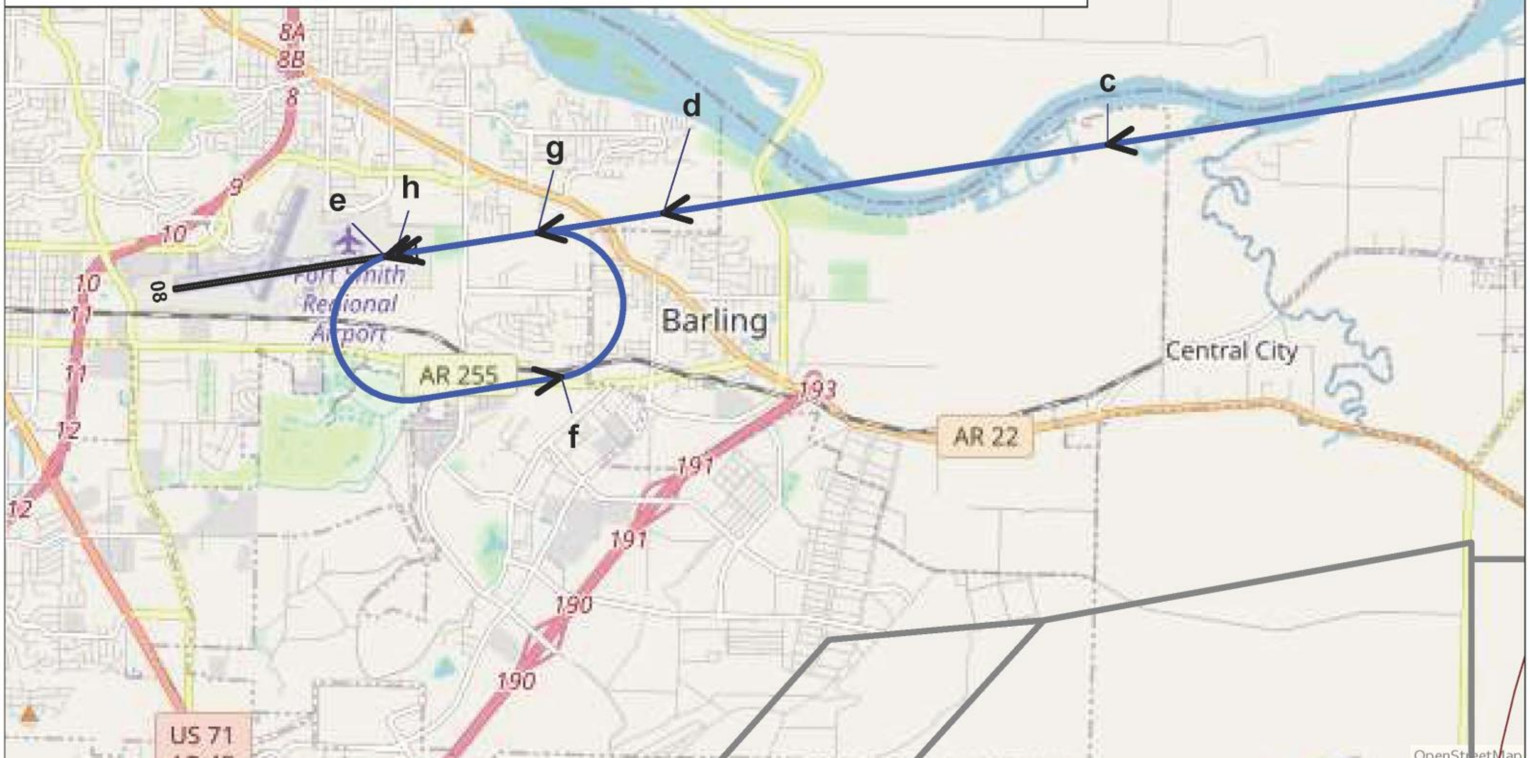
Scale in Feet 1:356,000 (1 inch = 29,600 feet)

N

221

Flight Profile TA10O01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	39.50	10,000 AGL	88 Variable	250	-2.0	-900	332	
b	16.46	5,000 AGL	88 Variable	250	-3.0	-1300	92	
c	10.08	3,000 AGL	88 Variable	250	-3.0	-1300	44	
d	7.00	2,500 MSL	88 Variable	250	0.0	0	28	
e	5.08	2,500 MSL	70 Approach	250	-3.8	-1400	42	break at runway threshold at 250 kts then decrease airspeed
f	2.57	1,500 MSL	78 Approach	180	-4.3	-1300	35	
g	0.99	300 AGL	75 Approach	150	-2.4	-600	25	
h	0.00	50 AGL	75 Approach	130				

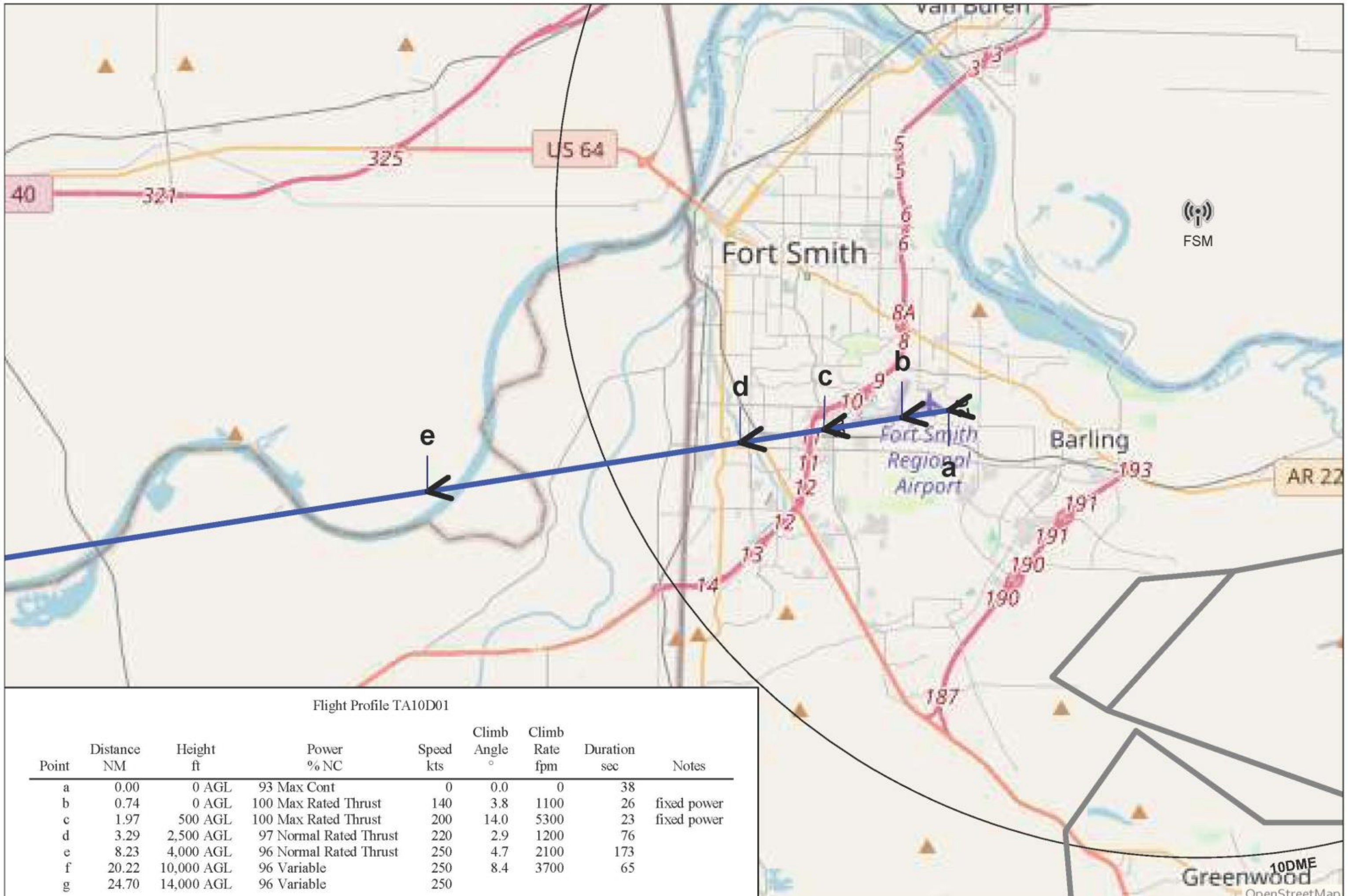


Fort Smith Transient A-10A Flight Profile TA10O01
Transient Overhead Break

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

222



Flight Profile TA10D01

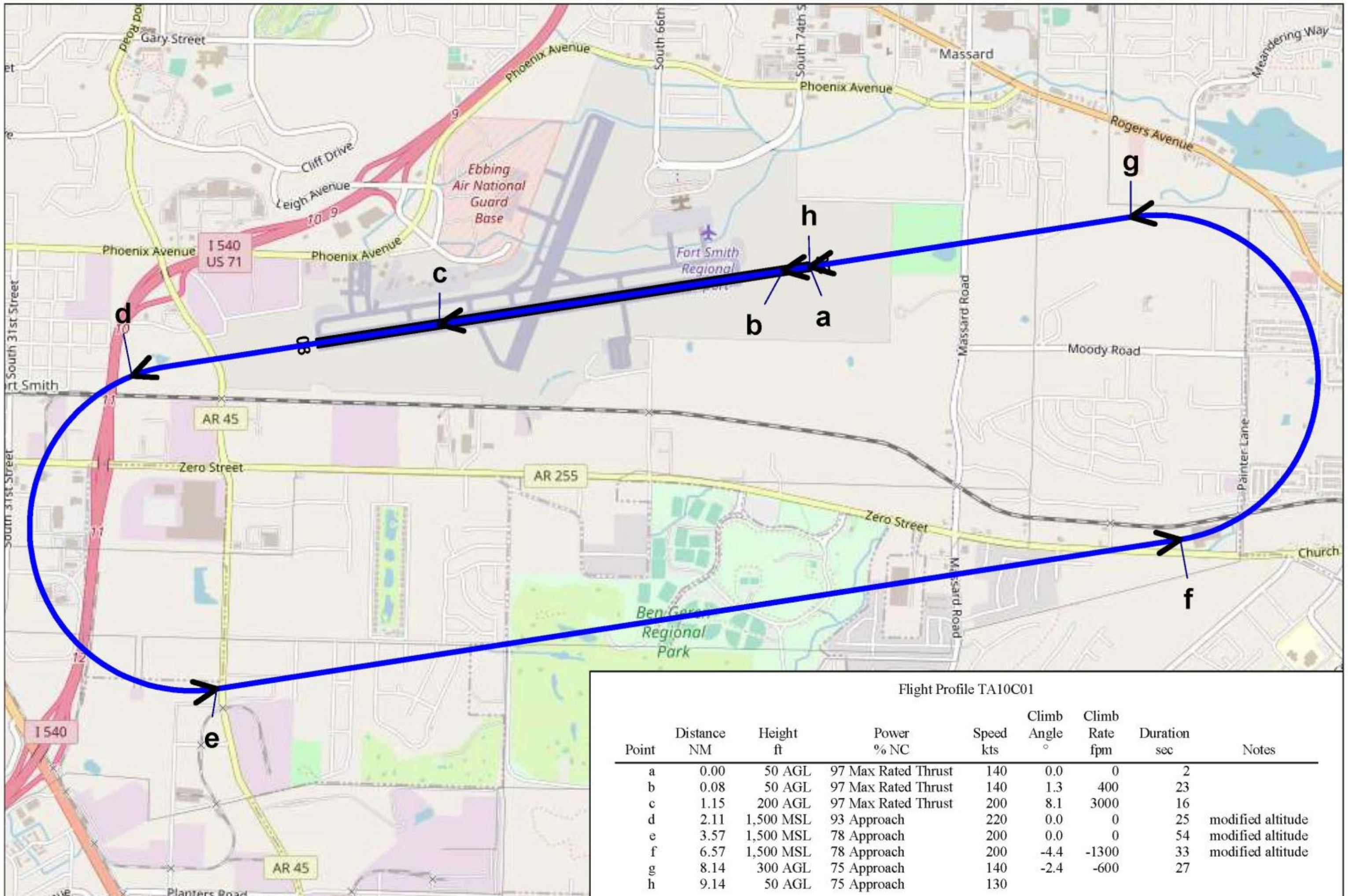
Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	93 Max Cont	0	0.0	0	38	
b	0.74	0 AGL	100 Max Rated Thrust	140	3.8	1100	26	fixed power
c	1.97	500 AGL	100 Max Rated Thrust	200	14.0	5300	23	fixed power
d	3.29	2,500 AGL	97 Normal Rated Thrust	220	2.9	1200	76	
e	8.23	4,000 AGL	96 Normal Rated Thrust	250	4.7	2100	173	
f	20.22	10,000 AGL	96 Variable	250	8.4	3700	65	
g	24.70	14,000 AGL	96 Variable	250				

Fort Smith Transient A-10A Flight Profile TA10D01
Transient Departure

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:178,000 (1 inch = 14,800 feet)

223



Flight Profile TA10C01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	97 Max Rated Thrust	140	0.0	0	2	
b	0.08	50 AGL	97 Max Rated Thrust	140	1.3	400	23	
c	1.15	200 AGL	97 Max Rated Thrust	200	8.1	3000	16	
d	2.11	1,500 MSL	93 Approach	220	0.0	0	25	modified altitude
e	3.57	1,500 MSL	78 Approach	200	0.0	0	54	modified altitude
f	6.57	1,500 MSL	78 Approach	200	-4.4	-1300	33	modified altitude
g	8.14	300 AGL	75 Approach	140	-2.4	-600	27	
h	9.14	50 AGL	75 Approach	130				

Fort Smith Transient A-10A Flight Profile TA10C01
INSIDE DOWNWIND PATTERN

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:35,000 (1 inch = 2,920 feet)

N

224

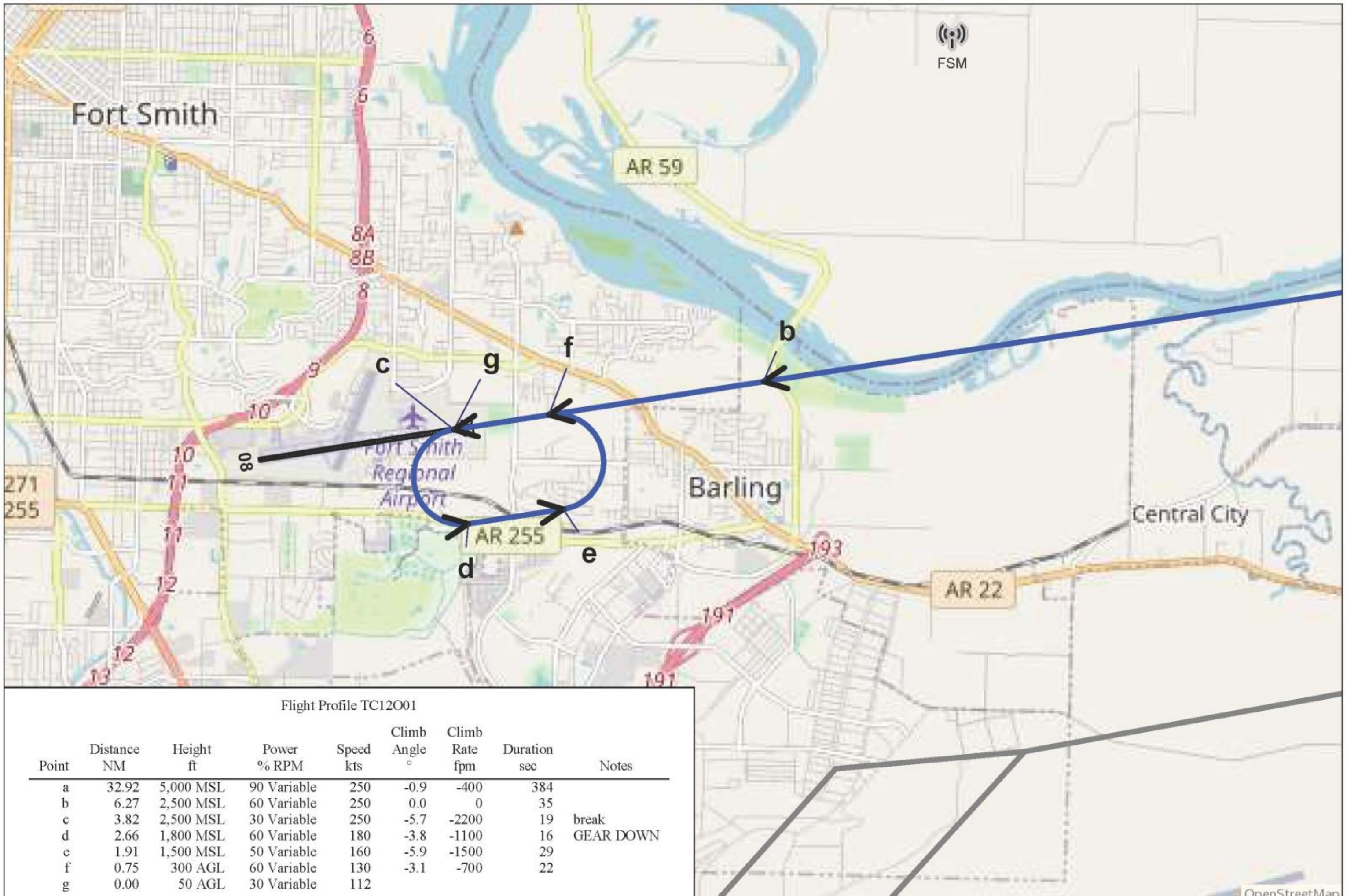
Flight Profile TC12A01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	27.00	6,000 MSL	90 Variable	230	-1.2	-500	171	
b	16.76	4,700 MSL	60 Variable	200	-4.4	-1500	123	
c	10.25	1,200 AGL	60 Variable	180	0.0	0	96	
d	6.00	1,200 AGL	60 Variable	140	0.0	0	26	
e	5.00	1,200 AGL	60 Landing	140	-2.2	-500	143	gear down
f	0.00	50 AGL	24 Landing	112				

Fort Smith Transient C-12 Flight Profile TC12A01
Straight-in Arrival

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:160,000 (1 inch = 13,300 feet)

225



Flight Profile TC12O01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	5,000 MSL	90 Variable	250	-0.9	-400	384	
b	6.27	2,500 MSL	60 Variable	250	0.0	0	35	
c	3.82	2,500 MSL	30 Variable	250	-5.7	-2200	19	break
d	2.66	1,800 MSL	60 Variable	180	-3.8	-1100	16	GEAR DOWN
e	1.91	1,500 MSL	50 Variable	160	-5.9	-1500	29	
f	0.75	300 AGL	60 Variable	130	-3.1	-700	22	
g	0.00	50 AGL	30 Variable	112				

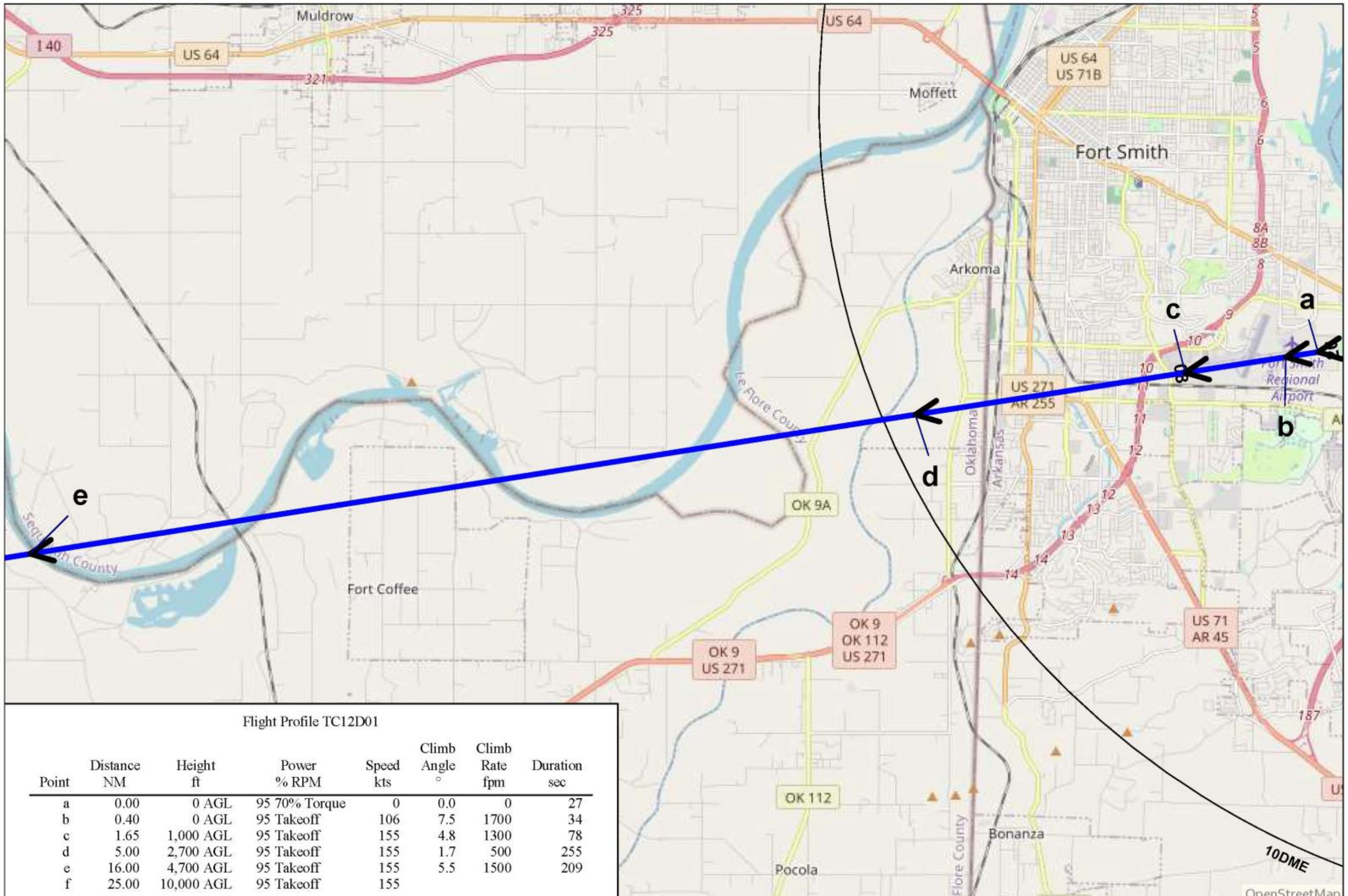
Fort Smith Transient C-12 Flight Profile TC12O01
Overhead Break Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

N

226



Flight Profile TC12D01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	0 AGL	95 70% Torque	0	0.0	0	27
b	0.40	0 AGL	95 Takeoff	106	7.5	1700	34
c	1.65	1,000 AGL	95 Takeoff	155	4.8	1300	78
d	5.00	2,700 AGL	95 Takeoff	155	1.7	500	255
e	16.00	4,700 AGL	95 Takeoff	155	5.5	1500	209
f	25.00	10,000 AGL	95 Takeoff	155			

Fort Smith Transient C-12 Flight Profile TC12D01

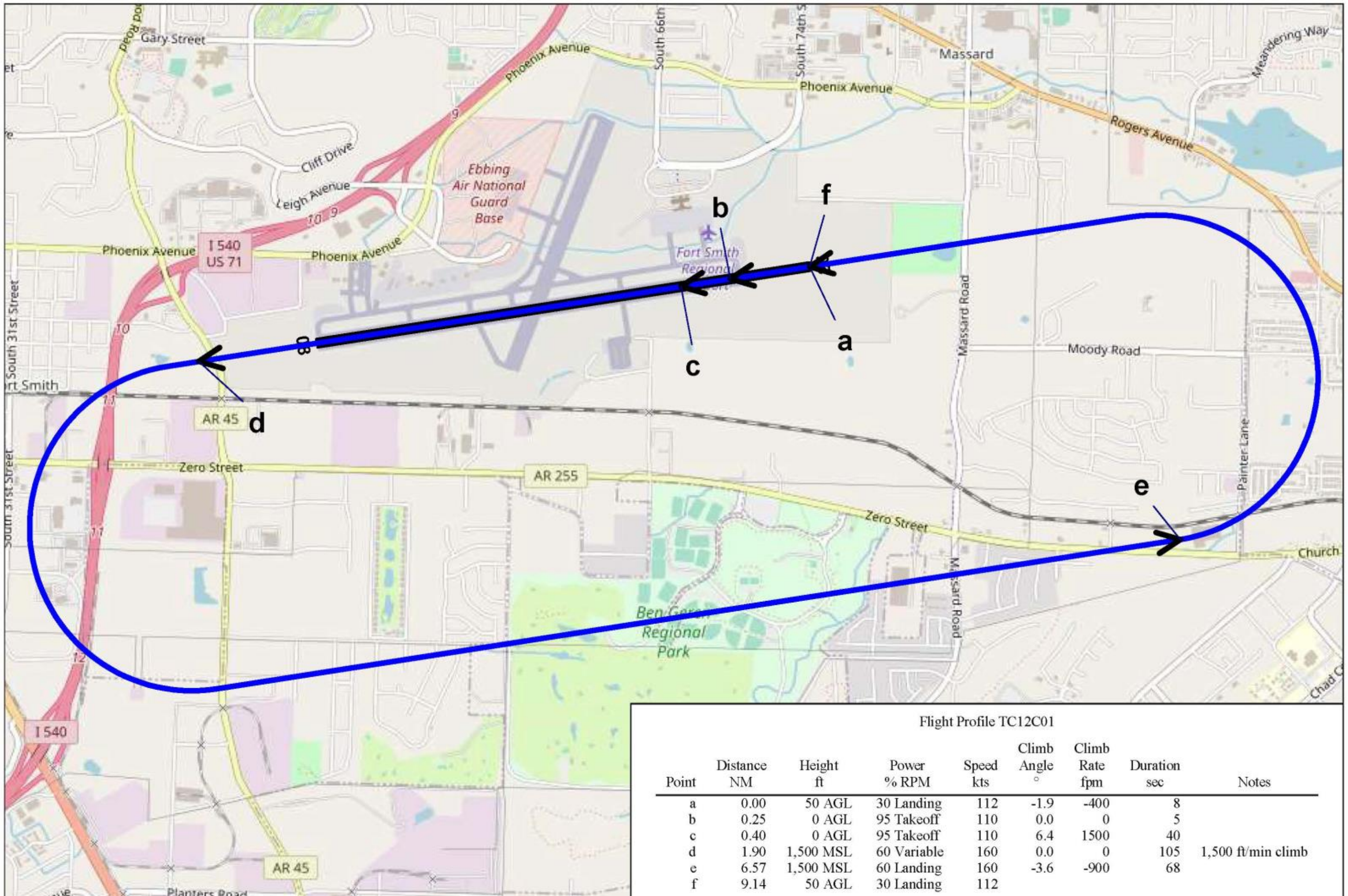
Standard Departure

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

Scale in Feet 1:140,000 (1 inch = 11,600 feet)

