Draft

Air National Guard
F-15EX Eagle II & F-35A Lightning II
Operational Beddowns
Environmental Impact Statement

January 2024

This page intentionally left blank.

PRIVACY ADVISORY

This Draft Environmental Impact Statement (EIS) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] §§1500–1508), and 32 CFR §989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EIS. Comments provided will be addressed in the EIS. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EIS or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EIS. However, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EIS.

The Rehabilitation Act of 1973 requires Federal agencies to make their electronic and information technology accessible to people with disabilities. The law (29 United States Code § 794 (d)) applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508, agencies must give disabled employees and members of the public access to information comparable to the access available to others. This document and the associated website meet Section 508 compliance requirements.

This page intentionally left blank.

Cover Sheet
DRAFT
AIR NATIONAL GUARD F-15EX EAGLE II & F-35A LIGHTNING II OPERATIONAL BEDDOWNS ENVIRONMENTAL IMPACT STATEMENT

a. *Responsible and Cooperating Agencies:* United States Department of the Air Force (DAF) and National Guard Bureau (NGB) (Responsible Agencies); the Federal Aviation Administration (FAA) and United States Department of the Navy (DON) are Cooperating Agencies.

b. *Title of Action:* Air National Guard F-15EX Eagle II and F-35A Lightning II Operational Beddowns

c. *Comments and Inquiries:* Mr. Will Strickland, NGB/A4AM, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157, (240) 612-7042; NGB.A4.A4A.NEPA.COMMENTS.Org@us.af.mil.

d. *Designation:* Draft Environmental Impact Statement (EIS)

e. *Abstract:* This Draft EIS has been prepared in accordance with the National Environmental Policy Act (NEPA). The public and agency scoping process resulted in the analysis of the following environmental resources: noise; airspace; air quality/climate change; socioeconomics/environmental justice/children's health and safety; land use/noise compatible land use; Department of Transportation, Section 4(f); water resources/floodplains/wild and scenic rivers; geological resources/soils/farmlands; cultural resources; safety; hazardous materials/waste; biological resources/coastal resources/wetlands; visual impacts; and infrastructure/utilities/natural resources and energy supply/transportation/public transportation. The Secretary of the Air Force proposes to replace the aging F-15C/D fleet at the Air National Guard (ANG) Fighter Wings that continue to fly these aircraft. The goal of basing these aircraft is to replace the aging F-15C/D fleet and continue to provide optimum Combatant Commander support and to efficiently meet regional and global receiver demands. This action would involve the beddown of one F-15EX squadron at two ANG fighter wings and one F-35A squadron at one ANG fighter wing. The beddown would consist of 21 F-15EX Primary Aerospace Vehicle Authorized (PAA) with 2 Backup Aerospace Vehicle Authorized (BAA) and 1 Attrition Reserve aircraft at each of the two F-15EX selected locations; and 21 F-35A PAA with 2 BAA at the one F-35A location. Three ANG fighter wings still fly the F-15C/D aircraft and are the subject of this EIS:

- 104th Fighter Wing (104 FW) at Westfield-Barnes Regional Airport (BAF) in Westfield, Massachusetts (candidate for the F-15EX or F-35A)
- 144th Fighter Wing (144 FW) at Fresno Yosemite International Airport (FAT) in Fresno, California (candidate for the F-15EX only)
- 159th Fighter Wing (159 FW) at Naval Air Station Joint Reserve Base New Orleans in Belle Chasse, Louisiana (candidate for the F-15EX or F-35A)

The DAF has identified the 144 FW and the 159 FW as the preferred alternative for the F-15EX beddowns and the 104 FW as the preferred alternative for the F-35A beddown.

f. *Comments:* The DAF and NGB have released this Draft EIS to the public and agencies for review and comment. A Notice of Availability was published in the Federal Register, newspaper advertisements were published, press releases were announced, flyers were posted, and letters accompanied the direct mailing of this Draft EIS document. This Draft EIS has been posted on a publicly accessible website at www.ANGF15EX-F35A-EIS.com. Copies of this Draft EIS document were also sent to local document repositories.

The Draft EIS public comment period must be a minimum of 45 days beginning on the Notice of Availability publication date. All substantive comments received prior to the close of the public comment period will be considered during preparation of the Final EIS. The DAF and NGB respond to substantive comments on a Draft EIS in the Final EIS, consistent with 40 Code of Federal Regulations § 1503.4. Substantive comments are regarded as those comments that challenge the analysis, methodologies, or information in the Draft EIS as being factually inaccurate or analytically inadequate; identify impacts not analyzed or identify reasonable alternatives or feasible mitigations not considered by the agency; or offer specific information that may have a bearing on the decision such as differences in interpretations of significance, scientific data, or technical conclusions. Non-substantive comments, which do not require a DAF or NGB response, are generally considered those comments that express a conclusion, an opinion, or a vote for or against the proposal itself, or some aspect of it; state a position for or against a particular alternative; or otherwise state a personal preference or opinion.

This page intentionally left blank.

HOW TO USE THIS DOCUMENT

Our goal is to give you a reader-friendly document that provides an in-depth, accurate analysis of the Proposed Action, the alternative basing locations, the No Action Alternative, and the potential environmental consequences for each alternative. The organization of this Environmental Impact Statement, or EIS, is shown below.

OVERALL PROPOSAL

1 Purpose and Need for the Proposed Action

2 Description of Proposed Action and Alternatives

3 Resource Definition and Methodology

4 Introduction to Fighter Wing Specific Sections

INFORMATION SPECIFIC TO EACH FIGHTER WING

104 FW, Westfield, MA

Section MA1.0 Fighter Wing Overview

Section MA2.0 Alternative

Section MA3.0 Affected Environment and Environmental Consequences

Section MA4.0 Cumulative Effects and Irreversible and Irretrievable Commitment of Resources

144 FW, Fresno, CA

Section CA1.0 Fighter Wing Overview

Section CA2.0 Alternative

Section CA3.0 Affected Environment and Environmental Consequences

Section CA4.0 Cumulative Effects and Irreversible and Irretrievable Commitment of Resources

159 FW, New Orleans, LA

Section LA1.0 Fighter Wing Overview

Section LA2.0 Alternative

Section LA3.0 Affected Environment and Environmental Consequences

Section LA4.0 Cumulative Effects and Irreversible and Irretrievable Commitment of Resources

OVERALL PROPOSAL

5 References

6 List of Preparers

Appendices

- **A** Agency, Tribal, and Public Involvement
- **B** Noise Modeling, Methodology, and Effects
- **C** Construction Tables
- **D** Air Quality

This page intentionally left blank.

TABLE OF CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

Acronym	*Definition*
°F	degree Fahrenheit
104 FW	104th Fighter Wing
144 FW	144th Fighter Wing
159 FW	159th Fighter Wing
AAD	Annual Average Day
ACA	Aerospace Control Alert
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing material
AEDT	Aviation Environmental Design Tool
AESA	Active Electronically Scanned Array
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film-Forming Foam
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFSEC	Air Force Safety Center
AGE	Aerospace Ground Equipment
AGL	above ground level
AGR	Air Guard Reserve
AICUZ	Air Installations Compatible Use Zone
ALP	Airport Layout Plan
ANG	Air National Guard
ANSI	American National Standards Institute
AOC	Area of Concern
APCD	Air Pollution Control District
APE	Area of Potential Effects
APZ	Accident Potential Zone
AR	Attrition Reserve
ARFF	Aircraft Rescue and Firefighting
ARTCC	Air Route Traffic Control Center
ASA	Acoustical Society of America
ASD	Average Sortie Duration
ASR	Airport Surveillance Radar
AST	aboveground storage tank
AT/FP	Anti-terrorism/Force Protection
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
BAA	Backup Aerospace Vehicle Authorized
BAF	Westfield-Barnes Regional Airport
BASH	Bird/Wildlife Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CA	California
CAA	Clean Air Act
CAANG	California Air National Guard
CalEEMod	California Emissions Estimator Model
CAP	Central Accumulation Point
CDNL	C-Weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulation
CNEL	Community Noise Equivalent Level
$CNEL_{mr}$	California Equivalent Onset-Rate Adjusted Day-Night Average Sound Level

Acronym	*Definition*
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	Course of Action
CONUS	Continental United States
CSO	Combat Systems Officer
CTOL	Conventional Take-Off and Landing
CV	Carrier Variant
CWA	Clean Water Act
CZ	Clear Zone
CZMA	Coastal Zone Management Act
DAF	Department of the Air Force
DAFI	Department of the Air Force Instruction
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
DCA	Defensive Counter-Air
DDW	Division of Drinking Water
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DNWG	Department of Defense Noise Working Group
DoD	Department of Defense
DON	Department of the Navy
DOT	Department of Transportation
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAT	Fresno Yosemite International Airport
FEMA	Federal Emergency Management Agency
FICUN	Federal Interagency Committee on Urban Noise
FL	Flight Level
FPPA	Farmland Protection Policy Act
FTU	Formal Training Unit
FY	Fiscal Year
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
GWP	Global Warming Potential
HAF/A3	Headquarters Air Force Operations, Plans and Requirements
HAP	Hazardous Air Pollutant
HAZMART	Hazardous Materials Pharmacy
HEF	high-expansion foam
HFPA-DA	hexafluoropropylene oxide dimer acid
HUD	Department of Housing and Urban Development
HWAS	Hazardous Waste Accumulation Site
HWMP	Hazardous Waste Management Plan
ICRMP	Integrated Cultural Resources Management Plan
IFR	Instrument Flight Rules
IR	Infrared
IRP	Installation Restoration Program
IWG	Interagency Working Group

Acronym	*Definition*
J-	Jet
JDAM	Joint Direct Attack Munition
JRB	Joint Reserve Base
JSOW	Joint Standoff Weapon
LA	Louisiana
LAANG	Louisiana Air National Guard
LBP	lead-based paint
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
$L_{eq(8)}$	8-hour Equivalent Sound Level
$L_{eq(24)}$	24-hour Equivalent Sound Level
LID	Low Impact Development
L_{max}	Maximum Sound Level
MA	Massachusetts
MAANG	Massachusetts Air National Guard
MAJCOM	Major Command
MassDEP	Massachusetts Department of Environmental Protection
MBTA	Migratory Bird Treaty Act
MCL	Maximum Contaminant Level
MESA	Massachusetts Endangered Species Act
mm	millimeter
MOA	Military Operations Area
MSA	Munitions Storage Area
MSL	mean sea level
MTR	Military Training Route
N_2O	Nitrous Oxide
NA	Number of Events at or above a specified threshold
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NAVAID	Navigational Aid
NAVFAC	Naval Facilities Engineering Systems Command
NEM	Noise Exposure Map
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIPTS	Noise Induced Permanent Threshold Shift
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OCA	Offensive Counter-Air
OHF	Old Hammer Field
OHP	Office of Historic Preservation
OPSNET	Operations Network
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
PA	Probability of Awakening
PAA	Primary Aerospace Vehicle Authorized
PCB	polychlorinated biphenyl
PFAS	per- and polyfluoroalkyl substances
PFAS6	perfluorodecanoic acid, perfluoroheptanoic acid, perfluorohexanesulfonic acid, perfluorononanoic acid, perfluorooctanoic acid, perfluorooctane sulfonic acid
PFBS	perfluorobutane sulfonic acid

Acronym	*Definition*
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PHL	Potential for Hearing Loss
PM	particulate matter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
POI	Point of Interest
POL	petroleum, oil, and lubricant
PRL	Potential Release Location
PSD	Prevention of Significant Deterioration
psf	pounds per square foot
QD	Quantity-Distance
R-	Restricted Area
RAP	Ready Aircrew Program
RCRA	Resource Conservation and Recovery Act
RNAV	Area Navigation
ROD	Record of Decision
ROI	Region of Influence
RPZ	Runway Protection Zone
SAA	Satellite Accumulation Area
SAP	Satellite Accumulation Point
SC-CH_4	Social Cost of Methane
SC-CO_2	Social Cost of Carbon
SC-GHG	Social Cost of Greenhouse Gases
SC-N_2O	Social Cost of Nitrous Oxide
SDB	Small Diameter Bomb
SEL	Sound Exposure Level
SF	square foot/feet
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SO_2	sulfur dioxide
STOVL	Short Take-Off, Vertical Landing
SUA	Special Use Airspace
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Protection Plan
T	Tango
TA	Time Above a specified level
TACAN	Tactical Air Navigation System
TAF	Terminal Area Forecast
TCE	trichloroethylene
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USCB	United States Census Bureau
UFC	Unified Facilities Criteria
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
V	Victor
VFR	Visual Flight Rules
VHF	Very High Frequency
VOC	Volatile Organic Compound
VOR	Omni-directional Radio-range
VORTAC	Very High Frequency Omnidirectional Range Tactical Air Navigation Aid
W-	Warning Area

Acronym	*Definition*
WCMD	Wind Correct Munitions Dispenser
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan

This page intentionally left blank.

1 Purpose and Need for the Proposed Action

This page intentionally left blank.

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (U.S.) Department of the Air Force (DAF) and National Guard Bureau (NGB) propose to maintain the combat capability of the Air National Guard (ANG) fighter wings currently flying the F-15C/D aircraft. These aircraft have reached the end of their lifespan and will be phased out due to safety and maintenance concerns. These fighter wings (that are not already undergoing similar evaluation) include the 104th Fighter Wing (104 FW) at Westfield-Barnes Regional Airport (BAF) in Westfield, Massachusetts (MA); the 144th Fighter Wing (144 FW) at Fresno Yosemite International Airport (FAT) in Fresno, California (CA); and the 159th Fighter Wing (159 FW) at Naval Air Station (NAS) Joint Reserve Base (JRB) New Orleans, in Belle Chasse, Louisiana (LA). The proposal is the beddown, operation, and associated infrastructure construction of one squadron of F-15EX Eagle II (F-15EX) aircraft at two of these fighter wings and one squadron of F-35A Lightning II (F-35A) aircraft at either the 104 FW or the 159 FW (Table 1.1-1). These aircraft would replace the aging F-15C/D fighter aircraft at the selected wings. It is also conceivable that one or more of these fighter wings would retain the legacy F-15C/D aircraft for the foreseeable future and construction associated with that alternative would be implemented to support the current legacy aircraft. Fighter wings evaluated under the Proposed Action are shown in Figure 1.1-1 and are based on criteria identified in Section 2.3, *Alternative Identification Process*.

Table 1.1-1 Aircraft Considered for Each Fighter Wing

Fighter Wing Installation	AIRCRAFT CONSIDERED FOR EACH FIGHTER WING	
	F-15EX (2 locations)	***F-35A (1 location)***
104 FW at BAF	X	X
144 FW at FAT	X	N/A
159 FW at NAS JRB New Orleans	X	X

Legend: 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; BAF = Westfield-Barnes Regional Airport; FAT = Fresno Yosemite International Airport; JRB = Joint Reserve Base; N/A = not applicable; NAS = Naval Air Station.

The 104 FW at BAF, 144 FW at FAT, and 159 FW at NAS JRB New Orleans all have fighter missions that are assigned to the DAF Air Combat Command (ACC) Major Command (MAJCOM) for their federal missions, and as such they implement a training syllabus associated with ACC. As an integral component of ACC, ANG units defend the homeland of the U.S., as well as deploy forces worldwide to meet threats to ensure the security of the U.S. To fulfill this role, the pilots must train as they would fight, which means that they must simulate battle conditions in a training environment.

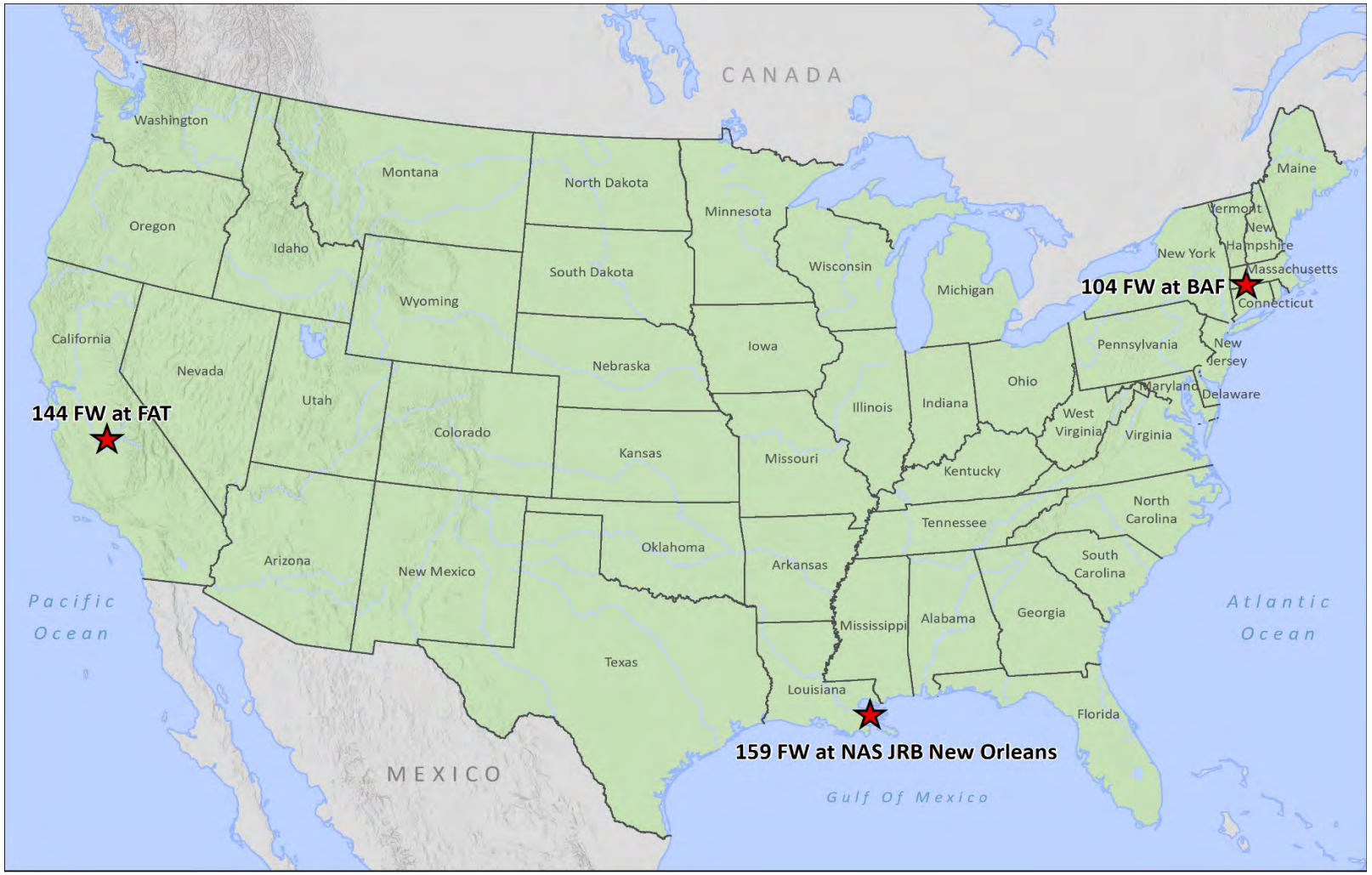


Figure 1.1-1 Existing F-15C/D ANG Fighter Wings Evaluated under the Proposed Action

1.2 PURPOSE AND NEED

1.2.1 Purpose of F-15EX and F-35A Operational Beddowns

The federal mission of these ANG units is to support the DAF by maintaining well-trained, well-equipped units available for prompt mobilization during wartime and to provide assistance during national emergencies. To meet these requirements, the ANG must operate combat and support aircraft and train personnel for the job, according to the training requirements established by ACC through its Ready Aircrew Program (RAP). In order to do so, the ANG must acquire and train with the current DAF aircraft, including the F-15EX and F-35A. The purpose of the Proposed Action is to maintain combat capability and mission readiness for the ANG's 104 FW in Westfield-Barnes, MA; 144 FW in Fresno, CA; and 159 FW in New Orleans, LA. Beddown and operation of the F-15EX and F-35A to replace the aging F-15C/D fleet at the 104 FW, 144 FW (F-15EX only), and 159 FW would enable this goal. These beddown actions and associated training would ensure availability of combat-ready pilots in the most advanced fighter aircraft in the world.

Since the DAF/NGB Proposed Action involves construction of infrastructure necessary to support the F-15EX and F-35A basing at two candidate civil airport locations (either aircraft at BAF and only the F-15EX at FAT), the airport owner/operator would need to request approval from the Federal Aviation Administration (FAA) for certain changes to their Airport Layout Plans (ALPs). Thus, FAA's federal action is approval of the respective civilian airport owner/operators ALP. The purpose and need of the FAA's action is to ensure the components of the Proposed Action subject to FAA approval do not derogate aviation safety and meet FAA airport design standards at BAF and FAT. The Department of the Navy's (DON's) federal action is approval of the Proposed Action occurring at NAS JRB New Orleans. The purpose and need of the DON's action is to support NGB in maintaining the combat capability and mission readiness of the ANG's 159 FW while ensuring the components of the Proposed Action do not impede ongoing mission requirements at NAS JRB New Orleans.

1.2.2 Need for F-15EX and F-35A Operational Beddowns

The F-15C/D fleet is reaching the end of its service life. The DAF determines the service life of a fleet based on capability and structural integrity of the aircraft constrained by economic reality. Theoretically, with unlimited funding, it would be possible to fly an aircraft forever, but eventually it is more cost- and capability-effective to replace older aircraft with newer aircraft. The DAF has decided it is not optimal to retain the F-15C/D aircraft beyond fiscal year (FY) 2026 and has already begun to retire aircraft that are reaching the end of their service life.

The F-15C/D aircraft currently based at these three ANG fighter wings face increased maintenance issues due to the age of the aircraft that limit flying ability and can present pilot and public safety hazards. The fighter aircraft need to be replaced due to attrition, decreasing service life, and because new F-15C/D aircraft are no longer being manufactured. The F-15EX and F-35A are solutions to the F-15C/D that maintains capacity to conduct the mission and adds capability to the DAF while preserving the Air Superiority and Homeland Defense missions. The F-15EX and F-35A aircraft offer next generation technologies, including an advanced cockpit, active electronically scanned array (AESA) radar, digital electronic warfare suite, the world's fastest mission computer, and modern sensors to remain ahead of current and evolving threats.

1.3 BACKGROUND OF THE F-15EX EAGLE II AND F-35A LIGHTNING II AIRCRAFT

1.3.1 Fighter Modernization

During the 1980s, the DAF assessed its tactical capabilities against projected threats and determined a multi-role aircraft deficiency would emerge in the near future. Such a deficiency could jeopardize the U.S. ability to ensure its forces have the freedom of action to conduct operations against opposing forces. As a result, the DAF developed a strategy to modernize the aging inventory of legacy fighter aircraft with a nearly all-stealth fighter force by 2025.

Designed as air superiority fighters and first fielded in the 1970s, the F-15C/Ds were planned to have retired by now, but the termination of the F-22 program after acquiring 186 aircraft—less than half the procurement goal—compelled the DAF to extend the F-15C/D service. Now, key structural components are reaching the end of their engineered service life—so much so that many F-15C/Ds must operate today under significant speed and G-loading restrictions. The F-15C/Ds will age out of the inventory faster than new F-35As can be produced, reducing the available fighter fleet at a time when the DAF is already 7 squadrons short of the 62 they need to meet the National Defense Strategy. The F-15EX is essentially an in-production aircraft and has approximately 70 percent commonality with the F-15C/D and E parts already in service, and can use much of the same ground equipment, hangars, simulators, and other support gear as the F-15C, D, and E models. At a unit price roughly comparable to that of the F-35A, F-15C/D squadrons could rapidly transition to the F-15EX, whereas converting pilots, maintainers, facilities, and equipment to the F-35A takes much longer (Tirpak 2019).

1.3.2 F-15EX Aircraft Characteristics

The F-15EX is an all-weather, extremely maneuverable, tactical fighter capable of speeds up to Mach 2.5. The F-15EX can employ air-to-ground, air-to-air, and guided weapons. The F-15EX also possesses a 20-millimeter (mm) Gatling-style rotary cannon for close air support and anti-armor missions. In addition, it employs defensive countermeasures such as chaff and flares.

The F-15EX is a replacement for the F-15C/D that offers next generation technologies. Similar infrastructure, support, and training requirements will permit existing F-15 units to quickly transition to the F-15EX. The F-15EX is configured with a two-seat cockpit enabling future crew/mission expansion.

The F-15EX can carry 29,500 pounds of weapons externally.

1.3.3 F-35A Aircraft Characteristics

There are three variants of the F-35: F-35A (DAF), Conventional Take-Off and Landing (CTOL); F-35B (Marine Corps), Short Take-Off, Vertical Landing (STOVL); and F-35C (DON), Carrier Variant (CV).

The F-35A is a supersonic, single seat, single engine, all-weather, stealth fighter aircraft capable of performing and surviving lethal strike warfare missions. The F-35A is capable of speeds up to Mach 1.5 and can employ air-to-ground, air-to-air, and guided weapons from an internal weapons bay. The DAF F-35A model also possesses a 25mm cannon for close air support and anti-armor missions. In addition, it employs defensive countermeasures such as chaff and flares, although its stealth characteristics reduce the need for such measures.

The F-35A combines internal weapon bays and expanded fuel capacity to permit low visibility penetration of enemy air defenses.

The F-35A CTOL variant is designed to embody critical combat capabilities to fulfill multiple DAF mission roles, emphasizing air-to-ground missions by providing a unique combination of capabilities, including a stealth design, a larger combat radius, upgraded computer systems, helmet-mounted display, and reduced maintenance costs.

1.3.4 F-15EX and F-35A Training Requirements

F-15EX and F-35A aircraft must be used in training exercises to ensure combat readiness for all major types of missions, including basic fighter maneuvers, surface attack tactics, air combat maneuvers, close air support, and air combat tactics. Each of these major missions requires the necessary airspace and range assets (e.g., targets and strafing pits) to permit realistic training. All flight operations would take place in existing training airspace. No additions or alterations of training airspace or ranges are associated with the Proposed Action. More details on F-15EX and F-35A training requirements can be found in Section 2.2, *Elements of the Proposed Action*, and fighter wing-specific details can be found in Chapter 4.0.

1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS AND PUBLIC INVOLVEMENT

This Environmental Impact Statement (EIS) has been prepared in compliance with Council on Environmental Quality (CEQ) and DAF National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321-4347) implementing regulations, and in consideration of applicable federal, state, and local environmental regulations. An EIS is prepared as a tool for compiling information for a proposal and provides a full and fair analysis of environmental impacts on the natural and human environment. Reasonable alternatives to the Proposed Action, including the No Action Alternative, are also evaluated in an EIS. The DAF and NGB have evaluated all reasonable alternatives to ensure that an informed decision is made after review and consideration of the potential environmental consequences. Compliance with NEPA guidance for preparation of an EIS involves several critical steps. Details regarding this process are described on the project website (URL address: www.angf15ex-f35a-eis.com).

1.5 SCOPING SUMMARY FOR EIS

The Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations [CFR] 989) and CEQ regulations (40 CFR 1503.1) specify public and agency stakeholder involvement at various junctures in the development of an EIS, including: (1) scoping prior to the preparation of a Draft EIS, and (2) public review of the Draft EIS prior to finalizing the document. Public involvement for this EIS is summarized in Appendix A.

Scoping for this EIS took place from July 19, 2022 to September 2, 2022. The initiation of the scoping process began with the publication of the Notice of Intent to prepare an EIS in the *Federal*

Register on July 19, 2022 (Appendix A) notifying the public and government agencies and other interested parties about the proposal, the scoping period, and associated scoping meetings. As required under NEPA, the scoping period extended at least 30 days, and in fact lasted 46 days, from publication of the Notice of Intent in the *Federal Register*.

NGB held four in-person meetings and three virtual meetings over the course of a 3-week period with 139 people attending the meetings. The NGB received a total of 79 public scoping comments during the official comment submittal period (July 19 to September 2, 2022).