N

227



Flight Profile TC12C01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	30 Landing	112	-1.9	-400	8	
b	0.25	0 AGL	95 Takeoff	110	0.0	0	5	
c	0.40	0 AGL	95 Takeoff	110	6.4	1500	40	
d	1.90	1,500 MSL	60 Variable	160	0.0	0	105	1,500 ft/min climb
e	6.57	1,500 MSL	60 Landing	160	-3.6	-900	68	
f	9.14	50 AGL	30 Landing	112				

Fort Smith Transient C-12 Flight Profile TC12C01

VFR Pattern

0 2,000 4,000 6,000 8,000 10,000

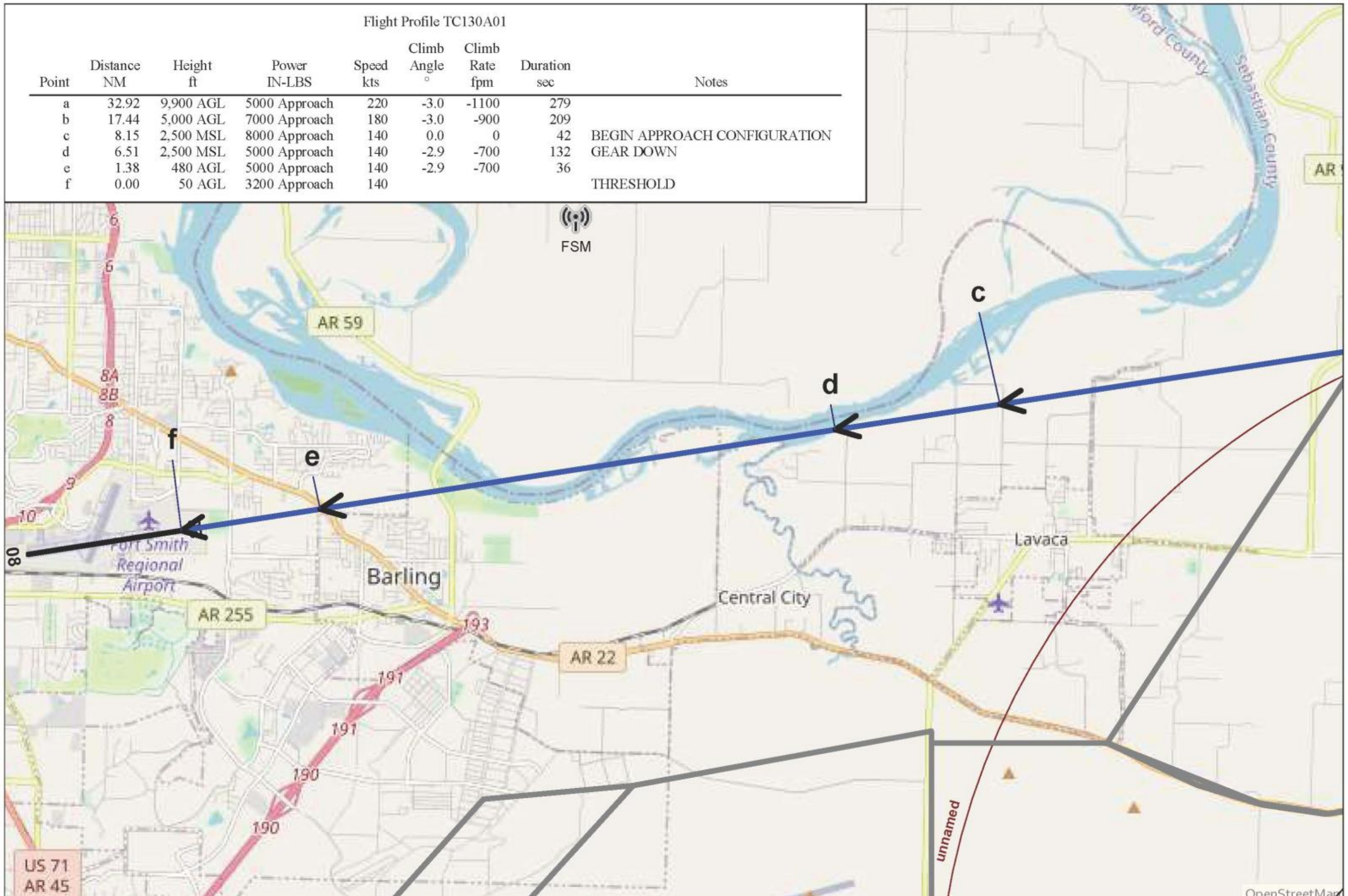
Scale in Feet 1:35,000 (1 inch = 2,920 feet)

N

228

Flight Profile TC130A01

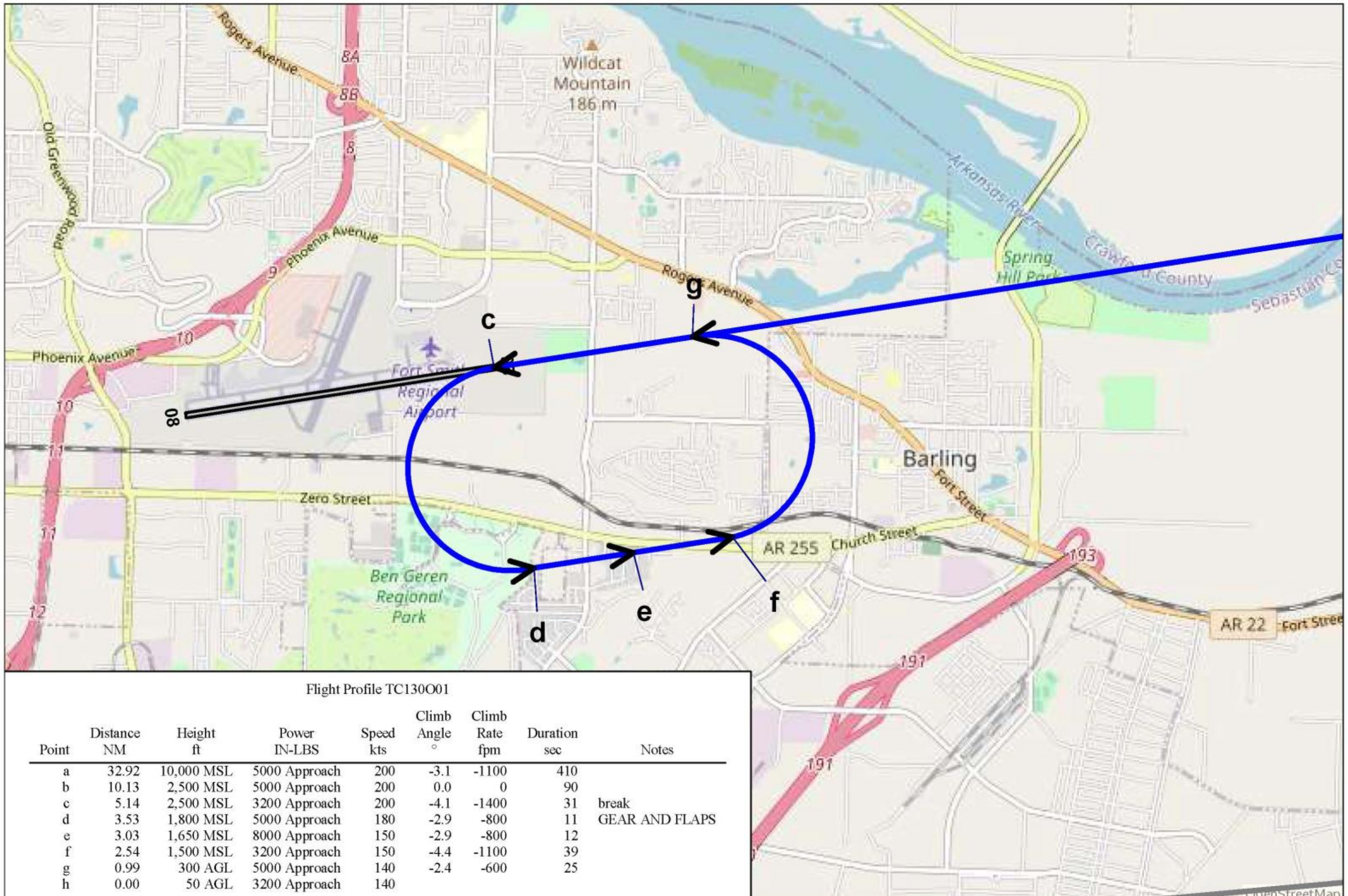
Point	Distance NM	Height ft	Power IN-LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	9,900 AGL	5000 Approach	220	-3.0	-1100	279	
b	17.44	5,000 AGL	7000 Approach	180	-3.0	-900	209	
c	8.15	2,500 MSL	8000 Approach	140	0.0	0	42	BEGIN APPROACH CONFIGURATION
d	6.51	2,500 MSL	5000 Approach	140	-2.9	-700	132	GEAR DOWN
e	1.38	480 AGL	5000 Approach	140	-2.9	-700	36	
f	0.00	50 AGL	3200 Approach	140				THRESHOLD



Fort Smith Transient C-130H&N&P Flight Profile TC130A01
STRAIGHT-IN ARRIVAL

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000
Scale in Feet 1:112,000 (1 inch = 9,340 feet)

229



Flight Profile TC130O01

Point	Distance NM	Height ft	Power IN-LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	10,000 MSL	5000 Approach	200	-3.1	-1100	410	
b	10.13	2,500 MSL	5000 Approach	200	0.0	0	90	
c	5.14	2,500 MSL	3200 Approach	200	-4.1	-1400	31	break
d	3.53	1,800 MSL	5000 Approach	180	-2.9	-800	11	GEAR AND FLAPS
e	3.03	1,650 MSL	8000 Approach	150	-2.9	-800	12	
f	2.54	1,500 MSL	3200 Approach	150	-4.4	-1100	39	
g	0.99	300 AGL	5000 Approach	140	-2.4	-600	25	
h	0.00	50 AGL	3200 Approach	140				

Fort Smith Transient C-130H&N&P Flight Profile TC130O01

OVERHEAD BREAK ARRIVAL

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

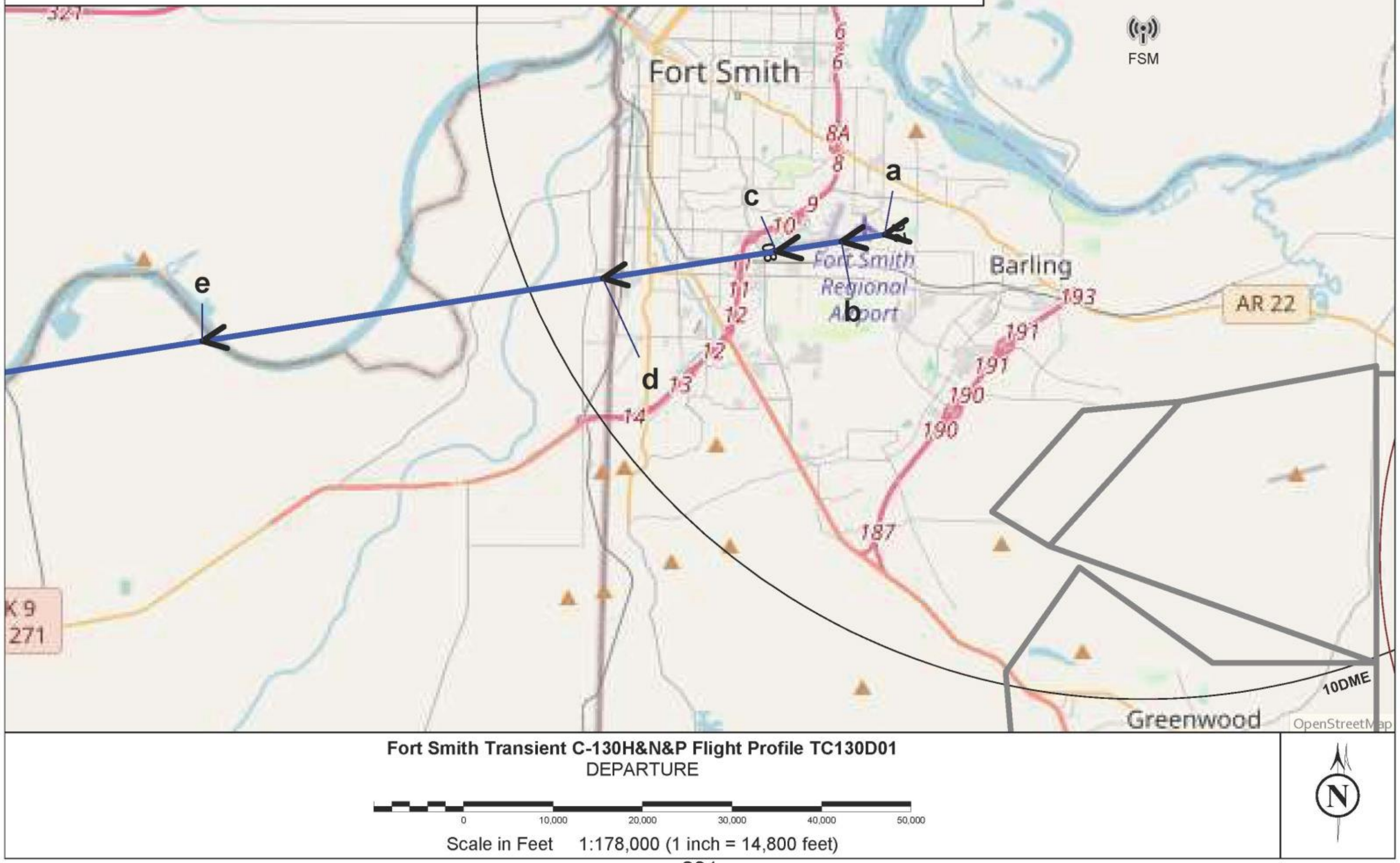
Scale in Feet 1:56,000 (1 inch = 4,670 feet)

N

230

Flight Profile TC130D01

Point	Distance NM	Height ft	Power IN-LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	16300 Takeoff	0	0.0	0	43	5 SECONDS AT POWER BEFORE BRAKE RELEASE
b	0.66	0 AGL	16300 Takeoff	110	3.8	900	27	4000 FT ROTATE
c	1.65	400 AGL	16300 Takeoff	150	1.4	400	57	
d	4.28	800 AGL	15000 Takeoff	180	3.2	1000	122	
e	10.37	2,900 AGL	15000 Takeoff	180	0.9	300	451	
f	32.92	5,000 AGL	15000 Takeoff	180				

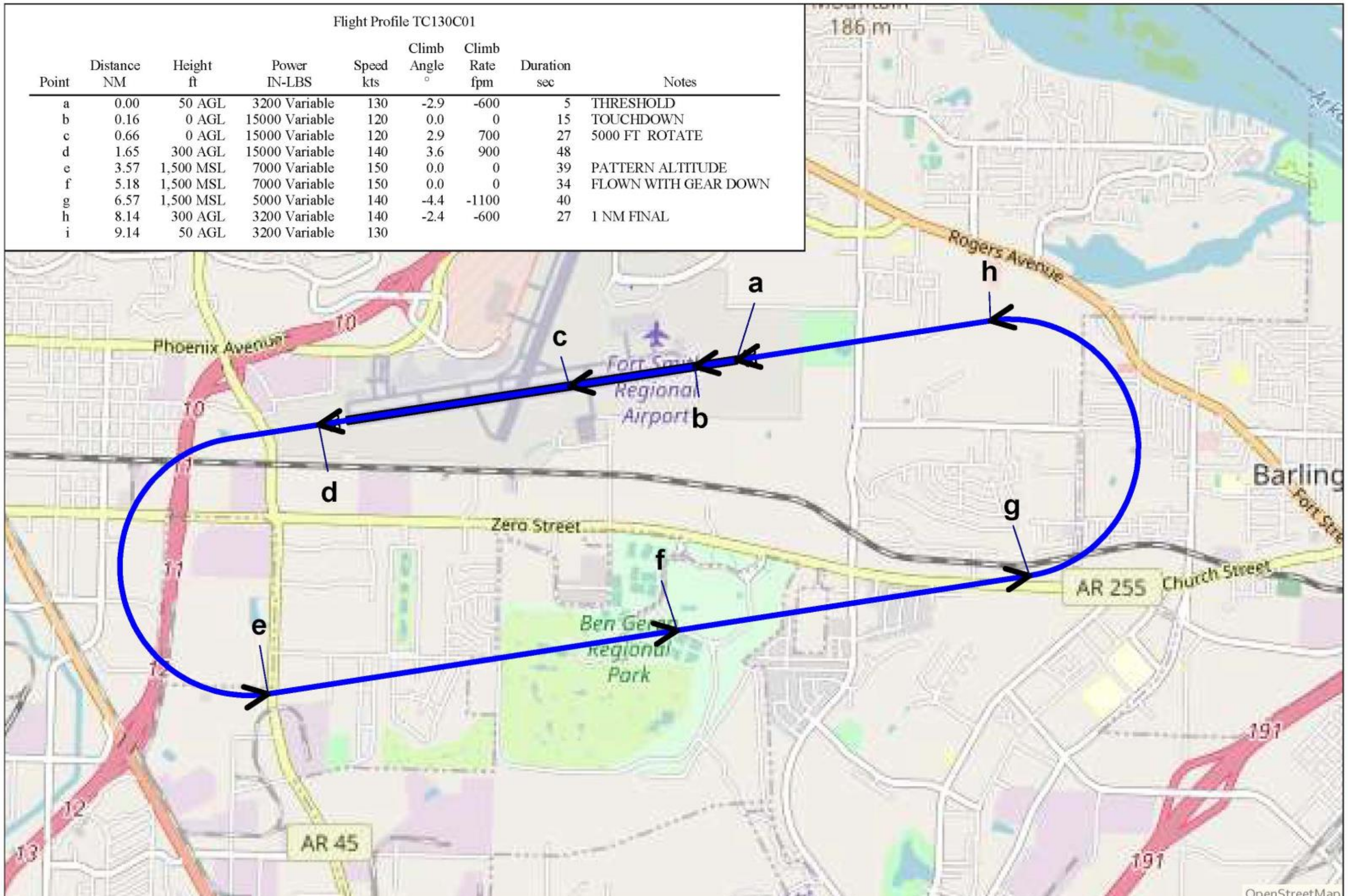


Fort Smith Transient C-130H&N&P Flight Profile TC130D01
DEPARTURE

Scale in Feet 1:178,000 (1 inch = 14,800 feet)

Flight Profile TC130C01

Point	Distance NM	Height ft	Power IN-LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	3200 Variable	130	-2.9	-600	5	THRESHOLD
b	0.16	0 AGL	15000 Variable	120	0.0	0	15	TOUCHDOWN
c	0.66	0 AGL	15000 Variable	120	2.9	700	27	5000 FT ROTATE
d	1.65	300 AGL	15000 Variable	140	3.6	900	48	
e	3.57	1,500 MSL	7000 Variable	150	0.0	0	39	PATTERN ALTITUDE
f	5.18	1,500 MSL	7000 Variable	150	0.0	0	34	FLOWN WITH GEAR DOWN
g	6.57	1,500 MSL	5000 Variable	140	-4.4	-1100	40	
h	8.14	300 AGL	3200 Variable	140	-2.4	-600	27	1 NM FINAL
i	9.14	50 AGL	3200 Variable	130				



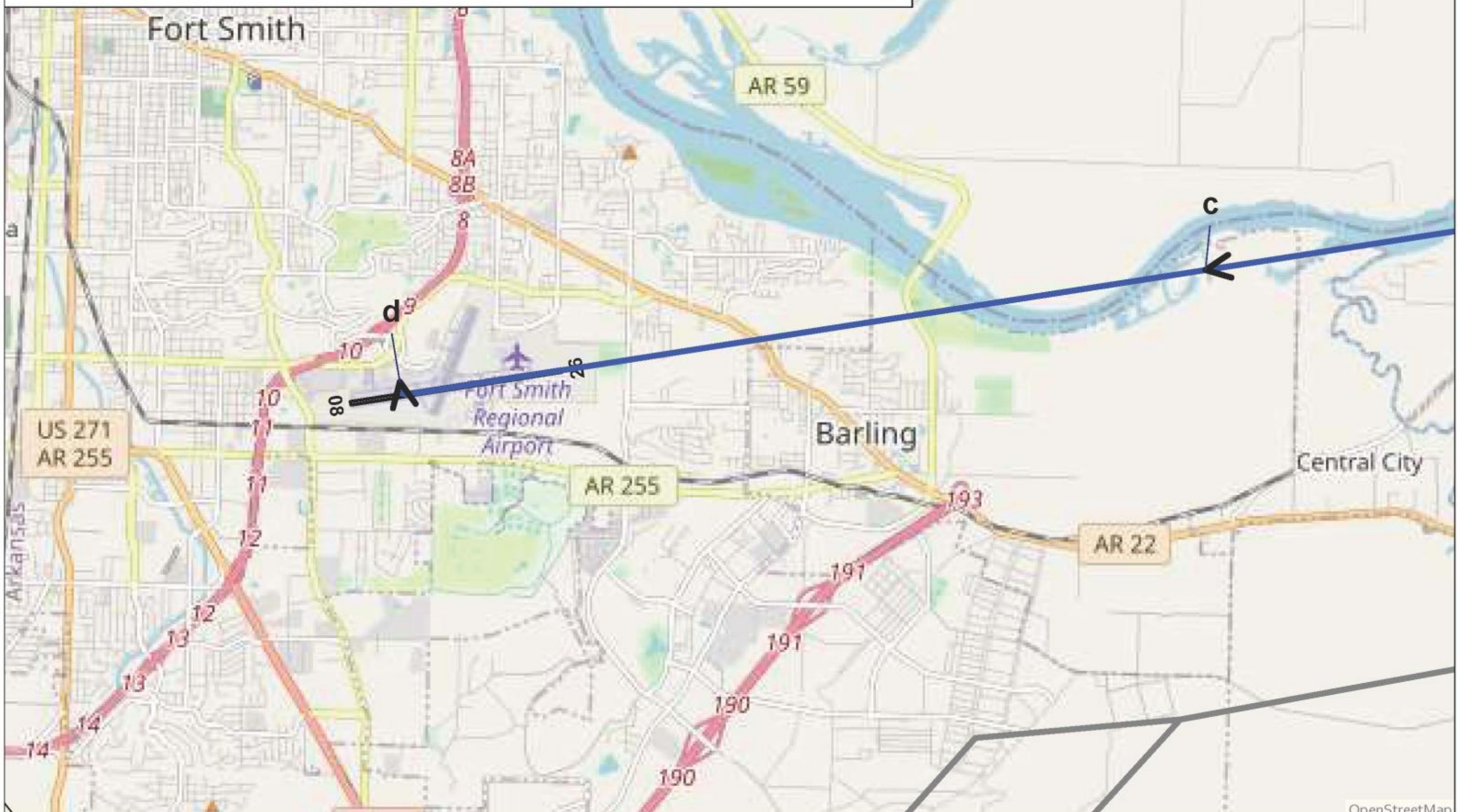
Fort Smith Transient C-130H&N&P Flight Profile TC130C01
VFR PATTERN

Scale in Feet 1:44,300 (1 inch = 3,690 feet)

232

Flight Profile TCH47A01

Point	Distance NM	Height ft	Power KNOTS	Notes
a	32.92	3,000 AGL	Lfo Lite 130 kts	ACTUAL ENROUTE SPEED TYPICALLY 120 KTS, LIMITED BY MODEL
b	11.85	3,000 AGL	Lfo Lite 130 kts	ACTUAL ENROUTE SPEED TYPICALLY 120 KTS, LIMITED BY MODEL
c	5.92	1,500 AGL	Tkf Lite 70 kts	
d	0.00	300 AGL	Tkf Lite 70 kts	THEN AIR TAXI TO LANDING