A summary of scoping comment topics can be found in Table 1.5-1.

Table 1.5-1 Summary of Scoping Comment Topics

Comment Topic	*Fresno*	*Lemoore*	*Barnes*	*New Orleans*	*Total**
General Support	9	3	8	1	21
General Opposition	2	0	2	1	5
Aircraft Preference	7	1	2	0	10
Location Preference	1	5	0	0	6
Noise	15	0	13	1	29
Vibration	2	0	2	0	4
Socioeconomics	4	2	0	0	6
Air Quality	2	0	2	0	4
Wildlife	0	0	1	0	1
Water	0	0	2	0	2
Airspace	0	0	0	1	1
Flight Operations	1	0	0	1	2
Environmental Justice	1	0	0	0	1
Transportation	1	0	1	0	2
Domestic Animals	1	0	0	0	1
Multiple Environmental	1	0	2	1	4
Other	1	0	2	0	3
Cumulative	0	0	1	0	1

Note: *Many comments addressed multiple topics.

The Draft EIS addressed all substantive comments received. Following release of the Draft EIS, the NGB will hold a series of public hearings. The public will have an opportunity to review results of the environmental analysis and see how the NGB addressed their concerns. The public will also be able to ask questions, make statements for the public record, and voice additional concerns, if they desire to do so.

1.5.1 Government-to-Government Consultation

In an ongoing effort to identify traditional cultural resources, as well as satisfy the requirements of various laws, regulations, and Executive Orders (EOs), the NGB and DON have consulted with American Indian Tribes according to the *Presidential Memorandum on Government-to-Government Relations with Native American Tribal Governments*; EO 13175, *Consultation and Coordination with*

Indian Tribal Governments; and Department of Defense (DoD) Policy on Native American and Native Alaskan Consultation. The NGB initiated informal government-to-government consultation with American Indian Tribes by notifying them of the intent to undertake the EIS as well as initiating informal consultation (Appendix A). Federally recognized tribes with potential interest in the Proposed Action locations were sent letters asking if they had any concerns, would like to provide further information for incorporation into the EIS, and/or desire to meet with the NGB. Copies of letters and responses are included in Appendix A. Refer to Chapter 4, fighter wing-specific sections, for information on the government-to-government consultation.

1.6 LEAD AND COOPERATING AGENCIES

1.6.1 Lead Agencies

The DAF and NGB are co-lead agencies responsible for the scope and content of this EIS. NGB is the environmental planning function executing this action. Pursuant to 42 USC Section 4332, 40 CFR Section 1500.5(d), and 40 CFR Section 1501.7(h), the DAF and NGB invited potential cooperating agencies to participate in the environmental review process for the F-15EX and F-35A basing proposals and requested these agencies to consider their authority and capacity to assume the responsibilities of a cooperating agency. Upon receipt of the cooperating agency responses (Appendix A) to the DAF's requests, DAF and NGB held interagency meetings to discuss the environmental review process, schedule, and agency responsibilities. The following subsections discuss the cooperating agencies that supported the preparation of this Draft EIS. The cooperating agencies' roles in this environmental review neither expands nor diminishes the final decision-making authority of these agencies.

The FAA and DON are cooperating agencies for this EIS. The NGB, FAA, and DON coordinated from the outset and developed this document to meet each agency's distinct obligations under the NEPA of 1969 (42 USC 4321–4347) to support the decision-making of all three agencies.

In accordance with NEPA of 1969 (42 USC 4321–4347), CEQ *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts 1500–1508), and 32 CFR Part 989 et seq., *Environmental Impact Analysis Process* (EIAP); FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*; and 32 CFR Part 775, *Policies and Responsibilities for Implementation of the National Environmental Policy Act Within the Department of the Navy*, the NGB has prepared this Draft EIS. The DAF and NGB use a systematic, interdisciplinary approach to consider the potential consequences to the quality of the human environment and important historic, cultural, and natural aspects of our national heritage that may result from implementation of this action.

1.6.2 Cooperating Agencies

1.6.2.1 Federal Aviation Administration

The FAA is serving as a cooperating agency for this EIS pursuant to 40 CFR Section 1501.8 (see Appendix A for a copy of the Cooperating Agency letter). The FAA has jurisdiction by law and special expertise relating to these F-15EX and F-35A basing proposals at the candidate civil airport locations where the ANG is a tenant. FAA's authorities and special expertise is based on its statutory responsibilities under the Airport and Airway Improvement Act of 1982 (49 USC Section 47101) and Section 163 of the 2018 FAA Reauthorization Act and relevant implementing regulations. The FAA is also responsible for providing leadership in planning and developing a safe and efficient national airport system and satisfying the needs of aviation interests of the U.S., with due consideration for economics, the environment, local property rights, and safeguarding the public investment. This includes oversight and administration of airport planning and development, airport noise compatibility planning, safety of airport operations, protection of airspace on and immediately adjacent to an airport, and environmental reviews of airport improvement projects. The FAA's Office of Airports is the lead within the FAA for the development of this EIS and coordinated internally to address all resources of concern under FAA's jurisdiction to ensure that the environmental review under NEPA and other regulatory processes (e.g., Section 4[f] of the Department of Transportation [DOT] Act of 1966) are efficient and completed in a timely manner.

If FAA receives a request from either the City of Westfield for BAF or the City of Fresno for FAT for approval of certain changes to their ALPs, FAA would be responsible for an environmental review under NEPA and may rely on the information and analyses in this EIS for its decision making purposes.

1.6.2.2 Department of the Navy

The DON has special expertise related to NAS JRB New Orleans, given that it is a Naval installation. If NAS JRB New Orleans is selected for a new aircraft, as Host, the DON has decision-making responsibilities regarding construction of facilities, potential leasing of additional installation property, and oversight approval of the beddown on DON property to ensure compatibility with installation facility and air operations. The DON, in accordance with 32 CFR Part 775, intends to adopt this EIS and sign a separate Record of Decision (ROD).

This page intentionally left blank.

2 Description of Proposed Action and Alternatives

This page intentionally left blank.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW OF THE PROPOSED ACTION AND ALTERNATIVES

The DAF and NGB propose to maintain the combat capability of ANG by recapitalizing the remaining F-15C/D aircraft, which are being retired. There are three remaining ANG units that are still flying the F-15C/D aircraft (that are not already undergoing similar evaluation); these include the 104 FW at BAF in Westfield, MA; the 144 FW at FAT in Fresno, CA; and the 159 FW at NAS JRB New Orleans, in Belle Chasse, LA. The proposal is the beddown, operation, and associated infrastructure construction of one squadron of F-15EX aircraft at two of these fighter wings and one squadron of F-35A aircraft at either the 104 FW or the 159 FW. These aircraft would replace the aging F-15C/D fighter aircraft at the selected wings. Should the DAF decide to not base either the F-15EX or the F-35A at one or more of the three ANG locations that currently fly the F-15C/D aircraft (104 FW, 144 FW, 159 FW), it would be imperative to continue to support the ANG mission with the required construction, infrastructure, and maintenance activities necessary to continue their mission into the foreseeable future, however long that may be with the F-15C/D aircraft. The facility and infrastructure construction required for continuing the legacy F-15C/D mission is also evaluated in this EIS for the three ANG fighter wings and is referred to as the "F-15C/D Legacy Aircraft Alternative" in this EIS. The No Action Alternative is also considered as required by 40 CFR Section 1502.14(c) (2020). Under the No Action Alternative, one or more of these fighter wings would retain the F-15C/D aircraft and continue flying that mission indefinitely. Under this alternative, there would be no infrastructure construction in support of that mission. The aircraft considered for each fighter wing are based on criteria identified in Section 2.3, *Alternative Identification Process*.

The Proposed Action also includes additional personnel needed to operate and maintain the F-15EX or F-35A, and construction of new and/or modification of existing facilities on the installations supporting the beddowns. Pilots operating the aircraft would conduct training from the installation and in existing Special Use Airspace (SUA) associated with each proposed location. No new SUA or reconfiguration of existing SUA is proposed to support the ANG beddowns for any of these fighter wings; however, there would likely be an increase in operations within the SUA, described in more detail in Section 2.2.2.1, *Training Airspace and Range Operations*.

This chapter presents the elements common to the Proposed Action for each of these fighter wings. The specifics of the proposal, relative to each of the fighter wings, are presented in Chapter 4.0. The methodology used to identify the Proposed Action and alternatives analyzed in this EIS, and the alternatives considered but not carried forward for analysis, are discussed in Section 2.3.2,

Alternatives Considered but Not Carried Forward. This chapter also discusses the No Action Alternative, as required under CEQ regulations (40 CFR Section 1502.14[c]).

2.2 ELEMENTS OF THE PROPOSED ACTION

2.2.1 Elements Affecting the Installation

2.2.1.1 Basing of the F-15EX or F-35A Aircraft

The beddown process would occur in phases associated with the manufacture and delivery of F-15EX or F-35A aircraft. Delivery of the first aircraft to an installation would be expected to be in FY 2027–28 for the F-15EX, and as early as 2026 for the F-35A; and the last aircraft delivery is scheduled to be completed within 6–12 months following initial aircraft arrival, at which time the full complement of 21 Primary Aerospace Vehicle Authorized (PAA) (plus 2 Backup Aerospace Vehicle Authorized [BAA] and 1 Attrition Reserve [AR]) F-15EX aircraft or 21 PAA (plus 2 BAAs) F-35A aircraft would be based at the selected fighter wing installations. ANG units typically deploy in multiples of six aircraft. While an ideal fighter squadron would be 24 aircraft, budgetary constraints will allow for only three squadrons of six aircraft plus three additional aircraft to support the homeland security mission, resulting in a proposal of 21 PAA.

For those two fighter wings that are selected to receive the F-15EX aircraft, there are three potential mission scenarios: (1) air-to-air mission only, (2) air-to-air and air-to-ground mission (dual mission), and (3) air-to-air and air-to-ground missions with the addition of Combat Systems Officers (CSOs), which would be in the second seat of the F-15EX cockpit. Though initially the F-15EX mission would likely be strictly an air-to-air mission, it is conceivable, and even likely that with time those fighter wings selected for the F-15EX mission would operate with the full mission capability of the aircraft (air-to-air, air-to-ground, and CSOs); therefore, for the purposes of this analysis, it is assumed the fighter wings that are selected for the F-15EX mission would operate with the full complement of missions.

2.2.1.2 Airfield Operations

To provide the training needed to ensure combat readiness, F-15EX and F-35A aircrews would conduct operations in two types of areas: (1) an airfield associated with an installation, and (2) training ranges and SUA. Additionally, pilots flying the F-15EX and F-35A would use ground-based flight simulators extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures.

This EIS uses three terms to describe different components of aircraft flying activities: *sortie, operation,* and *event.* Each has a distinct meaning and commonly applies to a specific set of

activities in a particular airspace environment or unit. These terms also provide a means to quantify activities for the purposes of analysis.

A *sortie* consists of a single military aircraft from a takeoff through a landing. For this EIS, the term *sortie* is commonly used when summarizing the amount of flight activities from an installation. A sortie can include more than one *operation.*

The term *operation* can apply to both airfield and airspace activities and represents the primary analytic and descriptive quantifier of aircraft flight activities presented in this EIS. At an airfield, an operation comprises one action such as a landing or a takeoff. For airspace and ranges, an operation comprises the use of one airspace unit (e.g., Military Operations Area [MOA], Restricted Area, Air Traffic Control Assigned Airspace [ATCAA]) by one aircraft. Each time a single aircraft flies in a different airspace unit, one operation is counted for that airspace unit. Thus, different installations could support the same number of sorties for the same aircraft type but generate different numbers of operations in the airspace due to the configuration of airspace units.

As a subset of operations, the term *event* is used to define specific training elements (e.g., a defensive countermeasure or ordnance delivery event). More than one event may be performed during the use of an airspace unit. During a single sortie, an aircraft could fly in several airspace units, conducting a number of operations and events. For these reasons, the number of operations and events may exceed total sorties and are not additive to one another.

Current airfield operations differ across fighter wing installations due to several factors: aircraft type, number of pilots requiring RAP training currency, and the availability of aircraft/training hours. The number of pilots requiring currency in their RAP training differs across installations and is a function of available training hours and the number of pilots requiring the training.

The annual flying program for both the F-15EX and the F-35A is 250 hours per aircraft. Though each aircraft may not achieve the full amount of annual flying hours, this analysis will evaluate the full 250 hours per aircraft. Thus, with 21 PAA proposed for either the F-15EX or the F-35A, the total flying hour program at any of these fighter wing installations would be 5,250 hours annually. The number of sorties conducted at each installation would vary depending on the average sortie duration (ASD) for each fighter wing installation (Table 2.2-1), which depends upon each installation's proximity to their training airspace.

Table 2.2-1 Current and Estimated Proposed Annual Airfield Sorties by Aircraft Beddown Alternative

ANG Unit and Airfield	*Existing Average Sortie Duration (hours)*	*Total Current F-15C/D Aircraft Sorties*	*Proposed F-15EX Sorties*	*Proposed F-35A Sorties*
104 FW, a tenant at BAF	1.65	1,900	3,182	3,182
144 FW, a tenant at FAT	1.60	1,811	3,281	N/A
159 FW, a tenant at NAS JRB New Orleans	1.37	1,850	3,832	3,832

Legend: 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; ANG = Air National Guard; BAF = Westfield-Barnes Regional Airport; FAT = Fresno Yosemite International Airport; JRB = Joint Reserve Base; N/A = not applicable; NAS = Naval Air Station.

A closed pattern is a takeoff from an airfield, followed by a flight pattern that sets the aircraft up for an immediate landing at the same airfield, without intent to ever leave the local area. These include closed patterns under visual flight rules (VFR) and instrument flight rules (IFR) dependent on the fighter wing installation and their inclusion in the analysis accounts for local training variations above each fighter wing's operations based on sorties alone. The current number of closed patterns per sortie flown with the legacy aircraft (F-15C/D) at each fighter wing was used to predict the proposed F-15EX or F-35A closed patterns. Therefore, if one fighter wing averaged one closed pattern per sortie and another averaged two closed patterns per sortie, the total of airfield operations at each would differ.

Each of the airfields associated with these fighter wings already supports a considerable number of military airfield operations; Table 2.2-2 provides the current number of legacy aircraft (ANG F-15C/D) operations flown at each of the locations and compares them to the proposed F-15EX and F-35A operations. The F-15EX and F-35A operations are based on a 100 percent manned wing with assigned pilots maintaining combat-ready status in accordance with the requirements of the RAPs. Using information from previous noise studies, airfield management logs, recent environmental documentation, and interviews with airfield managers and pilots, the current operations provide a guide to determining the benchmark against which proposed activities can be assessed. BAF and FAT are civil airfields, where general aviation and commercial air traffic comprise the majority of the airfield operations and the ANG is a tenant. The F-15EX and F-35A beddowns would not change the number or type of other based aircraft, transient military aircraft, or civilian and commercial operations. NAS JRB New Orleans is a Naval base that primarily supports DoD aircraft as opposed to general aviation and commercial traffic.

Table 2.2-2 Current and Estimated Proposed Annual Airfield Operations by Aircraft Beddown Alternative

ANG Unit and Airfield	*Total Current F-15C/D Aircraft Operations*	*Proposed F-15EX Operations*	*Proposed F-35A Operations*	*Percent Change from Current*
104 FW, tenant at BAF	4,100	6,866	6,866	+67%
144 FW, tenant at FAT	3,802	6,888	N/A	+81%
159 FW, a tenant at NAS JRB New Orleans	3,934	8,148	8,148	+107%

Legend: % = percent; 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; ANG = Air National Guard; BAF = Westfield-Barnes Regional Airport; FAT = Fresno Yosemite International Airport; JRB = Joint Reserve Base; N/A = not applicable; NAS = Naval Air Station.

If the 104 FW, the 144 FW, and/or the 159 FW are not selected for the F-15EX or the F-35A aircraft, then the existing F-15C/D aircraft would continue to fly at these installations with no changes to current operations for the foreseeable future; however, construction associated with continued operations with the legacy F-15C/D aircraft are analyzed in this EIS. Note that under the No Action Alternative, the existing F-15C/D aircraft would also continue to fly at these installations with no changes to current operations; however, there would be no construction implemented in support of the F-15C/D legacy aircraft.

All F-15EX and F-35A units have pilot proficiency requirements defined by Headquarters Air Force Operations, Plans and Requirements (HAF/A3) and published in the F-15EX (Air Force Manual [AFMAN] 11-2F-15E, Volume 1, June 20, 2019) and F-35A RAP (AFMAN 11-2F-35A, Volume 1, September 13, 2019). As is the case with current F-15C/D aircraft operations, F-15EX and F-35A combat missions require flying during daylight and dark conditions, as well as under myriad weather conditions. See Section 2.2.2.3 for more information on after dark training.

F-15EX and F-35A Flying Programs

Based on a 5,250 flying hour program, and ASDs ranging from 1.37–1.65 hours, the NGB anticipates that each of the three fighter wings could fly up to 3,182–3,832 sorties annually, depending on the fighter wing's proximity to their training SUA. Each sortie includes at least one departure and one arrival resulting in a potential 6,364 to 7,664 annual departure and arrival operations. A small number of additional airfield operations would occur as a result of practice approaches to the airfield. Closed pattern operations would differ by location ranging from 326 to 502 (again, depending on the fighter wing), resulting in total airfield operations of between 6,688 and 8,148. This EIS assumes that 100 percent of air operations would be at home station to provide a conservative estimate for the initial F-15EX qualification training required for ANG pilots.

Aircraft equipped with afterburner have the ability to increase engine thrust resulting in an increase in speed needed to safely lift off from a runway, and as needed in the training airspace to achieve high speeds quickly. The F-15C/D, F-15EX, and F-35A are all equipped with afterburner. Use of

afterburner consumes large amounts of fuel, so its use is typically limited to those times when it is absolutely necessary for flight safety requiring the additional thrust or higher rates of acceleration. During aircraft departures, afterburner could be needed if the aircraft is heavily loaded, or when certain weather conditions exist (such as some combinations of high temperature, high humidity, and low pressure).

For this Proposed Action, the DAF and NGB has evaluated the requirement for F-15EX afterburner use during a departure at each of the three fighter wings based on a basic training configuration, airfield elevation, runway length, and hottest temperature on record. Depending on the location, the F-15EX aircraft use of afterburner during takeoffs would vary based upon additional weight from the conformal fuel tanks, local weather conditions, and runway length. There is minimal operational requirement for afterburner use for the F-35A at any of the fighter wing locations under consideration. There is no training requirement for F-35A pilots to utilize afterburner on takeoffs. Although heavily loaded, F-35A training flights may drive afterburner use in rare cases; that training scenario would typically occur off-station and would not be required at any of the fighter wing locations evaluated in this EIS. However, to ensure that afterburner use is considered in this analysis, a minimal percentage of afterburner use was evaluated for the F-35A. The analysis in this EIS has evaluated the most likely percent use of afterburner at each location for each of the two aircraft and the legacy F-15C/D as shown in Table 2.2-3.

Table 2.2-3 Current (F-15C/D) and Proposed (F-15EX and F-35A) Afterburner Use at Airfield

Fighter Wing, Location	*F-15C/D*	*F-15EX*	*F-35A*
104 FW, BAF	80%	80%	5%
144 FW, FAT	12%	15%	N/A
159 FW, NAS JRB New Orleans	90%	90%	5%

Legend: % = percent; 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; BAF = Westfield-Barnes Regional Airport; FAT = Fresno Yosemite International Airport; JRB = Joint Reserve Base; N/A = not applicable; NAS = Naval Air Station.

2.2.1.3 Construction and Modification of Facilities

To accommodate the F-15EX, F-35A, or retention of the legacy F-15C/D aircraft, the fighter wing installations selected for these aircraft beddowns would require both new construction and modification of some existing facilities. All construction would be located within the airport or DON installation boundaries. Examples of some basic facility and infrastructure requirements include:

- Squadron operations/maintenance facilities
- Hangars
- Simulator facilities
- Installation communications infrastructure

- Electrical system upgrades
- Other installation support facilities, such as an engine repair shop and aircraft parking aprons, which vary from installation to installation

While each fighter wing installation currently offers many of the necessary facilities for the proposed beddowns, none of them provide all of the required infrastructure and facilities. At each fighter wing location (BAF, FAT, and NAS JRB New Orleans), construction of new facilities and/or modification of existing facilities would be necessary, although the nature and magnitude of these efforts would differ among these locations. Much of the proposed construction and modifications would occur before the first new aircraft would arrive at the selected fighter wing installations but may continue after the first aircraft arrives. The duration of construction is dependent upon the complexity and breadth of development needed to support the beddowns. Construction projects that would support the legacy aircraft if any of these fighter wings were not selected for the F-15EX or the F-35A aircraft are also analyzed within this EIS. Details on construction and modification projects related to the F-15EX and F-35A beddowns, as well as the legacy aircraft, are presented in each fighter wing-specific Chapter 4.0.

Because of the DAF and NGB Proposed Action, the airport sponsors for BAF and FAT would need to submit a request to the FAA for changes to their respective ALPs pursuant to 49 USC 47101 and relevant implementing regulations. The FAA's federal action would be a direct outcome of the airport sponsors' request for approval to change the ALP related to the construction/demolition of infrastructure within the airport boundary at BAF and FAT.

2.2.1.4 Personnel Changes

The total number of ANG personnel at each fighter wing location would increase by approximately 80–100 people depending on the particular aircraft beddown alternative. For the F-15EX, it is estimated there would be an increase of 36 officers (including 21 CSOs) and 65 enlisted persons. For the F-35A, it is estimated there would be an increase of 15 officers and 65 enlisted persons. The addition in personnel is in part to accommodate the increase in aircraft (from 18 to 21 PAA). Additionally, for the F-15EX, there is an accommodation for the CSO (in the second seat of the aircraft). If a fighter wing does not receive one of these new aircraft, then the number of personnel would not change from current conditions. Details on current personnel at each installation are presented in each fighter wing-specific Chapter 4.0.

2.2.2 Action Elements Affecting Training and Airspace Ranges

2.2.2.1 Training Airspace and Range Operations

To fulfill the multiple roles currently performed by the F-15C/D aircraft they would be replacing, the F-15EX and/or F-35A pilots must conduct training exercises in the respective aircraft per the appropriate RAP to ensure combat readiness. All flight operations would take place in existing training airspace. No additions or alterations of training airspace are associated with the Proposed Action; however, there could be an increase in utilization of the SUA.

Most training occurs within SUA (including Warning Areas, Restricted Areas, and MOAs) associated with ATCAAs. Because Warning Areas are offshore (and therefore remote from populations), there are often fewer restrictions on the activities there (such as for supersonic flight). Figure 2.2-1 depicts and describes the characteristics of this type of SUA. There are published restrictions for use of overland SUA that dictate altitudes, use for supersonic flight, use of ordnance, etc. Under this Proposed Action, there are no proposed changes to any SUA. Any new aircraft would use the same training airspace that the current aircraft use.

Legacy F-15C/D

The F-15C/D is purely an air-superiority fighter. Its mission is in the air-to-air arena only, with a variety of tasks in both the Defensive Counter-Air (DCA) and Offensive Counter-Air (OCA) mission sets. Training for F-15C/D squadrons includes full mission rehearsals and a variety of partial-task training events for implied tasking such as Basic Fighter Maneuvers and Air Combat Maneuvering. The greatest amount of time on many DCA and OCA missions would be spent at higher altitudes because training for Basic Fighter Maneuvers and Air Combat Maneuvering (being perishable skills) occur more often than they would likely be used in combat. These training activities are fights in the visual arena and are conducted down to 5,000 feet above ground level (AGL) regularly. In addition, to satisfy the ability of the F-15C/D to find and prosecute targets at lower altitudes (below 10,000 feet AGL), there has also been a regular need for use of training airspace at those lower altitudes for the "red air" (simulated enemy) aircraft engaged in the training. Current F-15C/D squadrons use these lower altitudes occasionally in training. Table 2.2-4 shows the average distribution of altitudes used for F-15C/D, F-15EX, and F-35A training across their full syllabi. This distribution does not apply to any single block of SUA, as flights in a particular location are subject to the restrictions for that particular airspace.

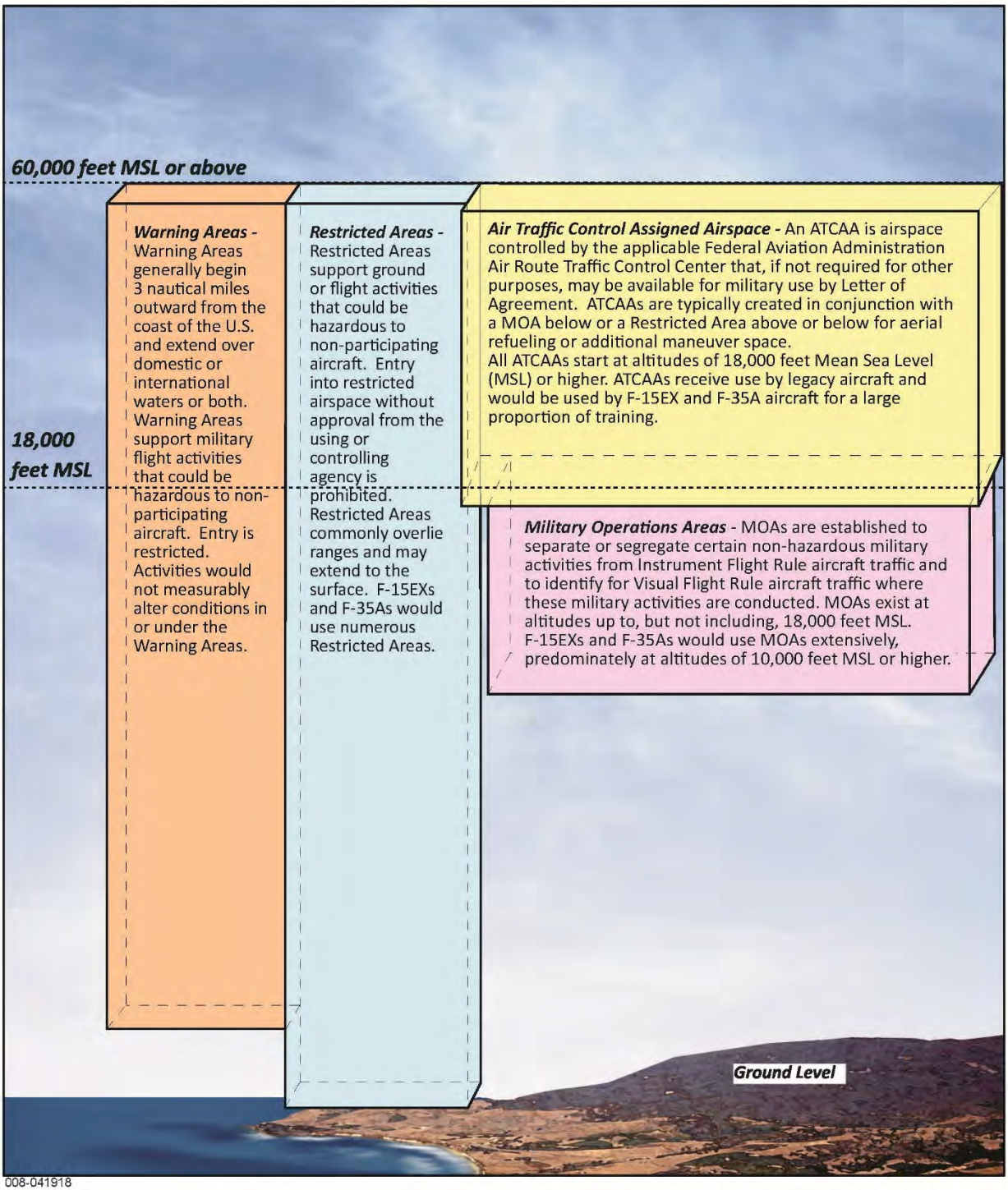


Figure 2.2-1 Types of Training Airspace

Table 2.2-4 Projected F-15EX, F-35A, and F-15C/D Training Altitude Distribution

Altitude (feet)	*Percent Use – F-15C/D*	*Percent Use – F-15EX*	*Percent Use – F-35A*
500–3,000 AGL	1	1	1
3,000–5,000 AGL	1	1	1
5,000–10,000 AGL	5	5	5
10,000–18,000 MSL	36	38	24
18,000–30,000 MSL	17	30	58
>30,000 MSL	40	25	11

Legend: AGL = above ground level; MSL = mean sea level.