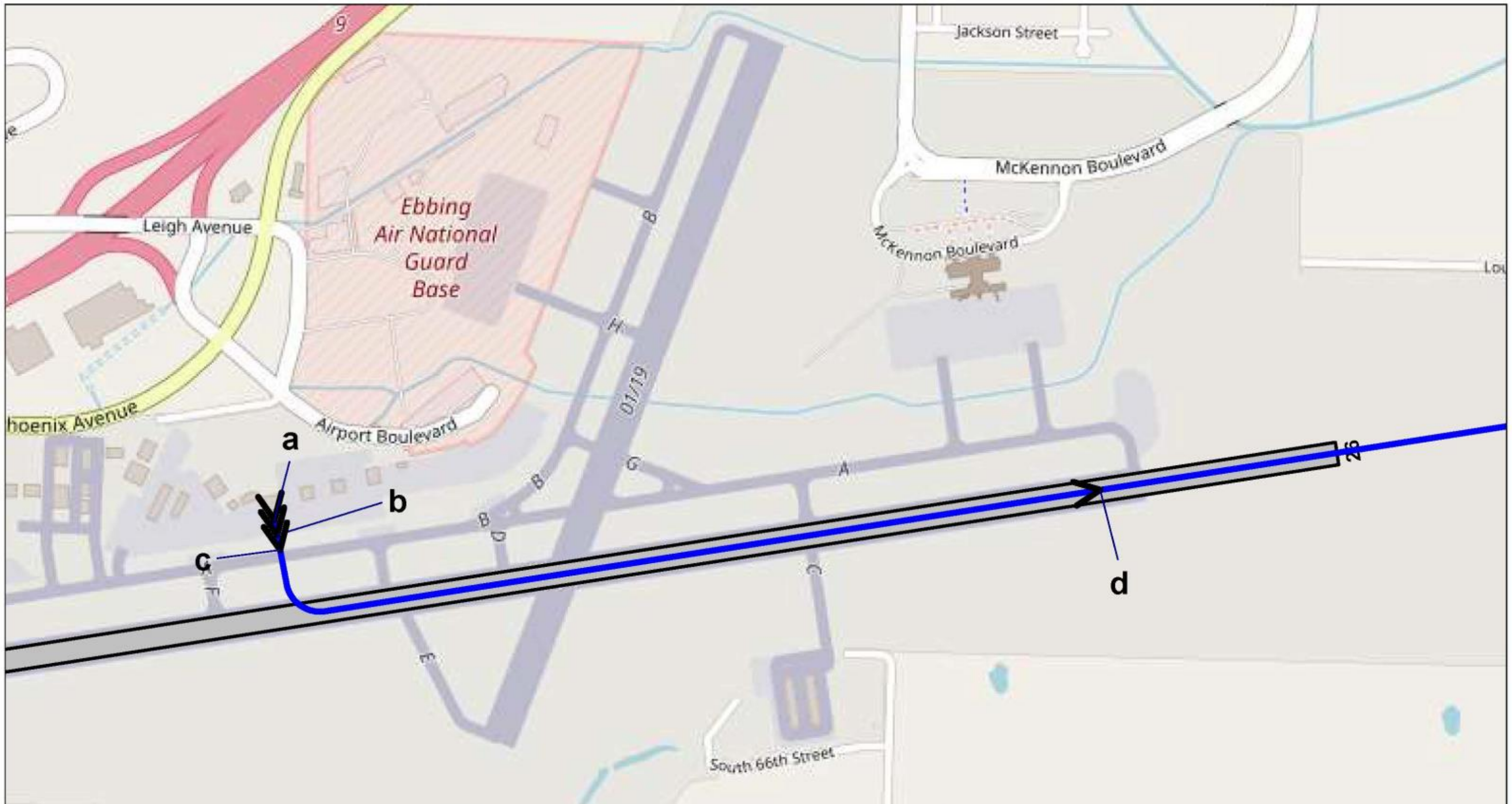


Fort Smith Transient CH47D Flight Profile TCH47A01
Transient Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

233



Flight Profile TCH47D01

Point	Distance NM	Height ft	Power KNOTS	Notes
a	0.00	0 AGL	Tkf Lite 70 kts	
b	0.02	100 AGL	Tkf Lite 70 kts	
c	0.03	150 AGL	Tkf Lite 70 kts	
d	0.99	1,420 AGL	Lfo Lite 100 kts	
e	2.19	3,000 AGL	Lfo Lite 130 kts	
f	32.92	3,000 AGL	Lfo Lite 130 kts	ACTUAL ENROUTE SPEED TYPICALLY 120 KTS, LIMITED BY MODEL

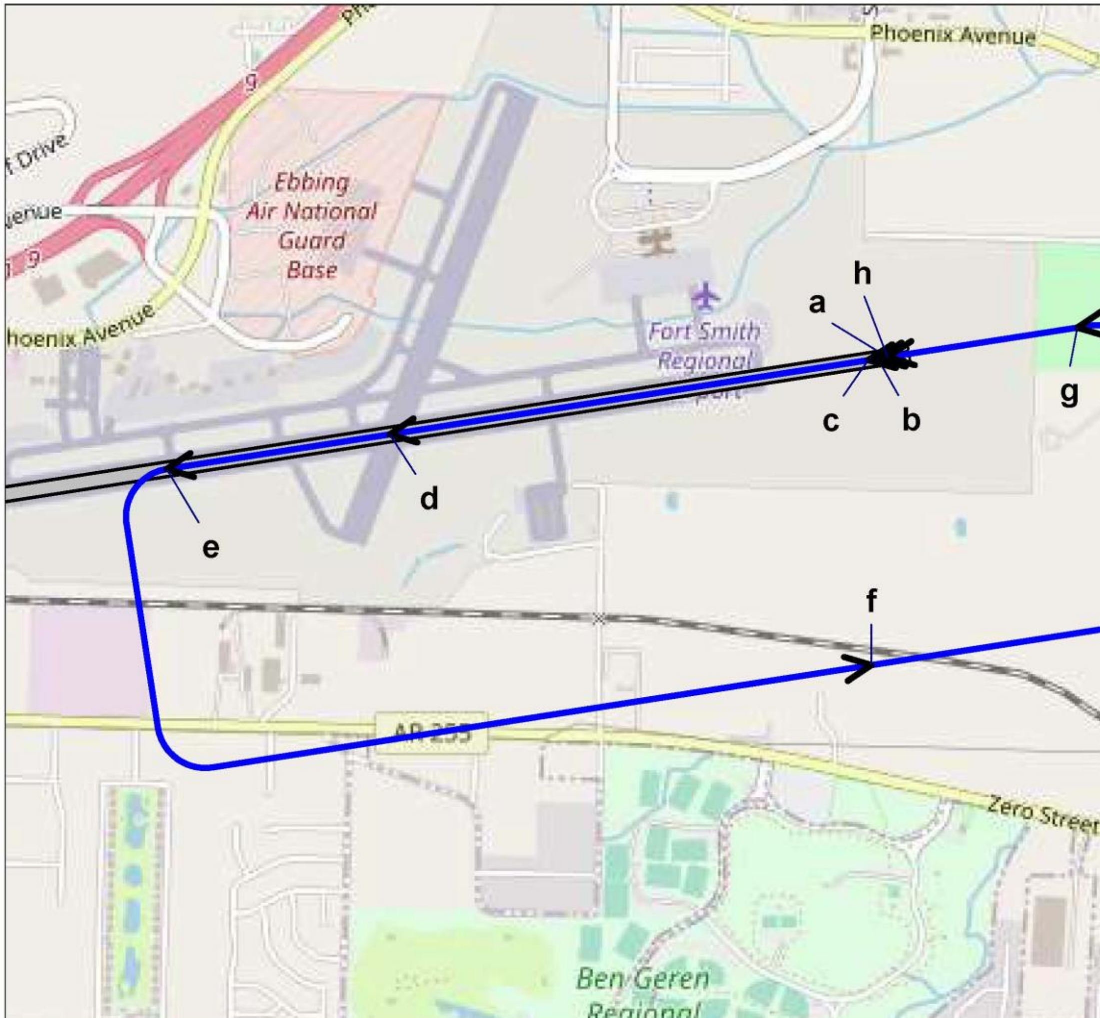
Fort Smith Transient CH47D Flight Profile TCH47D01
Transient Departure

0 400 800 1,200 1,600 2,000 2,400 2,800 3,200 3,600 4,000 4,400 4,800

Scale in Feet 1:14,000 (1 inch = 1,170 feet)

N

234



Flight Profile TCH47C01

Point	Distance NM	Height ft	Power KNOTS
a	0.00	50 AGL	Tkf Lite 70 kts
b	0.02	100 AGL	Tkf Lite 70 kts
c	0.03	150 AGL	Tkf Lite 70 kts
d	0.86	1,500 MSL	Lfo Lite 70 kts
e	1.25	1,500 MSL	Lfo Lite 100 kts
f	3.00	1,500 MSL	Lfo Lite 100 kts
g	4.09	500 AGL	Lnd Lite 70 kts
h	4.42	50 AGL	Lnd Lite 70 kts

Fort Smith Transient CH47D Flight Profile TCH47C01

Transient Closed Pattern

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000

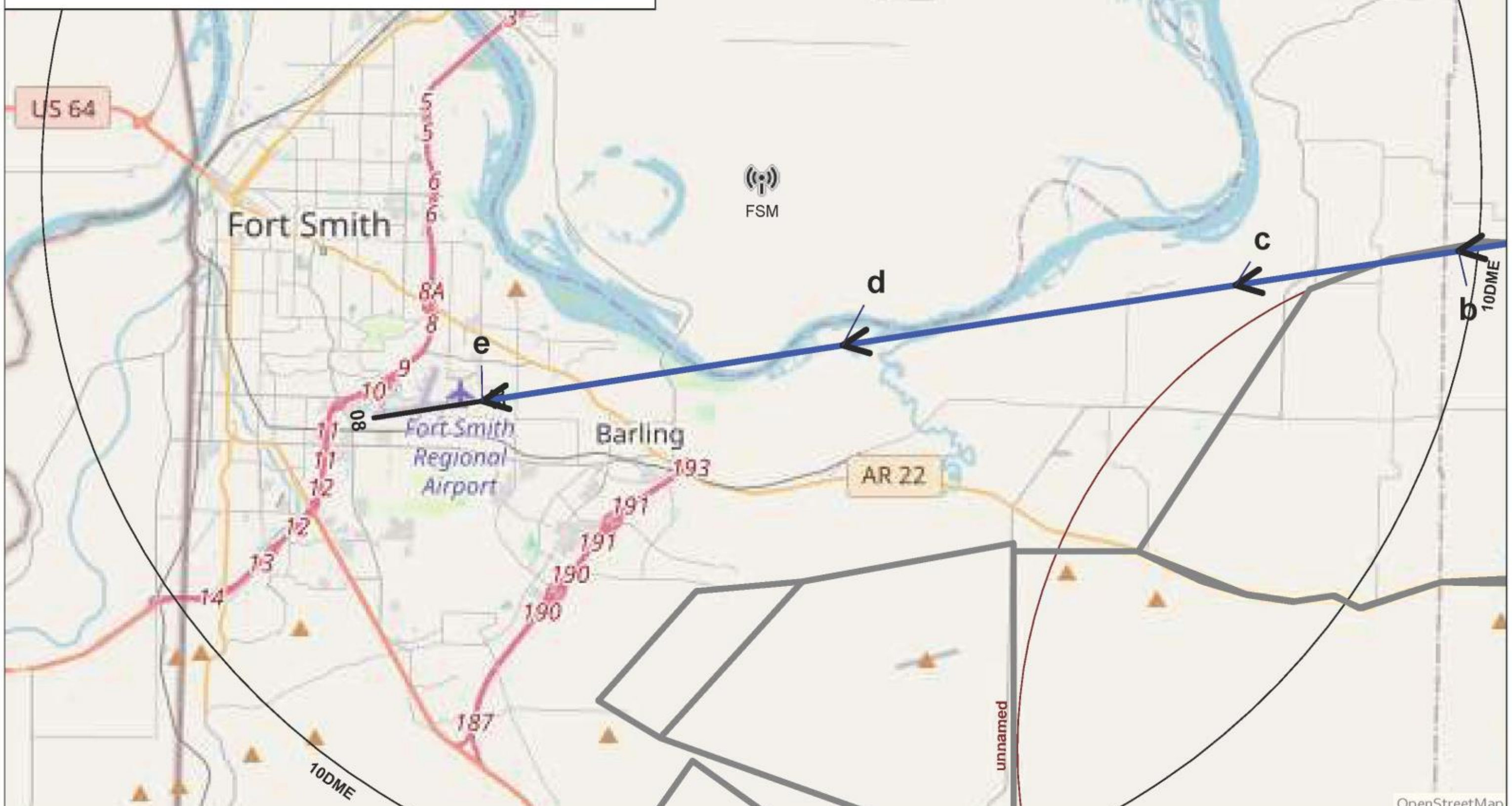
Scale in Feet 1:22,200 (1 inch = 1,850 feet)

N

235

Flight Profile TF16CA01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	49.37	5,000 MSL	84 Variable	300	-0.4	-200	428
b	13.72	3,000 AGL	80 Variable	300	-3.0	-1500	41
c	10.59	2,000 AGL	80 Variable	250	-0.5	-200	99
d	5.07	1,685 AGL	84 Variable	150	-3.0	-800	122
e	0.00	50 AGL	80 Variable	150			



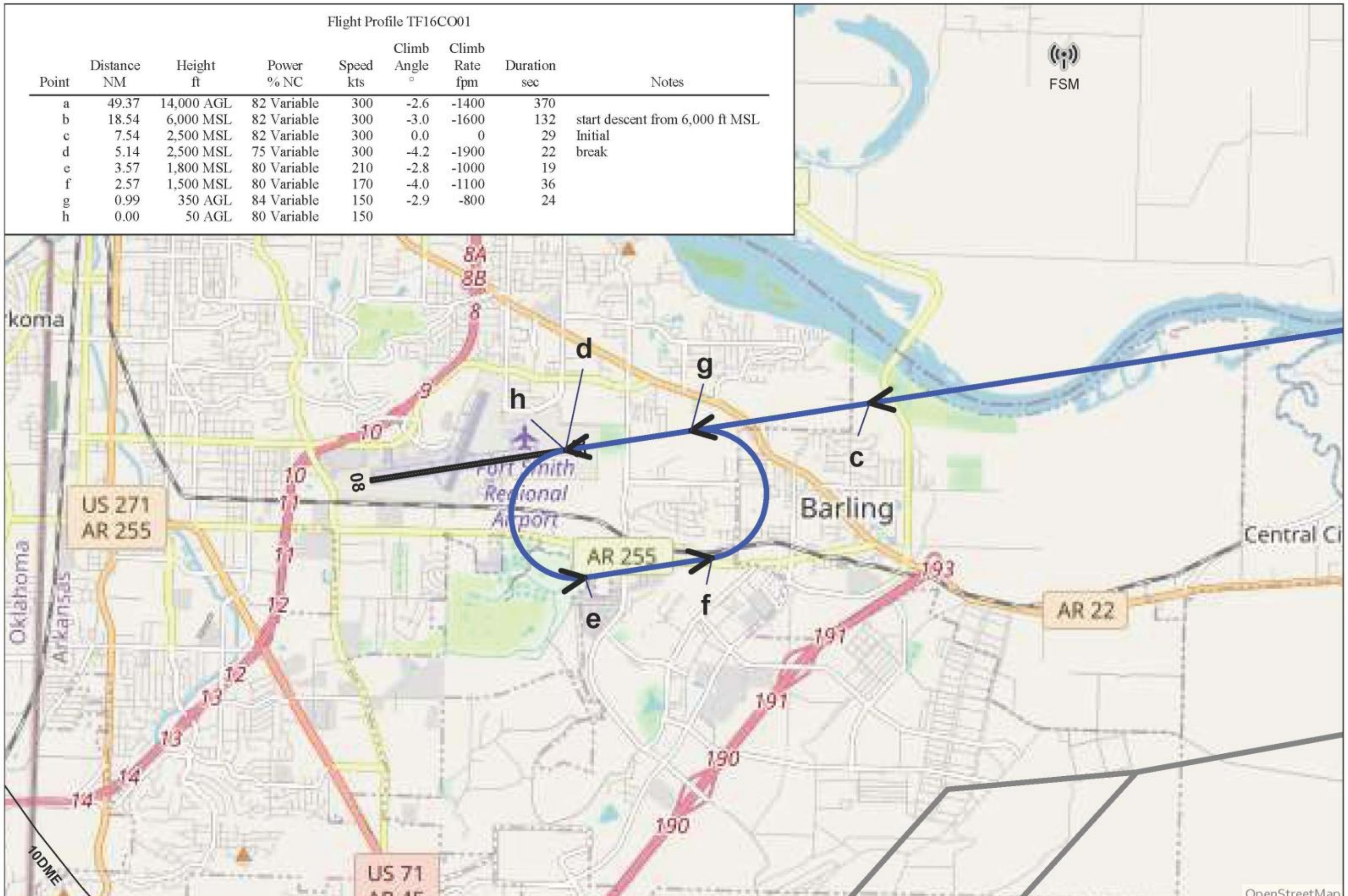
Fort Smith Transient F-16C Flight Profile TF16CA01
Transient Straight-in Arrival

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:178,000 (1 inch = 14,800 feet)

236

Flight Profile TF16CO01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	49.37	14,000 AGL	82 Variable	300	-2.6	-1400	370	
b	18.54	6,000 MSL	82 Variable	300	-3.0	-1600	132	start descent from 6,000 ft MSL
c	7.54	2,500 MSL	82 Variable	300	0.0	0	29	Initial
d	5.14	2,500 MSL	75 Variable	300	-4.2	-1900	22	break
e	3.57	1,800 MSL	80 Variable	210	-2.8	-1000	19	
f	2.57	1,500 MSL	80 Variable	170	-4.0	-1100	36	
g	0.99	350 AGL	84 Variable	150	-2.9	-800	24	
h	0.00	50 AGL	80 Variable	150				

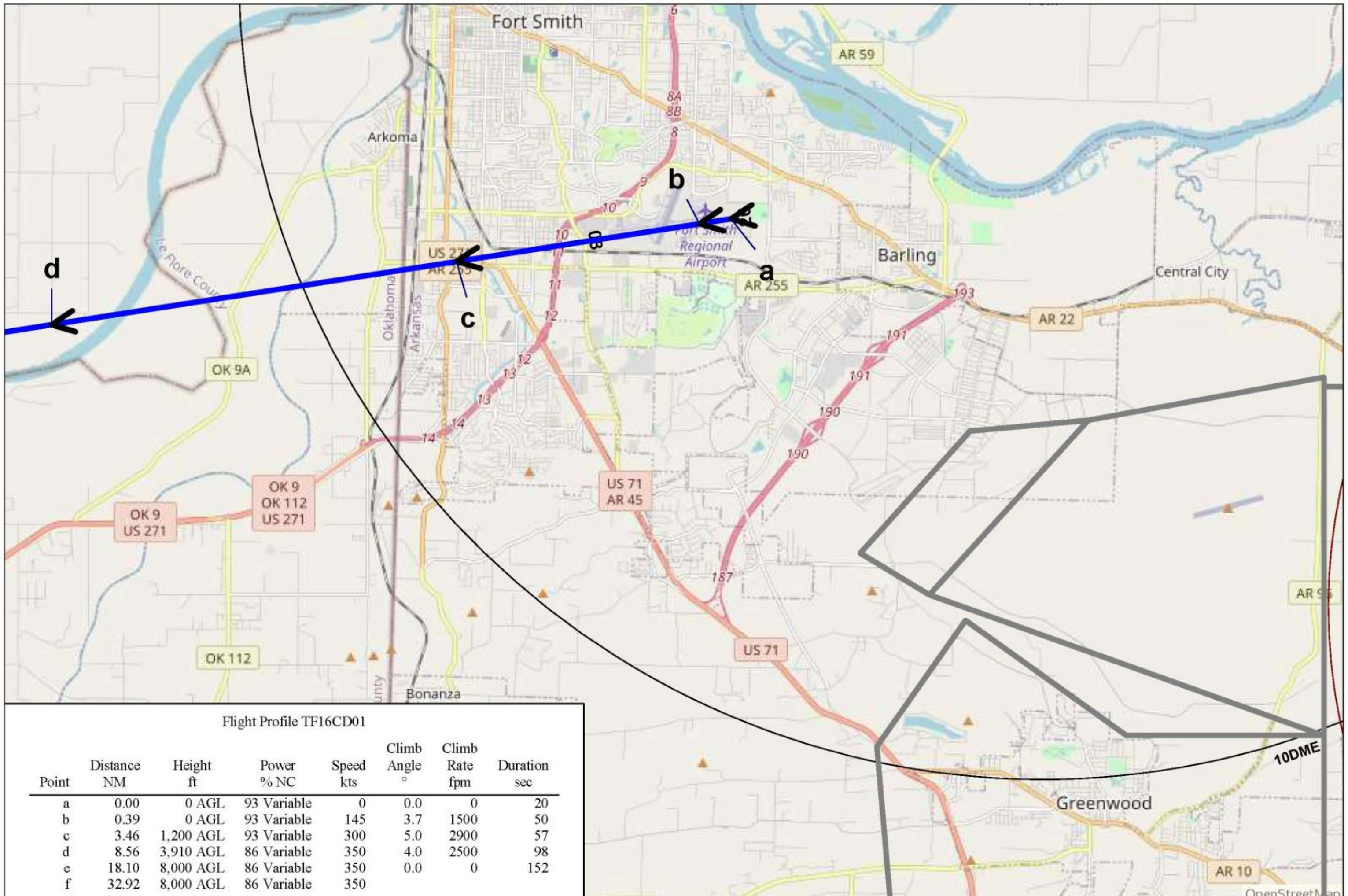


Fort Smith Transient F-16C Flight Profile TF16CO01
Transient Overhead Break

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

237



Flight Profile TF16CD01

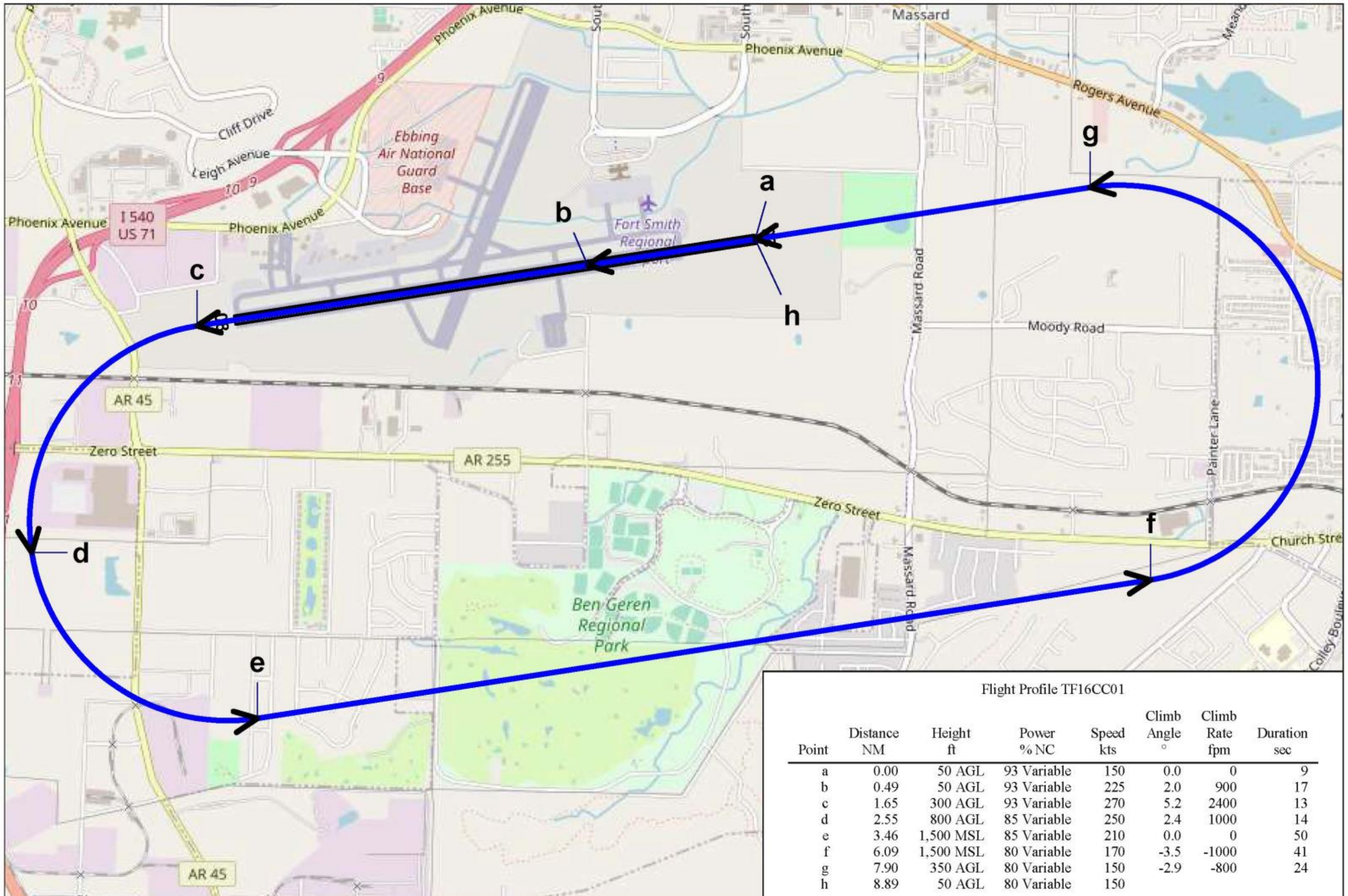
Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	0 AGL	93 Variable	0	0.0	0	20
b	0.39	0 AGL	93 Variable	145	3.7	1500	50
c	3.46	1,200 AGL	93 Variable	300	5.0	2900	57
d	8.56	3,910 AGL	86 Variable	350	4.0	2500	98
e	18.10	8,000 AGL	86 Variable	350	0.0	0	152
f	32.92	8,000 AGL	86 Variable	350			

Fort Smith Transient F-16C Flight Profile TF16CD01
Transient Departure

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
Scale in Feet 1:142,000 (1 inch = 11,800 feet)

N

238



Flight Profile TF16CC01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	50 AGL	93 Variable	150	0.0	0	9
b	0.49	50 AGL	93 Variable	225	2.0	900	17
c	1.65	300 AGL	93 Variable	270	5.2	2400	13
d	2.55	800 AGL	85 Variable	250	2.4	1000	14
e	3.46	1,500 MSL	85 Variable	210	0.0	0	50
f	6.09	1,500 MSL	80 Variable	170	-3.5	-1000	41
g	7.90	350 AGL	80 Variable	150	-2.9	-800	24
h	8.89	50 AGL	80 Variable	150			

Fort Smith Transient F-16C Flight Profile TF16CC01

VFR CLOSED PATTERN

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:33,200 (1 inch = 2,770 feet)

N

239

Flight Profile TF18EA01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	49.37	9,978 AGL	84 Variable	300	0.0	0	354	
b	19.91	9,978 AGL	75 Variable	300	-11.8	-6300	47	
c	15.96	4,978 AGL	80 Variable	300	-1.8	-900	134	
d	5.74	2,978 AGL	80 Parallel	250	-3.1	-1100	57	3k at 7DME
e	2.74	1,978 AGL	81 Parallel	130	-9.0	-2100	42	2k at 4 DME
f	1.21	500 AGL	85 Parallel	130	-3.5	-800	34	
g	0.00	50 AGL	85 Parallel	130				

Fort Smith Transient F-18E/F Flight Profile TF18EA01

Transient F-18E/F Straight-in

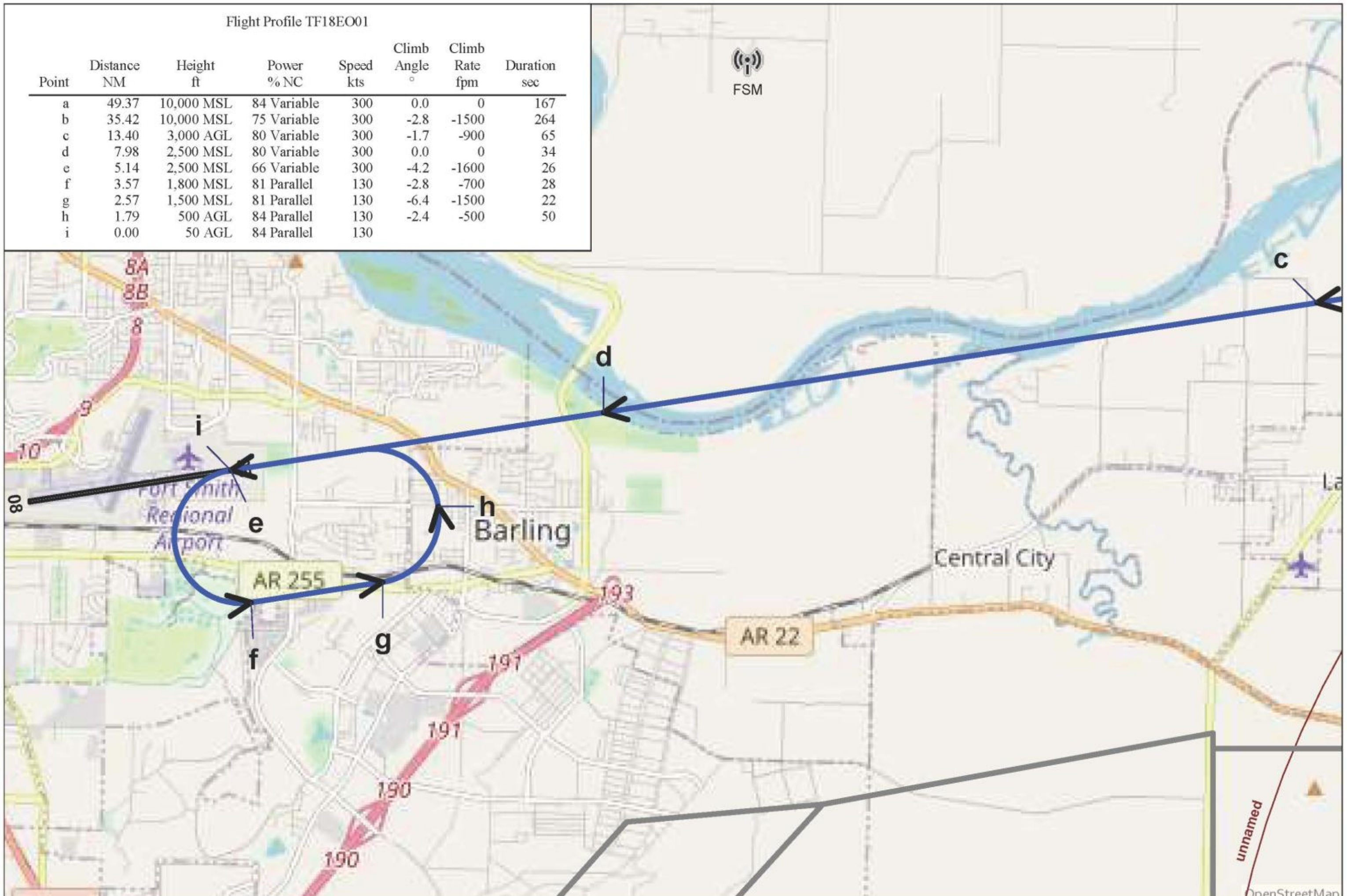
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000 52,000

Scale in Feet 1:153,000 (1 inch = 12,700 feet)

240

Flight Profile TF18EO01

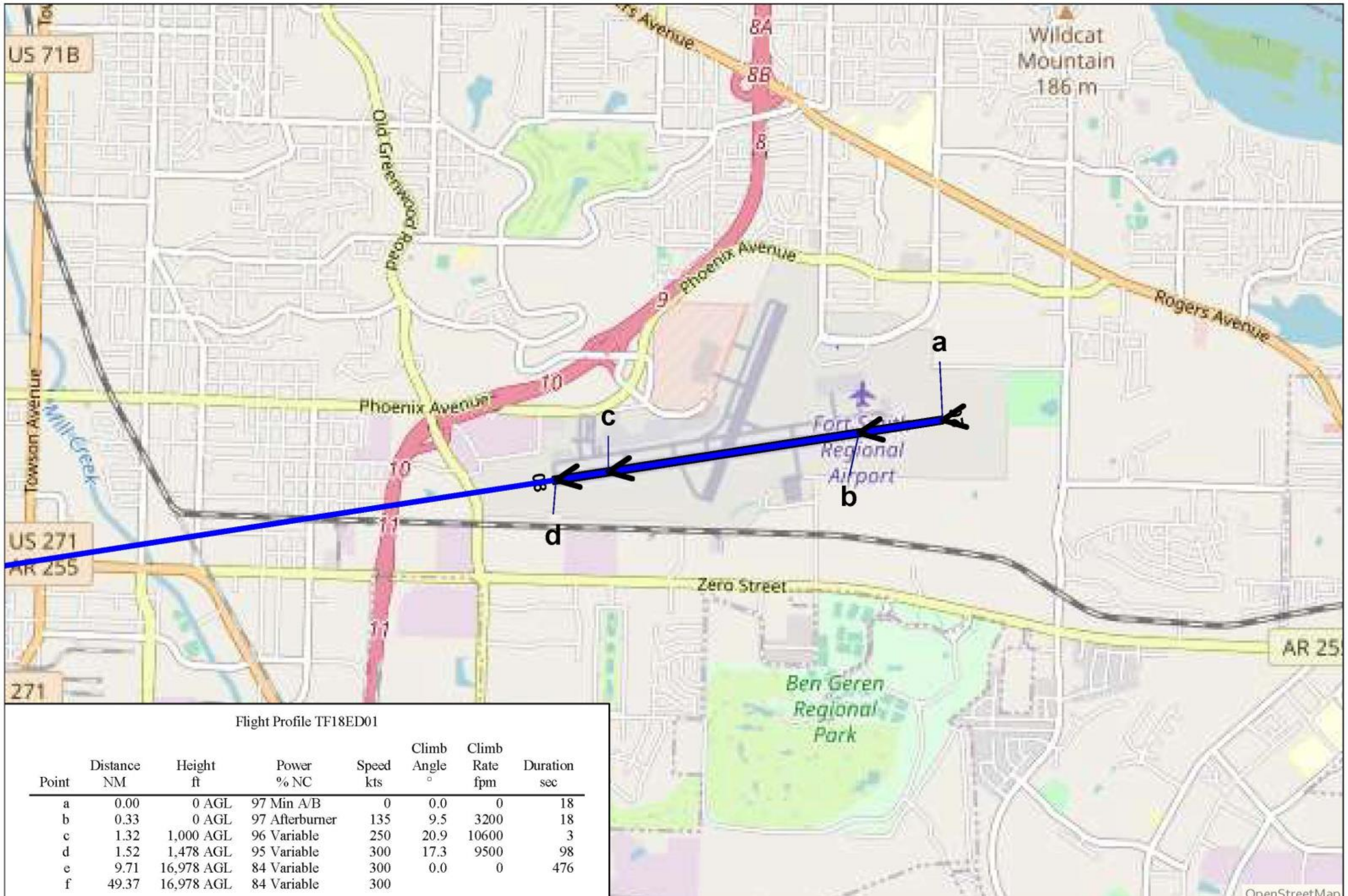
Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	49.37	10,000 MSL	84 Variable	300	0.0	0	167
b	35.42	10,000 MSL	75 Variable	300	-2.8	-1500	264
c	13.40	3,000 AGL	80 Variable	300	-1.7	-900	65
d	7.98	2,500 MSL	80 Variable	300	0.0	0	34
e	5.14	2,500 MSL	66 Variable	300	-4.2	-1600	26
f	3.57	1,800 MSL	81 Parallel	130	-2.8	-700	28
g	2.57	1,500 MSL	81 Parallel	130	-6.4	-1500	22
h	1.79	500 AGL	84 Parallel	130	-2.4	-500	50
i	0.00	50 AGL	84 Parallel	130			



Fort Smith Transient F-18E/F Flight Profile TF18EO01
Transient F-18E/F Overhead Break

Scale in Feet 1:85,500 (1 inch = 7,130 feet)

241



Flight Profile TF18ED01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	0 AGL	97 Min A/B	0	0.0	0	18
b	0.33	0 AGL	97 Afterburner	135	9.5	3200	18
c	1.32	1,000 AGL	96 Variable	250	20.9	10600	3
d	1.52	1,478 AGL	95 Variable	300	17.3	9500	98
e	9.71	16,978 AGL	84 Variable	300	0.0	0	476
f	49.37	16,978 AGL	84 Variable	300			

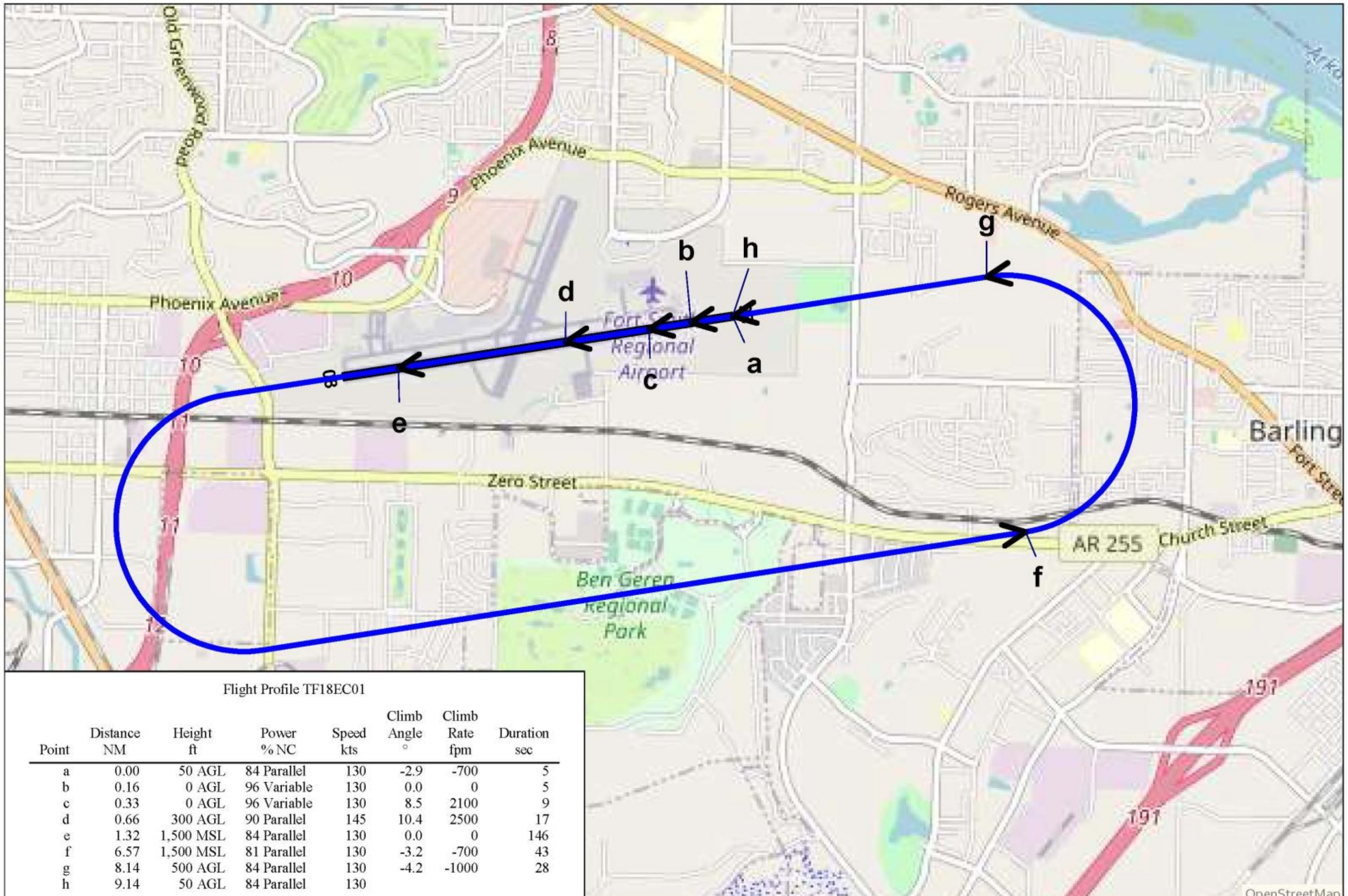
Fort Smith Transient F-18E/F Flight Profile TF18ED01
Transient F-18E/F Departure

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,300 (1 inch = 3,690 feet)

N

242



Flight Profile TF18EC01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	50 AGL	84 Parallel	130	-2.9	-700	5
b	0.16	0 AGL	96 Variable	130	0.0	0	5
c	0.33	0 AGL	96 Variable	130	8.5	2100	9
d	0.66	300 AGL	90 Parallel	145	10.4	2500	17
e	1.32	1,500 MSL	84 Parallel	130	0.0	0	146
f	6.57	1,500 MSL	81 Parallel	130	-3.2	-700	43
g	8.14	500 AGL	84 Parallel	130	-4.2	-1000	28
h	9.14	50 AGL	84 Parallel	130			

Fort Smith Transient F-18E/F Flight Profile TF18EC01
Transient F-18E/F Closed Pattern

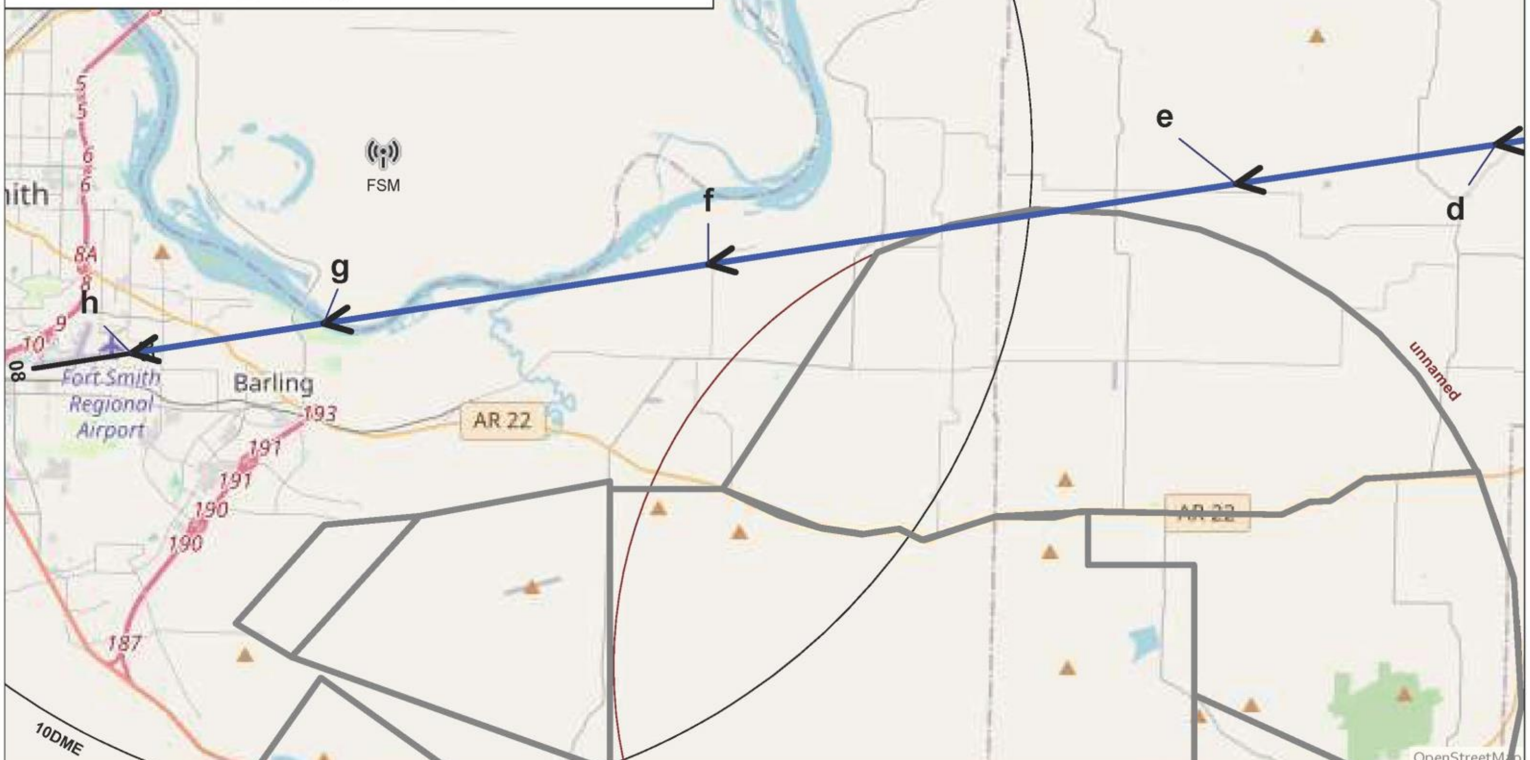
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000
Scale in Feet 1:44,300 (1 inch = 3,690 feet)

N

243

Flight Profile TC135A01

Point	Distance NM	Height ft	Power LBS/HR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	46.34	11,000 MSL	1500 Intermediate	220	0.0	0	139
b	37.84	11,000 MSL	1500 Intermediate	220	-2.8	-1000	174
c	27.67	8,000 MSL	1500 Approach	200	-7.4	-2600	115
d	21.27	2,500 AGL	1500 Approach	200	0.0	0	77
e	17.22	2,500 AGL	2300 Approach	180	0.0	0	177
f	8.99	2,500 AGL	2000 Approach	155	-2.8	-800	139
g	3.00	750 AGL	2000 Approach	155	-2.2	-600	72
h	0.00	50 AGL	2000 Approach	145			



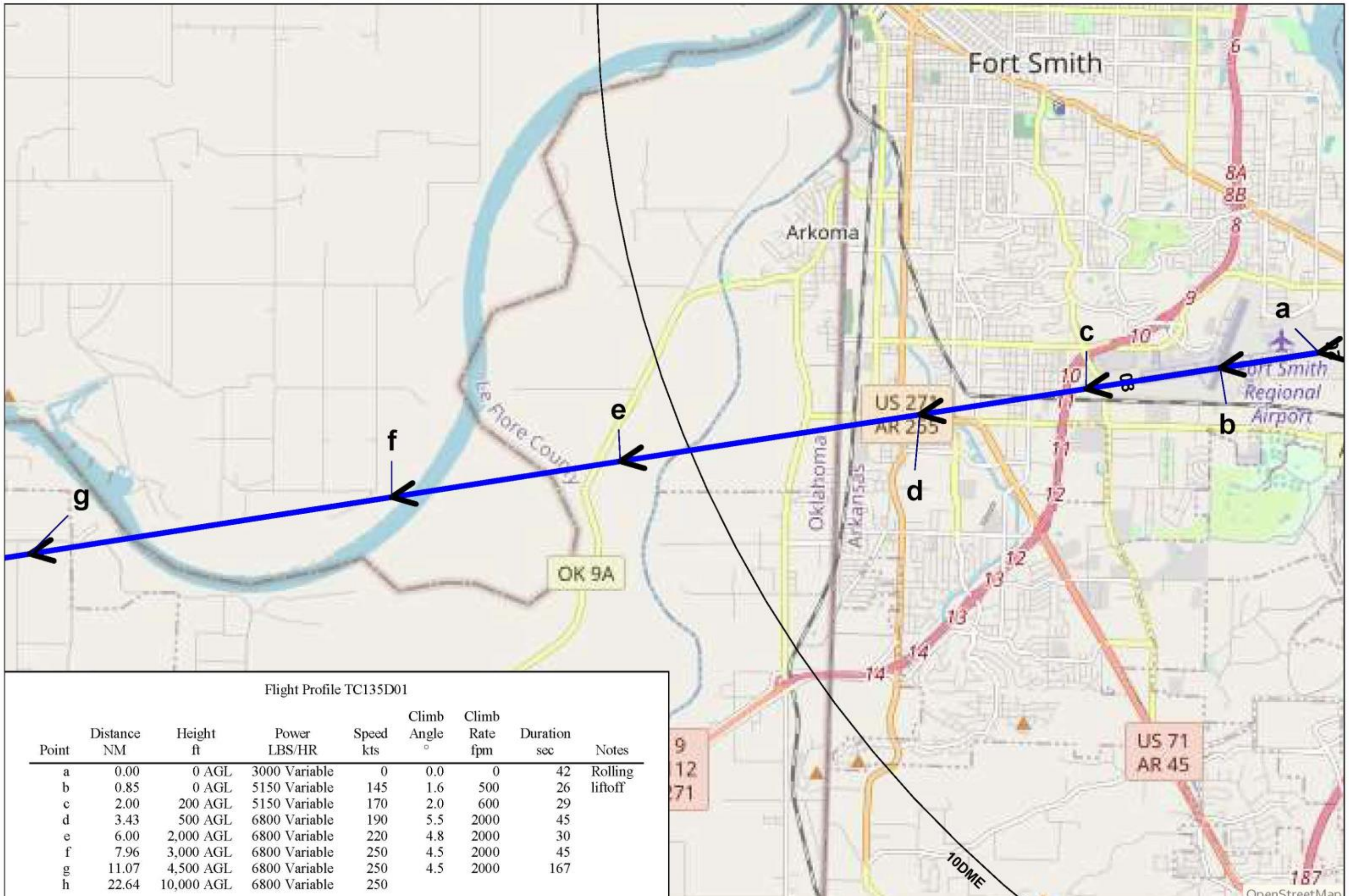
Fort Smith Transient KC-135R Flight Profile TC135A01

Straight-in

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:199,000 (1 inch = 16,600 feet)

244



Flight Profile TC135D01

Point	Distance NM	Height ft	Power LBS/HR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	3000 Variable	0	0.0	0	42	Rolling
b	0.85	0 AGL	5150 Variable	145	1.6	500	26	liftoff
c	2.00	200 AGL	5150 Variable	170	2.0	600	29	
d	3.43	500 AGL	6800 Variable	190	5.5	2000	45	
e	6.00	2,000 AGL	6800 Variable	220	4.8	2000	30	
f	7.96	3,000 AGL	6800 Variable	250	4.5	2000	45	
g	11.07	4,500 AGL	6800 Variable	250	4.5	2000	167	
h	22.64	10,000 AGL	6800 Variable	250				

Fort Smith Transient KC-135R Flight Profile TC135D01
Rolling/Accel Departure

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:96,700 (1 inch = 8,060 feet)

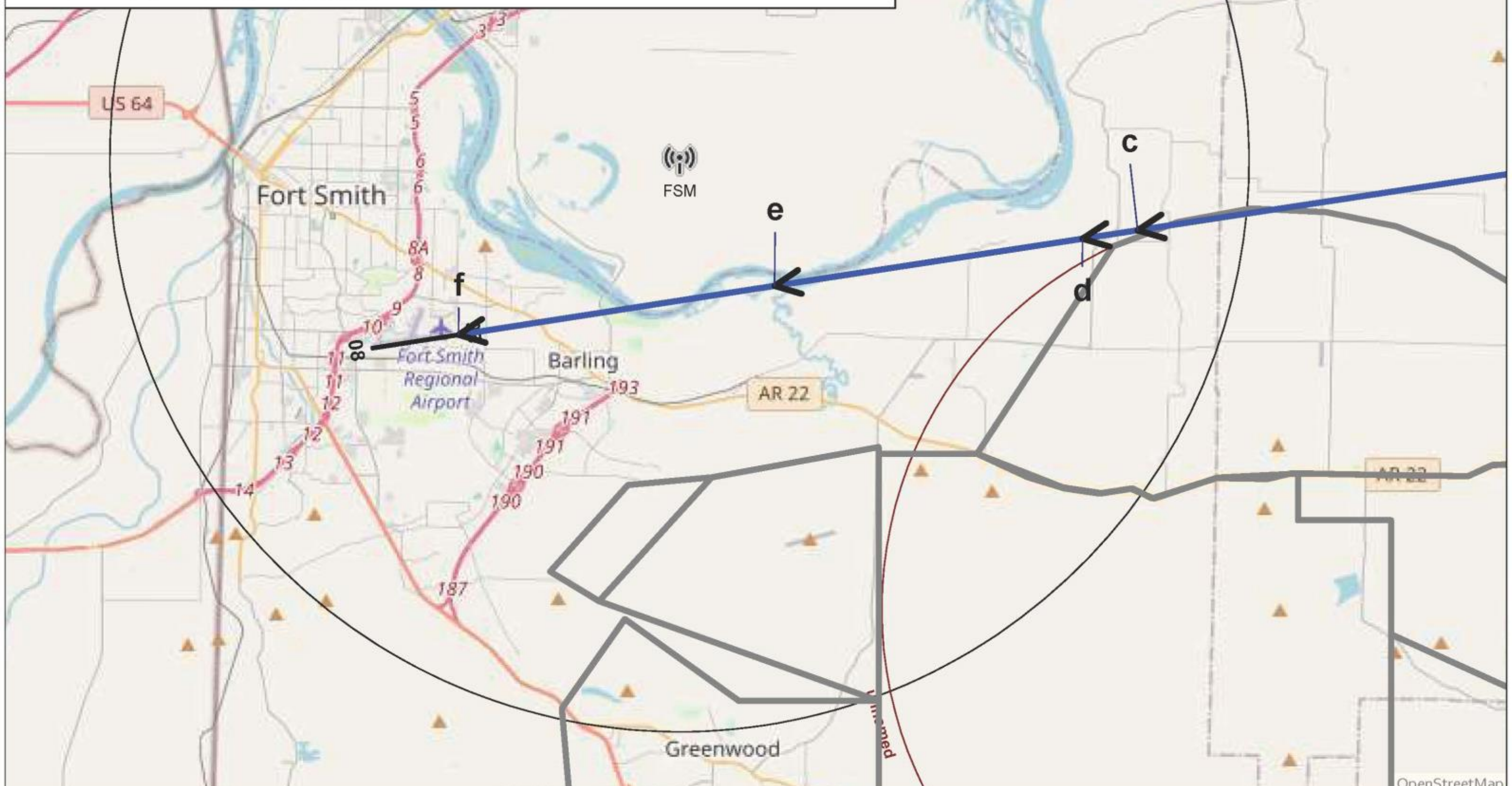
N

245

g

Flight Profile TP8A01

Point	Distance NM	Height ft	Power LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	49.37	10,000 MSL	17760 Variable	250	0.0	0	111	0.0 deg, 0 fpm, 111 sec
b	41.67	10,000 MSL	4610 Variable	250	-1.8	-800	426	-1.9 deg, -840 fpm, 426 sec
c	12.07	4,000 AGL	17760 Variable	250	-11.4	-4400	16	-11.4 deg, -4310 fpm, 16 sec
d	11.09	2,800 AGL	17760 Variable	180	-2.2	-600	125	-2.2 deg, -620 fpm, 125 sec
e	5.62	1,500 AGL	5530 Parallel	135	-2.4	-600	150	-2.4 deg, -580 fpm, 150 sec
f	0.00	50 AGL	5530 Parallel	135				