F-15EX/F-35A

While based on the F-15 family of aircraft, the newer F-15EX not only has an air-to-air mission, but also an air-to-ground mission, as previously described. It is considered a "multi-role" fighter, as is the F-35A. Either multi-role fighter would have to conduct air-to-air training in the same manner as the current F-15C/D, with very similar uses of altitudes as the F-15C/D both for OCA and DCA missions, and for the visual training (Basic Fighter Maneuvers and Air Combat Maneuvering) events that tend to occur at lower altitudes.

The other half of the multi-role is air-to-ground training. At one time, fighters conducting air-to-ground missions used to spend more time at lower altitudes, since they largely involved "dumb" weapons, and use of lower altitudes to minimize ranges at which weapons would be released (for accuracy of "dumb" weapons). Current air-to-ground weapons, and the aircraft sensors (built into the new fighters) that support them, are designed to allow the fighters to find targets from longer ranges, and release weapons from longer ranges and higher altitudes since they are "smart" weapons. This allows for greater aircraft survivability; at the same time there is greater effect on target.

Use of the gun/cannon in an air-to-ground mode is one tactic that could require some use of lower altitudes in an air-to-ground mission. Another might be when there are low cloud layers and the targets are in close proximity to friendly troops; in those cases, the fighter may have to descend below the clouds to gain sight of the target(s). Some practice for this must occur in training to maintain this capability.

It is expected that either F-15EX or the F-35A would use a very similar altitude profile as the F-15C/D in training. The use of low altitudes for air-to-air training would be expected to decrease more than the few additional sorties dedicated to strafing (with gun/cannon) or low altitude ("under-the-weather") deliveries of air-to-ground ordnance. Most training events would emphasize survivability against surface-to-air threats, which means greater use of higher altitudes and greater standoff distances.

In general, F-15EX and F-35A pilots at each fighter wing installation would operate in FAA-approved MOAs, ATCAAs, Restricted Areas, and Warning Areas. Air-to-ground training would also include ordnance delivery, which would occur in existing Restricted Areas over the approved ranges. Should either the F-15EX or the F-35A be beddown at these alternative fighter wing installations, ranges proposed for use include:

- Adirondack Range Complex, New York (104 FW) (F-15EX or F-35A)
- Restricted Area (R-) 2508 Range Complex, California (144 FW) (F-15EX only)
- Fort Johnson Range, Louisiana (159 FW) (F-15EX or F-35A)

Fighter wing-specific information for operations within these different airspace units is provided in Chapter 4.0. No changes specific to either the F-15EX or F-35A to airspace structure or size are proposed to support the beddown proposals; nor are any changes to range target configurations and types needed to accommodate training and operations. If in the future the DAF and NGB choose to make any range modifications, these actions would undergo the appropriate level of environmental analysis prior to implementation, though that is not anticipated. These fighter wings would continue to use the airspace and ranges in the same manner as they currently do, and within the capacity of these existing ranges.

Table 2.2-5 identifies airspace units associated with each fighter wing where F-15EX or F-35A aircraft would operate. To simplify discussion of the numerous airspace subunits, many are subsumed under a single unofficial designation (i.e., complex). This approach is taken because these airspace units are typically scheduled collectively at the same time due to their proximity to each other. Due to their capabilities and based on individual mission scenarios, current aircraft typically activate multiple contiguous SUA units rather than individual components, such as a single MOA. For example, pilots may schedule and use two or more MOAs and their overlying ATCAAs for one training activity. To conduct its training missions, the F-15EX and F-35A would also use airspace units in combination rather than singly. Additional airspace units associated with each fighter wing are presented in Chapter 4.0 for each installation.

Table 2.2-5 Summary of Existing Airspace Units Currently Used by F-15C/D and Proposed for Use by F-15EX or F-35A Aircraft

Airspace Unit	
104 FW, Massachusetts (BAF) (F-15EX or F-35A)	
• Adirondack MOA Complex • Carthage MOA Complex • Chugs MOA • Condor MOA Complex • Cranberry MOA • Laser ATCAA Complex • Lowville MOA • Lightning ATCAA Complex • Scotty ATCAA Complex • Tupper MOA Complex • Yankee MOA Complex	• R-5201 • R-5202 Complex • W-105 Complex
144 FW, California (FAT) (F-15EX only)	
• Bakersfield MOA • Barstow MOA • Bishop MOA • Buckhorn MOA • Foothill MOA Complex • Hunter MOA Complex • Isabella MOA • Lemoore MOA Complex • Owens MOA • Panamint MOA • Porterville MOA • Roberts MOA • Saline MOA • Shoshone MOA • Silver North MOA	• R-2502 Complex • R-2504 Complex • R-2505 • R-2506 • R-2508 Complex • R-2513 • R-2515 • R-2524 • W-283 Complex • W-285 Complex • W-532 Complex
159 FW, Louisiana (NAS JRB New Orleans) (F-15EX or F-35A)	
• Claiborne MOA Complex • Snake MOA Complex • Warrior MOA Complex	• R-3801 Complex • R-3803 Complex • R-3804 Complex • W-59 Complex • W-148 Complex • W-155 Complex • W-453 Complex

Legend: 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; ATCAA = Air Traffic Control Assigned Airspace; BAF = Westfield-Barnes Regional Airport; FAT = Fresno Yosemite International Airport; MOA = Military Operations Area; NAS = Naval Air Station; JRB = Joint Reserve Base; R- = Restricted Area; W- = Warning Area.

The number and duration of operations in the SUA would vary among the fighter wings due to the size, geographic distribution, and proximity of the airspace units to the installation. These differences also reflect adaptation of training activities to existing airspace.

The F-15EX or the F-35A would share training airspace with many other users. Representative types of other aircraft using the airspace include the DAF F-15, F-16, E-3, and C-12; DON F-18 and E-3; Marine Corps F-35B; and helicopters. These other users would continue operations after the beddown of the F-15EX or F-35A aircraft.

The F-15C/D fighter aircraft conduct training in the types of airspace identified in Figure 2.2-1; the F-15EX or the F-35A would use similar airspace. Although these aircraft would perform missions similar to the aircraft they are replacing, they have distinctive capabilities and would fly somewhat differently.

Military Training Routes (MTRs) are published routes that allow fast-moving military aircraft to practice low-level visual navigation at speeds higher than normally allowed at low altitudes. They are published by FAA and appear on VFR Sectional charts and other materials in use by civil aviation, to ensure that everyone is informed that there is a possibility of fast-moving aircraft at low altitudes, located outside SUA.

The F-15C/D use MTRs on a limited basis, and low-level navigation is not a part of their mission. Neither of the proposed F-15EX or F-35A multi-role fighters would require MTRs for their air-to-air mission sets. MTRs were previously used more for air-to-ground missions, when fighters had less-sophisticated navigation systems, and visual low-level navigation was a valuable skillset. Additionally, since most air-to-ground weapons were "dumb" and had to be released relatively close to the targets, many legacy fighters previously used low-level ingress to get to targets and be close enough to drop those weapons.

Both the F-15EX and F-35A have sophisticated navigation systems that do not rely on the low-level visual navigation skills of the pilots. Additionally, the weapons they carry are designed primarily for higher altitude releases with larger vertical and lateral standoff from the targets. Any low-altitude training would be conducted in the existing SUA listed in Table 2.2-5.

2.2.2.2 Supersonic Flight

To train with the full capabilities of the aircraft, F-15EX and/or F-35A pilots would employ supersonic flight (i.e., flying at or greater than the speed of sound). All supersonic flights would occur within airspace and at altitudes previously approved for such activities. Section 3.2.1.1 of each fighter wing-specific Chapter 4.0 includes details on the location and frequency of supersonic flights. NGB anticipates that time spent in air-to-air combat training would involve supersonic

flight for a maximum of 2 to 3 minutes per sortie. Supersonic speeds enable the aircraft to employ weapons at greater distances than an adversary aircraft with less supersonic capability. After simulated weapon employment, the aircraft uses its speed to evade adversary missiles and aircraft. Supersonic flight would be conducted above 15,000 feet mean sea level (MSL), with 90 percent of these supersonic events occurring above 30,000 feet MSL (Table 2.2-6), again within airspace already approved for supersonic activities.

Table 2.2-6 Average Altitude Profiles for Supersonic Flight

Altitude (feet)	*F-15C/D Fighter Aircraft*	*Projected F-15EX, F-35A*
5,000 AGL–10,000 MSL	0%	0%
10,000–15,000 MSL	8%	0%
15,000–30,000 MSL	12%	10%
+30,000 MSL	80%	90%

Legend: % = percent; AGL = above ground level; MSL = mean sea level.

Legacy F-15C/D

The F-15C/D uses supersonic flight regularly. The air-to-air mission is enhanced by the ability to use higher speeds for a number of reasons. In DCA, faster speeds allow a fighter to intercept its target further from what is being protected. In OCA, faster speeds can help reduce decision times for defenses. In any engagement, there may be a decision made to abort or escape, in which case, the faster a fighter can go, the more survivable it is. All training airspaces have published restrictions on use of supersonic flight, which is typically in terms of altitudes and headings. Legacy F-15C/D squadrons train in these airspace blocks and comply with those restrictions that have been developed through policy, and other environmental studies.

F-15EX/F-35A

The F-15EX and F-35A would also use supersonic flight regularly for their air-to-air training and for some of their air-to-ground training. It is expected that completion of multi-role fighter training syllabi would result in the same amount (or less) of supersonic flight than a purely air-to-air mission, and the flight conditions would be subject to the same restrictions currently in use by the F-15C/D in these same airspace blocks.

2.2.2.3 Night and Evening Operations

Fighter aircraft pilots have annual requirements for accomplishing “after dark” training in order to ensure viability in combat. For flight training purposes, “after dark” is considered to be the time period from 1 hour after sunset to 1 hour before sunrise. The time of day flown in the dark varies between the units because of their geographic location and also varies seasonally. “After dark” training is different than “environmental night,” which is used to predict changes to the noise

environment. "Environmental night" is defined as the time period between 10 p.m. and 7 a.m. as prescribed by the Day-Night Average Sound Level (DNL) and Community Noise Equivalent Level (CNEL) noise metrics that account for the added intrusiveness of aircraft operations during these hours. Additionally, for bases located in California, CNEL serves as a variation of DNL that adds an "evening" period between 7 p.m. and 10 p.m. Standard procedures do not include F-15EX or F-35A departures during environmental night (10 p.m. to 7 a.m.), although some arrivals may occur during environmental night due to contingencies such as weather or special combat mission training. The legacy F-15C/D aircraft potentially being replaced at the three fighter wing installations rarely fly at night generating less than 2 percent of their operations after 10 p.m. or before 7 a.m. because "after dark" operations are typically achieved prior to 10 p.m.

F-15EX and F-35A pilots would also need to train after dark since combat can occur 24 hours a day. Under most circumstances, these after dark operations would continue to be completed before environmental night (10 p.m. to 7 a.m.) and at relatively low rates during the CNEL evening period for locations within the state of California. Typical ANG flight schedules would not require F-15EX or F-35A departures during environmental night, although some arrivals may occur during environmental evening or night and would be consistent with existing legacy aircraft operations. Contingencies such as weather or special combat mission training may result in rare, unplanned operations during this period.

2.2.2.4 Defensive Countermeasures

Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to evade attack by enemy air defense systems. Fighter pilots must train to employ defensive countermeasures, even for the F-35A, which possesses stealth features that substantially reduce its detectability.

A bundle of chaff consists of approximately 5 to 5.6 million fibers that are cut to reflect radar signals, and when dispensed from aircraft, form an electronic "cloud" that breaks the radar signal and temporarily hides the maneuvering aircraft from radar detection. RR-180 and RR-188 chaff are approved by the FAA for military training in SUA and ATCAAs.

Flares ejected from aircraft provide high-temperature heat sources that mislead heat-sensitive or heat-seeking targeting systems. Flares burn at a temperature in excess of 2,000 degrees Fahrenheit (°F) to simulate jet exhaust. A flare is designed to burn out within 500 feet from the time of release (generally 3 to 5 seconds) (DAF 2011).

Chaff and flare deployment in authorized airspace associated with the alternatives is governed by Air Force Instruction (AFI) 11-214, Change 1 and local supplements based on safety and environmental considerations and limitations. This instruction establishes procedures governing

the use of chaff and flares over ranges, other federally controlled lands, and nongovernment-owned or -controlled areas. The DAF has set standard minimum-release altitudes (AFI 11-214, Change 1, 2021) for flares over government-owned and -controlled lands. These standards, which vary from 300 to 900 feet AGL depending on the flare type, are designed to allow the flares to burn out completely at least 100 feet above the ground. Over nongovernment-controlled lands, flare release is restricted to a minimum of 2,000 feet AGL and above for all aircraft (and would be the same for F-15EX and F-35A aircraft). More restrictive altitude limits are followed for specific airspace units in response to local considerations, including wildfire threat levels. Flares can be dispensed in the offshore Warning Areas without altitude restrictions. The use of chaff requires approval from the FAA to ensure that it does not interfere with radar or communications used to direct air traffic. Use and limitations within SUA are defined in each unit's letter of agreement with the Air Route Traffic Control Center (ARTCC) responsible for controlling the airspace. The allocation and use of defensive countermeasures is not expected to change from the current usage with either the F-15EX or the F-35A. They would be used for Aerospace Control Alert (ACA) missions and would also be used in training. Each of the three units would continue to receive the same allocation of chaff and flares that they currently receive. They would be used at the same rates in the same places, subject to the same restrictions that exist now.

2.2.2.5 Ordnance Use

Air-to-air ordnance is used to destroy other aircraft and includes air-to-air missiles (AIM-120 and AIM-9) and the cannon. The F-15C/D and F-15EX have 20mm cannon systems, and the F-35A cannon is 25mm.

Air-to-ground ordnance is used for ground-based targets. There are many types of air-to-ground ordnance, to include free-fall bombs ("dumb" bombs), and a variety of laser-guided (such as Paveway), global positioning system (GPS)-guided weapons (such as the Joint Direct Attack Munition [JDAM] family, Joint Standoff Weapon [JSOW], and inertial guidance weapons such as Wind Correct Munitions Dispenser [WCMD]). Some munition types have multiple guidance options (such as Small Diameter Bomb [SDB]).

The F-15C/D does not carry any air-to-ground ordnance since it does not have an air-to-ground mission. In support of air-to-air training missions, the F-15C/D carries training missiles and instrument pods (which help record the aircraft's position for training purposes). These training aids do not release from the aircraft.

Legacy F-15C/D aircraft are also used in ACA missions supporting U.S. National Security. For these missions, the alert aircraft are loaded with live air-to-air missiles, and the cannon is loaded

with 20mm gun rounds. For ANG locations where the fighter squadron is located on a civil airport, there are strict regulations about the storage, loading, flying, and unloading of these items.

In locations where the ANG beddown would be located on civilian airfields (BAF and FAT), the ANG squadrons would deploy to other locations to train with live air-to-ground ordnance. For the proposed location where the new beddown would be on a military airfield (NAS JRB New Orleans), the squadron would be able to store, load, and fly with air-to-ground ordnance similar to the other squadrons currently assigned to that location. Local regulations on safety for storage, handling, and use of ordnance would all remain as they are now.

2.3 ALTERNATIVE IDENTIFICATION PROCESS

2.3.1 Alternative Identification Process Methodology

Identification and analysis of alternatives is one of the core elements of the EIAP under NEPA and the DAF's implementing regulations. The Secretary of the Air Force may expressly eliminate alternatives from detailed analysis based on reasonable selection standards (32 CFR 989.8[c]). Based on extensive analysis by the NGB and DAF operations communities, a study was conducted to determine the specific requirements for beddowns of the F-15EX and F-35A aircraft and to identify potential military installations where these beddowns could occur. Following this study, the Secretary of the Air Force and the Chief of Staff of the Air Force approved selection criteria for beddown.

In general, the DAF uses the strategic basing process outlined in Department of the Air Force Instruction (DAFI) 10-503 (2023) to identify potential locations to beddown missions. The process begins by determining an enterprise definition from which potential installations could be identified. This enterprise of installations is then evaluated using objective criteria to screen the top alternative installations. Site surveys are then conducted at each alternative location to determine if the installation could reasonably support the mission in question. The Strategic Basing Group oversees the process and reports findings directly to the Secretary of the Air Force and Chief of Staff of the Air Force. This process was mandated by the Secretary of the Air Force to ensure basing decisions were made using a standardized, repeatable, transparent process. These F-15EX and F-35A basing decisions followed this general basing process. The following planning conventions were followed:

1. Identify the number of F-15EX aircraft scheduled to be delivered between 2027 and 2028 and F-35A scheduled to be delivered in 2026. This time period corresponded to the DoD 2020–2024 Future Years Defense Program, which is the program and financial plan approved by the Secretary of Defense and provides a basis for DAF planning. Planning beyond this time period is speculative due to the uncertainty of funding availability.

2. Identify the number of F-15EX and F-35A aircraft to be allocated to operations based on then-current national strategic considerations.
3. Determine the enterprise definition, from which the number of potential locations capable of supporting one squadron of at least 21 F-15EX PAA or at least 21 F-35A PAA can be identified. The PAA are those assigned to meet the primary aircraft authorization and reflect the number of aircraft flown by a unit in performance of its mission.
4. Recognize additional factors of Plans and Guidance and Global Posture, which include strategic considerations but do not provide meaningful distinction among installations for ANG training within the U.S. and its territories.
5. Determine if the candidate beddown locations can accommodate the new construction associated with the F-15EX or F-35A beddowns within the necessary timeframe in order to maintain operational readiness.

Consideration of the planning conventions above led to an initial screening of all alternative locations against the following standards:

1. a unit that currently supports an F-15C/D fighter aircraft mission,
2. units that are not formal training units (FTUs), and
3. the installation has to be located in the contiguous U.S. (Continental U.S. [CONUS]).

The Proposed Action was limited to ANG units that are currently assigned the F-15C/D since the DAF has determined that it is not optimal to retain the F-15C/D aircraft beyond FY 2026 and has already begun to retire aircraft that are reaching the end of their service life. The DAF needs to replace F-15C/D aircraft with new fighter aircraft. The only two active fighter procurement programs in the DAF are the F-15EX and the F-35A.

2.3.1.1 Results of Alternative Identification Process

The standards resulted in only three fighter wings being considered: the 104 FW, the 144 FW (F-15EX only), and the 159 FW.

On April 18, 2023, based on an evaluation of operational parameters, the Secretary of the Air Force announced preferred alternatives for the 10th F-35A and 2nd and 3rd F-15EX Eagle II Operational Beddowns: the 104 FW was identified as the preferred location to host the next F-35A squadron and the 144 FW and 159 FW were identified as the preferred locations to host the F-15EX squadrons. According to the announcement, the new squadrons would consist of 18 F-35A PAA at the 104 FW at BAF and 18 F-15EX PAA each at both the 159 FW at NAS JRB New Orleans and 144 FW at FAT. The Secretary of the Air Force makes the final basing decision for the F-35A location after the requisite environmental analysis (this EIS) is complete. The final decisions for the F-15EX locations and the signing of the ROD are delegated to lower levels.

2.3.2 Alternatives Considered but Not Carried Forward

Three alternatives were considered but not carried forward for detailed analysis because they failed to meet all the DAF criteria. NAS Lemoore was considered as a potential alternative location for the 144 FW should they be selected for the F-35A due to the fact that DON F-35C aircraft are based at NAS Lemoore, possibly providing some synergy with ANG F-35A operations. This alternative was later determined to not be reasonable because it could not meet the beddown schedule, in addition it was considered to be extraordinarily costly. Another alternative considered but not carried forward for detailed analysis was a locational alternative at FAT. The 144 FW is currently based on the southwestern portion of the airfield. This alternative would have relocated the entire 144 FW installation onto the Fresno Airways Golf Course located north of the current military leasehold at FAT on the northern side of the two parallel runways. The golf course is presumed to be a protected resource under Section 4(f) of the DOT Act of 1966, as amended. Since the airport is a civilian airport and the NGB is a tenant and does not own or operate the airport, if this resource were found to be significant by the officials having jurisdiction over the resource, FAA approval of this alternative would be required pursuant to Section 4(f) of the DOT Act. Absent a determination from the City of Fresno that the resource is not significant and thus not subject to provisions of Section 4(f), FAA approval of this alternative using a Section 4(f) protected resource would not be possible because the Act requires no other possible alternative to using a Section 4(f) resource. Due to the lengthy delay this would cause, and no projected timelines for a determination, review, and resolution of Section 4(f) issues, this alternative was eliminated from further consideration because it would not meet the beddown schedule and thus would not meet the purpose and need of the Proposed Action. The third alternative considered, but not carried forward for detailed analysis, was replacing the 144 FW's existing fleet of 18 F-15C aircraft at FAT with 21 F-35A aircraft. This alternative was subsequently determined not reasonable, as this installation did not have the necessary infrastructure to support a squadron of F-35A aircraft, could not construct the necessary infrastructure in a timeframe to meet the purpose of the action, and would incur extraordinary cost. Therefore, considering the purpose and need, environmental factors, and cost, Secretary of the Air Force determined that this alternative could not be carried forward for full analysis.

2.3.3 Proposed Action and Alternatives Carried Forward for Detailed Analysis

Three ANG fighter wings (104 FW, 144 FW, and 159 FW) were considered for the F-15EX beddowns and two (104 FW and 159 FW) for the F-35A beddowns and are carried forward for detailed analysis. To provide a context for the Proposed Action and beddown alternatives, the following presents a brief description of each fighter wing installation and its mission. More detailed information is provided in Section 2.0 of each fighter wing-specific Chapter 4.0.

2.3.3.1 104th Fighter Wing

The 104 FW, located at BAF, currently flies 18 PAA F-15C aircraft. The ANG unit is a tenant at BAF, which has two bi-directional runways:

- Runway 02/20, which is 9,000 feet long and 150 feet wide
- Runway 15/33, which is 5,000 feet long and 75 feet wide

The unit's primary training airspace is described in detail in Section MA2.1.5, *104th Fighter Wing: Training Airspace and Ranges*.

2.3.3.2 144th Fighter Wing

The 144 FW, located at FAT, currently flies 18 PAA F-15C aircraft. The ANG unit is a tenant at FAT, which has two bi-directional runways:

- 11L/29R, which is 9,539 feet long and 150 feet wide
- 11R/29L, which is 8,008 feet long and 150 feet wide

The unit's primary training airspace is described in detail in Section CA2.1.5, *144th Fighter Wing: Training Airspace and Ranges*.

2.3.3.3 159th Fighter Wing

The 159 FW, located at NAS JRB New Orleans, currently flies 18 PAA F-15C/D aircraft. The ANG unit shares the airfield with other military tenants. NAS JRB New Orleans has two bi-directional runways:

- 04/22, which is 10,000 feet long and 200 feet wide
- 14/32, which is 6,000 feet long and 200 feet wide

The unit's primary training airspace is described in detail in Section LA2.1.5, *159th Fighter Wing: Training Airspace and Ranges*.

2.3.4 No Action Alternative

Analysis of the No Action Alternative provides the benchmark, enabling decision-makers to compare the magnitude of the environmental effects of the Proposed Action or alternatives. Section 1502.14(c) of CEQ regulations implementing NEPA requires an EIS to analyze the No Action Alternative. No action means that an action would not take place, and the resulting environmental effects from taking no action are compared with the effects of allowing the proposed

activity to go forward. Under the No Action Alternative for this EIS, F-15EX or F-35A operational aircraft would not be based, no personnel changes or construction (even construction for the F-15C/D legacy aircraft) would be performed, and no training activities by the F-15EX or F-35A operational aircraft would be conducted in the airspace. Under the No Action Alternative, these fighter wings would continue to conduct their current mission using existing, legacy aircraft with multiple configurations and existing infrastructure. Additionally, no infrastructure or facility construction would occur in support of the current mission under the No Action Alternative.

Typically, the FAA publishes a Terminal Area Forecast (TAF), which projects civilian and commercial operations into the near future, and these projections would be utilized in the noise impact analysis. However, operational data based on a TAF was not utilized to inform development of the inputs for the noise modeling and subsequent noise impact analysis described in this draft EIS. Instead, the NGB relied upon the 'best available information' at the time of preparing this analysis at the time of data collection in 2021 and 2022, which was a combination of civilian aircraft operations as modeled in prior Noise Exposure Map (NEM) updates completed under 14 CFR Part 150 and average historical civilian operations levels from the FAA Operations Network (OPSNET).

This EIS assumed that air traffic at the civilian airfields associated with this action would return to pre-COVID conditions by the time this action would be implemented, but prior to substantial additional growth in civilian and commercial operations. Thus, the No Action Alternative for this EIS was assumed to be equivalent to the existing conditions in terms of aircraft and airfield operations.

This EIS relied upon the 'best available information' at the time of analysis, consistent with NEPA requirements. However, after the EIS impact analysis was completed, historical civil aircraft operations data became available for 2021 and 2022 and the FAA updated TAFs to refine civil operational projections. The noise studies associated with this EIS present an additional, comparative review of the newly available 2022 TAFs and their potential effects on the noise analysis presented in this EIS to best inform both the public and decision makers. This review found that the updates to projections of civil aircraft operations would result in a negligible change to noise impacts as shown in Section 7.0 of the noise studies. Therefore, noise impacts and the conclusions based on the 2022 FAA TAFs would not change from those currently presented in this EIS. The noise studies are incorporated by reference (see Section 2.5) and can be found on the project website.

2.4 COMPARISON OF ENVIRONMENTAL CONSEQUENCES AMONG ALTERNATIVES

Comparing and differentiating among alternatives are a fundamental premise of NEPA. For the basing alternatives identified for this Proposed Action, summaries and comparisons of consequences are presented in Table 2.4-1. In the context of Table 2.4-1, "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs, while "base/installation" includes the area surrounding the base/installation and associated airfield, to include the immediate airspace at the candidate civil airport locations, BAF and FAT.