Fort Smith Transient P-8 Flight Profile TP8A01
Transient Arrival

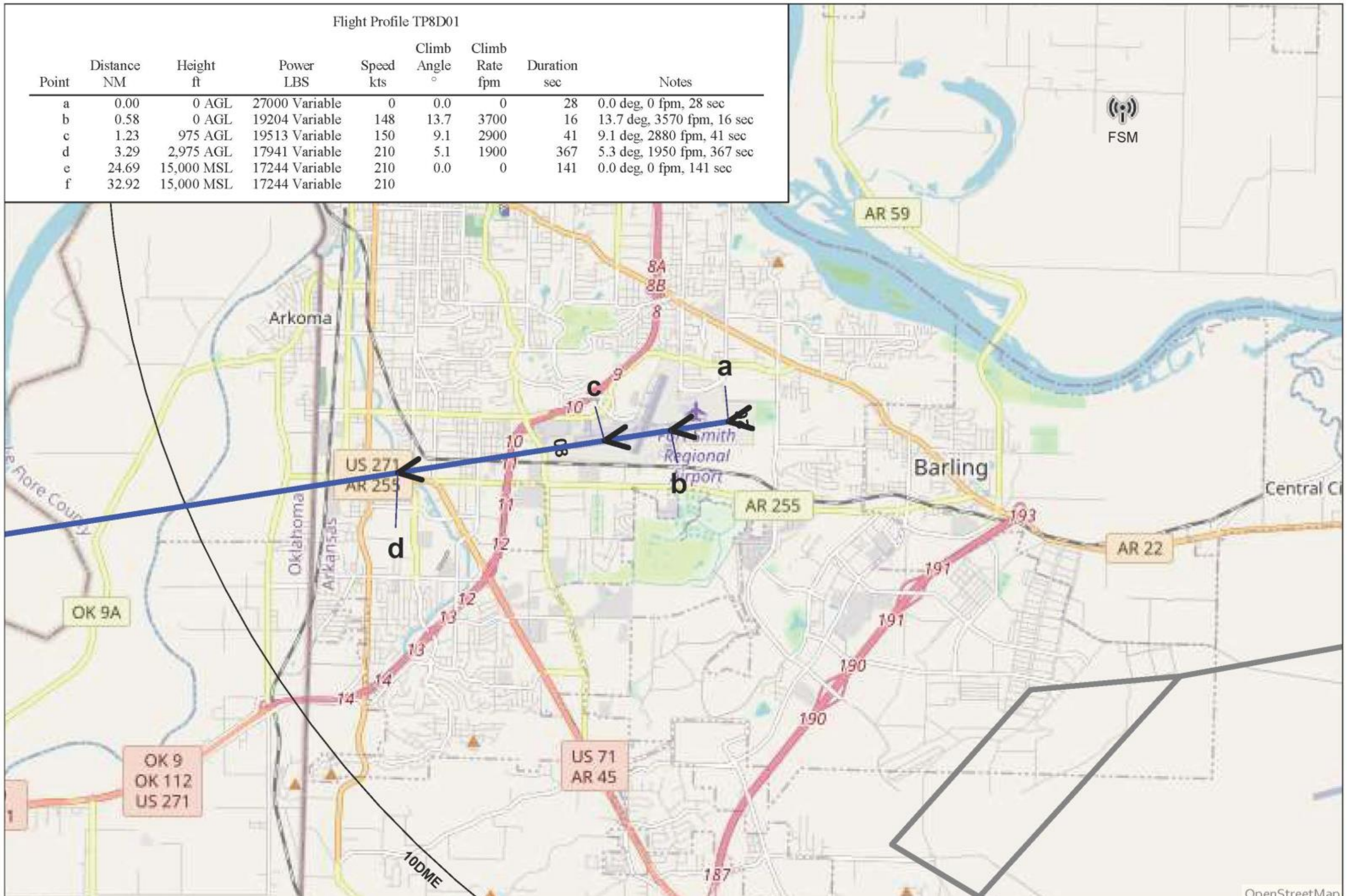
0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

Scale in Feet 1:224,000 (1 inch = 18,700 feet)

246

Flight Profile TP8D01

Point	Distance NM	Height ft	Power LBS	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	27000 Variable	0	0.0	0	28	0.0 deg, 0 fpm, 28 sec
b	0.58	0 AGL	19204 Variable	148	13.7	3700	16	13.7 deg, 3570 fpm, 16 sec
c	1.23	975 AGL	19513 Variable	150	9.1	2900	41	9.1 deg, 2880 fpm, 41 sec
d	3.29	2,975 AGL	17941 Variable	210	5.1	1900	367	5.3 deg, 1950 fpm, 367 sec
e	24.69	15,000 MSL	17244 Variable	210	0.0	0	141	0.0 deg, 0 fpm, 141 sec
f	32.92	15,000 MSL	17244 Variable	210				



Fort Smith Transient P-8 Flight Profile TP8D01
Transient Departure

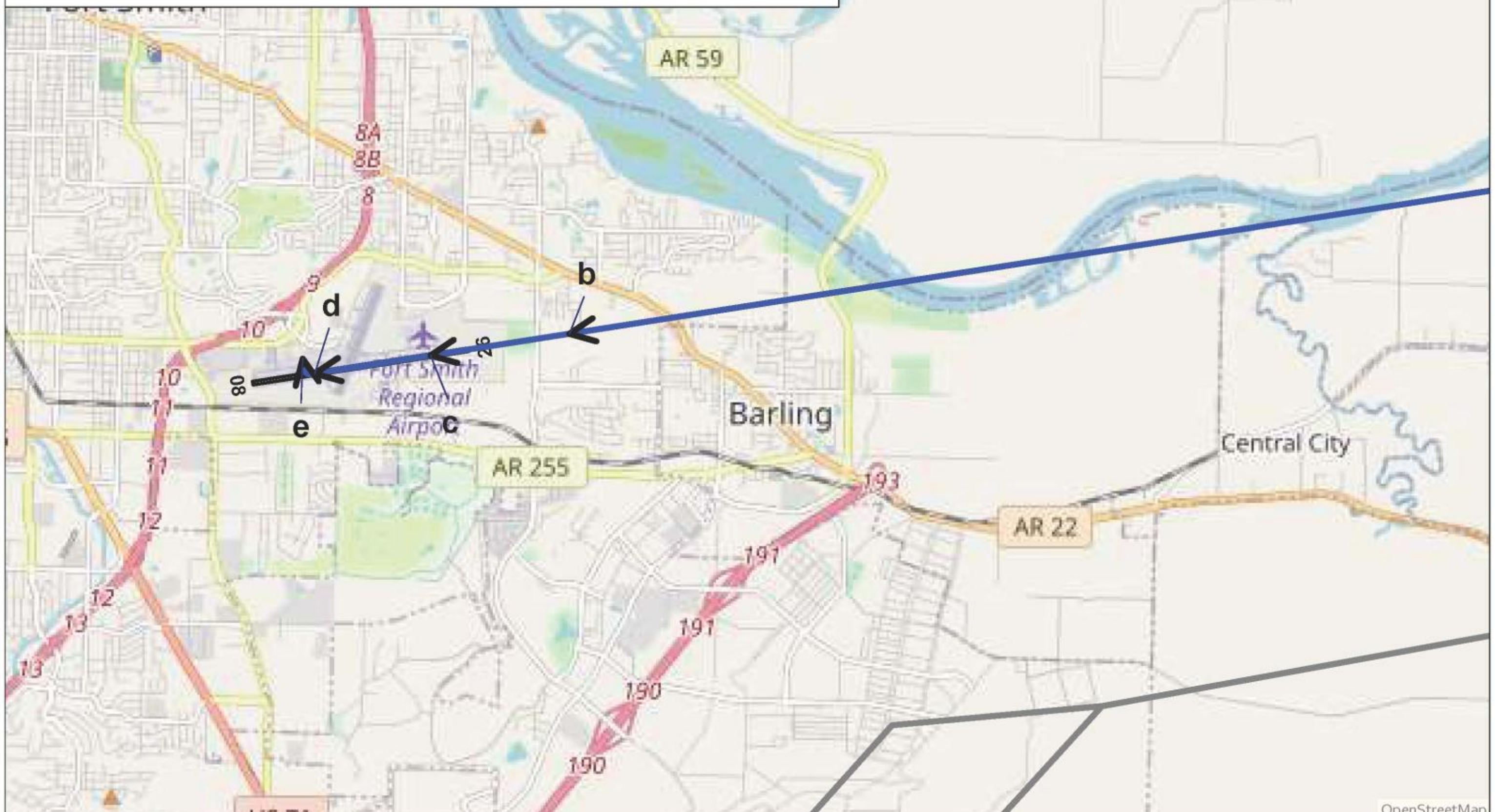
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:112,000 (1 inch = 9,340 feet)

247

Flight Profile TH60A01

Point	Distance NM	Height ft	Power KNOTS	Notes
a	32.92	800 AGL	Flyover 150 kts	actual en route speed is 140 KIAS, limited by fixed model setting
b	1.97	800 AGL	Flyover 150 kts	actual en route speed is 140 KIAS, limited by fixed model setting
c	0.99	800 AGL	Flyover 150 kts	actual en route speed is 140 KIAS, limited by fixed model setting
d	0.16	300 AGL	Approach 69 kts	
e	0.00	50 AGL	Approach 69 kts	

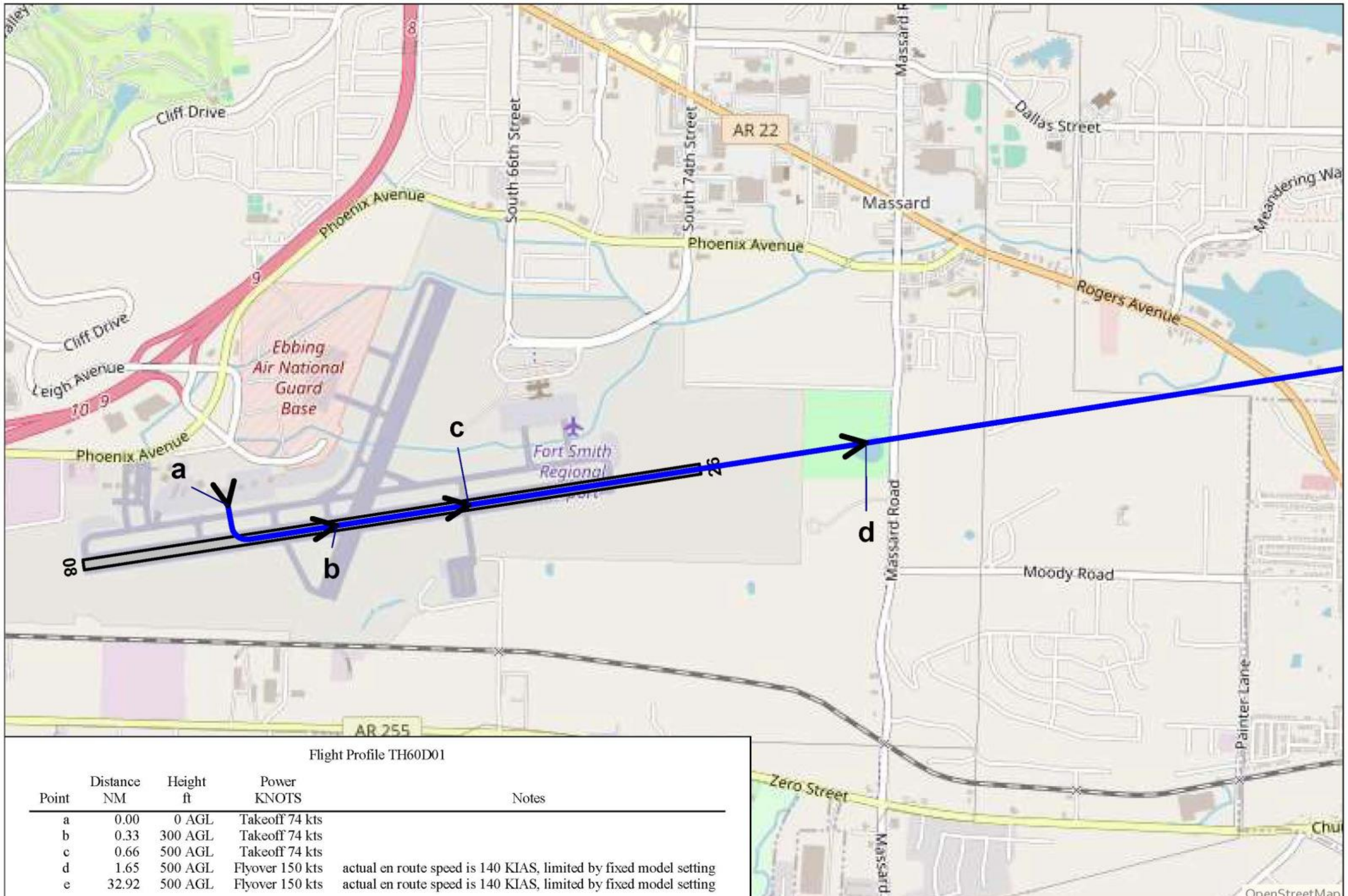


Fort Smith Transient SK70 (UH-60A) BLACKH Flight Profile TH60A01
Transient Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000
Scale in Feet 1:88,700 (1 inch = 7,390 feet)

N

248



Flight Profile TH60D01

Point	Distance NM	Height ft	Power KNOTS	Notes
a	0.00	0 AGL	Takeoff 74 kts	
b	0.33	300 AGL	Takeoff 74 kts	
c	0.66	500 AGL	Takeoff 74 kts	
d	1.65	500 AGL	Flyover 150 kts	actual en route speed is 140 KIAS, limited by fixed model setting
e	32.92	500 AGL	Flyover 150 kts	actual en route speed is 140 KIAS, limited by fixed model setting

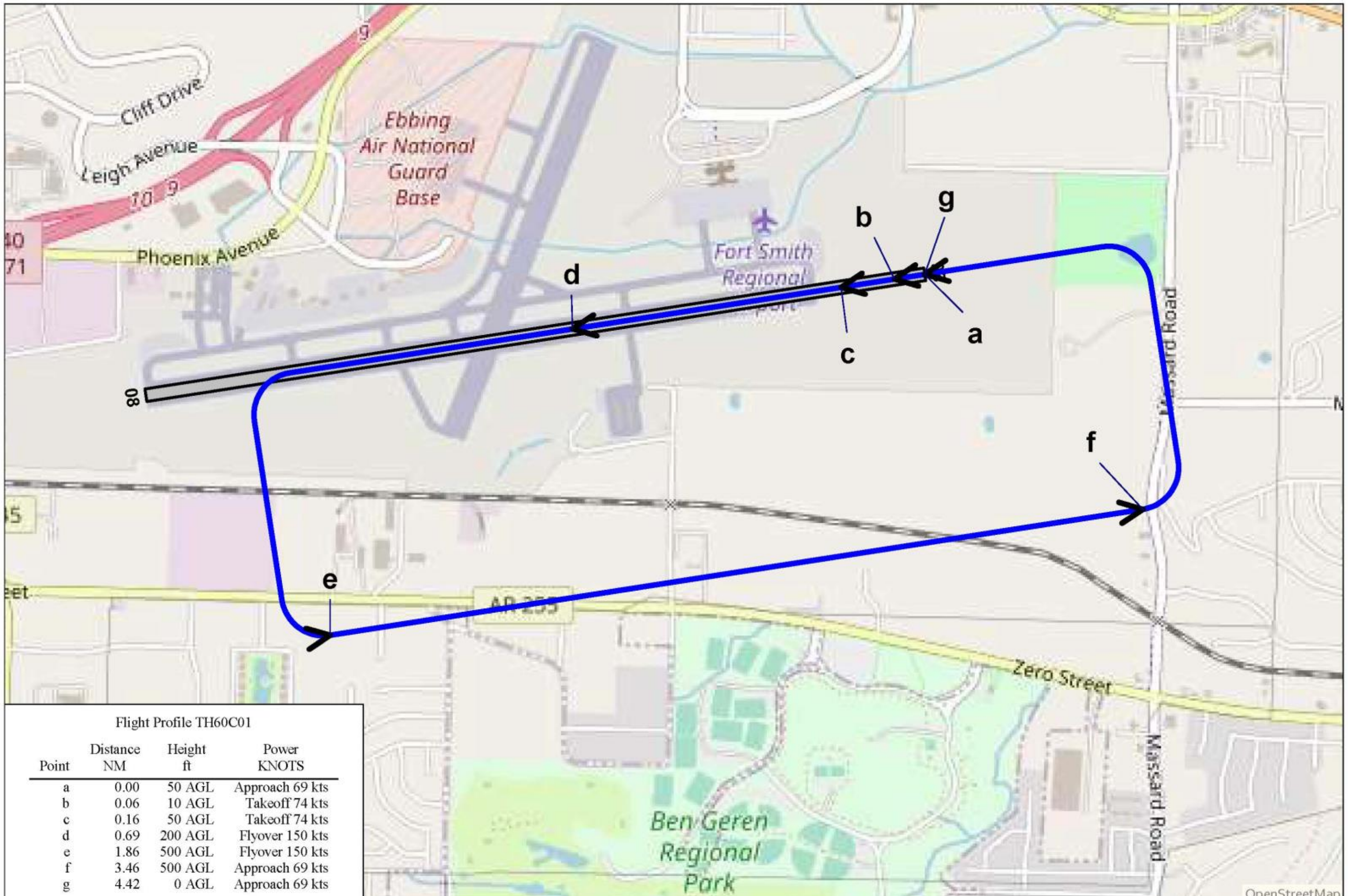
Fort Smith Transient SK70 (UH-60A) BLACKH Flight Profile TH60D01

Transient Departure

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000

Scale in Feet 1:28,000 (1 inch = 2,330 feet)

249



Point	Distance NM	Height ft	Power KNOTS
a	0.00	50 AGL	Approach 69 kts
b	0.06	10 AGL	Takeoff 74 kts
c	0.16	50 AGL	Takeoff 74 kts
d	0.69	200 AGL	Flyover 150 kts
e	1.86	500 AGL	Flyover 150 kts
f	3.46	500 AGL	Approach 69 kts
g	4.42	0 AGL	Approach 69 kts

Flight Profile TH60C01

Fort Smith Transient SK70 (UH-60A) BLACKH Flight Profile TH60C01
CLOSED PATTERN

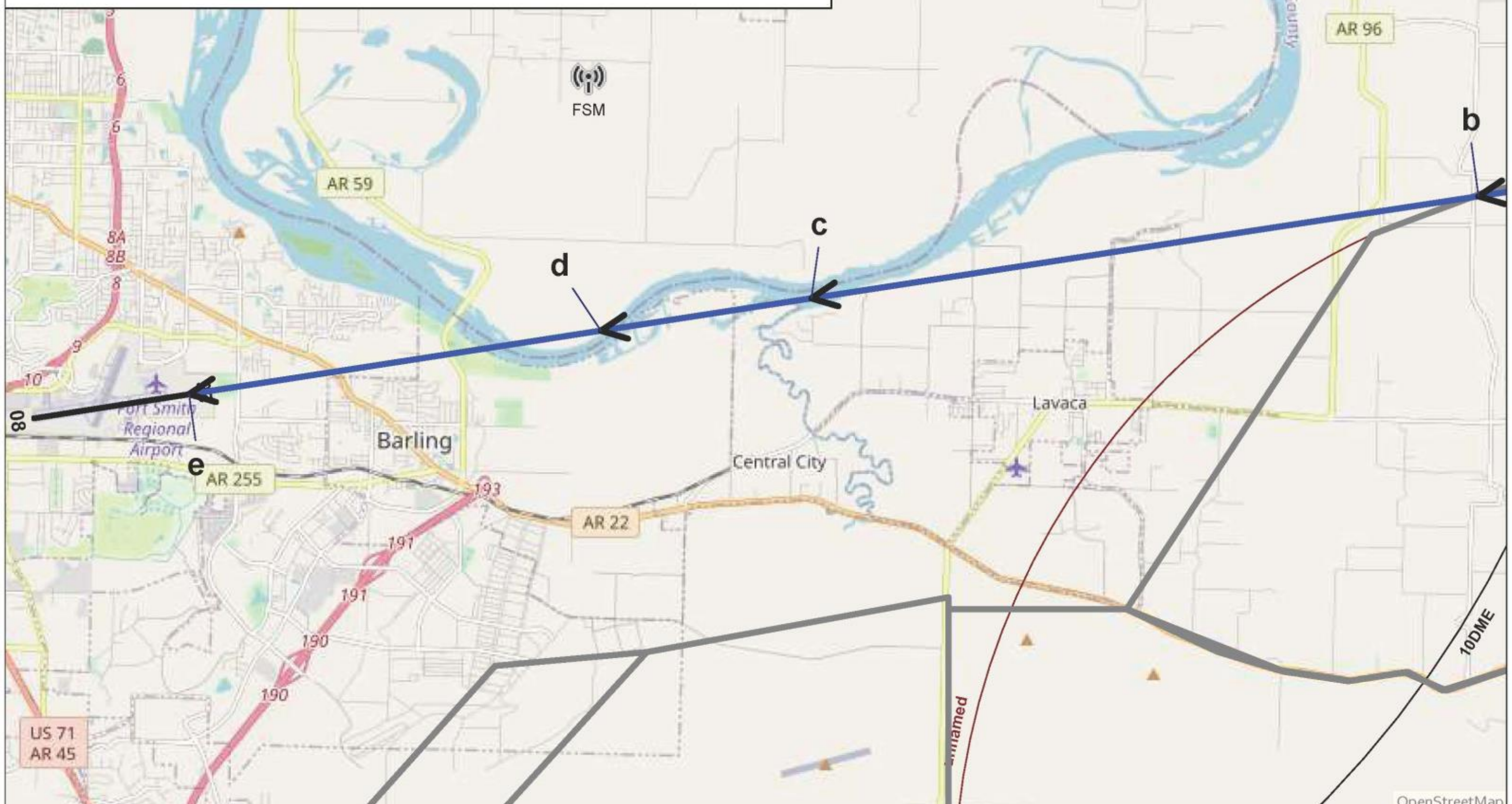
0 1,000 2,000 3,000 4,000 5,000 6,000 7,000
Scale in Feet 1:22,200 (1 inch = 1,850 feet)

N

250

Flight Profile TT1A01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	8,000 MSL	80 Variable	240	-2.1	-800	347	
b	12.67	3,000 AGL	80 Variable	180	-1.4	-400	135	
c	6.12	2,000 AGL	75 Variable	170	-3.0	-800	51	7 DME CONFIGURED
d	4.05	1,338 AGL	65 Variable	120	-3.0	-600	127	FAF 5 DME
e	0.00	50 AGL	65 Variable	110				



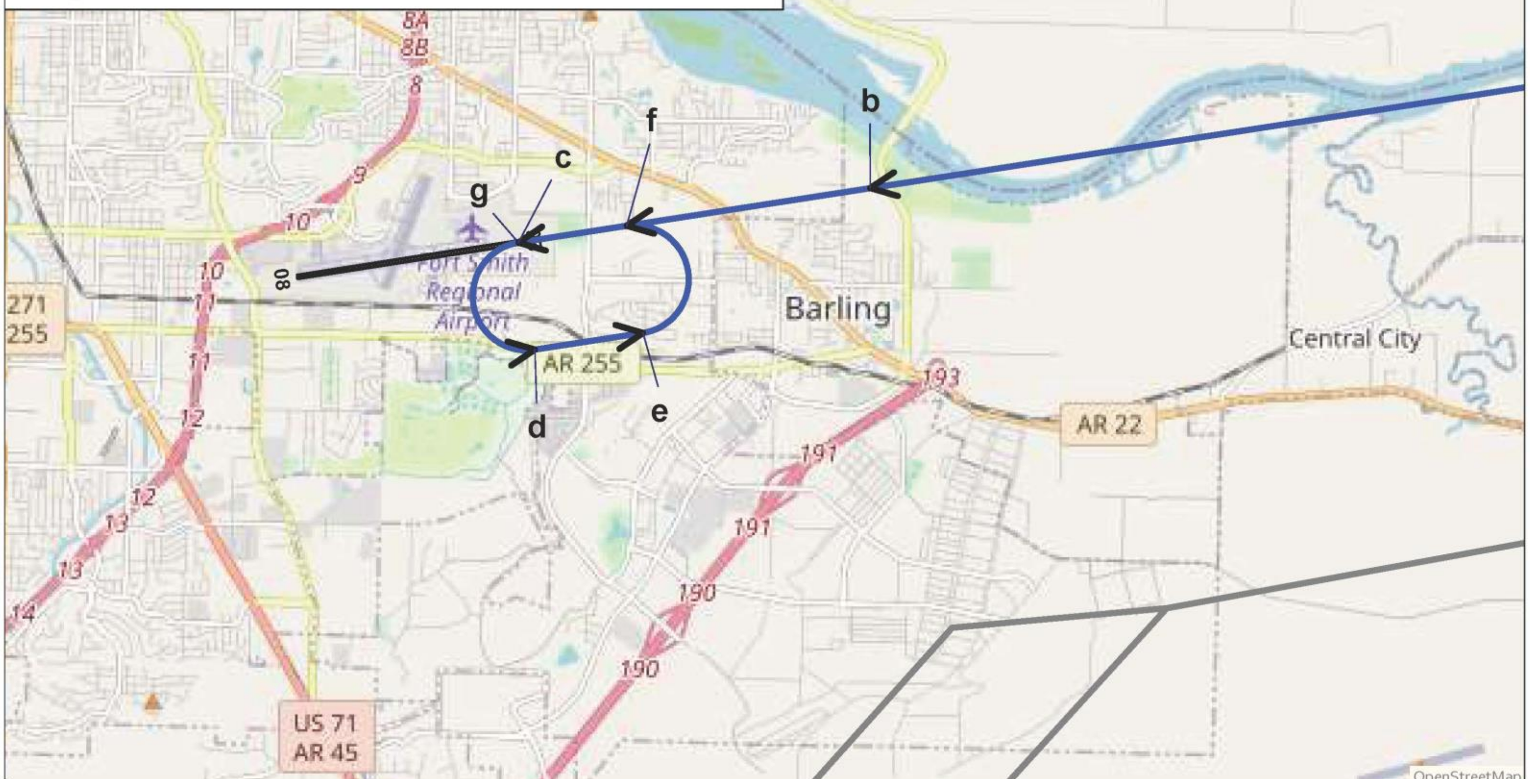
Fort Smith Transient T-1 Flight Profile TT1A01
Transient Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000
Scale in Feet 1:124,000 (1 inch = 10,300 feet)

251

Flight Profile TT1O01

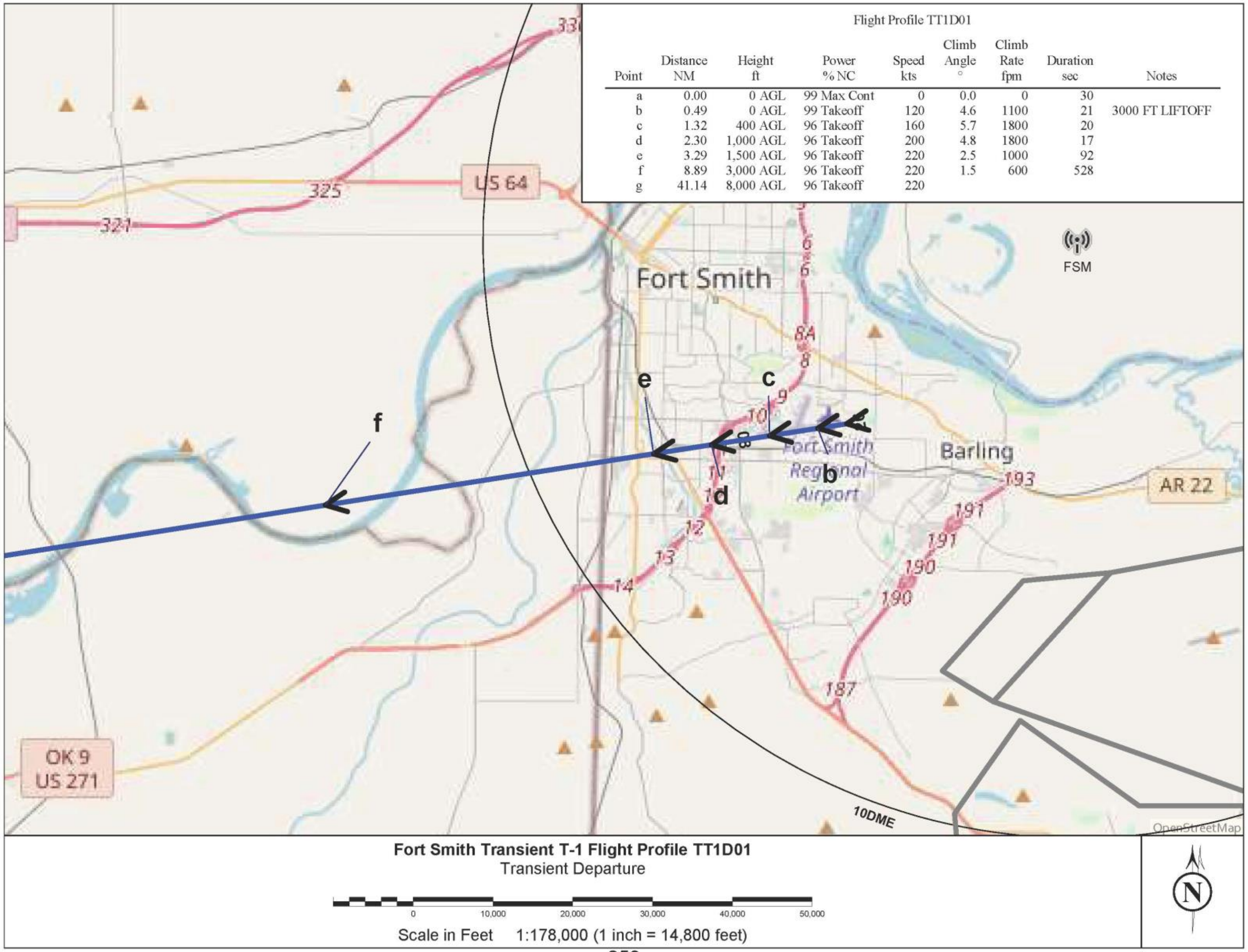
Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	5,000 MSL	80 Variable	250	-0.9	-400	384	
b	6.27	2,500 MSL	80 Variable	250	0.0	0	35	
c	3.82	2,500 MSL	50 Variable	250	-5.7	-2000	21	break
d	2.66	1,800 MSL	80 Variable	150	-3.8	-900	20	GEAR DOWN
e	1.91	1,500 MSL	65 Variable	120	-5.9	-1200	36	
f	0.75	300 AGL	65 Variable	110	-3.1	-600	25	
g	0.00	50 AGL	65 Variable	110				



Fort Smith Transient T-1 Flight Profile TT1O01
Overhead Break Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000
Scale in Feet 1:88,700 (1 inch = 7,390 feet)

252



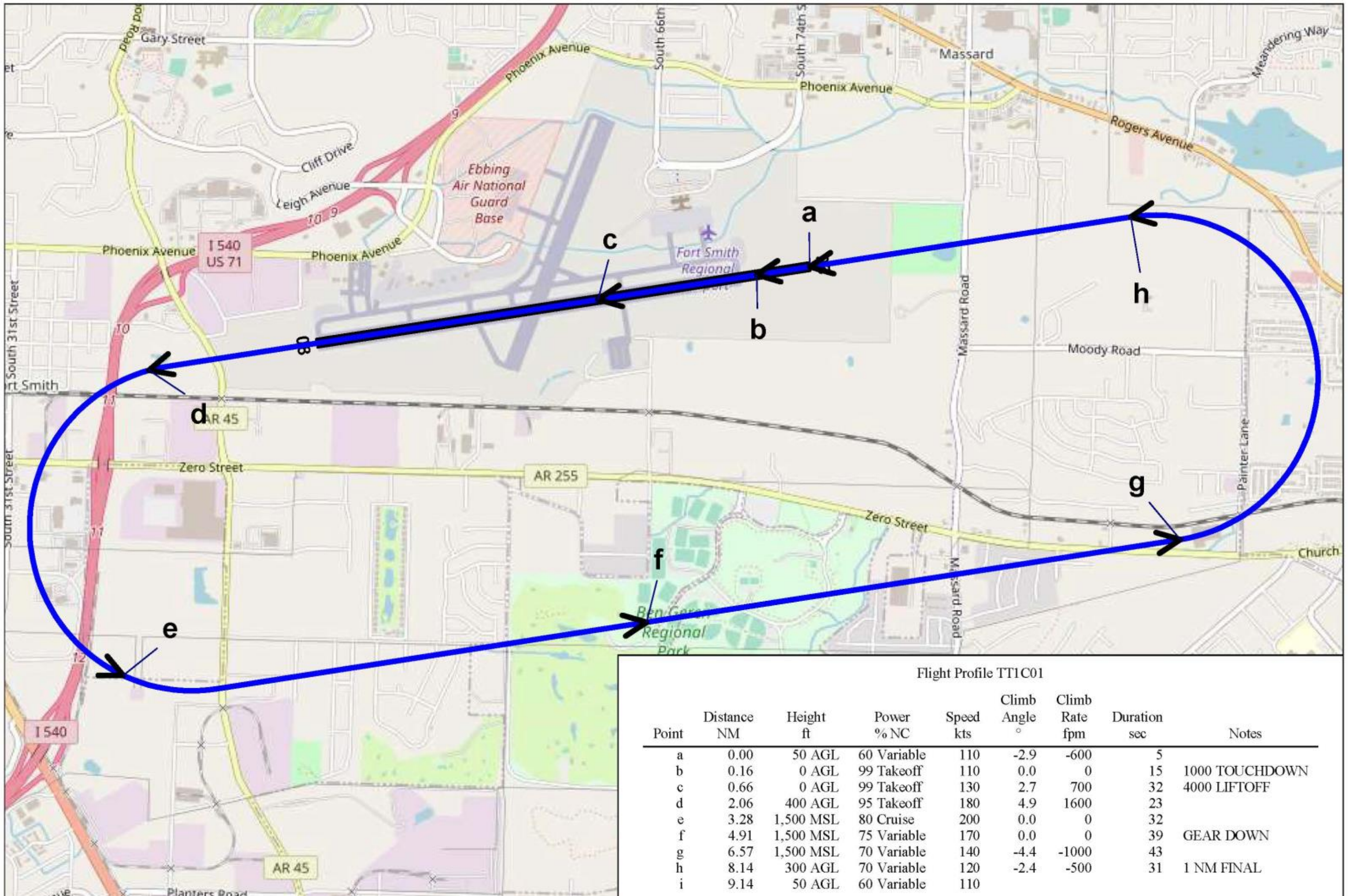
Flight Profile TT1D01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	99 Max Cont	0	0.0	0	30	
b	0.49	0 AGL	99 Takeoff	120	4.6	1100	21	3000 FT LIFTOFF
c	1.32	400 AGL	96 Takeoff	160	5.7	1800	20	
d	2.30	1,000 AGL	96 Takeoff	200	4.8	1800	17	
e	3.29	1,500 AGL	96 Takeoff	220	2.5	1000	92	
f	8.89	3,000 AGL	96 Takeoff	220	1.5	600	528	
g	41.14	8,000 AGL	96 Takeoff	220				

Fort Smith Transient T-1 Flight Profile TT1D01
Transient Departure

Scale in Feet 1:178,000 (1 inch = 14,800 feet)

253



Flight Profile TT1C01

Point	Distance NM	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	60 Variable	110	-2.9	-600	5	
b	0.16	0 AGL	99 Takeoff	110	0.0	0	15	1000 TOUCHDOWN
c	0.66	0 AGL	99 Takeoff	130	2.7	700	32	4000 LIFTOFF
d	2.06	400 AGL	95 Takeoff	180	4.9	1600	23	
e	3.28	1,500 MSL	80 Cruise	200	0.0	0	32	
f	4.91	1,500 MSL	75 Variable	170	0.0	0	39	GEAR DOWN
g	6.57	1,500 MSL	70 Variable	140	-4.4	-1000	43	
h	8.14	300 AGL	70 Variable	120	-2.4	-500	31	1 NM FINAL
i	9.14	50 AGL	60 Variable	110				

Fort Smith Transient T-1 Flight Profile TT1C01
Closed Pattern

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:35,000 (1 inch = 2,920 feet)

254

Flight Profile TT38A01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	41.14	7,000 MSL	80 Variable	300	-0.9	-500	126	
b	30.68	6,000 MSL	80 Variable	300	-1.0	-500	115	
c	21.13	5,000 MSL	80 Variable	300	-1.9	-1000	118	
d	11.29	3,000 MSL	80 Variable	300	-1.0	-400	75	
e	6.09	2,000 AGL	95 Variable	200	-3.0	-1000	62	GEAR DOWN
f	2.96	1,000 AGL	88 Variable	165	-3.0	-900	67	FAF
g	0.00	50 AGL	88 Variable	155				

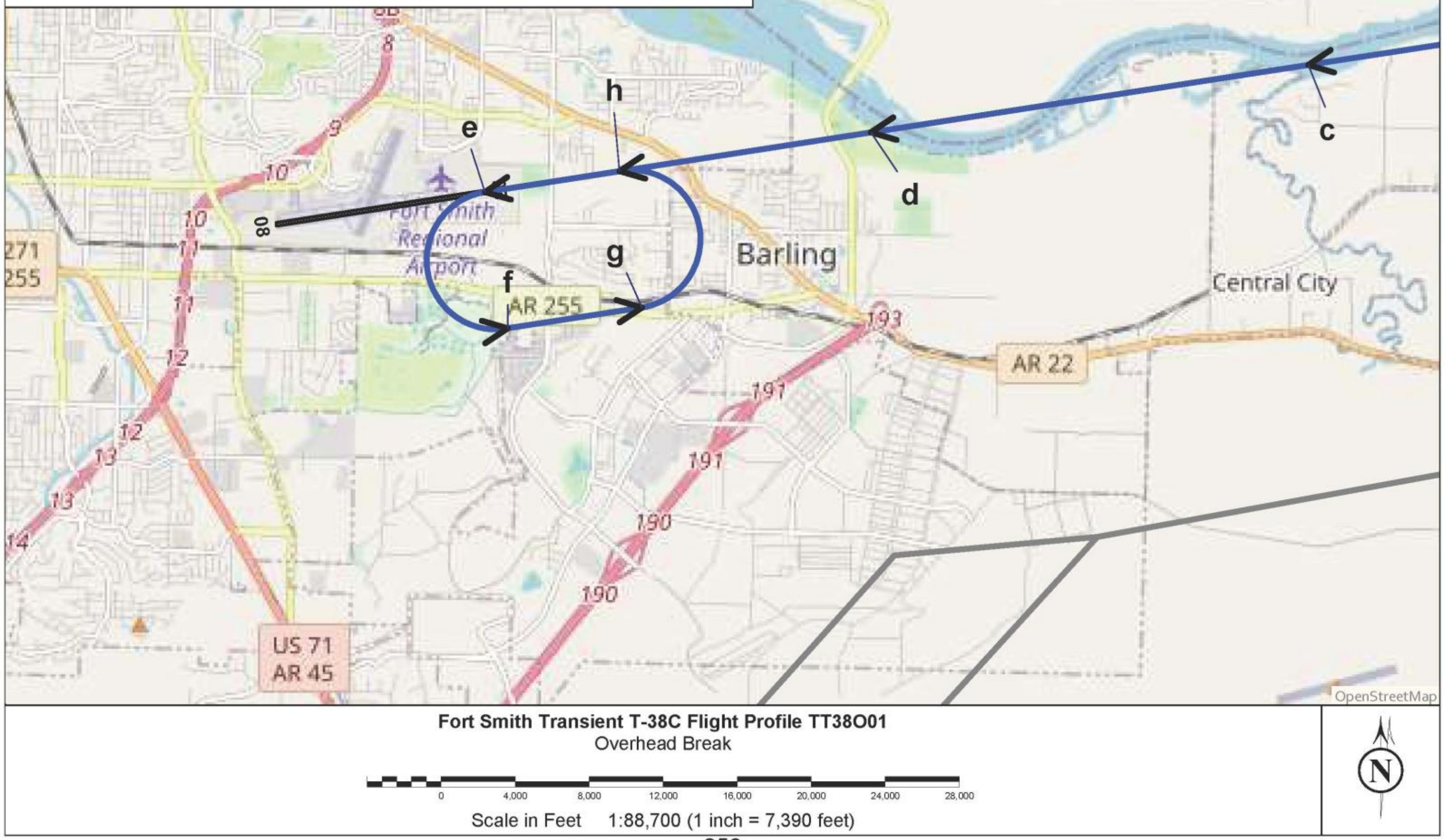
Fort Smith Transient T-38C Flight Profile TT38A01
Transient Arrival

Scale in Feet 1:178,000 (1 inch = 14,800 feet)

255

Flight Profile TT38O01

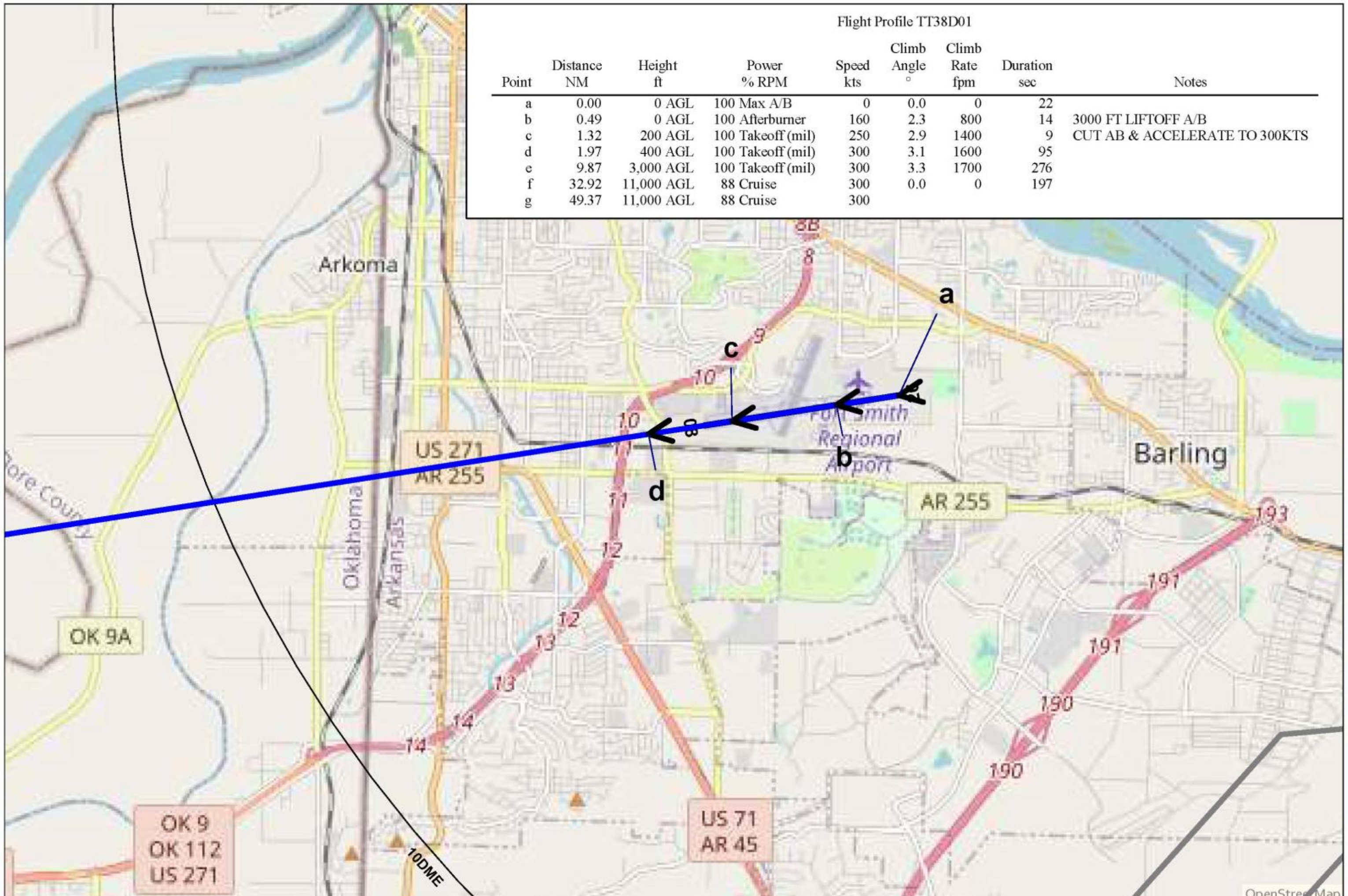
Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	6,000 MSL	80 Cruise	300	0.0	0	140	
b	21.24	6,000 MSL	80 Cruise	300	-2.4	-1300	121	
c	11.19	3,000 AGL	88 Cruise	300	-2.8	-1500	39	
d	7.98	2,500 MSL	88 Cruise	300	0.0	0	37	
e	5.14	2,500 MSL	80 Cruise	250	-4.2	-1700	25	
f	3.56	1,800 MSL	95 Approach	200	-2.9	-1000	18	GEAR DOWN
g	2.57	1,500 MSL	89 Approach	200	-4.3	-1400	31	
h	0.99	300 AGL	88 Approach	165	-2.4	-700	22	1 NM FINAL
i	0.00	50 AGL	88 Approach	155				



Fort Smith Transient T-38C Flight Profile TT38O01
Overhead Break

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

256



Flight Profile TT38D01

Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	0 AGL	100 Max A/B	0	0.0	0	22	
b	0.49	0 AGL	100 Afterburner	160	2.3	800	14	3000 FT LIFTOFF A/B
c	1.32	200 AGL	100 Takeoff (mil)	250	2.9	1400	9	CUT AB & ACCELERATE TO 300KTS
d	1.97	400 AGL	100 Takeoff (mil)	300	3.1	1600	95	
e	9.87	3,000 AGL	100 Takeoff (mil)	300	3.3	1700	276	
f	32.92	11,000 AGL	88 Cruise	300	0.0	0	197	
g	49.37	11,000 AGL	88 Cruise	300				

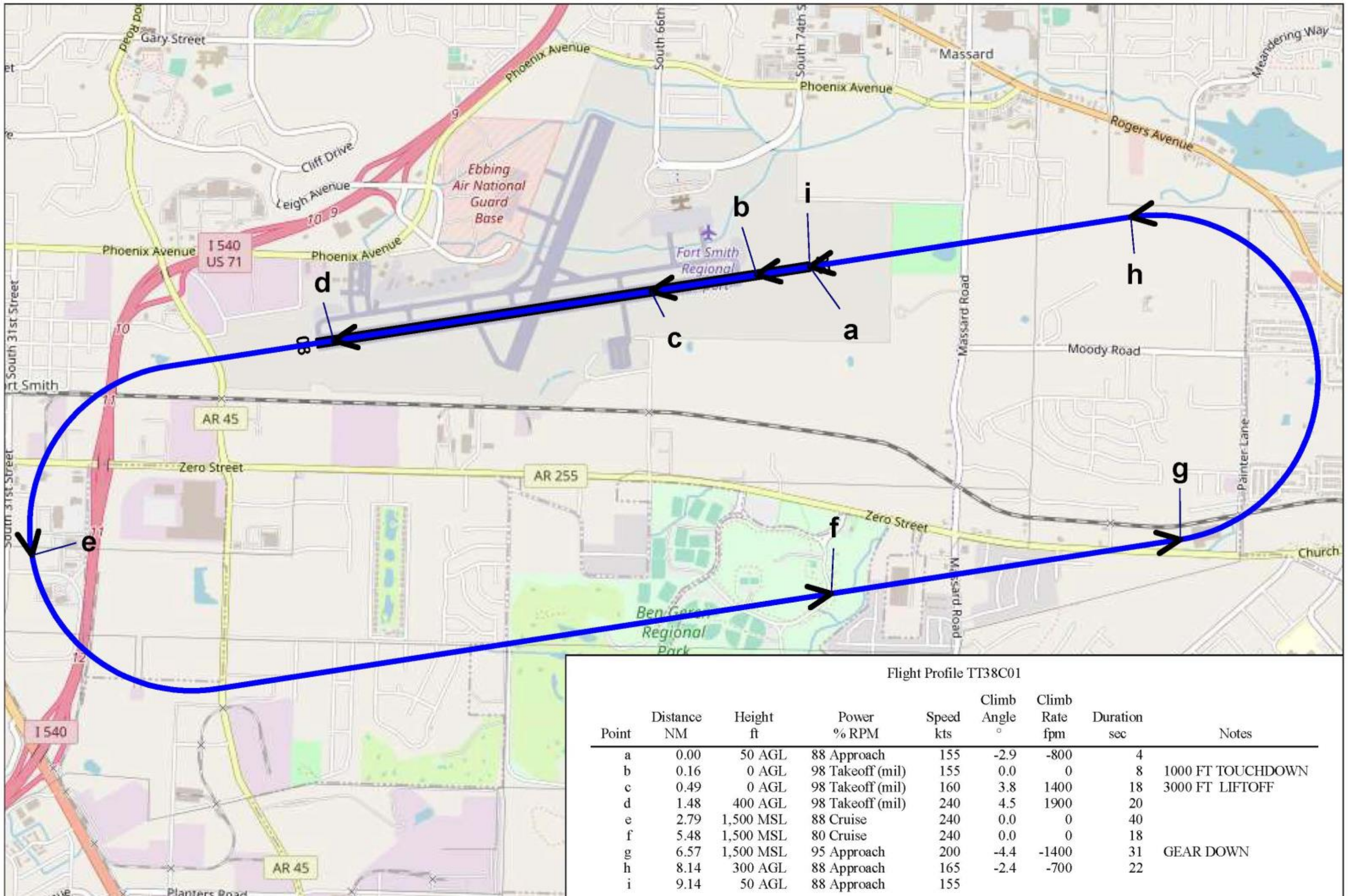
Fort Smith Transient T-38C Flight Profile TT38D01