Table 2.4-1 Summary of Impacts

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
NOISE			
F-15EX	There would be 845 more acres off the airport property, 197 additional households, and 547 additional people that would be exposed to 65 dB DNL or greater. Six additional POIs would be exposed to 65 dB DNL. Thirty-five POIs would experience increases between 1 and 5 dB DNL. Under FAA standards, 10 POIs would experience significant increases while 304 households and 852 people would be affected. Five POIs, 621 households, and 1,811 people would experience a reportable increase in noise according to FAA criteria. Noise impacts in the vicinity of the airfield would be significant. Noise associated with the construction projects would be temporary and not significant. Fighter jet-generated noise would continue to dominate sound levels in the training airspace. L_{dnmr} and DNL would increase by up to 5 dB but remain in the 35–45 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and would not be significant within the SUA.	There would be 1,086 more acres off the airport property, 1,780 additional households, and 5,589 additional people that would be exposed to 65 dB CNEL or greater. Three additional POIs would be exposed to 65 dB CNEL. The CNEL at 2 POIs would decrease up to 2 dB, 4 POIs would not change, and 53 POIs would increase 1-6 dB. Under FAA standards, 7 POIs would experience significant increases while 1,924 households and 6,010 people would be affected. Six POIs, 5,063 households, and 14,977 people would experience a reportable increase in noise according to FAA criteria. Noise impacts in the vicinity of the airfield would be significant. Noise associated with the construction projects would be temporary and not significant. Fighter jet-generated noise would continue to dominate sound levels in the training airspace. $CNEL_{mr}$ and CNEL would increase by up to 6 dB but remain in the 35–41 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and would not be significant within the SUA.	There would be 92 more acres off the airport property, though 136 fewer households, and 327 fewer people that would be exposed to 65 dB DNL or greater. The number of POIs exposed to 65 dB DNL would not change. The DNL at noise sensitive receptors would increase 1–4 dB at 29 POIs. Noise impacts in the vicinity of the airfield would not be significant. Noise associated with the construction projects would be temporary and not significant. Fighter jet-generated noise would continue to dominate sound levels in the training airspace. L_{dnmr} and DNL would increase by up to 6 dB but remain in the 35–46 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and would not be significant within the SUA.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-35A	There would be 1,288 more acres off the airport property, 267 additional households, and 779 additional people that would be exposed to 65 dB DNL or greater. Four additional POIs would be exposed to 65 dB DNL. Thirty-one POIs would increase 1–7 dB DNL. Under FAA standards, 6 POIs would experience significant increases while 429 households and 1,212 people would be affected. Three POIs, 885 households, and 2,406 people would experience a reportable increase in noise according to FAA criteria. Noise impacts in the vicinity of the airfield would be significant. Noise associated with the construction projects would be temporary and not significant. Fighter jet-generated noise would continue to dominate sound levels in the training airspace. L_{dnmr} and DNL would increase by up to 7 dB but remain in the 35–47 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and would not be significant within the SUA.	N/A	There would be 1,127 more acres off the airport property, 508 additional households, and 1,320 additional people that would be exposed to 65 dB DNL or greater. The DNL at noise sensitive receptors would increase 1–4 dB at 41 POIs. Due to the increase of households and population exposed to greater than 65 dB DNL noise contours, impacts resulting from the F-35A beddown at NAS JRB New Orleans would be significant. Noise associated with the construction projects would be temporary and not be significant. Fighter jet-generated noise would continue to dominate sound levels in the training airspace. L_{dnmr} and DNL would increase by up to 8 dB but remain in the 35–48 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and would not be significant within the SUA.
F-15C/D	Impacts from aircraft noise would be the same as under the existing conditions/No Action Alternative and would not be significant. Impacts associated with construction would be temporary and less than significant.	Impacts from aircraft noise would be the same as under the existing conditions/No Action Alternative and would not be significant. Impacts associated with construction would be temporary and less than significant.	Impacts from aircraft noise would be the same as under the existing conditions/No Action Alternative and would not be significant. Impacts associated with construction would be temporary and less than significant.
No Action	There would be no change in aircraft, and no construction would occur. There would be no significant impacts.	There would be no change in aircraft, and no construction would occur. There would be no significant impacts.	There would be no change in aircraft, and no construction would occur. There would be no significant impacts.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
AIRSPACE			
F-15EX	The replacement of the F-15C with the F-15EX would not require changes in local airspace. Over time, the replacement of the F-15C aircraft at the installation could result in a 6.7 percent increase in total airfield operations at BAF. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the controlled airspace and SUA. Impacts would not be significant.	The replacement of the F-15C with the F-15EX would not require changes in local airspace. Over time, the replacement of the F-15C aircraft at the installation could result in a 3.6 percent increase in total airfield operations at FAT. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the controlled airspace and SUA. Impacts would not be significant.	The replacement of the F-15C/D with the F-15EX would not require changes in local airspace. Over time, the replacement of the F-15C/D aircraft at the installation could result in a 19.8 percent increase in total airfield operations at NAS JRB New Orleans. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the controlled airspace and SUA. Impacts would not be significant.
F-35A	Impacts would be as described for the F-15EX and would not be significant.	N/A	Impacts would be as described for the F-15EX and would not be significant.
F-15C/D	There would be no change in operations within the SUA or controlled airspace from the existing conditions/No Action Alternative. Impacts would not be significant.	There would be no change in operations within the SUA or controlled airspace from the existing conditions/No Action Alternative. Impacts would not be significant.	There would be no change in operations within the SUA or controlled airspace from the existing conditions/No Action Alternative. Impacts would not be significant.
No Action	Impacts would be as described for the F-15C/D and would not be significant.	Impacts would be as described for the F-15C/D and would not be significant.	Impacts would be as described for the F-15C/D and would not be significant.
AIR QUALITY/CLIMATE CHANGE			
F-15EX	The net change in emissions would not exceed the General Conformity thresholds for VOCs or NO_x and would not exceed the comparative indicator thresholds for the remaining criteria pollutants. Impacts would not be significant.	The net change in emissions at either of the two locational scenarios would not exceed the *de minimis* thresholds for any criteria pollutant. As a result, the emissions are presumed to conform, as defined in 40 CFR 93.153(g), and no further action under the General Conformity Rule is required.	The net change in emissions resulting from implementation of the F-15EX Alternative would not exceed the NAAQS comparative indicator thresholds for any criteria pollutant. Long-term operational emissions associated with the aircraft activity and additional personnel commutes would increase over the existing conditions/No Action Alternative but would remain below the comparative indicator threshold for all criteria pollutants. Impacts would not be significant.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-35A	The net change in emissions would not exceed the General Conformity thresholds for VOCs or NO_x and would not exceed the comparative indicator thresholds for the remaining criteria pollutants. Impacts would not be significant.	N/A	The net change in emissions resulting from implementation of the F-35A Alternative would not exceed the comparative indicator thresholds for any criteria pollutant. Long-term operational emissions associated with the aircraft activity and additional personnel commutes would decrease when compared to the existing conditions/No Action Alternative for VOCs and CO, and all other criteria pollutants would increase over the existing conditions/No Action Alternative but would remain below the comparative indicator thresholds. Impacts would not be significant.
F-15C/D	There would be no increase in operations at BAF, though construction for the F-15C would occur. Construction activities would not result in exceedance of the *de minimis* thresholds for VOCs or NO_x and would not exceed the comparative indicator thresholds for the remaining criteria pollutants. Impacts would not be significant.	There would be no increase in aircraft operations at FAT, though construction for the F-15C would occur. Emissions would be below the *de minimis* and comparative thresholds for all criteria pollutants. Construction activities would not result in significant air quality impacts.	There would be no increase in operations at NAS JRB New Orleans, though construction for the F-15C/D would occur. Construction activities would not result in significant air quality impacts.
No Action	No construction would occur, and no change in operations. There would be no impacts on air quality.	No construction would occur, and no change in operations. There would be no impacts on air quality.	No construction would occur, and no change in operations. There would be no impacts on air quality.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
SOCIOECONOMICS/ENVIRONMENTAL JUSTICE/CHILDREN'S HEALTH AND SAFETY			
F-15EX	Construction projects would lead to minor beneficial impacts on the local economy and employment. A substantial portion of the workforce could be supplied by the local construction industry, so impacts from non-local construction workers moving into the area would be minimal. Under the F-15EX Alternative, impacts on minority or low-income populations would not be disproportionate. However, there would be a higher percentage of children under the age of 18 and elderly within the projected noise contours than compared to the reference counties, and therefore, applying DoD criteria, they would be disproportionately impacted.	Construction projects would lead to minor beneficial impacts on the local economy and employment. A substantial portion of the workforce could be supplied by the local construction industry or from within commuting distance, so impacts from non-local construction workers moving into the area would be minimal. Under the F-15EX Alternative, there would be a higher percentage of minority and low-income populations affected than the reference community, thus applying criteria, impacts on minority and low-income populations would be disproportionate. There would be a higher percentage of children under the age of 18 impacted than the reference community, and therefore, applying DoD criteria, they would be considered disproportionate, while impacts on the elderly population would not be disproportionate.	Construction projects would lead to minor beneficial impacts on the local economy and employment. A substantial portion of the workforce could be supplied by the local construction industry, so impacts from non-local construction workers moving into the area would be minimal. Under the F-15EX Alternative, impacts on minority populations would not be disproportionate, whereas impacts on low-income populations would be slightly higher than the three-Parish reference group. The percent of children under 18 years of age and the elderly that would be affected by the F-15EX noise contours would both be below the three-Parish reference group.
F-35A	Under the F-35A Alternative, impacts on minority or low-income populations would not be disproportionate. However, there would be a higher percentage of children under the age of 18 and elderly within the projected noise contours than compared to the reference counties, and therefore, applying DoD criteria, they would be disproportionately impacted.	N/A	Under the F-35A Alternative, the percent of minority, low-income, children under the age of 18, and the elderly would all be below the three-Parish reference populations, and therefore would not be disproportionate.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15C/D	There would be no increase in operations at BAF, though construction for the F-15C would occur. Construction activities would not result in significant socioeconomic or environmental justice impacts.	As with the F-15EX Alternative, construction projects would lead to minor beneficial impacts on the local economy and employment. Impacts on minority and low-income populations would not be disproportionate. Similarly, impacts on children under the age of 18 or the elderly population would not be disproportionate.	There would be no increase in operations at NAS JRB New Orleans, though construction for the F-15C/D would occur. Construction activities would not result in significant socioeconomic or environmental justice impacts.
No Action	No construction would occur, and no change in operations. Minor economic benefits from construction activities would not be realized. Impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.	No construction would occur, and no change in operations. Minor economic benefits from construction activities would not be realized. Impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.	No construction would occur, and no change in operations. Minor economic benefits from construction activities would not be realized. Impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
LAND USE/NOISE COMPATIBLE LAND USE			
F-15EX	There would be 845 more acres off the airport property that would be exposed to DNL 65 dB or greater. Residential land use acreage would increase by 287 acres within the 65–70 dB DNL and 23 acres within the 70–75 dB DNL. Impacts on residential land uses would be considered significant. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.	There would be 1,086 more acres off the airport property that would be exposed to CNEL 65 dB or greater. Residential land use acreage would increase 262 acres within the 65–70 dB CNEL noise contours, and 15 within the 70–75 dB CNEL noise contours. Irwin O. Addicott Elementary School/Scandinavian Middle School would be additionally exposed to 3 acres within 70–75 dB CNEL. There would be an additional 260 acres of industrial land uses within the 65–70 dB CNEL noise contours, 51 acres within the 70–75 dB CNEL contours, 7 acres within the 75–80 dB CNEL. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities. Impacts on residential land uses, public land uses as they relate to school facilities, industrial land uses, and recreational land uses as they relate to the Fresno Airways Golf Course would be considered significant.	There would be 92 more acres off the airport property that would be exposed to DNL 65 dB or greater. Residential land use acreage would decrease 59 acres within the 65–70 dB DNL. No significant impacts on residential land uses would occur. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-35A	There would be 1,288 more acres off the airport property that would be exposed to DNL 65 dB or greater. Residential land use acreage would increase by 449 acres within the 65–70 dB DNL, 109 acres within the 70–75 dB DNL, and 2 acres within the 75–80 dB DNL. Impacts on residential land uses would be considered significant. Under the F-35A, significant impacts would also occur to recreational land uses associated with the North Road Recreational Area where 6 acres would be newly exposed to 75–80 dB DNL noise contours. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.	N/A	There would be 1,127 more acres off the airport property that would be exposed to DNL 65 dB or greater. An additional 252 acres of residential land use would be within the 65–70 dB DNL and 8 acres within the 70–75 dB DNL. Impacts on residential land uses would be considered significant. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.
F-15C/D	There would be no increase in operations at BAF, though construction for the F-15C would occur. Construction activities would not result in significant land use impacts.	There would be no increase in operations at FAT, though construction for the F-15C would occur. Construction activities would not result in significant land use impacts.	There would be no increase in operations at NAS JRB New Orleans, though construction for the F-15C/D would occur. Construction activities would not result in significant land use impacts.
No Action	No construction would occur, and no change in operations. There would be no impacts on land use.	No construction would occur, and no change in operations. There would be no impacts on land use.	No construction would occur, and no change in operations. There would be no impacts on land use.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)			
F-15EX	Construction and operations associated with the F-15EX beddown would not have appreciable effects to proposed Section 4(f) resources, including historic sites. No permanent incorporation of land, direct use, or temporary occupancy of Section 4(f) resources would occur as no construction would occur near or within the boundaries of the Section 4(f) resources. Impacts would not be significant. Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant. See Section CA3.1, *Noise*, for a detailed discussion on noise impacts. There are no incompatible land uses under this alternative. Indirect impacts on Section 4(f) resources related to noise impacts from operations would not be considered significant.	Construction and operations associated with the F-15EX would not have appreciable effects to proposed Section 4(f) under either of the locational scenarios at FAT. Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant. See Section CA3.1, *Noise*, for a detailed discussion on noise impacts.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to Section 4(f) resources.
F-35A		N/A	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to Section 4(f) resources.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15C/D	There would be no increase in operations at BAF, though construction for the F-15C would occur. Construction activities would not result in significant Section 4(f) impacts.	There would be no increase in operations at FAT, though construction for the F-15C would occur at the existing cantonment area. There would be no significant impacts on Section 4(f) resources.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to Section 4(f) resources.
No Action	No construction would occur, and no change in operations. There would be no impacts on Section 4(f) properties.	No construction would occur, and no change in operations. There would be no impacts on Section 4(f) properties.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to Section 4(f) resources.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
WATER RESOURCES/FLOODPLAINS/WILD AND SCENIC RIVERS			
F-15EX	Construction activities would result in up to 148,000 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. None of the proposed construction or modification projects are located within the 100-year floodplain. Impacts on water resources would not be significant.	Proposed construction activities would result in up to 231,300 SF for Locational Scenario 1, and 670,900 SF for Locational Scenario 2 of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. None of the proposed construction or modification projects are located within the 100-year floodplain. Impacts on water resources would not be significant.	Construction activities would result in up to 85,300 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. Several of the proposed construction and modification projects are located within the 100-year floodplain; however, none are located in an active floodway. EO 11988 requires that agencies evaluate the potential effects of actions within a floodplain and to avoid floodplains unless the agency determines there is no practicable alternative. Since the proposed projects would involve construction in a floodplain, a Finding of No Practicable Alternative would be required. Therefore, in compliance of EO 11988 and with preparation of a Finding of No Practicable Alternative, impacts on water resources would not be significant.
F-35A	Impacts would be as described for the F-15EX, though new impervious surface would be 136,600 SF. Impacts on water resources would not be significant.	N/A	Impacts would be as described for the F-15EX, though new impervious surface would be 100,800 SF. Impacts on water resources would not be significant.
F-15C/D	Impacts would be as described for the F-15EX, though new impervious surface would be 128,400 SF. Impacts on water resources would not be significant.	Impacts would be as described for the F-15EX, though new impervious surface would be up to 104,700 SF for Locational Scenario 1; Locational Scenario 2 is not an option for this alternative. Impacts on water resources would not be significant.	Impacts would be as described for the F-15EX, though new impervious surface would be 62,500 SF. Impacts on water resources would not be significant.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
No Action	No construction would occur, and no change in operations. There would be no impacts on water resources.	No construction would occur, and no change in operations. There would be no impacts on water resources.	No construction would occur, and no change in operations. There would be no impacts on water resources.
GEOLOGICAL RESOURCES/SOILS/FARMLANDS			
F-15EX	Construction activities would result in up to 218,100 SF of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Construction and modification activities would only occur on soils designated by the NRCS as farmland of statewide importance. However, there would be no conversion of farmland to non-agricultural uses as the land within the BAF boundary has been previously disturbed and is not currently being used as farmland. Impacts on geological resources would not be significant.	Construction activities would result in up to 1,148,600 SF for Locational Scenario 1, and 1,588,200 SF for Locational Scenario 2 of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Construction and modification activities would only occur on soils designated by the NRCS as Prime Farmland if irrigated. However, there would be no conversion of farmland to non-agricultural uses as the land within FAT boundaries has been previously disturbed and is not currently being used as farmland. Impacts on geological, soils, and farmland resources would not be significant.	Construction activities would result in up to 218,800 SF of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Impacts on geological resources would not be significant.
F-35A	Impacts would be as described for the F-15EX, though ground disturbance would be 203,800 SF. Impacts on geological resources would not be significant.	N/A	Impacts would be as described for the F-15EX, though ground disturbance would be 151,500 SF. Impacts on geological resources would not be significant.
F-15C/D	Impacts would be as described for the F-15EX, though ground disturbance would be 173,900 SF. Impacts on geological resources would not be significant.	Impacts would be as described for the F-15EX, though ground disturbance would be 1,062,000 SF for Locational Scenario 1; Locational Scenario 2 is not an option for this alternative. Impacts on geological resources would not be significant.	Impacts would be as described for the F-15EX, though ground disturbance would be 81,700 SF. Impacts on geological resources would not be significant.
No Action	No construction would occur, and no change in operations. There would be no impacts on geological resources.	No construction would occur, and no change in operations. There would be no impacts on geological resources.	No construction would occur, and no change in operations. There would be no impacts on geological resources

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
CULTURAL RESOURCES			
F-15EX	There are no known archaeological sites within any of the proposed construction footprints. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. No buildings associated with the proposed construction have been determined to be eligible for the NRHP. There are no historic properties within 1/2 mile of BAF and are beyond the 65 dB DNL therefore, analysis under the category Off-Installation is not carried forward. No traditional cultural properties have been identified at the 104 FW installation. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Historic properties are present on the lands beneath the SUA.	There are no known archaeological sites within any of the proposed construction footprints at the 144 FW installation at FAT. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. Building 2606, built in 1966, has not been evaluated for NRHP eligibility. However, modifications for Building 2606 would be confined to the interior of the building, which would not affect the building's potential significance or integrity. One structure has been evaluated for the NRHP, the Gould Canal, and six structures have not been evaluated within the 65 dB and greater noise contours surrounding the airfield. These structures are managed as NRHP eligible, and there would be no adverse effect per 36 CFR Section 800.5(b). The proposed action would not be anticipated to effect eligibility. No traditional cultural properties have been identified at the 144 FW installation at FAT. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP.	There are no known archaeological sites within any of the proposed construction footprints. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. No buildings associated with the proposed construction have been determined to be eligible for the NRHP. There are no historic properties within 1/2 mile of NAS JRB New Orleans and are beyond the 65 dB DNL therefore, analysis under the category Off-Installation is not carried forward. No traditional cultural properties have been identified at the 159 FW installation. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Historic properties are present on the lands beneath the SUA. Use of the SUA would increase but would be similar in nature to ongoing operations.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15EX (continued)	Use of the SUA under the Proposed Action would be similar to ongoing operations. Therefore, beddown of the F-15EX would not result in significant impacts to cultural resources. Implementation of the F-15EX Alternative at the 104 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	Historic properties are present on the lands beneath the SUA. Use of the SUA under the Proposed Action would be similar to ongoing operations. Therefore, implementation of the F-15EX Alternative at the 144 FW installation would result in no adverse effect per 36 CFR Section 800.5(b). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b). Overall, implementation of F-15EX beddown at FAT would not result in significant impacts on cultural resources.	Implementation of the F-15EX Alternative at the 159 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b). Overall, implementation of F-15EX beddown at FAT would not result in significant impacts on cultural resources.
F-35A	Impacts would be as described for the F-15EX and would not be significant. Therefore, implementation of the F-35A Alternative at the 104 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	N/A	Impacts would be as described for the F-15EX and would not be significant. Therefore, implementation of the F-35A Alternative at the 159 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).
F-15C/D	Impacts would be as described for the F-15EX though no change in operations at BAF or in the SUA would occur. Therefore, implementation of the F-15C/D Alternative at the 104 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	Impacts would be as described for the F-15EX though no change in operations at FAT or in the SUA would occur. Therefore, implementation of the F-15C/D Alternative at the 144 FW installation would likely result in no adverse effect per 36 CFR Section 800.5(b). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	Impacts would be as described for the F-15EX though no change in operations at NAS JRB New Orleans or in the SUA would occur. Therefore, implementation of the F-15C/D Alternative at the 159 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
No Action	No construction would occur, and no change in operations. There would be no impacts on cultural resources. Therefore, implementation of the No Action Alternative at the 104 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	No construction would occur, and no change in operations. There would be no impacts on cultural resources. Therefore, implementation of the No Action Alternative at the 144 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).	No construction would occur, and no change in operations. There would be no impacts on cultural resources. Therefore, implementation of the No Action Alternative at the 159 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).
SAFETY			
F-15EX	Fire and crash response would continue to be conducted by the 104 FW's fire department. Construction activities would not pose any unusual concerns, and standard construction safety procedures would be implemented. No construction would occur within RPZs and there would be no new airfield obstructions created by construction or modification projects. QD arcs would not change from the existing conditions/No Action Alternative. While there are some planned constructions that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements. The 104 FW BASH plan and WHMP are used to mitigate and reduce the chances of a wildlife strike from occurring. There would be no significant impacts on safety.	Fire and crash response would continue to be conducted by the 144 FW's fire department. Construction activities would not pose any unusual concerns, and standard construction safety procedures would be implemented. QD arcs would not change from the existing conditions/No Action Alternative. While there are some planned construction projects that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements. The 144 FW BASH plan and WHMP are used to mitigate and reduce the chances of a wildlife strike from occurring. There would be no significant impacts on safety.	Fire and crash response would continue to be conducted by the 159 FW's fire department. Construction activities would not pose any unusual concerns, and standard construction safety procedures would be implemented. QD arcs would not change from the existing conditions/No Action Alternative. While there are some planned construction projects that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements. The 159 FW BASH plan would continue to be followed to mitigate and reduce the chances of a BASH event from occurring. There would be no significant impacts on safety.
F-35A	Impacts would be as described for the F-15EX and would not be significant.	N/A	Impacts would be as described for the F-15EX and would not be significant.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15C/D	Impacts would be as described for the F-15EX though no change in operations at BAF or in the SUA would occur. Maintenance issues for the F-15C would continue to impair operational readiness. There would be no significant impacts on safety.	Impacts would be as described for the F-15EX though no change in operations at FAT or in the SUA would occur. Maintenance issues for the F-15C would continue to impair operational readiness. There would be no significant impacts on safety.	Impacts would be as described for the F-15EX though no change in operations at NAS JRB New Orleans or in the SUA would occur. Maintenance issues for the F-15C/D would continue to impair operational readiness. There would be no significant impacts on safety.
No Action	No construction would occur, and no change in operations. There would be no impacts on safety. Maintenance issues for the F-15C would continue to impair operational readiness. There would be no significant impacts on safety.	No construction would occur, and no change in operations. There would be no impacts on safety. Maintenance issues for the F-15C would continue to impair operational readiness. There would be no significant impacts on safety.	No construction would occur, and no change in operations. There would be no impacts on safety. Maintenance issues for the F-15C/D would continue to impair operational readiness. There would be no significant impacts on safety.
HAZARDOUS MATERIALS/WASTE			
F-15EX	The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C fleet. Throughput of petroleum substances and hazardous waste streams would be expected to increase due to increased operations. Short-term increases in the quantity of fuel used during construction activities for this action would occur. Hazardous waste generation would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP. No changes to the installation's Large Quantity Generator status would occur despite the increase in hazardous waste generation	The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C fleet. Throughput of petroleum substances and hazardous waste streams would be expected to increase due to increased operations. Short-term increases in the quantity of fuel used during construction activities for this action would occur. Hazardous waste generation would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP. No changes to the installation's Small Quantity Generator status would occur despite the increase in hazardous waste generation from aircraft operations. Any projects proposed for	The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C/D fleet. Throughput of petroleum substances and hazardous waste streams would be expected to increase due to increased operations. Short-term increases in the quantity of fuel used during construction activities for this action would occur. Hazardous waste generation would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP. No changes to the installation's Large Quantity Generator status would occur despite the increase

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15EX (continued)	from aircraft operations. Any projects proposed for modifications would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities. If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation, work would cease until 104 FW Program Managers establish an appropriate course of action. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. As such, there would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	modifications would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities. Both Locational Scenarios 1 and 2 involve Project 8 at Building 2606 which does include ACM and Project 12 at Building 157 where there is the potential for ACM. There are no active IRP sites that could potentially impact the proposed construction projects under the F-15EX beddown at Locational Scenarios 1 or 2. However, there is a TCE-contaminated groundwater plume associated with the OHF Area 1 (Formerly Used Defense Site) Remedial Investigation Site which overlaps with Project 5, Project 9.1, and Project 14. Projects 6, 11, and 16, would overlap with areas identified as being potential sources of PFAS (PRL 2 [Aircraft Parking Ramp]). Under Locational Scenario 2, there would be the same overlap with the OHF Area 1 TCE-contaminated groundwater plume and the proposed projects as with the Locational Scenario 1. Projects 6, 9.2, 11, 16, 17, 18, 19, and 20, however, would overlap with areas identified as being potential sources of PFAS (PRL 2 and Former Marine Corps Facility). If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation, work would cease until 144 FW Program Managers establish an appropriate course of action.	in hazardous waste generation from aircraft operations. Any projects proposed for modifications would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities. If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation, work would cease until 159 FW Program Managers establish an appropriate course of action. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. As such, there would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
F-15EX (continued)		The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. As such, there would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	
F-35A	Impacts would be as described for the F-15EX and would not be significant.	N/A	Impacts would be as described for the F-15EX and would not be significant.
F-15C/D	Impacts would be as described for the F-15EX though no increase in operations at BAF would occur. There would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	Impacts would be as similar to those described for the F-15EX with the exception that the only projects that would be constructed with potential impacts from contaminated sites are Project 5 (overlaps the TCE-contaminated groundwater plume) and Project 6 (overlaps PRL 2). In addition, there would be no increase in operations at FAT. There would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	Impacts would be as described for the F-15EX though no increase in operations at NAS JRB New Orleans would occur. There would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.
No Action	No construction would occur, and no change in operations. There would be no impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	No construction would occur, and no change in operations. There would be no impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.	No construction would occur, and no change in operations. There would be no impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
BIOLOGICAL RESOURCES/COASTAL RESOURCES/WETLANDS			
F-15EX	No impacts on sensitive vegetation would occur because no such species exist at the proposed construction sites for the 104 FW. Noise associated with construction activities and/or aircraft operations would be unlikely to affect wildlife or special status species because they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not impact biological resources. Impacts on biological resources would not be significant.	No effects to sensitive vegetation would occur because no such species exist at the proposed construction sites for the 144 FW. Noise associated with construction activities and/or aircraft operations would be unlikely to affect wildlife or special status species because they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not impact biological resources. Impacts on biological resources would not be significant.	No impacts on sensitive vegetation would occur because no such species exist at the proposed construction sites for the 159 FW. Noise associated with construction activities and/or aircraft operations would be unlikely to affect wildlife or special status species because they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not impact biological resources. The Navy has initiated informal section 7 consultation with USFWS on potentially occurring ESA-listed species. Impacts on biological resources would not be significant.
F-35A	Impacts would be as described for the F-15EX and would not be significant.	N/A	Impacts would be as described for the F-15EX and would not be significant.
F-15C/D	Impacts would be as described for the F-15EX though no increase in operations at BAF would occur. Impacts on biological resources would not be significant.	Impacts would be as described for the F-15EX though no increase in operations at FAT would occur. Impacts on biological resources would not be significant.	Impacts would be as described for the F-15EX though no increase in operations at NAS JRB New Orleans would occur. Impacts on biological resources would not be significant.
No Action	No change in operations at BAF or in the SUA, and no construction at BAF would occur. There would be no impacts on biological resources.	No change in operations at FAT or in the SUA, and no construction at FAT would occur. There would be no impacts on biological resources.	No change in operations at NAS JRB New Orleans or in the SUA, and no construction would occur. There would be no impacts on biological resources.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
VISUAL IMPACTS			
F-15EX	Construction and operations associated with the F-15EX beddown would not have appreciable effects to visual resources at the 104 FW installation, BAF, or the immediate surrounding community. The proposed facilities and associated infrastructure would remain consistent with the existing visual character of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through BAF would not be significantly different from existing conditions/No Action Alternative. Basing the 21 F-15EX and associated construction and operations would not substantially increase off-airport light emissions or create visual effects. Impacts on visual resources would not be significant.	Construction and operations associated with the F-15EX beddown would not have appreciable effects to visual resources at the 144 FW installation, FAT, or the immediate surrounding community. The proposed facilities and associated infrastructure associated with both of the locational scenarios at FAT would remain consistent with the existing visual character of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through FAT would not be significantly different from existing conditions/No Action Alternative. Basing of the 21 F-15EX to replace the existing 18 F-15C at the 144 FW and associated construction and operations at FAT would not substantially increase light emissions or create visual effects and therefore would be less than significant for all locational alternatives at FAT.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to visual resources.
F-35A	Impacts would be as described for the F-15EX and would not be significant.	N/A	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to visual resources.
F-15C/D	Impacts would be as described for the F-15EX though no increase in operations at BAF would occur. Impacts on visual resources would not be significant.	Impacts would be as described for the F-15EX though no increase in operations at FAT would occur. Impacts on visual resources would not be significant.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to visual resources.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
No Action	No change in operations, and no construction at BAF would occur. There would be no impacts on visual resources.	No change in operations, and no construction at FAT would occur. There would be no impacts on visual resources.	FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Given that NAS JRB New Orleans is not a civilian airfield, it was not analyzed for impacts related to visual resources.
INFRASTRUCTURE/UTILITIES/NATURAL RESOURCES AND ENERGY SUPPLY/TRANSPORTATION/PUBLIC TRANSPORTATION			
F-15EX	There would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel would not significantly impact regional natural resources, energy supply, or existing systems at the 104 FW installation. Impacts on infrastructure as a result of the F-15EX beddown would be slightly more intensive than the other alternatives as there would be 101 more personnel and a slightly larger construction footprint. This alternative would not have the potential to cause demand to exceed available or future supplies of applicable resources. Impacts on infrastructure would not be significant.	There would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel at FAT would not significantly impact regional natural resources, energy supply, or existing systems at the 144 FW installation at FAT. While construction and operation associated with the F-15EX beddown would require the use of natural resources and energy supply, beddown of the F-15EX at either of the locational scenarios at FAT would not have the potential to cause demand to exceed available or future supplies of applicable resources. Impacts on infrastructure would not be significant.	There would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel would not significantly impact regional natural resources or energy supply or existing systems at the 159 FW installation. Impacts on infrastructure as a result of the F-15EX beddown would be slightly more intensive than the other alternatives as there would be 101 more personnel and a slightly larger construction footprint. This alternative would not have the potential to cause demand to exceed available or future supplies of applicable resources. Impacts on infrastructure would not be significant.
F-35A	Impacts would be as described for the F-15EX though 21 fewer additional personnel would be needed. Impacts on infrastructure would not be significant.	N/A	Impacts would be as described for the F-15EX though 21 fewer additional personnel would be needed. Impacts on infrastructure would not be significant.
F-15C/D	Impacts would be as described for the F-15EX though no new additional personnel would be required. Impacts on infrastructure would not be significant.	Impacts would be as described for the F-15EX though no new additional personnel would be required. Impacts on infrastructure would not be significant.	Impacts would be as described for the F-15EX though no new additional personnel would be required. Impacts on infrastructure would not be significant.

Resource and Alternative	*104 FW at BAF*	*144 FW at FAT*	*159 FW at NAS JRB New Orleans*
No Action	No change in operations, and no construction at BAF would occur. There would be no impacts on infrastructure.	No change in operations, and no construction at FAT would occur. There would be no impacts on infrastructure.	No change in operations, and no construction at NAS JRB New Orleans would occur. There would be no impacts on infrastructure.

Legend: 104 FW = 104th Fighter Wing; 144 FW = 144th Fighter Wing; 159 FW = 159th Fighter Wing; ACM = asbestos-containing material; APCD = Air Pollution Control District; AT/FP = Anti-terrorism/Force Protection; BAF = Westfield-Barnes Regional Airport; BASH = Bird/Wildlife Aircraft Strike Hazard; BMP = Best Management Practice; CFR = Code of Federal Regulations; CNEL = Community Noise Equivalent Level; $CNEL_{mr}$ = California Equivalent Onset-Rate Adjusted Day-Night Average Sound Level; CO = carbon monoxide; DAF = Department of the Air Force; dB = decibel; DNL = Day-Night Average Sound Level; EIAP = Environmental Impact Analysis Process; EISA = Energy Independence and Security Act; EO = Executive Order; FAA = Federal Aviation Administration; FAT = Fresno Yosemite International Airport; FW = Fighter Wing; HWMP = Hazardous Waste Management Plan; IRP = Installation Restoration Program; JRB = Joint Reserve Base; LBP = lead-based paint; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; LID = Low Impact Development; N/A = not applicable; NA = Number of Events at or above a specified threshold; NAAQS = National Ambient Air Quality Standards; NAS = Naval Air Station; NGB = National Guard Bureau; NO_x = nitrogen oxides; NRCS = Natural Resources Conservation Service; NRHP = National Register of Historic Places; OHF = Old Hammer Field; OSHA = Occupational Safety and Health Administration; PFAS = per- and polyfluoroalkyl substances; PM_{10} = particulate matter less than or equal to 10 microns in diameter; POI = Point of Interest (DoD methodology not applicable to FAA); PRL = Potential Release Location; QD = Quantity-Distance; ROI = Region of Influence; RPZ = Runway Protection Zone; SF = square foot/feet; SIP = State Implementation Plan; SUA = Special Use Airspace; SWPPP = Storm Water Pollution Prevention Plan; TCE = trichloroethylene; VOC = volatile organic compound; WHMP = Wildlife Hazard Management Plan.

2.5 DOCUMENTS INCORPORATED BY REFERENCE

In accordance with CEQ regulations for implementing NEPA and with the intent of reducing the size of this document, materials relevant to the Proposed Action at the alternative locations are incorporated by reference, where appropriate. These documents include detailed noise reports and biological surveys conducted for this EIS and are available on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) and are also part of the administrative record. Specific documents include:

- Noise Study, 104 Fighter Wing at Westfield-Barnes Regional Airport (BAF), Massachusetts for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement (NGB 2023a)
- Noise Study, 144 Fighter Wing at Fresno Yosemite International Airport (FAT), California for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement (NGB 2023b)
- Noise Study, 159 Fighter Wing at NAS JRB New Orleans, Louisiana for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement (NGB 2023c)
- Waters of the United States Delineation Report, Barnes Air National Guard, 104 FW, BAF, Westfield, Massachusetts (NGB 2022)
- Waters of the United States Delineation Report, Airways Golf Course, Fresno, California (NGB 2023d)
- Bat Survey Report, 144 Fighter Wing, Air National Guard, Fresno County, California (NGB 2023e)
- Flora and Fauna Survey Report for Airways Golf Course, Fresno County, California (NGB 2023f)

2.6 MITIGATION MEASURES

Mitigations avoid, minimize, remediate, or compensate for environmental impact. The CEQ regulations (40 CFR 1508.20) define mitigation to include:

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action;
2. **Minimizing** impacts by limiting the degree or magnitude of the action and its implementation;
3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment;
4. **Reducing or eliminating** the impact over time by preservation and maintenance operations during the lifetime of the action; or

5. **Compensating** for the impact by replacing or providing substitute resources or environments.

Avoiding, minimizing, or reducing potential impacts has guided the development of basing alternatives. Mitigation measures are built or designed into the Proposed Action and alternatives; applied to construction, operation, or maintenance involved in the action; or implemented as compensatory measures.

The DAF already institutes various noise reducing procedures for existing aircraft (i.e., minimize flying between 10 p.m. and 7 a.m., use afterburner only when required for safety, utilize runways and flight tracks to reduce overflight over the most populated areas, etc.). These existing best practices would continue under all alternatives to the best extent possible. Given the proactive procedures already in place and included within the Proposed Action's analysis, further noise mitigation would not be practicable either due to the cost or the impact to training. For instance, the DAF does not have authority to expend appropriated funds on facilities where they do not have an established federal interest.

No specific mitigation measures have been identified beyond the best practices previously mentioned. Following publication of the ROD, a mitigation plan will be prepared in accordance with 32 CFR 989.22(d), that will address any specific mitigations identified and agreed to during this environmental process.

3 Resource Definition and Methodology

This page intentionally left blank.

3.0 RESOURCE DEFINITION AND METHODOLOGY

3.1 INTRODUCTION

3.1.1 Analytical Approach

CEQ regulations (40 CFR Parts 1500–1508) require an EIS to discuss impacts in proportion to their potential magnitude and to present only enough discussion of peripheral issues to demonstrate why more study is not warranted. The analysis in this EIS considers the affected environment and compares that to conditions that might occur should the DAF and NGB implement the Proposed Action or any of the alternatives. The Proposed Action includes components potentially affecting the 104 FW at BAF, Westfield, MA; the 144 FW at FAT, Fresno, CA; and the 159 FW at NAS JRB New Orleans, Belle Chasse, LA, as well as their surrounding environs. Existing training airspace and ranges used by each of the three fighter wings that the F-15EX, F-35A, or legacy F-15C/D aircraft would train in also form part of the affected environment. Only certain components of the Proposed Action have the potential to affect certain resources in the SUA or at the ranges. For example, the aircraft transition and personnel changes would not generate any impacts in the SUA. While this EIS considers all resource topics for each discrete geographic area and its relationship to each component of the Proposed Action, it emphasizes those resources affected by the Proposed Action and only briefly mentions those not affected.

The following sections for each resource topic begin with an introduction that defines the resources addressed in the section, summarizes applicable laws and regulations that apply to all installations, and defines key terms as necessary. A general region of influence (ROI) for each installation/resource is described in this chapter with a refined ROI within the specific affected environment section, as are any local/regional regulations.

The methodology used to analyze potential impacts for each resource follows the definition of the resource sections in this chapter. The analysis of significance considers both context and intensity as well as both direct and indirect effects. Quantitative thresholds are applied, where appropriate, to determine the level of significance. Other impacts are assessed qualitatively based on context and intensity.

3.1.2 Organization of this Chapter

This EIS presents descriptions of affected environment and potential impacts for each of the installations in their respective fighter wing-specific subsections: MA3, CA3, and LA3. However, the definition of the resource and analysis methodology for each resource would remain the same regardless of the location. Therefore, to prevent redundancy, the EIS captures all of that information in this chapter. Resources discussed in this chapter include:

- Noise
- Airspace
- Air Quality/Climate Change
- Socioeconomics/Environmental Justice/Children's Health and Safety
- Land Use/Noise Compatible Land Use
- Department of Transportation Act, Section 4(f)
- Water Resources/Floodplains/Wild and Scenic Rivers
- Geological Resources/Soils/Farmlands
- Cultural Resources
- Safety
- Hazardous Materials/Waste
- Biological Resources/Coastal Resources/Wetlands
- Visual Impacts
- Infrastructure/Utilities/Natural Resources and Energy Supply/Transportation/Public Transportation

3.2 NOISE

This EIS evaluates noise effects to people, land uses, and historic structures, as well as wildlife and domesticated animals. Noise effects on populations are evaluated in the noise, socioeconomics, environmental justice, and cultural resources sections; noise effects to land uses and historic structures are evaluated in the land use and cultural resources sections, respectively; and the potential noise effects to wildlife and domesticated animals is addressed in the biological resources section. Additional details for noise impacts can be found in Appendix B, *Noise Modeling, Methodology, and Effects*. Specific topics discussed in Appendix B include, among other things, land use compatibility, noise-induced hearing impairment, non-auditory health effects, and noise effects on children. More details regarding noise modeling methodology and results specific to this EIS can be found in the Noise Studies that are located on the project website (URL address: www.angf15ex-f35a-eis.com/documents/). The following provides a definition of the resource applicable to any of the three fighter wing locations, as well as the noise metrics, supplemental noise analyses, types of military aircraft noise, and the analysis methodology.

3.2.1 Definition of Resource

3.2.1.1 Population Noise Effects

Sound is a physical phenomenon consisting of minute vibrations exhibited as waves, measured in frequency and amplitude, which travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. Noise is generally described as unwanted sound. Unwanted

sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). Noise analysis thus requires assessing a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socio-acoustic effects. The response of different individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual. Noise may also affect wildlife through disruption of nesting, foraging, migration, and other life-cycle activities.

3.2.1.2 Land Use Noise Effects

At and around each of the installations and for areas under the airspace, land use categories may include residential; manufacturing; transportation, communication and utilities; commercial (trade); services; cultural, entertainment, and recreational; institutional; and resources production and extraction. Special use areas are an additional land use category under airspace and are identified by government agencies as being worthy of more rigorous management. These areas can include Wilderness Areas, Wilderness Study Areas, National and State Parks, and National Wildlife Refuges.

3.2.1.3 Wildlife and Domesticated Animals Noise Effects

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. The ability to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate for calls of warning, territorial defense, during courtship, and other reasons that are subsequently related to an individual's or group's cohesiveness and responsiveness.

Domesticated animal species differ in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects, and include population decline and habitat loss (Smith et al. 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Wildlife responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and distance), engine

noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing [jet] versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith et al. 1988). It is difficult, therefore, to generalize wildlife responses to noise disturbances across species. Appendix B, *Noise Modeling, Methodology, and Effects*, provides more detail on noise effects to domesticated animals and wildlife.

3.2.2 Noise Metrics

The following sub-sections describe the noise metrics and criteria required by the DoD and FAA for noise analysis associated with military and civil aircraft. Section 3.2.5, *Analysis Methodology*, and Table 3.2-1 compares these differences and similarities in noise metrics between the two agencies.

Noise and sound levels are expressed in logarithmic units measured by decibel (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech at a distance of about 3 feet equates to a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall 1995). The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a doubling (or halving) of a sound's loudness when there is a 10 dB change in sound level (DoD Noise Working Group [DNWG] 2009a).

All sound contains a spectral content, which means the magnitude or level differs by frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements usually employ an "A-weighted" scale, denoted as dBA, which de-emphasizes very low and very high frequencies to better replicate human sensitivity. "C-weighting" is typically applied to impulsive sounds such as a sonic boom or ordnance detonation. As is done in many environmental documents, the "A" in dBA is dropped for brevity to refer to A-weighted sound levels. All sound levels presented in this document are A-weighted unless otherwise denoted as C-weighted or dBC.

In accordance with DoD guidelines and standard practice for environmental impact analysis documents, the noise analysis herein uses the following three types of noise metrics:

- A measure of the greatest sound level generated by single aircraft events: Maximum Sound Level (L_{max}),
- A combination of the sound level and duration: Sound Exposure Level (SEL), and

- A cumulative measure of multiple flight and engine maintenance activity: Day-Night Average Sound Level (L_{dn}, also written as DNL).

The DoD expands upon the above standard metrics with the following supplemental metrics described in the DNWG guidelines (DNWG 2009a):

- Number of Events at or above a specified threshold (NA),
- Time Above a specified level (TA), and
- Equivalent Sound Level (L_{eq}).

Metrics appropriate to analyze aircraft operations within airspace include Onset-Rate Adjusted Day-Night Average Sound Level (L_{dnmr}) or the California equivalent Onset-Rate Adjusted Community Noise Equivalent Level ($CNEL_{mr}$) and C-weighted DNL (CDNL) for supersonic operations (DNWG 2009a).

3.2.2.1 Maximum Sound Level

L_{max} is the greatest integrated sound level measured during a single event in which the sound level changes value with time (e.g., an aircraft overflight). During an aircraft overflight, the noise level begins at the ambient or background noise level, rises to the maximum level as the aircraft passes close to the observer, and returns to the background level as the aircraft recedes into the distance. L_{max} defines the maximum sound level occurring for a fraction of a second, which is defined as 1/8 second, and is denoted as "fast" response (American National Standards Institute [ANSI] 1988). In this EIS, L_{max} is one metric used in the analysis of speech interference, and each fighter wing-specific section includes a comparison of L_{max} for F-15EX, F-35A, and F-15C/D legacy aircraft.

3.2.2.2 Sound Exposure Level

The SEL composite metric 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 over which the event occurs. During an aircraft flyover, SEL captures the total sound energy during the entire acoustic event but does not directly represent the sound level heard at any given time. The total sound energy of the event is condensed into a 1-second period of time containing the same amount of energy. For sound from aircraft overflights, which typically lasts more than 1 second, the SEL is usually greater than the L_{max} because an individual overflight lasts more than a few seconds. SEL represents the best metric to compare noise levels from disparate aircraft overflights because it accounts for both the magnitude and duration of the event. Each fighter wing-specific section (Chapter 4.0) includes a

comparison of SELs for applicable legacy F-15C/D aircraft to proposed F-15EX and F-35A aircraft. Analysis of sleep disturbance employs the SEL metric.

3.2.2.3 Equivalent Sound Level

The L_{eq} is a "cumulative" metric that combines a series of noise events over a period of time by averaging the sound energy. The time period specified for L_{eq} is typically provided along with the value and relates to a type of activity and presented in parenthesis (e.g., $L_{eq[24]}$ for 24 hours). An 8-hour equivalent sound level ($L_{eq[8]}$) is used in this study to represent a typical school day occurring from 7 a.m. to 3 p.m. and is used for school screening for potential classroom impacts from noise.

3.2.2.4 Day-Night Average Sound Level and Community Noise Equivalent Level

The DNL noise metric is the energy-averaged sound level measured over a 24-hour period, with an additional 10 dB weighting assigned to noise events occurring between 10 p.m. and 7 a.m. (DNL nighttime). DNL values are obtained by averaging the SEL values for a given 24-hour period, with louder values receiving emphasis. FAA requires the use of Average Annual Day (AAD) for describing DNL. DNL is the preferred noise metric of Department of Housing and Urban Development (HUD), FAA, U.S. Environmental Protection Agency (EPA), and DoD and used extensively in all U.S. states except California. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments; there is a consistent relationship between DNL and the level of annoyance (U.S Air Force [USAF] 2016).

The CNEL noise metric used specifically by the State of California mirrors DNL with the same energy-averaged sound level measured over a 24-hour period and 10 dB weighting for events occurring between 10 p.m. and 7 a.m.[1] However, CNEL adds an additional evening weighting by multiplying evening events by 3 (equivalent to 4.77 dB weighting) if occurring between 7 p.m. and 10 p.m.

Most people are exposed to sound levels of 50 to 65 dB DNL (or CNEL) or higher on a daily basis. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise [FICUN] 1980). Therefore, the 65 dB DNL (or CNEL) noise level is typically used to help determine compatibility of military aircraft operations with local land use, particularly for land use associated with airfields.

[1]FAA Order 1050.1F. The FAA permits the use of CNEL in lieu of DNL for FAA actions in California.

3.2.2.5 Onset-Rate Adjusted Day-Night Average Sound Level and Onset-Rate Adjusted Community Noise Equivalent Level

Subsonic noise levels associated with the types of military airspace proposed for use by the F-15EX or F-35A are characterized by the L_{dnmr}, based upon DNL (or the California equivalent $CNEL_{mr}$ based upon CNEL) (USAF 1996). Military aircraft operating in MOAs or Restricted Areas includes low-altitude and high-speed operations that do not occur at airfields. Because military jet aircraft can exhibit a high rate of increase in sound level (onset rate) of up to 150 dB per second in such areas, the L_{dnmr} metric applies an adjustment of up to +11 dB to account for the startle effect.

Unlike the use of DNL around airfields, the FICUN compatibility standards do not readily apply to land use under military airspace. Rather, the analysis considers both the L_{dnmr} generated by the proposed operations and the degree of change in L_{dnmr} from current to proposed noise conditions. Note that an L_{dnmr} of 45 dB or less is low and considered indistinguishable from ambient outdoor noise levels. The implications of higher L_{dnmr} depend upon the underlying land uses and the degree of change in noise levels.

3.2.2.6 C-Weighted Day-Night Average Sound Level

Supersonic noise is described using C-weighted DNL, or CDNL. This metric captures the impulsive characteristics of supersonic noise in a day-night average. In addition, the analysis considers changes in the number of sonic booms per month as a measure of effects.

3.2.3 Supplemental Noise Analyses

To characterize the potential effects of noise from aircraft operations, this EIS includes supplemental noise analyses according to DoD standards. These supplemental analyses apply to the airfield environs due to their proximity and include evaluation of speech interference, classroom learning interference, recreational interference, sleep disturbance, potential for hearing loss, and workplace noise. The detailed noise analysis developed for this project and maintained in the administrative record provides additional information on noise effects, metrics, and noise modeling results. The FAA relies upon DNL as the primary noise metric that may optionally be supplemented on a case-by-case basis with prior permission from the FAA, as summarized in Section 3.2.5, *Analysis Methodology*, and Table 3.2-1. The DAF did not consult with or seek FAA concurrence on the use for supplemental metrics used by the DAF for the potential effects of noise from aircraft operations.

3.2.3.1 Number of Events Above a Threshold Level

The NA metric provides the total number of events that exceed a noise level threshold during a specified period of time. The threshold can be either SEL or L_{max}, and it is important that this selection is shown in the nomenclature. For example, where determining the number of events that would exceed an SEL of 90 dB over a given period of time, the nomenclature would be NA90SEL. Similarly, for L_{max} it would be written as NA90L_{max}. The time period can be an average 24-hour day, DNL daytime, DNL nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

The NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level providing additional information about the acoustic environment and a valuable tool in describing noise exposure to the community. A threshold level and metric are selected that best meet the need for each situation. An L_{max} threshold is normally selected to analyze speech interference, while an SEL threshold is normally selected for analysis of sleep disturbance.

3.2.3.2 Time Above a Threshold Level

Similar to NA, TA considers a specified threshold and period of time but results in the duration of time that the threshold is exceeded. For instance, TA65 during an 8-hour school day results in the number of minutes that noise levels exceed 65 dB (which equate to interior levels of 50 dB with windows open).

3.2.3.3 Speech Interference

Speech interference is measured by the number of events per hour, on an average daily basis, when the aircraft noise is greater than or equal to 50 dB L_{max} inside the building during the DNL daytime hours (7 a.m. to 10 p.m.) with open and closed windows. The software model predicts outdoor sound levels that must be converted to interior levels by applying typical building attenuation values of 15 dB or 25 dB for windows open and windows closed conditions, respectively (DNWG 2009a).

3.2.3.4 Classroom Learning Interference

When considering intermittent noise caused by aircraft overflights, guidelines for classroom interference indicate that an appropriate criterion for impact screening is an outdoor $L_{eq(8hr)}$ of 60 dB (DNWG 2009a). Subsequent classroom impact analysis considers the numbers of events that would exceed 50 dB interior level, which would equate to NA65L_{max} with windows open or

NA75L_{max} with windows closed. Thus, the number of annual average daily events where L_{max} would be greater than or equal to outdoor 65 dB and 75 dB serves as the measure of potential classroom effects and are presented on a per-hour basis. Because classrooms are in use during the day predominantly, these criteria are applied for annual average daily aircraft operations occurring over an 8-hour period between 7 a.m. and 3 p.m., rather than for a 15-hour period between 7 a.m. and 10 p.m. for standard speech interference.

Of additional use is the TA metric (i.e., TA65 with windows open), which calculates the duration of time that interior noise levels would exceed 50 dB.

3.2.3.5 Sleep Disturbance

Sleep disturbance can be caused by excessive noise, which can hinder people's ability to fall asleep or to cause people to wake from sleep. A method for calculation of the probability of awakening (PA) from at least one event per night is described in ANSI/Acoustical Society of America (ASA) S12.9-2008/Part 6. The standard utilizes the estimated interior SEL caused by aircraft events along with the number of occurrences per night to calculate the PA from that event. Multiple events can be combined to determine the PA for all events during a single night. ANSI recommended that only nighttime events occurring during the DNL nighttime with SELs between 50 and 100 dB should be used for this PA calculation. Data suggested that events below 50 dB do not contribute significantly to PA and the formula underpredicts PA for events over 100 dB. The DNWG for environmental impact analysis has endorsed this ANSI/ASA 2008 methodology (DNWG 2009b).

As of July 2018, the ANSI and ASA have withdrawn the 2008 standard, which formed the basis of much of the DNWG 2009b guidance:

> *The decision of Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6 implies that the method for calculating "at least one behavioral awakening per night" contained in the former Standard should no longer be relied upon for environmental impact assessment purposes. The Working Group believes that continued reliance on the 2008 Standard would lead to unreliable and difficult-to-interpret predictions of transportation-noise-induced sleep disturbance (ANSI/ASA 2018).*

The 2008 standard relied on the assumption that the calculation for PA from a single event is independent of the subsequent events, so multiple events in the same night can simply be combined using the same formula. Additionally, the studies that supported the 2008 standard assumed varying sensitivity to awakening of individual study participants and employed "sensitivity coefficients" to improve the prediction correlation. However, the sensitivity coefficients for residents of airport neighborhoods were not generalizable from one airport to another making

accurate prediction at airfields without such studies and sensitivity coefficients difficult and less reliable.

The explanations given by ANSI and ASA for the withdrawal of the 2008 standard include the following criticism:

- When applied to large populations, a fractional increase in noise level produces an unrealistic increase in number of awakenings.
- Lacks advice concerning situational limits of its applicability allowing misapplication in very large study areas resulting in implausibly large total numbers of awakenings, even at imperceptibly low sound levels.
- Lacks guidance about the reliability of its predictions, which encourages practitioners to apply the predictive equations with the assumption of unlimited accuracy.
- Due to the awakening studies' setup, predictions of sleep awakening in settings with greater than 20 DNL nighttime events are dubious.

Additionally, ANSI/ASA 2018 described the relatively small number of field observations of behavioral awakenings attributable to transportation sleep disruption, which lack sufficient representation of the reactions of diverse populations necessary for the typical application of the 2008 standard.

The discussion in ANSI/ASA 2018 included consideration of SEL's value in computing PA and concluded that reliance solely on SEL may not be reliable because awakenings depend only slightly on SEL, particularly at lower levels. A study by Fidell et al. (2013) re-analyzed the same database published in the 2008 ANSI but concluded that PA more closely related to relative SEL rather than absolute, *"Minor differences in prediction of small awakening rates should not be interpreted as evidence of meaningfully different environmental impacts of one project alternative with respect to another."*

Without a reliable and standardized method to compute PA, or updated guidance from the DNWG, this study presents the sleep impact analysis utilizing the previous standard (ANSI/ASA 2018; DNWG 2009b) for environmental impact disclosure purposes. The reader is cautioned that the PA metric provides only a crude estimate because it cannot truly account for all variables that could affect a person's sleep. A comparison of the affected environment and Proposed Action awakening percentages showing large changes to PA could provide some insight on whether a particular action would be likely to increase or decrease sleep impacts. However, any additional conclusions may not be supportable.

3.2.3.6 Potential for Hearing Loss

Per the 2009 DoD policy memorandum, populations exposed to noise greater than 80 dB DNL are at the greatest risk of potential for hearing loss (PHL) (Undersecretary of Defense for Acquisition Technology and Logistics 2009). The EPA's Guidelines for Noise Impact Analysis quantifies hearing loss risk in terms of Noise Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week. The DoD recommends screening for PHL risk by determining if any residences would be exposed to 80 dB DNL or greater (DNWG 2013). If any residences are identified in that risk area, then additional analysis shall be performed utilizing L_{eq} in 1 dB bands.

3.2.3.7 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dB as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss (NIOSH 1998). Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document, which reaffirmed the 85 dB recommended exposure limit (NIOSH 1998). Active duty and reserve components of the USAF, as well as civilian employees and contracted personnel working on USAF bases, must comply with Occupational Safety and Health Administration (OSHA) regulations (29 CFR Section 1910.95, *Occupational Noise Exposure*); DoD Instruction 6055.12, *Hearing Conservation Program;* and AFI 48-127, *Occupational Noise and Hearing Conservation Program* (including material derived from the International Standards Organization 1999.2, *Acoustics-Determination of Occupational Noise Exposure and Estimation of Noise Induced Impairment*).

3.2.4 Types of Military Aircraft Noise

Sound from military aircraft can be categorized into two types, named after the type of flight from which they originate—subsonic and supersonic. As described in the following two subsections, these two types of noise differ in their characteristics.