Transient Departure

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

257



Flight Profile TT38C01

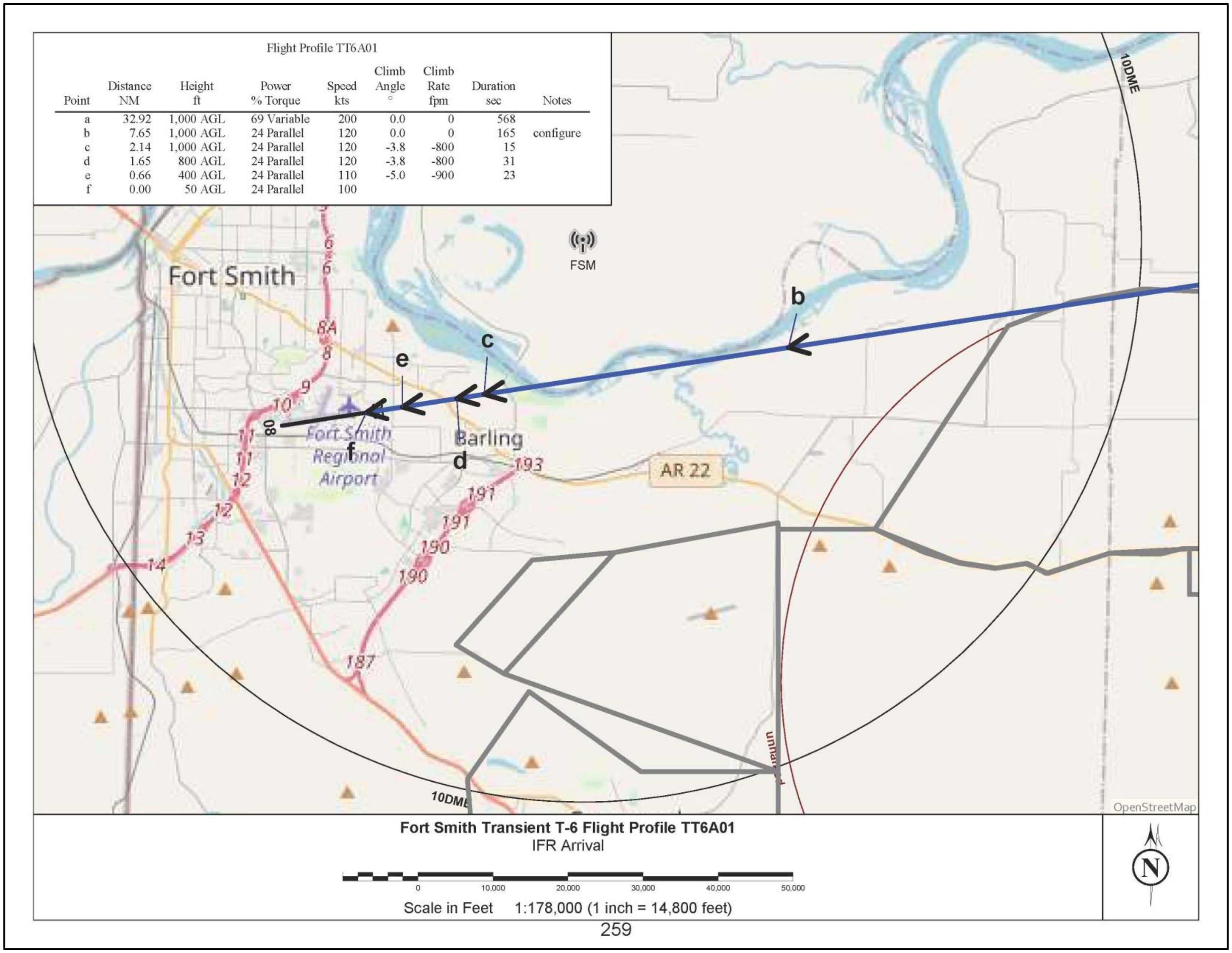
Point	Distance NM	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0.00	50 AGL	88 Approach	155	-2.9	-800	4	
b	0.16	0 AGL	98 Takeoff (mil)	155	0.0	0	8	1000 FT TOUCHDOWN
c	0.49	0 AGL	98 Takeoff (mil)	160	3.8	1400	18	3000 FT LIFTOFF
d	1.48	400 AGL	98 Takeoff (mil)	240	4.5	1900	20	
e	2.79	1,500 MSL	88 Cruise	240	0.0	0	40	
f	5.48	1,500 MSL	80 Cruise	240	0.0	0	18	
g	6.57	1,500 MSL	95 Approach	200	-4.4	-1400	31	GEAR DOWN
h	8.14	300 AGL	88 Approach	165	-2.4	-700	22	
i	9.14	50 AGL	88 Approach	155				

Fort Smith Transient T-38C Flight Profile TT38C01
Closed Pattern

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:35,000 (1 inch = 2,920 feet)

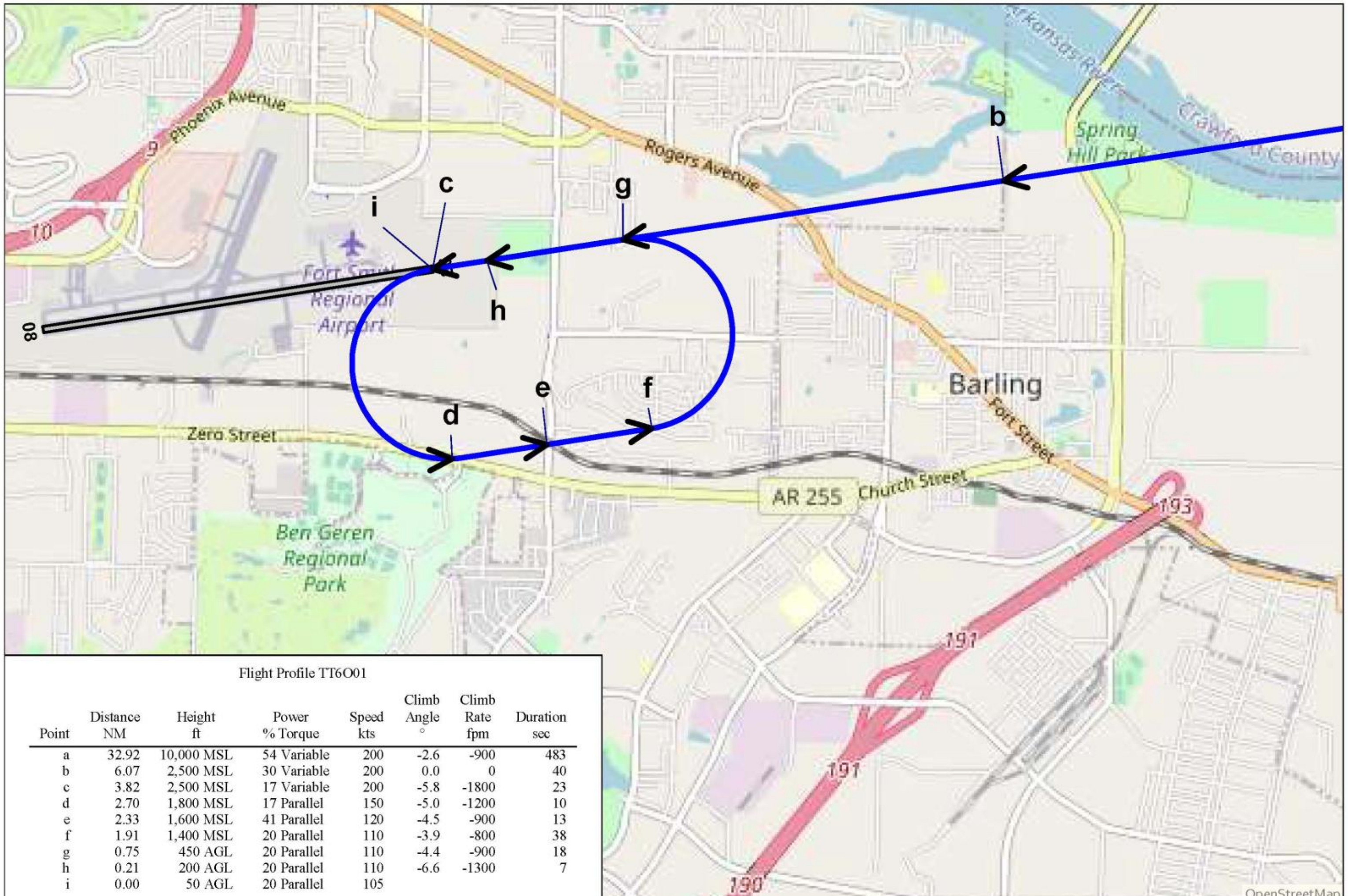
258



Flight Profile TT6A01

Point	Distance NM	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	32.92	1,000 AGL	69 Variable	200	0.0	0	568	
b	7.65	1,000 AGL	24 Parallel	120	0.0	0	165	configure
c	2.14	1,000 AGL	24 Parallel	120	-3.8	-800	15	
d	1.65	800 AGL	24 Parallel	120	-3.8	-800	31	
e	0.66	400 AGL	24 Parallel	110	-5.0	-900	23	
f	0.00	50 AGL	24 Parallel	100				

Fort Smith Transient T-6 Flight Profile TT6A01
IFR Arrival



Flight Profile TT6O01

Point	Distance NM	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	32.92	10,000 MSL	54 Variable	200	-2.6	-900	483
b	6.07	2,500 MSL	30 Variable	200	0.0	0	40
c	3.82	2,500 MSL	17 Variable	200	-5.8	-1800	23
d	2.70	1,800 MSL	17 Parallel	150	-5.0	-1200	10
e	2.33	1,600 MSL	41 Parallel	120	-4.5	-900	13
f	1.91	1,400 MSL	20 Parallel	110	-3.9	-800	38
g	0.75	450 AGL	20 Parallel	110	-4.4	-900	18
h	0.21	200 AGL	20 Parallel	110	-6.6	-1300	7
i	0.00	50 AGL	20 Parallel	105			

Fort Smith Transient T-6 Flight Profile TT6O01
Overhead Break Arrival

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

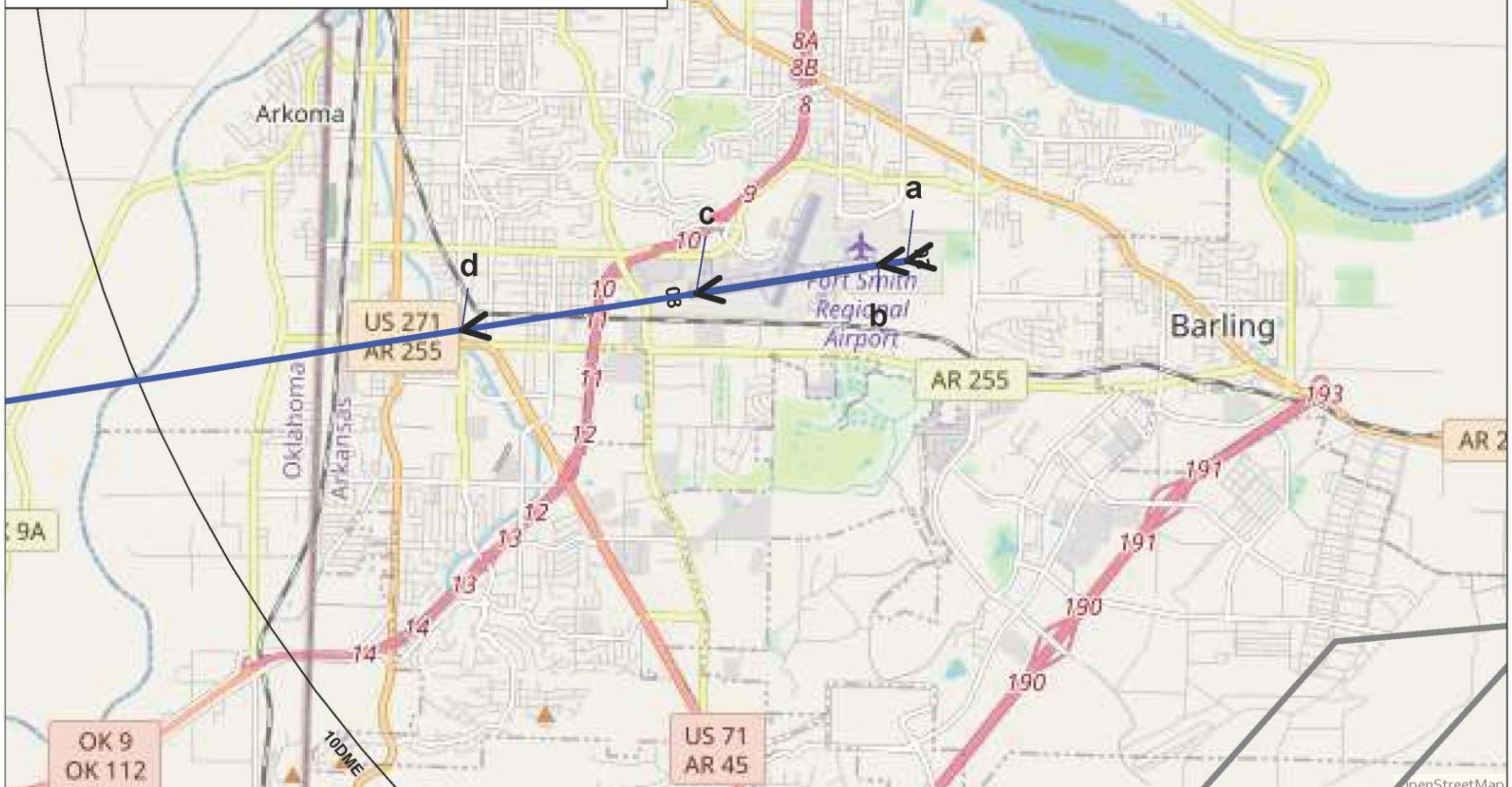
Scale in Feet 1:44,300 (1 inch = 3,690 feet)

N

260

Flight Profile TT6D01

Point	Distance NM	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	0 AGL	100 Variable	0	0.0	0	18
b	0.20	0 AGL	100 Variable	80	3.7	700	42
c	1.48	500 AGL	100 Variable	140	6.3	1900	35
d	3.13	1,600 AGL	54 Variable	200	7.9	2800	127
e	10.16	8,000 MSL	54 Variable	200	0.0	0	410
f	32.92	8,000 MSL	54 Variable	200			

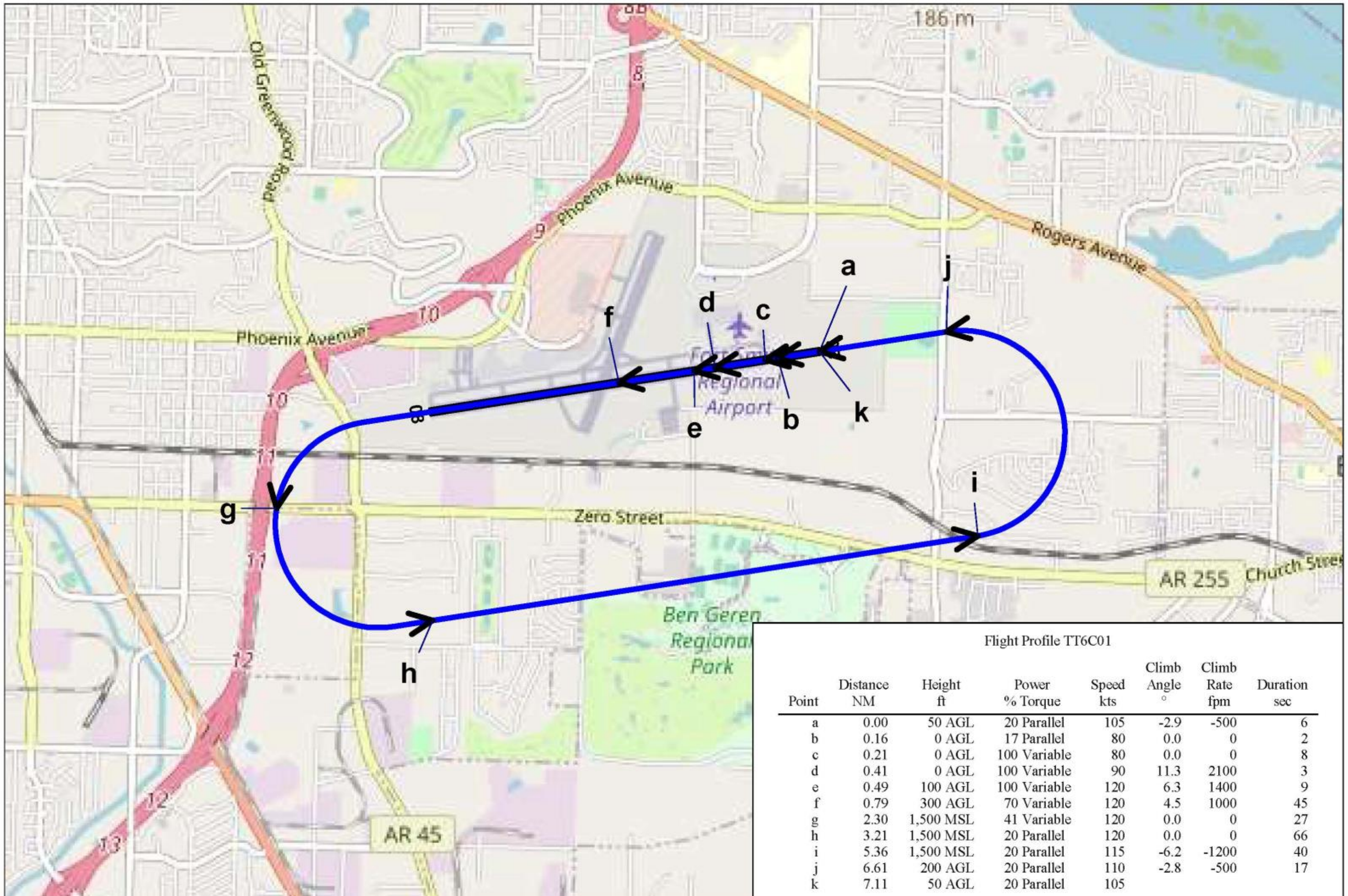


Fort Smith Transient T-6 Flight Profile TT6D01
IFR Departure

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

261



Flight Profile TT6C01

Point	Distance NM	Height ft	Power % Torque	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0.00	50 AGL	20 Parallel	105	-2.9	-500	6
b	0.16	0 AGL	17 Parallel	80	0.0	0	2
c	0.21	0 AGL	100 Variable	80	0.0	0	8
d	0.41	0 AGL	100 Variable	90	11.3	2100	3
e	0.49	100 AGL	100 Variable	120	6.3	1400	9
f	0.79	300 AGL	70 Variable	120	4.5	1000	45
g	2.30	1,500 MSL	41 Variable	120	0.0	0	27
h	3.21	1,500 MSL	20 Parallel	120	0.0	0	66
i	5.36	1,500 MSL	20 Parallel	115	-6.2	-1200	40
j	6.61	200 AGL	20 Parallel	110	-2.8	-500	17
k	7.11	50 AGL	20 Parallel	105			

Fort Smith Transient T-6 Flight Profile TT6C01

Touch and Go

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,300 (1 inch = 3,690 feet)

N

262

This page intentionally left blank.

APPENDIX D
LAND USE

This page intentionally left blank.

Land Use

This appendix presents information that has been updated from the 2023 *Foreign Military Sales (FMS) Pilot Training Center (PTC) Environmental Impact Statement (EIS*), Appendix B, § B.1.3, which is incorporated by reference. The 2023 FMS PTC EIS, Appendix B, *Land Use Supporting Information*, Table 4 presents federally managed lands in the airspace region of influence (ROI) and Table 5 lists state-managed lands in the airspace ROI. Both of these tables are incorporated by reference.

The 2023 FMS PTC EIS, Appendix B, *Land Use Supporting Information,* Table 6, presented a list of designated Wilderness Areas under the affected airspace. **Table D-1** shows the same information but has been updated to include the potential noise levels under the No Action Alternative, the Proposed Action, and Alternative 1 assessed in this Supplemental EIS.

Table D-1. Wilderness Areas in the Airspace ROI

Wilderness Area	State	Managed By	% in ROI	Total Area (acres)	Airspace Unit	NAA Sound Levels (L_{dnmr} [DNL] dBA)	PA Sound Levels (L_{dnmr} [DNL] dBA)	Alt. 1 Sound Levels (L_{dnmr} [DNL] dBA)
Black Fork Mountain	AR	USFS	100%	8,430	Hog B MOA (western)	48.2 (48.2)	45.6 (45.6)	<45 (<45)
					Hog B MOA (western) and MTRs	54.3 (52)	54.9 (52)	53.9 (51)
Black Fork Mountain	OK	USFS	36%	5,149	Hog B MOA (western)	48.2 (48.2)	45.6 (45.6)	<45 (<45)
Caney Creek	AR	USFS	46.3%	14,460	Hog B MOA (western)	48.2 (48.2)	45.6 (45.6)	<45 (<45)
			0.03%		IR-164/VR-1104	53.8 (49.5)	54.8 (51)	53.6 (50)
Dry Creek	AR	USFS	100%	6,310	Hog A MOA	57.2 (55.9)	55 (53.9)	53.5 (52.3)
					Hog A MOA and MTRs	61.2 (58.8)	61 (58.2)	59.8 (57.1)
East Fork	AR	USFS	100%	10,777	Shirley A MOA	<45 (<45)	<45 (<45)	<45 (<45)
Hurricane Creek	AR	USFS	100%	15,307	Shirley A MOA	<45 (<45)	<45 (<45)	<45 (<45)
					Shirley A MOA and MTRs	50.5 (48.5)	51.2 (48.5)	50.1 (47.4)
Leatherwood	AR	USFS	0.3%	16,838	Shirley B MOA	<45 (<45)	<45 (<45)	<45 (<45)
Poteau Mountain	AR	USFS	100%	11,299	Hog A MOA	57.2 (55.9)	55 (53.9)	53.5 (52.3)
					Hog A MOA and MTRs	61.2 (58.8)	61 (58.2)	59.8 (57.1)
Richland Creek	AR	USFS	100%	11,801	Shirley A MOA	<45 (<45)	<45 (<45)	<45 (<45)
Upper Buffalo	AR	USFS	1.7%	12,000	Shirley A MOA	<45 (<45)	<45 (<45)	<45 (<45)
Upper Kiamichi River	OK	USFS	20.8%	10,819	Hog B MOA (western)	48.2 (48.2)	45.6 (45.6)	<45 (<45)

Source: DAF. (2023). *Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan Final Environmental Impact Statement.*

Key: % = percent; < = less than; Alt. = Alternative; AR = Arkansas; DAF = Department of the Air Force; dBA = A-weighted decibels; DNL = day-night average sound level; IR = Instrument Route; L_{dnmr} = onset rate-adjusted monthly day-night average sound level; MOA = Military Operations Area; MTR = Military Training Route; NAA = No Action Alternative; OK = Oklahoma; PA = Proposed Action; ROI = region of influence; USFS = United States Fish and Wildlife Service; VR = Visual Route

This page intentionally left blank.

APPENDIX E
AIR QUALITY CALCULATIONS

This page intentionally left blank.

Air Quality Calculations

This appendix presents an export of results directly from the air quality modeling software retaining the organizational headings, text, and table formatting produced by the software.

E.1 PROPOSED ACTION – ACAM DETAIL REPORT

1. General Information

- Action Location
Base: FORT SMITH REGIONAL AIRPORT
State: Arkansas
County(s): Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Ebbing FMS PTC Supplemental Environmental Impact Statement

- Project Number/s (if applicable): N/A

- Projected Action Start Date: 7 / 2025

- Action Purpose and Need:
The purpose of the Proposed Action is to support the expansion of the Foreign Military Sales (FMS) Pilot Training Center (PTC) mission by accommodating an additional 12 F-35 aircraft, increasing the total Primary Aerospace Vehicle Authorization (PAA) at Ebbing Air National Guard (ANG) Base, Arkansas, to 36 F-35s and 12 F-16s. The need for the Proposed Action stems from the Department of the Air Force's (DAF) obligation to support existing international agreements requiring advanced F-35 pilot training within the United States.

This expansion reflects the growing demand for F-35 training from partner nations, including the Republic of Singapore Air Force (RSAF), which has committed to additional aircraft purchases and requires a consolidated training location for its pilots. Furthermore, the need includes providing adequate infrastructure, operations, and support personnel at a single, centralized site while ensuring compliance with applicable safety, environmental, and operational standards.

The Federal Aviation Administration (FAA) must also evaluate and approve modifications to the Fort Smith Regional Airport (FSRA) Airport Layout Plan (ALP), consistent with 49 U.S.C. § 47101 and associated implementing regulations, to include construction of new infrastructure (e.g., vertical landing pads and expanded parking ramps) within the FSRA boundary. The FAA's purpose is to ensure the proposed infrastructure enhancements meet statutory and operational requirements without negatively impacting the airport or its stakeholders.

- Action Description:
The DAF proposes to expand the permanent FMS PTC at Ebbing ANG Base, Arkansas. This action would increase the beddown of F-35 aircraft by 12, bringing the total to 36 F-35s and 12 F-16s. In addition to accommodating the aircraft, the proposal includes increasing personnel by 271 and dependents by 325, requiring construction, renovation, and operational adjustments to facilities and airfield infrastructure. New infrastructure requirements include constructing a vertical landing pad (VLP) for the F-35B aircraft, expanding the existing ramp, and upgrading hangars and maintenance facilities to meet operational demands. Construction projects would occur primarily within previously disturbed areas, minimizing environmental impact while meeting mission objectives.

Flight operations for the F-35 and F-16 aircraft would be conducted within existing designated Special Use Airspace (SUA). F-35B vertical landing maneuvers, F-35B vertical landing maneuvers, an operational requirement for STOVL (Short Takeoff/Vertical Landing) aircraft, would be conducted on the newly constructed VLP. Overall air operations would increase within existing airspace and training ranges, including the Hog and Shirley Military Operations Areas (MOAs).