3.2.4.1 Subsonic Aircraft Noise

Subsonic noise from an individual aircraft traveling at less than the speed of sound is a time-varying continuous sound, typically lasting 20 to 30 seconds. It is first audible as the aircraft approaches, increases to a maximum when the aircraft is near its closest point, and then decreases

as it departs. The noise depends on the speed and power setting of the aircraft and its flight track. Noise levels from flight operations exceeding ambient noise typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to aircraft parking ramps and staging areas. As aircraft in flight gain altitude, their noise contribution drops to lower dB levels, often becoming indistinguishable from ambient noise.

3.2.4.2 Supersonic Aircraft Noise (Sonic Boom)

Aircraft in supersonic flight (i.e., exceeding the speed of sound [Mach 1]) generate an air pressure wave. The air pressure wave is sometimes reflected upward resulting from changing air temperatures at different altitudes such that it never reaches the ground (Plotkin et al. 1989). When the pressure wave does reach the ground, it is heard as a sonic boom. A sonic boom is characterized by a rapid increase in pressure, followed by a decrease before a second rapid return to normal atmospheric levels. This change occurs very quickly, usually within a few tenths of a second. It is usually perceived as a "bang-bang" sound. The amplitude of a sonic boom is measured by its peak overpressure, in pounds per square foot (psf). The amplitude depends on the aircraft's size, weight, geometry, Mach number, maneuver (e.g., turn, dive), and flight altitude.

As mentioned above, not all supersonic flights cause sonic booms that are heard on the ground. As altitude increases, air temperature and sound speed decrease. The change in the speed of sound with altitude typically results in pressure waves, which create sonic booms, to be turned upward as they move toward the ground. Depending on the altitude of the aircraft and the Mach number, many pressure waves can be bent upward such that they never reach the ground. This phenomenon, referred to as "cutoff," also acts to limit the width (or area covered) of the sonic booms that do reach the ground.

The biggest single condition affecting overpressure is altitude, but maneuvers can also affect boom psf, increasing or decreasing overpressures from those for steady level flight. The shape and size of the aircraft also plays a role in the magnitude of boom experienced at ground level. In the case of supersonic flight at altitudes of 10,000 feet MSL or greater, the overpressures of booms that reach the ground are well below those that would begin to cause physical injury to humans or animals (USAF 2016). They can be, however, annoying and cause startle reactions in humans and animals. On occasion, sonic booms can cause physical damage (e.g., to a window) if the overpressure is of sufficient magnitude. The condition of the structure is a major factor when damage occurs, the probability of which tends to be low. At 1 psf, the probability of window breakage ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). At 10 psf, the probability of breakage is between one in a hundred and one in a thousand (Haber and Nakaki 1989).

Sonic booms from air combat training activities tend to be concentrated within elliptical boundaries fitting within the airspace. Aircraft set up at positions at opposite ends of the airspace before proceeding toward each other for an engagement. Supersonic events can occur as the aircraft accelerate toward each other, during dives in the engagement itself, and during disengagement. When booms occur relatively frequently, it is useful to estimate the overall 24-hour exposure of the booms to relate it to land use compatibility and annoyance.

3.2.5 Analysis Methodology

Analysis methodologies differ across governmental agencies due to differing activities and requirements applicable to each agency. Table 3.2-1 presents a summary of the DoD and FAA standards, which includes prescribed software models, noise metrics, and significance determination.

This analysis uses the DoD NOISEMAP suite of computer programs which refers to BASEOPS as the input module for military aircraft and NMAP as the noise model for predicting noise exposure resulting from military operations in the installation environment because DoD prepared the analysis. This model is used to analyze the military aircraft operations at all airfields considered. The Aviation Environmental Design Tool (AEDT) refers to the computer model used to predict noise exposure from civilian aircraft operating in the airport environment, which applies to the 104 FW at BAF, MA, and the 144 FW at FAT, CA. Both NMAP and AEDT produce grids of noise levels and the NMPLOT tool combines these noise grids to produce noise contours for plotting on a single noise exposure map for each of these installations. Noise exposure is presented in terms of contours, i.e., lines of equal value, of DNL (or CNEL at California locations), and for this analysis, the grid spacing used for calculating noise exposure was 500 feet. DNL or CNEL contours of 65 to 85 dB, presented in 5 dB increments, graphically depict the aircraft noise environment. This modeling process, using the NOISEMAP software suite and AEDT Version 3e, is the DoD- and FAA-accepted method for representing the overall community noise exposure over time.

Table 3.2-1 Summary of DoD and FAA Noise Analysis Standard Methodologies

Category	*Analysis Type*	*DoD*	*FAA*
Software	Airfield	NMAP, RNM, AAM (part of the NOISEMAP Suite of programs)[1,2]	AEDT[3,4]
	Airspace	MR_NMAP (Part of the NOISEMAP Suite of programs)[1] BOOMAP96 (for supersonic operations)	AEDT, but recognizes the DoD's MRNMAP and BOOMAP96 model[3,4]
Primary Noise Metric	Airfield	DNL; CNEL to be used in lieu of DNL for DoD actions occurring within California[1]	DNL; CNEL may be used in lieu of DNL for FAA actions needing approval in California[4]
	Airspace	L_{dnmr}; $CNEL_{mr}$ to be used for DoD actions occurring within California[1]	
Supplemental Noise Metrics	Terminology	Representative POIs[5]	Noise Sensitive Area[4]
	Classroom Learning Interference	$L_{eq(8hr)}$ 60 dB for screening; NA65 and TA65 for impacts during school hours (corresponding to interior L_{max} of 60 dB)[5]	DNL is the recommended metric. DNL analysis may optionally be supplemented on a case-by-case basis with prior permission from FAA[4]
	Speech Interference (Average Day)	NA65 for windows open and NA75 for windows closed[5]	
	Sleep Disturbance	Probability of awakening utilizing ANSI S12.9-2008. Formally withdraw by ANSI/ASA in 2018 but still used for disclosure purposes until better methodology is developed[6]	
	Potential for Hearing Loss	Report the number of people living within each 1 dB $L_{eq(24)}$ contour band inside of the 80 DNL (or CNEL) contour[7]	

Category	*Analysis Type*	*DoD*	*FAA*
Significance Criteria	In the Vicinity of an Airfield	Evaluating context and intensity of impacts through off-base acreage population and household affected by each DNL (or CNEL) contour	DNL (or CNEL) Noise exposure contours at least 65, 70, and 75 dB and shall identify noise increases of DNL 1.5 dB or more over noise sensitive areas that are exposed to noise at or above the DNL 65 dB noise exposure level, or that would be exposed at or above the DNL 65 dB level due to a 1.5 dB or greater increase[4] • The number of people residing within each noise contour at or above DNL 65 dB and the net change. • The location and number of noise sensitive uses in addition to residences (e.g., schools, hospitals, parks, recreation areas) exposed to DNL 65 dB or greater. • The identification of noise sensitive areas exposed to aircraft noise above DNL 60 dB but below DNL 65 dB and projected to experience an increase of DNL 3 dB or more, only when DNL 1.5 dB increases are documented within the DNL 65 dB contour. • Discussion of the noise impact on noise sensitive areas within the DNL 65 dB contour. • Maps and other means to depict land uses within the noise study area.
	Under Airspace	Context and Intensity determination based on primary metrics 65 dB noise contours (L_{dnmr} (or $CNEL_{mr}$) and supplemental metric levels (SEL and L_{max}), as appropriate	Change-of-exposure tables and maps at population centers to identify where noise will change by the following specified amounts[4]: • For DNL 65 dB and higher: + DNL 1.5 dB • For DNL 60 dB to <65 dB: + DNL 3 dB ("reportable") • For DNL 45 dB to <60 dB: + DNL 5 dB ("reportable")

Notes: [1]DoD Instruction 4715.13. DoD Operational Noise Program. January 28.
[2]Deputy Assistant Secretary of Defense 2022. Helicopter modeling for NAS JRB New Orleans occurred prior to the AAM software release, so the helicopter portion of the analysis utilized the Rotary Noise Model (RNM).
[3]FAA Memorandum. Guidance on determining which version of the AEDT to use for FAA actions and studies. September 27.
[4]FAA 1050.1F, Desk Reference. Version 3. June.
[5]DNWG 2009a. Using Supplemental Noise Metrics and Analysis Tools. December.
[6]DNWG 2009b. Sleep Disturbance from Aviation Noise. December.
[7]DNWG 2013. Noise-Induced Hearing Impairment. December.

Legend: AEDT = Aviation Environmental Design Tool; ANSI = American National Standards Institute; ASA = Acoustical Society of America; CNEL = Community Noise Equivalent Level; $CNEL_{mr}$ = California Equivalent Onset-Rate Adjusted Day-Night Average Sound Level; dB = decibel; DNL = Day-Night Average Sound Level; DNWG = Defense Noise Working Group; DoD = Department of Defense; EIS = Environmental Impact Statement; FAA = Federal Aviation Administration; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level; $L_{eq(24)}$ = 24-hour Equivalent Sound Level; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; L_{max} = Maximum Sound Level; NA = Number of Events at or above a specified threshold; POI = Point of Interest; TA = Time Above a specified level.

Noise exposure is also presented in terms of DNL at representative points of interest (POIs) and on- and off-airport acreages within each noise contour. POIs were selected by compiling a list of schools and healthcare facilities in the vicinity of each airfield. Census tract centroids (the geometric center of each census tract area) provided many additional POIs and the locations most likely to contain nearby noise sensitive land uses (i.e., residential, daycare, places of worship, nursing homes, etc.). The final POI screening involved analyzing the areas surrounding each airfield and primary flight paths to identify noise sensitive locations most likely to experience elevated aircraft noise that were not already captured by other nearby POIs. All supplemental metric analyses are analyzed at all POIs regardless of type because many noise sensitive uses are located nearby. For instance, residential areas often surround schools, so calculating the potential for sleep disturbance at school provides impacts applicable to the neighborhoods that surround each school.

The DAF has no definitive significant threshold for noise impacts in the vicinity of military airfields or beneath SUA, and therefore relies on the context of the local environment and the intensity of the change on that environment. Context refers to the need to consider impacts within the setting in which they occur (e.g., changes in a rural area may elicit more of a response than one in an urban area). Intensity refers to the severity of the noise impact based on a change in the acoustic environment as a result of both single events (SEL, L_{max}) and the combination of all noise events (DNL/CNEL, L_{dnmr}/$CNEL_{mr}$). To determine the level of significance in the airfield environment, analyzed factors include: (1) changes to land use compatibility in relation to the number and type of structures, and population within the affected area; (2) the potential for increases in events that could result in sleep disturbance, speech interference, and interference with classroom learning; and (3) the PHL to occur to off-installation populations. Changes in the SUA were based on predicted changes in human annoyance and interference with daily activities.

The FAA has designated significance thresholds for changes in the acoustic environment at civilian airports where proposed actions are subject to NEPA compliance. FAA Order 1050.1F states that an action that would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe, would be considered a significant impact. This threshold does not directly apply or adequately address impacts on areas where other noise is very low and a quiet setting is the generally recognized purpose and attribute, such as national parks and wildlife refuges often located beneath SUA (FAA Order 1050.1F).

The ROI for noise associated with the three fighter wings includes the counties, townships, and towns/cities that each installation lies within, as well as those that are and would be affected by

noise generated at the airfields. The ROI also includes areas under the airspace that would be used by each of the units.

3.2.5.1 Airfield Noise Modeling

Noise modeling using DNL is based on AAD aircraft operations, which are determined by dividing the total yearly airfield/airport operations by 365 days per year. DNL has two time periods of interest: daytime and nighttime. As identified above, DNL daytime hours are from 7 a.m. to 10 p.m. local time. There is an exception for California, which recognizes daytime as 7 a.m. to 7 p.m. and then has an evening period from 7 p.m. to 10 p.m. DNL nighttime hours are from 10 p.m. to 7 a.m. local time. CNEL is used in the state of California and applicable to 144 FW at FAT, which adds an additional evening noise weighting. Note that "daytime" and "nighttime" in DNL calculations are sometimes referred to as "acoustic day" and "acoustic night." This is often different from the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset, and are important for military training in dark conditions. These times vary throughout the year, latitudinally, and with seasonal changes. DNL and CNEL metrics are used by all federal agencies for predicting human annoyance and other potential noise effects on humans. FAA requires the use of average annual day for describing DNL airfield noise (or CNEL) while DoD generally utilizes average annual day unless there exists specific reasons to instead use a 'busy day' calculation, such as at auxiliary airfields that experience large fluctuations in seasonal or monthly training utilization (FAA Order 1050.1F; DoD 2020; DNWG 2009a)

Military Aircraft Flight Operations

Noise modeling of subsonic military activity was conducted by determining and building each aircraft's flight tracks (paths over the ground) and profiles (which include data such as altitude, airspeed, power settings, and other flight conditions). This information was developed iteratively with a team primarily made up of representatives from the installation's flying squadrons, air traffic controllers, and the NGB. These data were combined with information about the numbers of each type of operation by aircraft/track/profile, local climate, ground surrounding the airfield and used the DoD's NOISEMAP suite of software programs to predict applicable noise levels that would be experienced at ground level.

The BOOMAP96 software program was utilized to investigate the supersonic aircraft activity within the airspace. BOOMAP96 has little to no limitations on the modeled minimum altitudes, which would not be directly applicable to airspace analyzed in this study with supersonic minimums of 10,000 feet MSL over water and 30,000 feet MSL over land. However, the software can provide an accurate calculation of the relative or change to CDNL that would occur under a proposed action compared to existing conditions and/or the No Action Alternative.

Civilian Aircraft Flight Operations

Civilian aircraft noise modeling was accomplished using the AEDT Version 3e software program. The data (numbers and types of aircraft, time of day, runway assignments, type of operation) used were developed with data obtained from recent noise studies and coordination with representatives from the FAA, air traffic controllers, and the NGB. Actual times were used to assign operations to acoustic day and night, and, where applicable, using daylight savings time conversion. Standardized flight profile data (power settings, airspeeds, etc.) available with AEDT were used for civilian aircraft operations.

In situations that require the preparation of a noise analysis in accordance with FAA Order 1050.1F, information in forecasts is a key data point when preparing this type of analysis under NEPA. Airports can rely on a forecast they prepare, and is approved by the FAA, or seek approval from the FAA to use the TAF, which is issued annually and projects civilian and commercial operations into the near future, and these projections are utilized to determine operations levels associated with the noise impact analysis. However, operational data based on a TAF was not utilized to inform development of the inputs for the noise modeling and subsequent noise impact analysis described in this draft EIS. Instead, the NGB relied upon the 'best available information' at the time of preparing this analysis, which was a combination of civilian aircraft operations as modeled in prior Noise Exposure Map (NEM) updates completed under 14 CFR Part 150 and average historical civilian operations levels from the FAA Operations Network (OPSNET). For BAF, the 2019 NEM update 2024 forecast condition civilian operations were used without adjustment as they fell within 3% of a 3-year historical average of recorded operations in the FAA OPSNET from 2017–2019. For FAT, the 2017 NEM update 2022 forecast condition civilian operations were used, and then scaled to a 3-year historical average of recorded operations levels in the FAA OPSNET from 2017–2019. This scaling was done to account for a significant decrease in civil air traffic associated with COVID-19 that was not reflected in the 2017 NEM update. For both BAF and FAT, this EIS assumed that the historical 3-year average of civilian operations as recorded in the FAA OPSNET from 2017–2019 was representative of when civilian air traffic associated with this action would return to pre-COVID-19 conditions at BAF and FAT and represented the 'best available' data source from which to forecast civilian operations at the time the Proposed Action or alternatives would be implemented. This EIS also assumed that there would not be substantial additional growth in civilian operations at BAF or FAT above and beyond the pre-COVID-19 conditions at the time the Proposed Action or alternatives would be implemented. Thus, the No Action Alternative for this EIS for both BAF and FAT were assumed to be equivalent to the existing conditions prior to COVID-19 interruptions in terms of aircraft and airfield operations.

Though the analysis of aircraft (military and civil) noise impacts was completed during the development of this draft EIS, updated civil aircraft operations data became available for the FAA's 2022 TAF in February 2023 prior to the planned date for the publication of the draft EIS for public review. Therefore, before publishing the draft EIS for public review, the NGB in coordination with the FAA, determined it was appropriate to consider if this updated civil aircraft operations data would change the results of the noise analysis, and conducted a comparative review. The noise studies associated with BAF and FAT present the additional, comparative review of the newly available 2022 civilian aircraft fleet mix and FAA 2022 TAF and evaluate their potential effects on the noise analysis presented in this EIS to best inform both the public and the decision makers. This review found that the updates to projections of civil aircraft operations and fleet mix would result in relatively minor changes to the projected noise contours as shown in the noise studies. Therefore, noise impacts and the conclusions based upon the FAA 2022 TAF and 2022 civilian aircraft fleet mix would not substantially change from those currently presented in this draft EIS. Estimated changes in acreages and number of individuals affected utilizing the revised 2022 TAF and 2022 civilian fleet mix can be found in the noise studies, which have been incorporated by reference (see Section 2.5) and can be found on the project website.

Static Engine Run-up Operations

In addition to the flight operations from takeoffs and landings, static engine run-up modeling accounts for aircraft maintenance activity occurring on the ground on stationary aircraft while engines operate. Static runup modeling considered historic and projected run-up locations, aircraft heading during run-up, number of engines operated, power setting, duration, and time of the day. All run-up operations are modeled on an average annual daily event basis.

3.2.5.2 Special Use Airspace Noise Modeling

In the airspace environment, L_{dnmr} is the relevant noise metric used by DoD standards while FAA specifies average annual use of DNL or CNEL in the state of California (FAA Order 1050.1F; DoD 2020; DNWG 2009a). If there are large variations in the distribution of airspace from one month to the next, then L_{dnmr} used for DoD would be based upon the month with the most aircraft activity in each airspace unit to account for the sporadic nature of operations. However, the airspace training considered in this study for the existing F-15C/D and proposed F-15EX and F-35A remains relatively consistent, so an average month of training forms the basis for the airspace noise analysis. L_{dnmr} is similar to the DNL except that an additional weighting is applied to account for the startle effect of aircraft operating at low altitudes and at high rates of speed (e.g., speeds above 400 knots), as described in Section 3.2.2.5, *Onset-Rate Adjusted Day-Night Average Sound Level and Onset-Rate Adjusted Community Noise Equivalent Level*. Noise modeling in the airspace was accomplished by identifying the overland airspace unit nearest noise sensitive

receptors and assuming a 'worst-case' scenario with all ANG training events occurring within that airspace with typical airspace profiles appropriate for each aircraft type. This approach provides a conservative estimate of the greatest L_{dnmr} that could occur. L_{dnmr} for a typical year would be less because a portion of training would occur in overwater training airspace where there would be no noise impacts.

For comparison, Table 3.2-2 presents single-event noise levels in terms of SEL and L_{max} for the F-15C, F-15EX, and F-35A. In general, the F-15EX would be 2 to 3 dB greater in terms of SEL and 4 to 5 dB greater in L_{max} when compared to the F-15C at times when both aircraft would operate at military power and 400 knots. The F-35A would be 3 to 5 dB greater in terms of SEL and 6 to 8 dB greater in L_{max} when compared to the F-15C at times when both aircraft would operate at military power and 400 knots.

Table 3.2-2 SEL and L_{max} Comparison for Typical Military Airspace Profiles

Altitude (feet AGL)	*F-15C (PW-220)*		*F-15EX (GE-129)*		*F-35A (PW-100)*	
Metric	*SEL*	*L_{max}*	*SEL*	*L_{max}*	*SEL*	*L_{max}*
500	116	111	119	116	121	119
1,000	111	104	113	109	115	111
2,000	105	97	107	101	108	103
5,000	95	85	98	89	99	91
10,000	86	75	88	79	89	81

Note: All aircraft modeled at military power and 400 knots for comparison.
Legend: AGL = above ground level; L_{max} = Maximum Sound Level; SEL = Sound Exposure Level.
Source: NOISEMAP version 7.3.

3.3 AIRSPACE

3.3.1 Definition of Resource

This resource includes evaluation of both airspace management and use and addresses the use of airspace needed to support airfields and their surrounding airspace, as well as the airspace used for military training, and other components of the National Airspace System. Issues associated with the Proposed Action focus on the management and use of that system. Although the FAA Order 1050.1F does not prescribe Airspace as an environmental impact category, its inclusion is a requirement of DoD NEPA policy.

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. "Navigable airspace" is airspace above the minimum altitudes of flight prescribed by regulations under USC Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 USC Section 40102). Congress has charged the FAA with responsibility for managing airspace, as well as developing plans and policy for the use of the

navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and its efficient use (49 USC Section 40103[b]; FAA Order JO 7400.2L, Change 3). Management of this resource considers how airspace is designated, used, and administered to best accommodate the individual and common needs of military, commercial, and general aviation. The FAA considers multiple and sometimes competing demands for aviation airspace in relation to airport operations, Federal Airways, Jet Routes, military flight training activities, and other special needs to determine how the National Airspace System can best be structured to address all user requirements. There are two categories of airspace or airspace areas, regulatory and non-regulatory. Within these two categories, there are four types of airspace: Controlled, Uncontrolled, Special Use, and Other.

Controlled airspace is airspace of defined dimensions within which air traffic control service is provided to IFR and to VFR flights in accordance with the airspace classification (FAA 2021). Controlled airspace is categorized into five separate classes: Classes A through E (Figure 3.3-1). These classes identify airspace that is under the control of an air traffic controller, airspace supporting airport operations, and designated airways supporting en route transit from place-to-place. The classes also dictate pilot qualification requirements, flight rules that must be followed, and the type of equipment necessary to operate within that airspace. In controlled airspace, air traffic controllers use Air Traffic Service routes to direct the flow of air traffic throughout the U.S. based on Navigational Aids (NAVAIDS) and/or Area Navigation (RNAV) using GPS waypoints. Victor (V) and Tango (T) routes are the low-altitude airways in airspace below 18,000 feet MSL used by air traffic control (ATC) to route air traffic between fixed locations. Jet (J-) and Q-Routes are published airways designated at altitudes between 18,000 feet MSL and 45,000 feet MSL.

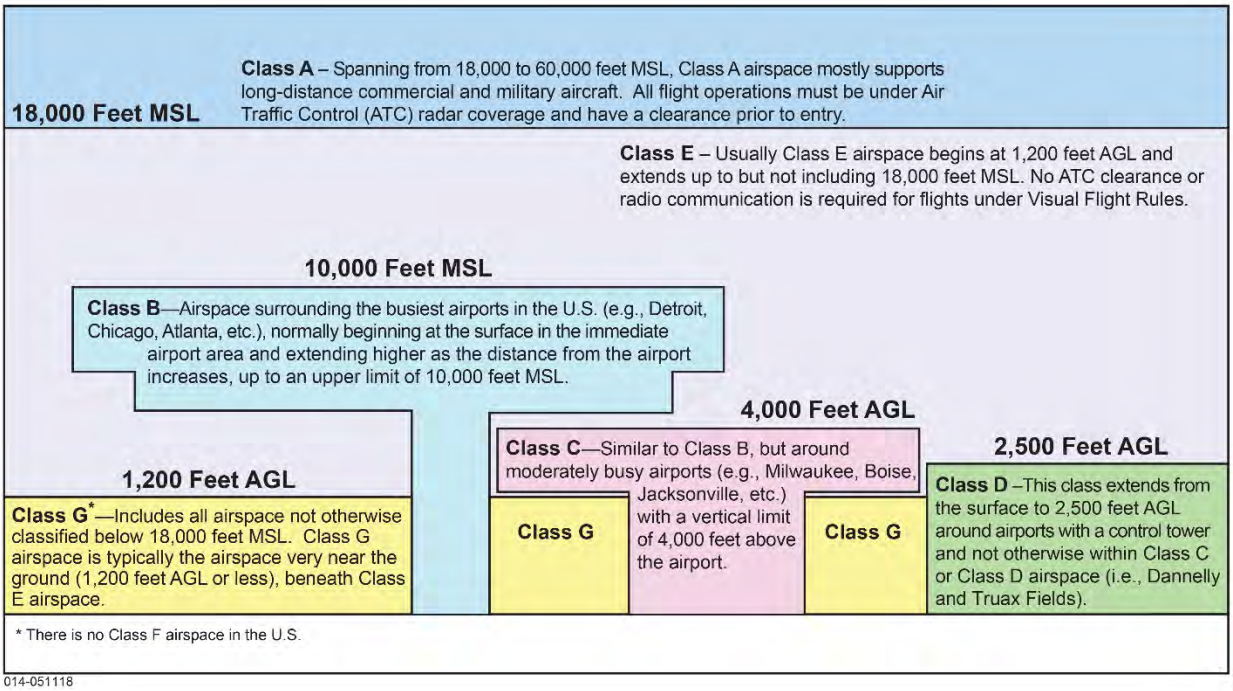


Figure 3.3-1 Cross Section of Airspace Classes and their Relationships

Uncontrolled airspace is designated as Class G airspace. Within the CONUS and out to 12 nautical miles offshore, Class G airspace includes all airspace up to 14,500 feet MSL that has not been designated as Class B, C, D or E.

Special Use Airspace has defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature, or where limitations are imposed upon aircraft operations that are not a part of those activities or both. The types of SUA are Prohibited Areas, Restricted Areas, MOAs, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas. The vertical limits of SUA are described by designating floors (the lowest altitude within the SUA) and ceilings (the highest altitude within the SUA). Depending on the terrain or operational considerations, floors of SUA are designated as feet AGL, MSL, or both (e.g., 5,000 feet MSL or 3,000 feet AGL, whichever is higher). Ceilings are expressed as a flight level (FL) or as feet MSL. A FL denotes thousands of feet MSL when an aircraft's altimeter is set to a standard atmospheric pressure, thereby ensuring that all aircraft are flying at their designated altitudes (i.e., FL500 would be 50,000 feet MSL). For this EIS, flight levels are omitted and discussed as feet MSL for ease of reading. SUA designated for military and other governmental activities is charted and published by the National Aeronautical Charting Office in accordance with FAA Order JO 7400.2P, Chg. 2, *Procedures for Handling Airspace Matters*, and other applicable regulations and orders. Specific rules and regulations concerning designation and management of SUA are listed in FAA Order JO 7400.10, *Special Use Airspace* (FAA 2022).

Warning Areas extend from 3 nautical miles outward from the coast of the U.S. The purpose of a Warning Area is to warn pilots of activity that may be hazardous to nonparticipating aircraft. Nonparticipating VFR aircraft are authorized through; however, IFR aircraft are not unless appropriate separation and deconfliction can be established by the controlling agency.

MOAs are established for the purpose of separating certain non-hazardous military activities from IFR traffic. When a MOA is active, nonparticipating IFR traffic may be cleared through the MOA if ATC can provide appropriate separation. Otherwise, ATC will reroute nonparticipating IFR traffic. VFR pilots may enter an active MOA; however, it is not recommended.

No person may operate an aircraft within a restricted area unless advance permission has been granted. Hazards to aircraft may include artillery firing, aerial gunnery, or guided missiles. If the restricted area is not active and has been released to the controlling agency (FAA), ATC will allow an aircraft to operate within or transition through the restricted airspace without a specific clearance to do so. If the restricted area is active, ATC is required to provide the appropriate separation from the active restricted area and therefore, will not allow an aircraft to penetrate the active restricted area airspace.

Other airspace includes advisory areas, temporary flight restrictions, areas designated for parachute jump operations, Military Training Routes, Aerial Refueling Tracks, and ATCAAs. ATCAAs are not charted; it is airspace that can be requested from and authorized by the controlling ARTCC when needed for military training. ATCAAs are often used to expand the airspace vertically over a MOA but can also be independent of other SUA.

Pilots comply with the minimum safe altitudes when flying, identified by the FAA and codified in 14 CFR Section 91.119. At a minimum, aircraft operators must avoid congested areas of a city, town, or settlement or any open-air assembly of people by 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. Outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet except over open water or sparsely populated areas.

3.3.2 Analysis Methodology

Management of the ranges and airspace used for military training focuses on ensuring safe, effective, and efficient operations, while balancing the military's need to accomplish realistic training and testing with the need to minimize potential impacts of such activities on the environment and surrounding communities. Analysis in this EIS considers these competing factors as a means to assess the nature and magnitude of the potential impacts that could occur from replacing existing F-15C/D aircraft with F-15EX or F-35A aircraft.

This EIS describes the existing operations at the 104 FW, 144 FW, and 159 FW installations, and in associated SUA that the F-15EX or F-35A would use to support operational training. Further, the EIS evaluates changes that could occur in the use and management of the training airspace should the F-15EX or F-35A replace the existing aircraft.

The assessment of airfield and airspace use and management discusses how the No Action and Proposed Action would affect civil, commercial, and military air traffic within the airspace of each airfield, and in SUA that the F-15EX or F-35A would use. Because no modifications or additions are proposed for the current airspace structure, the impact analysis focuses on changes in use that would result from the predicted change in annual airfield and airspace operations. It is important to note that when discussing operations in the training airspace (e.g., MOAs, ATCAAs), a single aircraft creates one operation each time it flies through an individual airspace unit. For example, an individual aircraft flying through MOA A to MOA B and back again to MOA A in the same training mission would account for three airspace operations.

Impacts on air traffic were assessed with respect to the potential for disruption of existing air traffic patterns and systems, and changes in existing levels of air traffic. Factors used to assess the impacts of the proposed beddown on air traffic include consideration of an alternative's potential to result in an increased number of flights such that they could not be accommodated within established operational procedures and flight patterns at the airfield; a requirement for an airspace modification to SUA; or an increase in air traffic that might increase collision potential between military and civilian operations. In addition, the analysis evaluated the potential for conflicts with civil aviation and underlying airfields.

The ROI for airspace associated with the three fighter wings includes the airspace associated with operations at each of the airfields, as well as the SUA that would be used by each of the units.

3.4 AIR QUALITY/CLIMATE CHANGE

3.4.1 Definition of Resource

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interaction of emissions, meteorology, and chemistry. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Most air pollutants originate from human-made sources, including mobile sources (e.g., gasoline- or diesel-fueled vehicles) and stationary sources (e.g., concrete batch plant, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also

released from natural sources such as volcanic eruptions and wildfires. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere.

Air pollution is a threat to human health and damages trees, crops, other plants, lakes, and animals. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. To improve air quality and reduce air pollution, Congress passed the Clean Air Act (CAA) and its amendments in 1970 and 1990, which set regulatory limits on air pollutants and to help ensure basic health and environmental protection from air pollution.

3.4.1.1 Criteria Pollutants

Air quality is defined by ambient concentrations of specific air pollutants – pollutants the EPA determined may affect the health or welfare of the public (EPA 2022a). The major pollutants of concern are called "criteria pollutants": carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) (dust particles less than or equal to 10 microns in diameter [PM_{10}] and fine particulate matter less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. The CAA requires the EPA establish National Ambient Air Quality Standards (NAAQS) for these criteria pollutants, shown in Table 3.4-1. These standards set specific concentration limits for criteria pollutants in the outdoor air.

Table 3.4-1 National Ambient Air Quality Standards

Pollutant		***Primary/Secondary[1, 2]***	***Averaging Time***	***Level***
Carbon Monoxide (CO)		Primary	8 hours	9 ppm
Carbon Monoxide (CO)		Primary	1 hour	35 ppm
Nitrogen Dioxide (NO_2)		Primary	1 hour	100 ppb
Nitrogen Dioxide (NO_2)		Primary and Secondary	Annual	53 ppb
Ozone (O_3)		Primary and Secondary	8 hours	0.070 ppm
Particulate Matter	$PM_{2.5}$	Primary	Annual	12 µg/m^3
Particulate Matter	$PM_{2.5}$	Secondary	Annual	15 µg/m^3
Particulate Matter	$PM_{2.5}$	Primary and Secondary	24 hours	35 µg/m^3
Particulate Matter	PM_{10}	Primary and Secondary	24 hours	150 µg/m^3
Sulfur Dioxide (SO_2)		Primary	1 hour	75 ppb
Sulfur Dioxide (SO_2)		Secondary	3 hours	0.5 ppm
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3

Notes: [1]Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.
[2]Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
Legend: µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppm = parts per million; ppb = parts per billion.
Source: EPA 2022a.

The concentration limits for the criteria pollutants were developed to aid in protecting public health and the environment as they are common in outdoor air and come from numerous and diverse

sources. Areas with air pollution problems typically have one or more criteria pollutants consistently present at levels that exceed the NAAQS. These areas are designated as nonattainment for the standards that are not met for each criteria pollutant.

3.4.1.2 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are pollutants for which there are no NAAQS but are still regulated under the federal CAA because of their potentially adverse effects on human health and the environment. Also known as "air toxics," these pollutants are comprised of a wide array of organic and inorganic compounds (e.g., formaldehyde, 1 acetaldehyde, benzene, toluene, acrolein, 1,3-Butadiene, xylene, lead, naphthalene, propionaldehyde). In relation to aviation sources, such emissions are present in the exhaust of aircraft, auxiliary power units, aerospace ground equipment, and motor vehicle engines and, to a lesser extent, from boilers, fuel facilities, and other stationary sources (FAA 2015).

3.4.1.3 General Conformity Rule

Federal actions are required to conform with the approved State Implementation Plan (SIP) for those areas of the U.S. designated as nonattainment or maintenance areas for any criteria air pollutant under the CAA (40 CFR Section 93.158). The purpose of the General Conformity Rule is to ensure that applicable federal actions, such as the Proposed Action, would not cause or contribute to a violation of an air quality standard and that the Proposed Action would not adversely affect the attainment and maintenance of any NAAQS. A conformity applicability analysis must be completed for every DAF action that would be located or include a nonattainment or maintenance area and that generates emissions to determine and document whether the proposed action complies with the General Conformity Rule. The analysis must consider the total direct and indirect emissions, including all emission increases and decreases that are practicably controllable through an agency's continuing program responsibility and that are reasonably foreseeable at the time that the conformity applicability analysis is conducted.

The first step in a conformity applicability analysis involves calculating the non-exempt direct and indirect emissions associated with the action. If the action is a change from a current level of emissions, then the current level is compared to future emissions. The net change is the difference between the emissions associated with the action and the current emissions. The net change may be positive, negative, or zero. In the Conformity Applicability Analysis, the emissions thresholds that trigger the conformity requirements are called *de minimis* thresholds. The net change emissions calculated for the direct and indirect emissions are compared to these thresholds. If the emissions are below *de minimis* thresholds, the proposed project is presumed to conform to the SIP. If the net change in emissions equals or exceeds the *de minimis* conformity applicability

threshold values, then a formal Conformity Determination must be prepared to demonstrate conformity with the approved SIP. *De minimis* levels are shown in Table 3.4-2.

Table 3.4-2 *De Minimis* Thresholds for Conformity Determinations

Pollutant	*Nonattainment or Maintenance Area Type*	*De Minimis Threshold (TPY)*
Ozone (VOC or NO_x)	Serious nonattainment	50
Ozone (VOC or NO_x)	Severe nonattainment	25
Ozone (VOC or NO_x)	Extreme nonattainment	10
Ozone (VOC or NO_x)	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
Ozone (NO_x)	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
Ozone (VOC)	Maintenance within an ozone transport region	50
Ozone (VOC)	Maintenance outside an ozone transport region	100
CO, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
PM_{10}	Moderate nonattainment and maintenance	100
$PM_{2.5}$	All nonattainment and maintenance	100
Lead	All nonattainment and maintenance	25

Legend: CO = Carbon Monoxide; NO_2 = Nitrogen Dioxide; NO_x = Nitrogen Oxides; $PM_{2.5}$ = Particulate Matter Less Than or Equal to 2.5 Microns in Diameter; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxide; TPY = tons per year; VOC = Volatile Organic Compound.
Source: 40 CFR 93.153.

3.4.1.4 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. The EPA has specifically identified carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride as GHGs (EPA 2009). These emissions occur from natural processes and human activities.

To estimate global warming potential (GWP), which is the heat trapping capacity of a gas, the U.S. quantifies GHG emissions using the 100-year timeframe values established in the Intergovernmental Panel on Climate Change Fourth Assessment Report (Intergovernmental Panel on Climate Change 2007). Two additional climate change assessment reports (Fifth and Sixth) have since been released, but the EPA recommends the use of GWPs from the fourth assessment in an effort to ensure consistency between the EPA's voluntary (GHG Reporting Program) and non-voluntary (National Inventory) reporting programs (EPA 2022b). This was done in accordance with United Nations Framework Convention on Climate Change (United Nations Framework Convention on Climate Change 2014) reporting procedures. All GWPs are expressed relative to a reference gas, CO_2, which is assigned a GWP equal to 1. Six other primary GHGs have GWPs: 25 for methane, 298 for nitrous oxide, 124 to 14,800 for hydrofluorocarbons, 7,390 to greater than 17,340 for perfluorocarbons, 17,200 for nitrogen trifluoride, and up to 22,800 for sulfur hexafluoride. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion (78.8

percent) (EPA 2022c). Weighted by its GWP, methane is the second largest component of emissions, followed by nitrous oxide. To estimate the CO_2 equivalency, or CO_2e, of a non-CO_2 GHG, the appropriate GWP of that gas is multiplied by the amount of the gas emitted. Emissions of a GHG are multiplied by the GWP to calculate the total equivalent emissions of CO_2. GWP-weighted emissions are presented in terms of CO_2e, using units of metric tons.

At this time, climate change presents a global problem caused by increasing concentrations of GHG emissions and the current state of the science surrounding it does not support determining the global significance of local or regional emissions of GHGs from a particular action. On January 9, 2023, CEQ published the interim guidance, *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (CEQ 2023). This interim guidance has been incorporated into this analysis. The guidance explains how agencies should apply NEPA principles and existing best practices to their climate change analyses. Key changes in the interim guidance for agencies preparing NEPA documentation are listed below.

- Leverage early planning processes to integrate GHG emissions and climate change considerations into the identification of proposed actions, reasonable alternatives (as well as the no-action alternative), and potential mitigation and resilience measures.
- Quantify a proposed action's projected GHG emissions or reductions for the expected lifetime of the action, considering available data and GHG quantification tools that are suitable for the proposed action.
- Provide additional context for GHG emissions, including through the use of the best available social cost of GHG estimates, to translate climate impacts into the more accessible metric of dollars; allow decision-makers and the public to make comparisons; help evaluate the significance of an action's climate change effects; and better understand the tradeoffs associated with an action and its alternatives.
- Discuss methods to appropriately analyze reasonably foreseeable direct, indirect, and cumulative GHG emissions.
- Consider reasonable alternatives and mitigation measures, as well as addressing short- and long-term climate change effects.
- Use the best available information and science when assessing the potential future state of the affected environment in NEPA analyses and provide up-to-date examples of existing sources of scientific information.
- Use the information developed during the NEPA review to consider reasonable alternatives that would make the actions and affected communities more resilient to the effects of a changing climate.
- Incorporate environmental justice considerations into their analyses of climate-related effects, consistent with EOs 12898 and 14008.

A widely discussed opportunity for mitigation of non-CO_2 emissions from aviation is the avoidance of persistent contrails that can form contrail cirrus. If the conditions are suitable, emissions of soot and water vapor can trigger the formation of contrails, which can spread to form extensive contrail-cirrus cloud coverage. Contrails only form in ice-supersaturated air below a critical temperature threshold (Kärcher 2018). Such cloud coverage is estimated to result in a significant portion of the effective radiant forcing in global aviation. A widely discussed opportunity for mitigation of non-CO_2 emissions from aviation is the avoidance of these persistent contrails. It is therefore feasible to alter flight trajectories to avoid such areas conducive to contrail formation, since ice-supersaturated areas tend to be tens to hundreds of kilometers in the horizontal and only a few 100 meters in the vertical extent (Gierens et al. 1997). However, meteorological models cannot currently predict the formation of persistent contrails with sufficient accuracy in time and space (Gierens et al. 2020); this mitigation option is speculated to take up to a decade to mature.

The DoD and the DAF have established various directives pertaining to climate change. DoD Directive 4715.21 from January 2016 integrates climate change considerations into all aspects of the department. DoD components are charged with assessing and managing risks and mitigating the effects of climate change on natural and cultural resource management, force structure, basing, and training and testing activities in the field environment. The DAF released a Climate Action Plan in 2022 that establishes goals, objectives, and key results in order to address the challenges and risks presented by climate change such as a 50 percent emissions reduction from 2008 levels by FY 2033 and the DAF installation portfolio having net-zero emissions by FY 2046; increasing "operational energy intensity" (i.e., delivering more combat power to the warfighter using less fuel) by 5 percent by FY 2027 and 7.5 percent by FY 2032; obtaining 100 percent carbon pollution-free electricity on a net annual basis by FY 2030, and 100 percent zero emission non-tactical vehicles by FY 2035, including 100 percent zero emission light-duty vehicle acquisitions by FY 2027 and aircraft support equipment by FY 2032 (DAF 2022).

3.4.2 Analysis Methodology

The environmental impact methodology for air quality impacts presented in this EIS was derived by utilizing the same operational data as directed by AFMAN 32-7002, *Environmental Compliance and Pollution Prevention* (4 February 2020). The air analysis for criteria pollutant emissions from aircraft operations factors in the engine types used in the aircraft, the time spent at or below 3,000 feet AGL at specific engine power settings, the emission factors associated with those flight modes, engine maintenance run-ups, and other relevant details. These data are included in the DAF Air Conformity Applicability Model (ACAM) and in supplemental spreadsheets used for analysis. Construction operations similarly evaluate the operation of construction equipment and other fuel-burning sources as the primary emission sources of that activity. These data, along with information on the affected environment and the proposed and

alternative actions, are used to produce a consistent determination of air quality impacts. Potential impacts on air quality are evaluated with respect to the potentially affected environment and the degree of the effects of the action, including both short-and long-term effects; beneficial and adverse effects; effects on public health and safety; and effects that would violate federal, state, Tribal, or local law protecting the environment (40 CFR 1501.3).

The air quality analysis includes CAA General Conformity Rule Applicability analyses for areas designated nonattainment and for areas that were nonattainment but have achieved attainment. These special attainment areas are designated as "maintenance areas." For nonattainment and maintenance areas, the air quality analysis must assess whether or not a general conformity determination is required pursuant to the General Conformity Rule (40 CFR Section 93B). For attainment area criteria pollutants, the project air quality analysis uses the EPA's Prevention of Significant Deterioration (PSD) permitting threshold of 250 tons per year as an initial indicator of the local significance of potential impacts on air quality, in conjunction with the EPA's most recent criteria pollutant design values for the ROI to assess the appropriateness of using the PSD threshold. The DAF Air Quality EIAP Guide, Volume II defines "near nonattainment" as an area having an ambient air quality design value within 5 percent of any NAAQS (USAF 2020). For areas that are attainment, but "near nonattainment," the PSD threshold may not be a reasonable tool. In that case, the General Conformity Rule *de minimis* thresholds should be used as an additional parameter to assess impacts. It is important to note that these indicators only provide a clue to the potential impacts on air quality. In the context of criteria pollutants for which the proposed project region is in attainment of a NAAQS and the area is not in "near nonattainment," the analysis compares the annual net increase in emissions estimated for each project alternative to the 250 tons per year PSD permitting threshold. The PSD permitting threshold represents the level of potential new emissions below which a new or existing minor non-listed stationary source may acceptably emit without triggering the requirement to obtain a permit. Thus, if the intensity of any net emissions increase for a project alternative is below 250 tons per year in the context of an attainment criteria pollutant, the indication is the air quality impacts will not be significant for that pollutant.

The ROI for the air quality impacts analysis for criteria pollutants and their precursors is the applicable attainment, nonattainment, or maintenance area surrounding the proposed demolition, construction, and operational activities.

Mixing height is another factor used in defining the ROI for various pollutants. The mixing height is the upper vertical limit of the volume of air in which emissions may affect air quality. Emissions released above the mixing height are typically restricted from affecting ground level ambient air quality in the region, while emissions of pollutants released *below* the mixing height may affect ground level concentrations. The portion of the atmosphere that is completely mixed begins at

ground level and may extend up to heights of thousands of feet. Mixing height varies from region to region based on daily temperature changes, amount of sunlight, and other climatic factors. The General Conformity Rule requires determining the mixing height, if any, used in the applicable SIP (40 CFR Section 93.153(c)(2)(xxii)). If the SIP does not specify any particular mixing height, the rule provides that the default mixing height of 3,000 feet may be used. For attainment area criteria pollutants, the default mixing height of 3,000 feet was used, unless a nonattainment or maintenance SIP for the same region specified a different mixing height.

As discussed in Section 3.4.1.4, *Greenhouse Gas Emissions*, GHG emissions are global by nature, and addressed accordingly. The quantitative analysis of CO_2e emissions in this EIS is for disclosing the local net effects (increase or decrease) of the Proposed Action and alternatives and for its potential usefulness in making reasoned choices among alternatives. The cumulative impacts section discusses the net change in GHG emissions from the Proposed Action and the alternatives as well as the life-cycle net change increase over 50 years and the social costs of carbon during the 50-year lifetime of the aircraft.

3.5 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE/CHILDREN'S HEALTH AND SAFETY

3.5.1 Definition of Resource

Socioeconomics comprises the basic attributes and resources associated with the human environment, particularly population and economic activity. A socioeconomic analysis evaluates how elements of the human environment such as population, housing, employment, economic growth, and public services might be affected by the Proposed Action and alternatives. Economic activity also typically encompasses employment, personal income, and economic growth. Impacts on these fundamental socioeconomic components also influence other issues such as housing availability and the provision of public services.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (1994), addresses potential disproportionate human health and environmental impacts that a project may have on minority or low-income communities. EPA defines environmental justice as, "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA 2022d). It goes on to clarify that "no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies."

CEQ guidance states that "minority populations should be identified where either: (a) the minority population of the affected areas exceeds 50 percent, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general

population or other appropriate unit of geographic analysis" (CEQ 1997). Minority populations include those that report their ethnicity as something other than non-Hispanic White alone; minority populations include Black or African American, Hispanic or Latin, American Indian, Native Hawaiian or other Pacific Islander, Asian, or Alaska Native (U.S. Census Bureau [USCB] 2011). Low-income populations were identified using methods recommended by the Environmental Justice Interagency Working Group and NEPA Committee (Environmental Justice Interagency Working Group 2016) and guidelines issued by the CEQ (1997). Using the low-income threshold criteria analysis, a census block group is considered to be a low-income area if the percentage of households with incomes below the poverty line is greater than the reference area. For this analysis, the reference area is the county, or the group of parishes in which the block group is located.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), requires federal agencies to, "identify and assess environmental health risks and safety risks that may disproportionately affect children," and, "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." Additionally, children and the elderly are identified in the DAF *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process* as sensitive receptors (Air Force Civil Engineer Center [AFCEC] 2020). Children are defined as those individuals under the age of 18 years and the elderly are defined as those who are aged 65 years and older.

3.5.2 Analysis Methodology

Socioeconomic impacts are assessed in terms of direct effects to the local economy and population and related indirect effects on other socioeconomic resources within the ROI. Although economic or social effects are not intended by themselves to require preparation of an EIS (Section 1508.14 CEQ Regulations), socioeconomic impacts would be considered significant if the Proposed Action resulted in a substantial shift in population trends or notably affected regional employment, earnings, or community resources such as schools.

The ROI for socioeconomics associated with the three fighter wings includes the counties, or parishes, that each installation lies within. The socioeconomic aspect of potential impacts on lands underlying SUA was not evaluated because no construction or other ground disturbance would occur to generate economic activity.

To evaluate potential effects to low-income and minority populations, children, and the elderly, areas containing relatively high percentages of these populations were identified and

determinations made as to whether adverse human health or environmental effects would occur in those areas.

Ethnicity and poverty status in census block groups in the vicinity of the fighter wing locations were examined. Any census block with 50 percent or more of the population identifying as a minority, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population, is classified as a minority population area. Census block groups where the percentage of households with incomes below the poverty level is higher than the county that the block group is located in are classified as low-income areas. Geographic Information System (GIS) data obtained from the USCB were used to obtain information on these populations located within the vicinity of the fighter wing locations. Additional POIs, such as schools, elder care facilities, and retirement homes, were considered with respect to other environmental justice populations.

The ROI for environmental justice and the potential effects to children includes the census block groups that are and will be affected by noise generated at the airfields. However, the environmental justice analysis considers any areas that are identified in other resource sections of this EIS as having adverse impacts. Environmental justice and potential effects to children in communities under the SUA were not evaluated because the only anticipated impacts would be due to aircraft noise, but any changes in noise levels in these areas are anticipated to be minor.

3.6 LAND USE/NOISE COMPATIBLE LAND USE

3.6.1 Definition of Resource

Land use describes how land is developed and used, typically in terms of the types of activities allowed. The attributes of land use examined in this EIS include land ownership and status, general land use patterns, land management plans, and special use areas. Land use comprises the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories generally include residential, commercial, industrial, agricultural, and other public uses. For the installations and environs, management plans and zoning regulations and guidance determine the type and extent of allowable land use in specific areas to limit conflicting land uses and protect specially designated or environmentally sensitive areas. On military installations, land use tends to be generally divided into various operational and support functions.

Several siting criteria have been established specifically for land development and use at and around commercial and military airfields. For example, Accident Potential Zones (APZs) and Runway Protection Zones (RPZs) address development density, and land use in and around airports, and are enforced to reduce the potential for aircraft-related hazards. FAA Advisory Circular 150/5300-13B, *Airport Design*, Section 1.5.82 defines an RPZ as an area at ground level

prior to the threshold or beyond the runway end to enhance the safety and protection of people and property on the ground.

FICUN, DoD, and FAA have established guidelines to help assess land use compatibility with aircraft noise exposure. As shown in Table 3.6-1, a range of noise exposure levels are associated with a given land use. These guidelines are intended as a planning tool and as such provide general indications as to whether particular land uses are appropriate for certain measured noise exposure levels. The designations in the table do not constitute a federal determination that any land use is acceptable or unacceptable under federal, state, or local law, nor are they used to determine if a structure is habitable or uninhabitable. Several counties, cities, and other municipalities prepare and regularly update comprehensive plans that provide a basis for long-range decision-making on issues such as land use, zoning, residential densities, and economic development. These comprehensive plans specify community goals and objectives for managing future growth. The land use designations listed in Appendix A (Table 1) of 14 CFR Part 150 combined with noise analyses depicting noise exposure levels provides state and local agencies with land use jurisdiction information that can be used for comprehensive land use planning.

For the areas under the airspace, analysis of land management considers the same basic topics as noted above. However, the land use categories also include special use areas, parks and recreation areas, and communities. Less emphasis is placed on ordinances, with broader land management being the focus. Areas under the airspace include federal, state, and local government, tribal lands, as well as private lands. For the ordnance ranges, most lands have been withdrawn for military purposes with public use either prohibited or restricted. How the land is managed is typically regulated by management plans, policies, and ordinances that determine the types of uses that are allowable or protect specially designated or environmentally sensitive uses.

3.6.2 Analysis Methodology

Impacts on land use are evaluated by identifying whether an action is incompatible with an existing land use due to noise, safety, or other issues. Incompatibility may arise as a result of substantial noise increases (e.g., increases in flight activities and training exercise tempo, introduction of new aircraft, introduction of supersonic flight). The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action. In general, land use impacts would be significant if the action would: (1) be inconsistent or noncompliant with applicable land use plans or policies, including the county or city plans; (2) preclude the viability of an existing land use activity within the affected environment; (3) preclude continued use or occupation of an area; or (4) be incompatible with adjacent nearby land use to the extent that public health or safety is threatened. Compatibility standards such as those identified in Table 3.6-1 provide the means to evaluate impacts.

Table 3.6-1 FAA Part 150 Land Use Compatibility with Yearly Day-Night Average Sound Levels

Land Use	*<65 dB DNL*	*65-70 dB DNL*	*70-75 dB DNL*	*75-80 dB DNL*	*80-85 dB DNL*	*>85 dB DNL*
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail - building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade - general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Note: *The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Numbers in parentheses refer to notes:

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Key: SLUCM = Standard Land Use Coding Manual; Y (Yes) = Land Use and related structures compatible without restrictions; N (No) = Land Use and related structures are not compatible and should be prohibited; NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure; 25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Source: 14 CFR Part 150, Appendix A, Table 1.

The ROI for land use includes the airfield at each of the fighter wing installations and their immediate vicinity. The ROI for land use does not include the SUA that would be used by each unit, and the land beneath it, as there would be no ground disturbance, construction, or changes in infrastructure under the SUA. The F-15EX and F-35A airframes would utilize existing training airspace. Changes in noise levels would not affect general land use patterns, land ownership, or management of lands or special use areas beneath the airspace.

3.7 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

3.7.1 Definition of Resource

This section provides impact analysis for resources under Section 4(f) of the DOT Act of 1966 (now codified at 49 USC Section 303) protecting significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites in transportation projects. Any project that receives funding from or requires the approval of the DOT, including the FAA, must be analyzed for compliance with Section 4(f). Section 4(f) properties include:

- Parks and recreational areas of national, state, or local significance that are both publicly owned and open to the public;
- Publicly owned wildlife or waterfowl refuges of national, state, or local significance that are open to the public; and
- Historic sites of national, state, or local significance in public or private ownership regardless of whether they are open to the public.

When private institutions, organizations, or individuals own parks, recreational areas, or wildlife and waterfowl refuges, Section 4(f) does not apply to these properties, even if such areas are open to the public. However, a privately owned property may be protected under Section 4(f) when it is located on long-term leased public land or a public easement. For historic sites, Section 4(f) applies to any type of architectural or archaeological resource that is on or is eligible for listing in the National Register of Historic Places (NRHP) regardless of ownership status. In addition, an archaeological site must also warrant preservation in place in order for Section 4(f) to apply.

A property must be a significant resource for Section 4(f) to apply. Any part of a Section 4(f) property is presumed to be significant unless there is a statement of insignificance relative to the entire property by the federal, state, or local official having jurisdiction over the property. Any statement of insignificance is subject to review by the DOT, and given the nature of this action, the DOT agency would be FAA.

3.7.2 Analysis Methodology

To comply with Section 4(f), it must first be determined if there are any Section 4(f) properties within the ROI. If a Section 4(f) property is present, then it must be determined whether the Proposed Action "uses" the Section 4(f) property. However, per the FAA 1050.1F Desk Reference, SUA actions are exempt from the requirements of Section 4(f). In addition, per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49 USC. Therefore, any potential 4(f) impacts related to the Proposed Action (specifically noise) would not be considered significant.

FAA Order 1050.1F places responsibility of determining impacts on Section 4(f) properties with the FAA and defines a *use* as either *direct* (actual physical taking of lands) or *constructive*. *Constructive use* would occur if impacts from the Proposed Action would substantially impair the Section 4(f) property.

Substantial impairment occurs when the activities, features, or attributes of the property that contribute to its significance or enjoyment are substantially diminished. The FAA is required to identify a feasible and prudent avoidance alternative if the Proposed Action is determined to have a greater than *de minimis* impact to a Section 4(f) property. A *feasible and prudent* alternative is one that avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. A *de minimis* impact determination may be made with respect to a physical use of a Section 4(f) property if, after taking into account any measures to minimize harm, the result is either:

- A determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or
- A Section 106 finding of no adverse effect or no historic properties affected.

The DOT cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent alternative to the use of the land.
- The action includes all possible planning to minimize harm to the property resulting from use.

Mitigation measures that eliminate or reduce the effects of a physical or constructive use are considered when evaluating impacts. The FAA consults with all appropriate federal, state, and

local officials having jurisdiction over affected Section 4(f) properties when determining the potential impact on the properties. The ROI for publicly owned parks, recreation areas, and wildlife or waterfowl refuges protected under Section 4(f) consists of each of the alternative installations for direct effects related to construction associated with the Proposed Action and the area demarcated by the proposed noise contours of DNL 65 dB and greater surrounding each installation to account for indirect affects including noise. For NRHP-listed or eligible historic resources that are protected under Section 4(f), the ROI is identical to the Area of Potential Effects (APE) defined for cultural resources under Section 106 of the National Historic Preservation Act (NHPA), in addition to the surrounding area potentially impacted by noise.

FAA, as a Department of Transportation modal agency, is subject by law to apply Section 4(f) of the DOT Act of 1966. Two of the fighter wings under consideration for new aircraft include the 104 FW at BAF and 144 FW at FAT. These are civilian airports regulated under FAA and as such are required to undergo Section 4(f) analysis.

3.8 WATER RESOURCES/FLOODPLAINS/WILD AND SCENIC RIVERS

3.8.1 Definition of Resource

Water resources include the quantity and quality of groundwater and surface water bodies, stormwater, floodplains, and wild and scenic rivers (wetlands are addressed in Section 3.13, *Biological Resources/Coastal Resources/Wetlands*). Groundwater includes subsurface hydrologic resources and is typically a reliable and safe fresh water source. Groundwater is an important component of the overall hydrologic cycle of the earth. Surface water includes all wetlands, rivers, streams, lakes, and ponds that are used for various applications including recreation, sustenance, irrigation, flood control, and human health. Surface waters in the U.S. are protected under the Clean Water Act (CWA), the goal of which is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

The CWA requires that any point source facility that discharges polluted wastewater into a body of water must first obtain a National Pollutant Discharge Elimination System (NPDES) permit that is issued at a national level through the EPA, or an approved State agency. Point source pollution is produced by a single identifiable source. Non-point source pollution affects surface water and groundwater resources as a result of pollution from diffuse sources. Stormwater is excess surface water that occurs or collects during periods of frequent precipitation and is typically diverted into a facility's stormwater sewer system. Stormwater runoff management addresses measures to reduce flow energy and pollutants in stormwater and to control discharge from point and non-point sources. These discharges are covered by an NPDES permit related to the construction activities being conducted.

On January 30, 2015, EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, was announced and amended to EO 11988. Floodplains are defined by EO 11988 (as amended) as "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands." The extent of the floodplain would be established using one of the following approaches outlined in EO 13690: climate-informed science approach; freeboard value approach; 0.2-percent-annual-chance flood approach; or any other method identified in an update to the Federal Flood Risk Management Standard. Areas subject to a 0.2 percent or greater chance of annual flooding are also referred to as 500-year floodplains. Per both orders, federal agencies are required to avoid, to the extent practicable, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development whenever there is a practicable alternative. If impacts cannot be avoided, the appropriate flood risk management strategies need to be applied to the design and construction of the building. In addition, all construction in floodplains require compliance with AFI 32-1023, *Designing and Constructing Military Construction Projects*, which includes compliance with federal and local standards.

Wild and scenic rivers are those rivers having remarkable scenic, recreational, geologic, fish, wildlife, historic, or cultural values as defined by the Wild and Scenic Rivers Act. The Wild and Scenic Rivers Act established the National Wild and Scenic River System, which consists of those rivers and river segments deemed by Congress to have one or more "outstandingly remarkable" scenic, recreational, geologic, fish and wildlife, historic, or cultural values. Rivers in the system are classified based on the degree of development present along the river, and whether the river is wild, scenic, or recreational. Section 12 of the Wild and Scenic Rivers Act requires a federal agency with jurisdiction over any lands which include, border upon, or are adjacent to a designated Wild and Scenic River or study river, to take action necessary to protect the river in accordance with the purposes of the Wild and Scenic Rivers Act.

3.8.2 Analysis Methodology

The protection of surface and groundwater sources during ground-disturbing activities, changes to stormwater control systems, disturbance of areas located within 100-year floodplains, and proximity and disturbance of wild and scenic rivers were considered when evaluating potential impacts on water resources. Water resources would be adversely impacted if there were significant modification of the floodplain, uncontrolled erosion and sedimentation due to stormwater runoff, or pollution discharged into impaired water bodies to exceed Total Maximum Daily Loads.

The ROI for water resources primarily consists of each of the fighter wing installations, with additional information presented for the surrounding vicinity, where relevant. The ROI does not include land beneath the SUA since no ground disturbance or construction would occur.

3.9 GEOLOGICAL RESOURCES/SOILS/FARMLANDS

3.9.1 Definition of Resource

Earth resources include the geology, topography, and soils of the installations. The discussion of this resource includes an overall description of the regional geological setting, as well as a description of the topography and soils associated with the affected environment. These terms are defined below.

- *Geology* – is defined by the distinctive, dominant, easily mapped and recognizable physical characteristics, and features of a volume of rock.
- *Topography* – is the natural and fabricated features of a place or region, which show relative positions and elevations at the Earth's surface.
- *Soils* – are unconsolidated earthen materials overlying rock.

The Farmland Protection Policy Act (FPPA), part of the Agriculture and Food Act of 1981 (Public Law 97-98), was passed in an effort to protect farmland and combat urban sprawl. Additionally, the FPPA is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state, local, and private programs and policies to protect farmland. Specifically, the Act regulates farmland identified as prime, unique, or of statewide or local importance.

The FAA may determine whether or not the site of the proposed action is prime, unique, state, or locally important farmland using criteria provided in 7 CFR § 658.5. If the FAA does not make its own determination, the FAA may elect to initiate coordination with the Natural Resources Conservation Service (NRCS) by completing Form AD-1006, a land evaluation and site assessment system used by NRCS to determine a rating score and establish impacts to farmlands. FAA Order 1050.1F provides the FAA's significance threshold for farmlands. A significant impact would occur when the total combined score on NRCS Form AD-1006, "Farmland Conversion Impact Rating," ranges between 200 and 260 points.

3.9.2 Analysis Methodology

Reports, studies, and best available data sets prepared by, or for, the federal government, the state governments, and independent researchers that address geology, topography, and soils were

reviewed for information related to the affected environment of geological and soil resources at each of the fighter wing locations. Additionally, federal and state regulations were reviewed for regulations that serve to protect, conserve, and manage geological and soil resources. No construction or ground disturbance would occur below the airspace proposed for use under any of the alternatives.

The ROI for earth resources primarily consists of each of the fighter wing installations, with additional information presented for the surrounding vicinity, where relevant. The ROI does not include land beneath the SUA since no ground disturbance would occur.

3.10 CULTURAL RESOURCES

3.10.1 Definition of Resource

Cultural resources can be broadly defined as precontact and historic sites and districts; structures; artifacts; features that display evidence of human activity; and landscapes and features that play a fundamental role in a specific community's identity, beliefs, or value system. Cultural resources can be divided into three major categories: archaeological resources (precontact and historic), architectural resources, and traditional cultural resources.

Archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., tools, projectile points, or bottles). "Precontact" refers to resources that predate the advent of written records in a region. These resources can range from a scatter composed of a few artifacts to village sites and rock art. "Historic" refers to resources that postdate the arrival of Europeans in the area. Archaeological resources can include campsites, roads, fences, trails, dumps, battlegrounds, mines, and a variety of other features.

Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for protection under existing cultural resource laws. However, more recent structures, such as Cold War-era military buildings, may warrant protection if they have exceptional characteristics and the potential to be historically significant structures.

Archaeological resources and architectural resources must also retain integrity according to the Secretary of the Interior's seven aspects of integrity (location, design, setting, materials, workmanship, feeling, and association). A property will retain several, and usually most, of the aspects to possess historic integrity.

Traditional cultural resources and sacred sites are eligible for inclusion in the NRHP because of their association with cultural practices and beliefs of a living community that are (a) rooted in the

community's history and (b) important to maintaining the continuing cultural identity of the community (National Park Service 1998). Traditional cultural resources can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the continuance of traditional cultures. Sacred sites are "any specific, discrete, narrowly delineated location that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site" (EO 13007).

Cultural resources that have been determined eligible for inclusion in the NRHP are historic properties. Historic properties are afforded protection and consideration under the NHPA. To be determined eligible for inclusion in the NRHP, a resource must meet at least one of the following criteria:

(a) associated with events that have made a significant contribution to the broad patterns of our history; or
(b) associated with the lives of persons significant in our past; or
(c) embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
(d) have yielded, or may be likely to yield, information important in prehistory or history.

Historic properties must retain aspects of integrity defined in the regulations as location, design, setting, materials, workmanship, feeling, and association.

Several federal laws and regulations address cultural resources, including the NHPA (1966), the Archaeological and Historic Preservation Act (1974), American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and Native American Graves Protection and Repatriation Act (1990).

On November 27, 1999, the DoD promulgated its Annotated American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis in recognition of their sovereignty as a nation. This Policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the respective services (DoD American Indian/Alaska Native Policy), as

does DoD Instruction 4710.02, *Interaction with Federally Recognized Tribes* (September 14, 2006). In addition, coordination with federally recognized Native American Tribes must occur in accordance with EO 13175, *Consultation and Coordination with Indian Tribal Governments*.

3.10.2 Analysis Methodology

Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA of 1966 empowers the Advisory Council on Historic Preservation to comment on federally initiated, licensed, or permitted projects affecting historic properties.

Analysis of potential impacts on cultural resources is based on the following considerations: (1) physically altering, damaging, or destroying all or part of a resource; (2) altering characteristics of the surrounding environment that contribute to resource significance; (3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or (4) neglecting the resource to the extent that it deteriorates or is destroyed. The potential to directly disturb cultural resources can be assessed by identifying the type and location of the proposed action and by determining the exact locations of cultural resources that could be affected. The potential to indirectly impact cultural resources can be assessed by identifying effects farther removed from the immediate project area, including visual, audible (noise), or atmospheric changes due to project implementation and are harder to quantify. In the case of the proposed action, potential effects to cultural resources could result from ground-disturbing activities associated with construction or demolition of significant structures, modification of significant structures, increased noise levels and vibrations, and visual intrusions from overflights.

Under Section 106 of the NHPA, federal agencies must consider the effect of their undertakings on historic properties, consult with the State Historic Preservation Officer (SHPO) and other consulting parties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment. The federal agency evaluates the NRHP eligibility of resources within the proposed undertaking's APE and assesses the possible effects of the proposed undertaking on historic properties in consultation with the SHPO and other parties.

The affected environment for cultural resources is based on the establishment of the APE of an undertaking, through consultation with the SHPO. An APE is defined in 36 CFR Section 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." The APE, and therefore the affected environment, for this project encompasses the areas where ground-disturbing activities, including new construction, building renovations and modifications, and building demolitions would occur. The APE is also defined as the areas affected by noise levels of 65 dB DNL and greater from the aircraft operations and are evaluated for their potential to affect

historic properties where noise could adversely impact them. The areas affected by noise generated and release of chaff and flares underlying the MOAs, ATCAAS, and Restricted Areas also fall under the APE.

Aircraft operations are most likely to affect historic structures and districts where setting is an important criterion for significance and where noise could adversely impact those types of resources. The DAF conducted a desktop records search for NRHP-listed, NRHP eligible, and unevaluated architectural sites within the 65 dB DNL and greater at the airfield.

For areas under the airspace, cultural resources that are listed in the NRHP or State Registers were considered. These include architectural resources, archaeological resources with standing structures, and traditional cultural resources. Precontact and historic archaeological sites lacking standing structures are not included as they are generally ground surface or even subsurface deposits that would not be affected by the Proposed Action. Some precontact archaeological sites could contain natural structures such as rock shelters or caves. These structures often house petroglyphs or pictographs, which are etched or painted onto the rock surfaces. However, studies have found that these types of natural formations are not affected by noise vibrations, such as sonic booms, any more than by natural erosion, wind, or seismic activity (Battis 1983).

Overpressure values are used to provide a general picture of psf resulting from supersonic flight. Actual overpressure varies based on maneuvers (climb/descent, turns, acceleration/deceleration) and specific weather conditions (winds, vertical temperature/pressure profile). Aircraft maneuvers result in concentration of sonic boom energy ("focus booms") that may exceed overpressure or defocusing that may result in lower overpressures. At 1 psf, the probability of window breakage ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). At 10 psf, the probability of breakage is between one in a hundred and one in a thousand (Haber and Nakaki 1989). Damage to plaster is in a comparable range but depends on the condition of the plaster. Adobe faces similar risks to plaster, but assessment is complicated by adobe structures being exposed to weather, where they can deteriorate in the absence of any specific loads (Sutherland 1990). Typical outdoor structures such as buildings, windmills, radio towers, etc., are resilient and are routinely subject to wind loads far in excess of sonic boom pressures. Foundations and retaining walls, which are intended to support substantive earth loads, are not typically at risk from sonic booms below 4 psf.

The release of chaff and flares could have a visual effect from residual materials which remain on the ground or land on structures or at sacred sites. Studies have shown that chaff and its debris do not pose a significant threat to the visual integrity of archaeological and architectural resources (Government Accounting Office 1998). Chaff does not accumulate to any great degree and the fibers, if found, were often mistaken for natural elements such as animal fur or plant material. The

fibers generally dissipate within a few days due to mechanical breakdown from wind, sediment erosion, and rain or snow. Chaff residual plastic materials are typically 1 inch by 1 inch. Flare residual plastic materials, usually red or blue in color, can be 1 inch by 2 inches or larger. Overall, chaff and flares are unlikely to adversely affect cultural resources. The residual materials from chaff and flares fall to the ground in a dispersed fashion and do not collect in quantities great enough to adversely affect the integrity and subsequent NRHP status of archaeological or architectural resources.

Impacts on traditional cultural resources and sacred sites can include the introduction of visual, audible, or atmospheric elements to traditional ceremonial life and traditional practices (i.e., hunting/fishing, vision quests, praying). Impacts on these resources regarding chaff and flare are more difficult to assess as no studies have been conducted on these resources.

For traditional cultural resources and sacred sites, consultation with federally recognized Tribal Nations was conducted. The list of Tribal Nations consulted was primarily compiled using two federal on-line tools: (1) HUD Tribal Directory Assessment Tool Version 3.0, which is designed to help users identify Tribal Nations by county and state and to provide appropriate tribal contact information to assist in consultation (HUD 2022); and (2) the Bureau of Indian Affairs, Tribal Leaders Directory database (2022). The *Indian Tribal Entities Within the Contiguous 48 States Recognized and Eligible to Receive Services from the United States Bureau of Indian Affairs* (77 Federal Register 47868, August 6, 2012) was used as another level of verification in identifying federally recognized Tribal Nations.

The ROI for cultural resources includes those locations on the installation where facility renovation or construction and its staging would occur, and potential ground disturbance would result. The ROI also includes areas affected by noise levels of 65 dB DNL and greater from the aircraft operations. The ROI also includes areas where the chaff and flares underlying the MOAs, ATCAAS, and Restricted Areas may be released.

3.11 SAFETY

3.11.1 Definition of Resource

Each branch within the DoD is dedicated to safely and effectively executing their mission. In order to do so, risk management policies are enforced by each respective branch of service. The DAF (including the ANG) practices risk management as prescribed in AFI 90-802, *Risk Management* (DAF 2019). The DON (including the U.S. Navy Reserve) practices risk management as prescribed in Chief of Naval Operations Instruction 3500.39D, *Operational Risk Management* (DON 2018). Requirements in both the AFI and Chief of Naval Operations instructions provide for a process to maintain readiness in peacetime and achieve success in

combat while safeguarding people and resources. The safety analysis herein addresses issues related to the health and well-being of both military personnel and civilians on or near the Proposed Action locations and under military training airspace. Specifically, this section provides information on fire risk and management; hazards associated with aviation safety (APZs); aircraft mishaps; and Bird/Wildlife Aircraft Strike Hazard [BASH]).

The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary safety concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes) to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or bird-aircraft strikes.

3.11.1.1 Installation

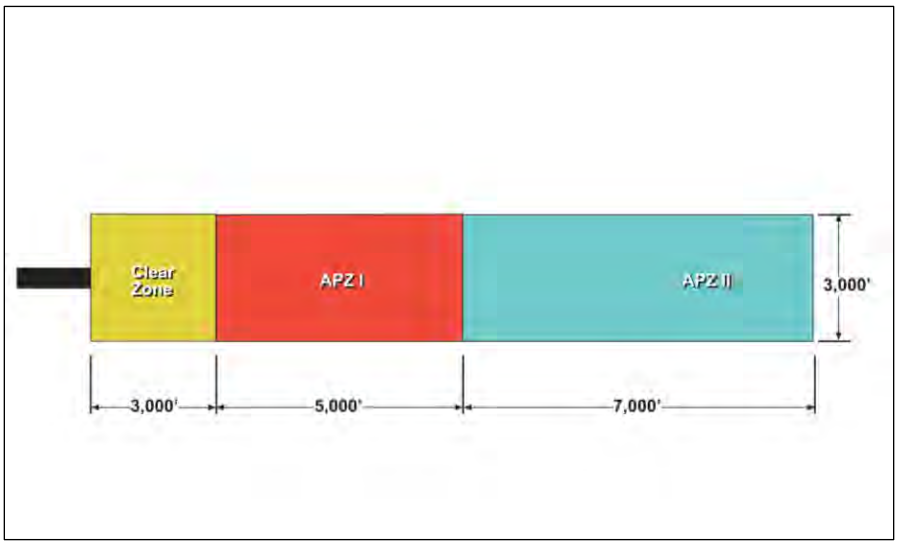
Fire and Crash Response

Day-to-day operations and maintenance activities conducted at all DAF installations identified for potential F-15EX or F-35A beddown are performed in accordance with applicable DAF safety regulations, published Air Force Technical Orders, and identified guidelines in the Air Force Occupational Safety and Health program (see AFI 91-202, *The USAF Mishap Prevention Program* [DAF 2022]). All maintenance and operations activities at NAS JRB New Orleans are conducted in accordance with the *Navy Safety and Occupational Health Manual* (Office of the Chief Naval Operations M-5100.23 [DON 2022]). In their entirety, these regulations, orders, and guidelines provide for the safety, fire protection, and health for military and civilian employees.

Accident Potential Zones and Runway Protection Zones

In accordance with DoD Instruction 4165.57, *Air Installations Compatible Use Zones* (DoD 2020), APZs are established at military airfields to delineate recommended compatible land uses for the protection of people and property on the ground. APZs define the areas of a military airfield that would have the highest potential to be affected if an aircraft mishap were to occur. Air Installation Compatible Use Zone (AICUZ) guidelines identify three types of APZs for airfields based on aircraft mishap patterns: the Clear Zone (CZ), APZ I, and APZ II (Figure 3.11-1). The standard DoD CZ is a rectangle area that extends 3,000 feet from the end of a runway, is 3,000 feet wide, and identifies the area with the highest probability for mishaps. APZ I, which typically extends 5,000 feet from the end of the CZ, has a lower mishap probability, and APZ II, which typically extends 7,000 feet from the end of APZ I, has the lowest mishap probability of the three zones.

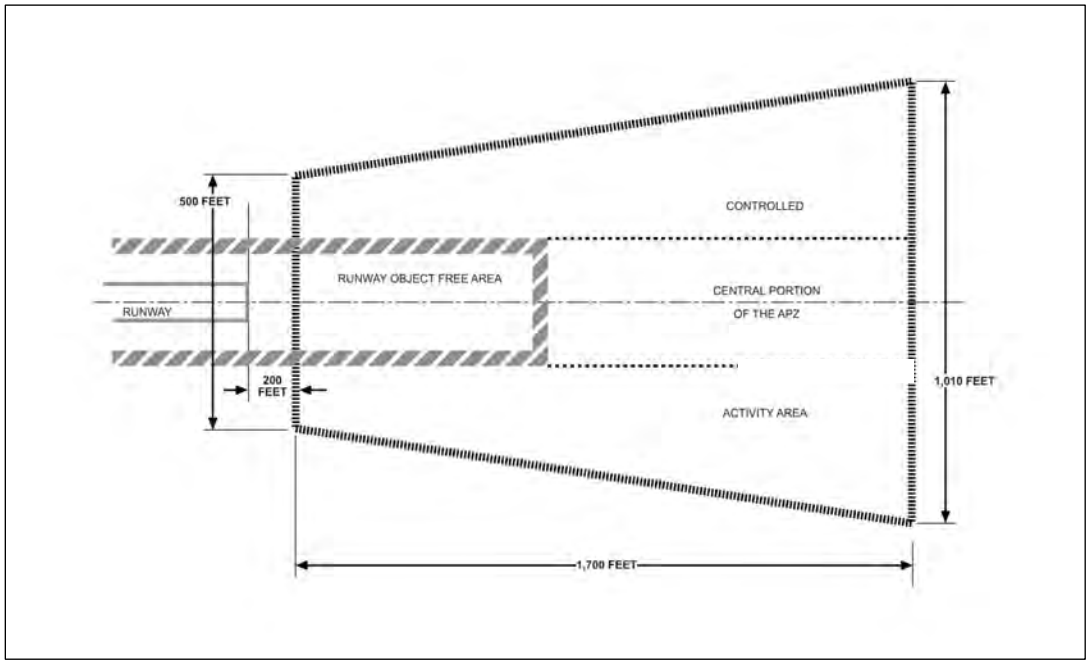
Both the shape and size of APZs can be modified (e.g., a curving APZ), if needed, to reflect different departure and arrival patterns.



Source: DoD 2011.

Figure 3.11-1 Standard APZs

On FAA-controlled runways, (like BAF and FAT), RPZs are used. The RPZs are trapezoidal zones extending outward from the ends of active runways at commercial airports and delineate those areas recognized as having the greatest risk of aircraft mishaps, most of which occur during takeoff or landing (Figure 3.11-2). Development restrictions within RPZs are intended to discourage incompatible land use activities from being established in these areas. The RPZ dimension for a particular runway end is a function of the type of aircraft and minimum approach visibility associated with that runway end, and therefore, differs for each airport.



Note: RPZ layouts are aircraft dependent; this figure represents a generic RPZ layout.

Figure 3.11-2 RPZs

Explosive Safety

Quantity-distance (QD) arcs define levels of risk considered acceptable for potential explosive sites. Separation distances are buffers that provide relative protective or safe distances. QD standards were developed over many years and are based on explosives mishaps and tests. All ordnance is handled and stored in accordance with DAF explosive safety directives (AFMAN 91-201), and all munitions maintenance is carried out by trained, qualified personnel using DAF-approved technical data.

Anti-terrorism/Force Protection

Anti-terrorism/Force Protection (AT/FP) standards seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live. These standards provide minimum levels of protection against terrorist attacks for the occupants of all DoD inhabited buildings. They are intended to be used by security and anti-terrorism personnel and design teams to identify the minimum requirements that must be incorporated into the design of all new construction and major renovations of inhabited DoD buildings. They also include recommendations that should be, but are not required to be, incorporated into all such buildings.

Air Surveillance Radar (ASR-11)

Airport Surveillance Radar (ASR-11) is an integrated primary and secondary radar system that interfaces with both legacy and digital automation systems and provides six-level national weather service calibrated weather capability, which provides enhanced situational awareness for both controllers and pilots. The ASR-11 system has a range of 60 nautical miles from the radar (FAA 2023). It is desirable to maintain a minimum separation of 1,500 feet between the ASR antenna and any aboveground structures or radio frequency generating equipment that may cause reflections or otherwise interfere with radar operation. With the advent of wide-bodied aircraft such as the 747, there may be potential for strong reflections occurring from aircraft that are parked or awaiting takeoff; as a result, it is recommended that an ASR system be located no closer than 1,500 feet from the edge of taxiways, holding bays, or terminal areas where such aircraft are known to remain for sustained periods of time.

3.11.1.2 Airspace

Flight Safety Procedures

Air Force Safety Center (AFSEC), along with the Naval Safety Command, continue efforts for proactive flight safety. While investigations after an accident have yielded causality of mishaps, proactive safety entails searching for and measuring precursors that can lead to accidents before they occur. In mission planning, pre-flight, and during flight, safety is at the forefront of all DAF operations. By regulations, each unit conducting or supporting flight operations must have a flight safety program to support its mission and foster a culture of mishap prevention.

Aircraft Mishaps

Aircraft mishaps are classified as A, B, C, or D (Table 3.11-1). Class A mishaps are the most severe with total property damage of $2.5 million or more or a fatality and/or permanent total disability. Comparison of Class A mishap rates for various aircraft types, as calculated per 100,000 flying hours, provide the basis for evaluating risks among different aircraft and levels of operations. Each fighter wing-specific safety section analyzes existing and projected Class A mishap potentials based on flying hours and aircraft types. Worldwide historic mishap data for

F-35As and F-15s are maintained by the AFSEC. F-18 mishap data is maintained by the U.S. Naval Safety Command.

Table 3.11-1 Aircraft Class Mishaps

Mishap Class	*Total Property Damage*	*Fatality/Injury*
A	$2,500,000 or more and/or aircraft destroyed	Fatality or permanent total disability
B	$600,000 or more but less than $2,000,000	Permanent partial disability or three or more persons hospitalized as inpatients
C	$60,000 or more but less than $600,000	Nonfatal injury resulting in loss of one or more days from work beyond day/shift when injury occurred
D	$25,000 or more but less than $60,000	Recordable injury or illness not otherwise classified as A, B, or C
E	Certain occurrences that do not meet reportable mishap classification criteria but are deemed important to investigate/report for hazard identification and mishap prevention	N/A

Source: DoD 2018.

Worldwide historic mishap data for F-35s and F-15s are presented in Table 3-11-2. Data from FY 1972 to 2021 represent these aircrafts' full incorporation into the fleet. Since 1972, the average historical mishap rate for every 100,000 flying hours is 2.29 for the F-15s and 2.22 for the F-35s (AFSEC 2021).

Table 3.11-2 Historic Class A Flight Mishaps for Relevant DoD Aircraft

Year	*F-15 Class A Mishaps*	*F-15 Flight Hours*	*F-15 Mishap Rate*	*F-35 Class A Mishaps*	*F-35 Flight Hours*	*F-35 Mishap Rate*
CY72	0	25	0.00	N/A	N/A	N/A
CY73	0	826	0.00	N/A	N/A	N/A
CY74	0	2,110	0.00	N/A	N/A	N/A
CY75	1	4,541	22.02	N/A	N/A	N/A
CY76	0	17,803	0.00	N/A	N/A	N/A
CY77	6	42,369	14.16	N/A	N/A	N/A
CY78	8	69,023	11.59	N/A	N/A	N/A
CY79	5	96,959	5.16	N/A	N/A	N/A
CY80	5	109,309	4.57	N/A	N/A	N/A
CY81	5	132,291	3.78	N/A	N/A	N/A
CY82	3	153,369	1.96	N/A	N/A	N/A
CY83	4	169,438	2.36	N/A	N/A	N/A
CY84	3	175,515	1.71	N/A	N/A	N/A
CY85	5	185,324	2.70	N/A	N/A	N/A
CY86	7	198,095	3.53	N/A	N/A	N/A
FY87	3	154,821	1.94	N/A	N/A	N/A
FY88	1	201,099	0.50	N/A	N/A	N/A
FY89	5	214,592	2.33	N/A	N/A	N/A
FY90	7	227,617	3.08	N/A	N/A	N/A
FY91	3	276,393	1.09	N/A	N/A	N/A
FY92	5	220,866	2.26	N/A	N/A	N/A
FY93	3	217,539	1.38	N/A	N/A	N/A
FY94	4	210,231	1.90	N/A	N/A	N/A
FY95	4	206,640	1.94	N/A	N/A	N/A
FY96	5	200,758	2.49	N/A	N/A	N/A

Year	*F-15 Class A Mishaps*	*F-15 Flight Hours*	*F-15 Mishap Rate*	*F-35 Class A Mishaps*	*F-35 Flight Hours*	*F-35 Mishap Rate*
FY97	3	192,073	1.56	N/A	N/A	N/A
FY98	3	188,205	1.59	N/A	N/A	N/A
FY99	8	189,109	4.23	N/A	N/A	N/A
FY00	4	179,372	2.23	0	0	0.00
FY01	2	183,706	1.09	0	0	0.00
FY02	5	194,847	2.57	0	0	0.00
FY03	4	193,611	2.07	0	0	0.00
FY04	3	189,596	1.58	0	0	0.00
FY05	3	169,158	1.