The action would not degrade the existing mission at Ebbing ANG Base or require changes to current airspace allocations. Facilities siting will prioritize efficiency and proximity to existing operational infrastructure, with environmental and operational assessments completed to ensure compliance with all relevant regulations

- Point of Contact

Name: Allison Williams
Title: Environmental Scientist
Organization: Leidos Corporation
Email: allison.williams@leidos.com
Phone Number: (719) 470 9579

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Personnel	Ebbing New Personnel
3.	Construction / Demolition	Building Renovations
4.	Construction / Demolition	New Building Construction
5.	Construction / Demolition	Other New Construction (Specialized Facilities)
6.	Aircraft	F-35B Aircraft and Operations
7.	Aircraft	Removed/Adjusted F-35A Operations

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Personnel

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ebbing New Personnel

- Activity Description:

F-35 Security Forces: 12
F-35 DAF: 30
F-35 Contractor MX: 225
F-35 Medical: 4
Total Personnel: 271

- Activity Start Date

Start Month: 10
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.466407
SO_x	0.004047
NO_x	0.260070
CO	6.308738

Pollutant	Emissions Per Year (TONs)
PM 10	0.033461
PM 2.5	0.011997
Pb	0.000000
NH_3	0.069355

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.026671
N_2O	0.009487

Pollutant	Emissions Per Year (TONs)
CO_2	574.730448
CO_2e	577.991092

2.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 46
Civilian Personnel: 0
Support Contractor Personnel: 225
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

2.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

2.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.29416	0.00224	0.12373	4.11008	0.02120	0.00705	0.04916
LDGT	0.23609	0.00283	0.17914	3.78975	0.02148	0.00773	0.04160
HDGV	0.73137	0.00609	0.59369	9.65026	0.04614	0.02255	0.08604
LDDV	0.12398	0.00125	0.17302	5.89741	0.02191	0.00750	0.01611
LDDT	0.17922	0.00127	0.31053	4.06470	0.02145	0.00843	0.01598
HDDV	0.11468	0.00430	2.49826	1.52881	0.15125	0.07472	0.06653

MC	2.47053	0.00283	0.64224	11.65256	0.03003	0.02067	0.05529

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01533	0.00505	318.07464	319.84326
LDGT	0.01574	0.00689	401.42592	403.69166
HDGV	0.04503	0.02346	863.90829	871.38506
LDDV	0.05313	0.00066	369.99506	371.65778
LDDT	0.03000	0.00095	376.98892	378.07968
HDDV	0.02530	0.16405	1278.48735	1322.67009
MC	0.09684	0.00272	393.80405	397.23655

2.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Building Renovations

- Activity Description:

To accurately simulate the renovation and construction project for existing facilities, including LRS Storage (Facility 108), AME Back Shops (Facility 115), Back Shops and Vehicle Maintenance (Facility 182), and F-35 Maintenance (Facility 200), the following parameters have been established: The total renovation area is 48,000 square feet, with LRS Storage comprising 15,000 square feet, AME Back Shops 10,000 square feet, Back Shops and Vehicle Maintenance 20,000 square feet, and F-35 Maintenance 3,000 square feet. Approximately 10% of the total renovation area, or 4,800 square feet, is assumed to require demolition, and the demolition height is assumed to be 12 feet. Demolition is anticipated to begin in July 2025 and take two months to complete. The new construction area is modeled as 33% of new building construction, equating to 15,840 square feet, with an assumed height of 12 feet. Building construction is projected to begin in September 2025 and last nine months, concluding in May 2026. Architectural coating is expected to begin in June 2026 and take one month to complete, applying to the full constructed area of 15,840 square feet. These assumptions ensure a comprehensive simulation of the renovation and construction project within the software's framework. By modeling the renovation as a percentage of new building construction and incorporating demolition and architectural coating parameters, this approach provides an accurate and detailed representation of the project scope.

- Activity Start Date
Start Month: 7
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.241965
SO_x	0.001189
NO_x	0.502700
CO	0.730574

Pollutant	Total Emissions (TONs)
PM 10	0.033771
PM 2.5	0.019355
Pb	0.000000
NH_3	0.001497

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.005311
N_2O	0.001754

Pollutant	Total Emissions (TONs)
CO_2	132.151896
CO_2e	132.765421

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 4800
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.43930	0.00743	3.63468	4.34820	0.10060	0.09255
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02333	0.00467	575.01338	576.98668
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807

LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

3.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolished (ft^2)
BH: Height of Building being demolished (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Building Construction Phase

3.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 9
Number of Days: 0

3.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 15840
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.20113	0.00487	1.94968	1.66287	0.07909	0.07277
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.26944	0.00487	2.55142	3.59881	0.13498	0.12418
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02140	0.00428	527.58451	529.39505
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02138	0.00428	527.10822	528.91712
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

3.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Architectural Coatings Phase

3.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

3.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 15840
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

3.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: New Building Construction

- Activity Description:

To accurately simulate the new construction project, including the 3-Bay Hangar (Facilities 113 and 119), Main Ramp Expansion, Fuel Storage Expansion, and Arm/De-Arm Expansion, the following parameters have been established. The 3-Bay Hangar encompasses 40,000 square feet and includes the demolition of 30,484 square feet of existing structures. The Main Ramp Expansion covers 203,000 square feet, and the Fuel Storage Expansion at the existing fuel farm accounts for 221,000 square feet. The Arm/De-Arm Expansion includes two areas totaling 20,000 square feet. Together, the total new construction area is 484,000 square feet.

Demolition of 30,484 square feet at a height of 12 feet is assumed to begin in July 2025 and take two months to complete. Site grading is estimated for 50% of the total area, or 242,000 square feet, at a depth of 1 foot, with 1,000 cubic yards of material hauled on-site and 5,000 cubic yards hauled off-site. Grading is anticipated to begin in September 2025 and take approximately 10 days to complete.

Building construction is assumed for 60,000 square feet at a height of 20 feet. Construction is expected to begin in September 2025, immediately following site grading, and take 12 months to complete. Architectural coating is assumed for 50% of the building area, or 30,000 square feet, and is projected to begin in October 2026, following construction, with an expected duration of three months. Finally, paving for the ramp and fuel farm expansions, totaling 424,000 square feet, is anticipated to begin in October 2026 and take one month to complete.

- Activity Start Date
Start Month: 7
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.555287
SO_x	0.003457
NO_x	1.580361
CO	2.056563

Pollutant	Total Emissions (TONs)
PM 10	0.933940
PM 2.5	0.055244
Pb	0.000000
NH_3	0.005470

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.014113
N_2O	0.008634

Pollutant	Total Emissions (TONs)
CO_2	368.321908
CO_2e	371.005187

4.1 Demolition Phase

4.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2

Number of Days: 0

4.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 30484
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.43930	0.00743	3.63468	4.34820	0.10060	0.09255
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02333	0.00467	575.01338	576.98668
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				

	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

4.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolished (ft^2)
BH: Height of Building being demolished (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Site Grading Phase

4.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 10

4.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 242000
Amount of Material to be Hauled On-Site (yd^3): 1000
Amount of Material to be Hauled Off-Site (yd^3): 5000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.33951	0.00490	2.85858	3.41896	0.15910	0.14637
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.29762	0.00487	2.89075	3.51214	0.17229	0.15851
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02155	0.00431	531.19419	533.01712
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02141	0.00428	527.74261	529.55369
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084

LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

4.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 12
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 60000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.20113	0.00487	1.94968	1.66287	0.07909	0.07277
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.26944	0.00487	2.55142	3.59881	0.13498	0.12418
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.54223	0.00793	4.34662	2.86938	0.17681	0.16267
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.49757	0.00735	3.67618	4.52476	0.11274	0.10373

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02140	0.00428	527.58451	529.39505
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02138	0.00428	527.10822	528.91712
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.32220	570.27253
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.86270	531.68105

Welders Composite [HP: 46] [LF: 0.45]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02305	0.00461	568.30078	570.25105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2026

- Phase Duration

Number of Month: 3
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 30000

Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 424000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.24787	0.00486	2.64574	3.44523	0.13933	0.12819
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.20238	0.00487	2.21583	3.41771	0.08945	0.08229
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.56682	0.00541	3.67816	4.11298	0.16639	0.15308

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02136	0.00427	526.53742	528.34436
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02141	0.00428	527.68636	529.49724
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02381	0.00476	586.90234	588.91644

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor

EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43560 / 2000$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)
2000: Conversion Factor square pounds to TONs (2000 lb / TON)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- **Activity Location**
  - **County:** Sebastian
  - **Regulatory Area(s):** NOT IN A REGULATORY AREA

- **Activity Title:** Other New Construction (Specialized Facilities)

- **Activity Description:**

To accurately simulate the new construction of specialized facilities, including a Vertical Landing Pad (VLP) and Parking Lot Expansions — the following parameters have been established. The specialized facilities consist of the Vertical Landing Pad (118,400 sq. ft.) and Parking Lot Expansions (three projects, totaling 567,587 sq. ft.), for a combined total area of 685,987 sq. ft.

Site grading is assumed for 50% of the total area, or 342,994 sq. ft., at a depth of 1 foot. Material movement is estimated at 1,500 cubic yards hauled on-site and 3,000 cubic yards hauled off-site. Grading is assumed to begin in July 2025 and take approximately 20 days to complete.

Paving activities for the Vertical Landing Pad and Parking Lot Expansions encompass the full area of 685,987 sq. ft. Paving is assumed to begin in August 2025, immediately after grading, and take approximately 2 months to complete.

Architectural coating is assumed for 4,000 sq. ft. of the Vertical Landing Pad. Coating is projected to begin in September 2025, following paving, and take approximately 14 days to complete.

- **Activity Start Date**
  - **Start Month:** 7
  - **Start Month:** 2025

- **Activity End Date**
  - **Indefinite:** False
  - **End Month:** 9
  - **End Month:** 2025

- **Activity Emissions:**

Pollutant	Total Emissions (TONs)
VOC	0.097353
SO_x	0.000516
NO_x	0.279825
CO	0.359879

Pollutant	Total Emissions (TONs)
PM 10	2.263046
PM 2.5	0.011367
Pb	0.000000
NH_3	0.001197

- **Global Scale Activity Emissions of Greenhouse Gasses:**

Pollutant	Total Emissions (TONs)
CH_4	0.002395
N_2O	0.002382

Pollutant	Total Emissions (TONs)
CO_2	66.563266
CO_2e	67.261505

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- **Phase Start Date**
  - **Start Month:** 7
  - **Start Quarter:** 1
  - **Start Year:** 2025

- **Phase Duration**
  - **Number of Month:** 0
  - **Number of Days:** 20

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 342994
Amount of Material to be Hauled On-Site (yd^3): 1500
Amount of Material to be Hauled Off-Site (yd^3): 3000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.40191	0.00542	3.44643	4.21104	0.10704	0.09848
Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.33951	0.00490	2.85858	3.41896	0.15910	0.14637
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.29762	0.00487	2.89075	3.51214	0.17229	0.15851
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Excavators Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02382	0.00476	587.13772	589.15263
Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02155	0.00431	531.19419	533.01712
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02141	0.00428	527.74261	529.55369
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower

LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Architectural Coatings Phase

5.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 3
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 14

5.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 4000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

5.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.3 Paving Phase

5.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

5.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 685987

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.24787	0.00486	2.64574	3.44523	0.13933	0.12819
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.20238	0.00487	2.21583	3.41771	0.08945	0.08229
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.56682	0.00541	3.67816	4.11298	0.16639	0.15308

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02136	0.00427	526.53742	528.34436
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02141	0.00428	527.68636	529.49724
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02381	0.00476	586.90234	588.91644

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

5.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43560 / 2000$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)
2000: Conversion Factor square pounds to TONs (2000 lb / TON)

6. Aircraft

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35B Aircraft and Operations

- Activity Description:
The Proposed Action includes the beddown of 12 F-35B additional aircraft at Ebbing ANG Base. The arrival of the aircraft is assumed to occur in December 2026 to coincide with facility completion, personnel arrival, and operational readiness. The additional F-35B operations are projected to include 5,340 annual flight operation cycles, encompassing arrivals, departures, and specialized training activities such as Vertical Landing Pad (VLP) maneuvers, which were not previously analyzed in the 2023 EIS.
Time-in-Mode (TIM) data for the F-35B operations were derived from site-specific flight operational data, weighted averages, and noise profile analyses to represent reasonably foreseeable activities. These inputs form the basis for estimating annual emissions of criteria pollutants and reflect the best available data. The assumptions and calculations account for maximum foreseeable operational activity levels under the Proposed Action.

- Activity Start Date
Start Month: 12
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	9.543399
SO_x	6.013639
NO_x	64.660009
CO	56.166379

Pollutant	Emissions Per Year (TONs)
PM 10	9.020558
PM 2.5	8.307702
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.578251
N_2O	0.113079

Pollutant	Emissions Per Year (TONs)
CO_2	13806.804766
CO_2e	13852.961824

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.087429
SO_x	4.108644
NO_x	37.451376
CO	39.574469

Pollutant	Emissions Per Year (TONs)
PM 10	6.215370
PM 2.5	5.587172
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)

Pollutant	Emissions Per Year (TONs)

CH_4	0.517228	CO_2	12300.742939
N_2O	0.100911	CO_2e	12341.966847

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	9.455970	PM 10	2.805188
SO_x	1.904995	PM 2.5	2.720530
NO_x	27.208634	Pb	0.000000
CO	16.591910	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	0.061023	CO_2	1506.061827
N_2O	0.012168	CO_2e	1510.994977

6.2 Aircraft & Engines

6.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35B
Engine Model: F135-PW-600
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

6.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

6.3 Flight Operations

6.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 12
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 5340
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 14.74
Approach [Approach] (mins): 2.39
Climb Out [Intermediate] (mins): 0.25
Takeoff [Military] (mins): 0.29
Takeoff [After Burn] (mins): 0.32

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

6.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)

$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

6.4 Auxiliary Power Unit (APU)

6.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

6.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

6.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

6.5 Aerospace Ground Equipment (AGE)

6.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 5340

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp

1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

6.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.7
NF-2	0.0	0.0	0.0	23.7	23.8
A/M32A-60A	0.0	0.0	0.0	237.4	238.2

6.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

7. Aircraft

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Removed/Adjusted F-35A Operations

- Activity Description:
This analysis estimates the impact of the 234 annual flight operations for F-35A aircraft that will no longer occur under the Proposed Action at Ebbing Air National Guard Base. The results from modeling these reduced

operations will be used to calculate the emissions reductions associated with the reduced F-35A operations. These reductions will be subtracted from the previously calculated emissions generated by the Proposed Action. This approach ensures a precise evaluation of the net change in emissions resulting from all proposed activities, including both operational increases and reductions.

- Activity Start Date
Start Month: 12
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	-0.423055
SO_x	-1.039959
NO_x	-13.943789
CO	-4.822080

Pollutant	Emissions Per Year (TONs)
PM 10	-1.362205
PM 2.5	-1.234384
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.123083
N_2O	-0.024025

Pollutant	Emissions Per Year (TONs)
CO_2	-2929.577487
CO_2e	-2939.390479

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.008693
SO_x	-0.956482
NO_x	-12.751500
CO	-4.095019

Pollutant	Emissions Per Year (TONs)
PM 10	-1.239281
PM 2.5	-1.115169
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.120409
N_2O	-0.023492

Pollutant	Emissions Per Year (TONs)
CO_2	-2863.581520
CO_2e	-2873.178340

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	-0.414363
SO_x	-0.083477
NO_x	-1.192288
CO	-0.727061

Pollutant	Emissions Per Year (TONs)
PM 10	-0.122924
PM 2.5	-0.119214
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	-0.002674
N_2O	-0.000533

Pollutant	Emissions Per Year (TONs)
CO_2	-65.995968
CO_2e	-66.212139

7.2 Aircraft & Engines

7.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

7.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

7.3 Flight Operations

7.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 12
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 234
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 14.76
Approach [Approach] (mins): 2.4
Climb Out [Intermediate] (mins): 0.11
Takeoff [Military] (mins): 0.27
Takeoff [After Burn] (mins): 0.32

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12
Approach (mins): 27
Intermediate (mins): 9
Military (mins): 9
AfterBurn (mins): 3

7.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)

60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

7.4 Auxiliary Power Unit (APU)

7.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

7.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

7.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

7.5 Aerospace Ground Equipment (AGE)

7.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 234

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

7.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.7
NF-2	0.0	0.0	0.0	23.7	23.8
A/M32A-60A	0.0	0.0	0.0	237.4	238.2

7.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

E.2 ALTERNATIVE 1 – ACAM DETAIL REPORT

1. General Information

- Action Location

Base: FORT SMITH REGIONAL AIRPORT
State: Arkansas
County(s): Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Ebbing FMS PTC Supplemental Environmental Impact Statement - Alternative 1

- Project Number/s (if applicable): N/A

- Projected Action Start Date: 7 / 2025

- Action Purpose and Need:

The purpose of Alternative 1 is to refine operations for the Foreign Military Sales (FMS) Pilot Training Center (PTC) mission at Ebbing Air National Guard (ANG) Base, Arkansas. Under this alternative, existing operations would be modified for the current 24 F-35 Primary Aerospace Vehicle Authorization (PAA) to address updated requirements and operational procedures identified for F-35A and F-35B aircraft since the completion of the 2023 FMS PTC Environmental Impact Statement (EIS).

The need for Alternative 1 arises from the Department of the Air Force's (DAF) commitment to supporting the evolving operational requirements of international agreements and training demands. This includes incorporating Short Takeoff/Vertical Landing (STOVL) operations for F-35B aircraft while maintaining compliance with safety, environmental, and operational standards.

- Action Description:

Alternative 1 would refine operational procedures for the existing 24 F-35 PAA, without increasing the number of aircraft. No additional personnel would be required, and construction activities would be limited to the development of a Vertical Landing Pad (VLP) to support F-35B STOVL operations. The VLP would be constructed at one of two identified locations within the Fort Smith Regional Airport (FSRA) airfield, with detailed analyses for the West and East VLP site subalternatives.

Flight operations for F-35A and F-35B aircraft would be adjusted to reflect updated flight tracks, profiles, and training requirements. Key changes include increased afterburner usage during departures, revised flight tracks to align with the updated syllabus, and no reduced-power departures. However, the number of annual operations, airspace events, nighttime operations, and use of munitions would remain consistent with the operational levels analyzed in the 2023 FMS PTC EIS.

This alternative ensures that operational adjustments meet updated mission requirements while maintaining the infrastructure and operational footprint established in the 2023 EIS.

- Point of Contact

Name: Allison Williams
Title: Environmental Scientist
Organization: Leidos Corporation
Email: allison.williams@leidos.com
Phone Number: (719) 470 9579

Report generated with ACAM version: 5.0.24a

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Vertical Landing Pad
3.	Aircraft	F-35A Aircraft Operations – Alternative 1
4.	Aircraft	F-35B Aircraft Operations – Alternative 1

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Vertical Landing Pad

- Activity Description:

The vertical landing pad will cover an area of 118,400 square feet. Site grading is assumed for 50% of the total area (59,200 square feet) to a depth of one foot, resulting in approximately 2,200 cubic yards of material movement (1,100 cubic yards on-site and 1,100 cubic yards off-site). Grading activities are assumed to begin in July 2025 and will take approximately 10-20 days to complete. Following site grading, paving activities for the vertical landing pad will encompass the entire 118,400 square feet. Paving is anticipated to begin in August 2025, immediately after grading, and will take approximately two months to complete. Additionally, architectural coating will cover portions of the vertical landing pad, assumed to be 3,000 square feet. This coating work is expected to start in September 2025 after paving is complete and will take approximately 14 days to complete.

- Activity Start Date

Start Month: 7
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.063653
SO_x	0.000403
NO_x	0.210679
CO	0.281641

Pollutant	Total Emissions (TONs)
PM 10	0.398224
PM 2.5	0.008756
Pb	0.000000
NH_3	0.000763

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.001767
N_2O	0.000955

Pollutant	Total Emissions (TONs)
CO_2	45.375153
CO_2e	45.677625

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 20

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 59200
Amount of Material to be Hauled On-Site (yd^3): 1100
Amount of Material to be Hauled Off-Site (yd^3): 1100

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.33951	0.00490	2.85858	3.41896	0.15910	0.14637
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.29762	0.00487	2.89075	3.51214	0.17229	0.15851
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02155	0.00431	531.19419	533.01712
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02141	0.00428	527.74261	529.55369
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735

LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Architectural Coatings Phase

2.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 14

2.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 3000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e

LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

2.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.3 Paving Phase

2.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

2.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 118400

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.55317	0.00854	4.19957	3.25548	0.16367	0.15057
Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.24787	0.00486	2.64574	3.44523	0.13933	0.12819
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.20238	0.00487	2.21583	3.41771	0.08945	0.08229
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.56682	0.00541	3.67816	4.11298	0.16639	0.15308

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cement and Mortar Mixers Composite [HP: 10] [LF: 0.56]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02313	0.00463	570.17504	572.13174
Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02136	0.00427	526.53742	528.34436
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02141	0.00428	527.68636	529.49724
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02381	0.00476	586.90234	588.91644

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.30380	0.00230	0.13808	4.31289	0.02176	0.00709	0.05084
LDGT	0.25127	0.00289	0.20252	4.16247	0.02198	0.00785	0.04343
HDGV	0.77493	0.00613	0.67031	10.49888	0.04741	0.02321	0.08807
LDDV	0.18616	0.00124	0.24271	6.58761	0.02359	0.00853	0.01560
LDDT	0.26066	0.00131	0.39373	5.73328	0.02230	0.00896	0.01618
HDDV	0.12820	0.00437	2.67607	1.58069	0.15973	0.08239	0.06570
MC	2.48034	0.00283	0.64426	11.80631	0.03018	0.02067	0.05492

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01656	0.00521	325.48409	327.32938
LDGT	0.01764	0.00714	408.91413	411.30120
HDGV	0.04874	0.02468	869.67218	877.57735
LDDV	0.05129	0.00066	367.07371	368.68510
LDDT	0.03027	0.00095	388.25146	389.34954
HDDV	0.02561	0.16216	1300.01541	1343.70400
MC	0.09853	0.00272	393.73376	397.21400

2.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560 / 2000$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)
2000: Conversion Factor square pounds to TONs (2000 lb / TON)

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35A Aircraft Operations – Alternative 1

- Activity Description:
Under Alternative 1, the total number of annual F-35A operations at Fort Smith Regional Airport and associated airspace remains unchanged from the 2023 FMS PTC-EIS baseline, 11,664 operations. However, the flight profiles, including afterburner use and climb procedures, have been revised to align with updated training requirements and operational procedures. These adjustments represent changes to times and modes of operation but do not involve an increase in the number of annual operations or the number of aircraft. For the purposes of this analysis in the Aircraft Activity Model, it is assumed that operational changes associated with Alternative 1 will begin in December 2026.

- Activity Start Date
Start Month: 12

Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	20.844694	PM 10	19.202733
SO_x	12.722705	PM 2.5	17.695362
NO_x	134.284587	Pb	0.000000
CO	122.180256	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	1.211101	CO_2	28922.198903
N_2O	0.236859	CO_2e	29018.877503

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	0.190306	PM 10	13.075446
SO_x	8.561681	PM 2.5	11.752991
NO_x	74.853594	Pb	0.000000
CO	85.939050	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	1.077812	CO_2	25632.553744
N_2O	0.210281	CO_2e	25718.457014

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
VOC	20.654388	PM 10	6.127287
SO_x	4.161023	PM 2.5	5.942371
NO_x	59.430993	Pb	0.000000
CO	36.241205	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	0.133290	CO_2	3289.645159
N_2O	0.026578	CO_2e	3300.420489

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-35A
Engine Model: F135-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No

Original Aircraft Name:

Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 24

Flight Operation Cycle Type: LTO (Landing and Takeoff)

Number of Annual Flight Operation Cycles for all Aircraft: 11664

Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 14.76

Approach [Approach] (mins): 2.4

Climb Out [Intermediate] (mins): 0.11

Takeoff [Military] (mins): 0.27

Takeoff [After Burn] (mins): 0.32

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins): 12

Approach (mins): 27

Intermediate (mins): 9

Military (mins): 9

AfterBurn (mins): 3

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3.5 Aerospace Ground Equipment (AGE)

3.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 11664

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

3.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.7
NF-2	0.0	0.0	0.0	23.7	23.8

A/M32A-60A	0.0	0.0	0.0	237.4	238.2

3.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

4. Aircraft

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Sebastian
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35B Aircraft Operations – Alternative 1

- Activity Description:
Under Alternative 1, the total number of annual F-35B operations at Fort Smith Regional Airport and associated airspace remains unchanged from the 2023 FMS PTC-EIS baseline, 2,340 operations. However, the flight profiles have been revised to incorporate short takeoff and vertical landing (STOVL) operations, requiring specialized procedures and updated climb profiles, including afterburner use. These adjustments represent changes to times and modes of operation but do not involve an increase in the number of annual operations or the number of aircraft. For the purposes of this analysis in the Aircraft Activity Model, it is assumed that operational changes associated with Alternative 1 will begin in December 2026.

- Activity Start Date
Start Month: 12
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	4.181330
SO_x	2.439543
NO_x	26.350446
CO	23.069110

Pollutant	Emissions Per Year (TONs)
PM 10	3.764810
PM 2.5	3.469693
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.228761

Pollutant	Emissions Per Year (TONs)
CO_2	5464.430055

N_2O	0.044746

CO_2e	5482.693161

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.037703
SO_x	1.604770
NO_x	14.427561
CO	15.798498

Pollutant	Emissions Per Year (TONs)
PM 10	2.535570
PM 2.5	2.277551
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	0.202021
N_2O	0.039414

Pollutant	Emissions Per Year (TONs)
CO_2	4804.470378
CO_2e	4820.571767

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	4.143627
SO_x	0.834773
NO_x	11.922884
CO	7.270612

Pollutant	Emissions Per Year (TONs)
PM 10	1.229240
PM 2.5	1.192142
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	0.026740
N_2O	0.005332

Pollutant	Emissions Per Year (TONs)
CO_2	659.959677
CO_2e	662.121394

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35B
Engine Model: F135-PW-600
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 24

Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 2340
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi [Idle] (mins): 14.74
Approach [Approach] (mins): 2.501
Climb Out [Intermediate] (mins): 0.012
Takeoff [Military] (mins): 1.065
Takeoff [After Burn] (mins): 0.013

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test
Idle (mins): 12
Approach (mins): 2.39
Intermediate (mins): 0.25
Military (mins): 0.29
AfterBurn (mins): 0.32

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year
$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)

1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

4.4 Auxiliary Power Unit (APU)

4.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

4.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

4.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

4.5 Aerospace Ground Equipment (AGE)

4.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 2340

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

4.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.7
NF-2	0.0	0.0	0.0	23.7	23.8
A/M32A-60A	0.0	0.0	0.0	237.4	238.2

4.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons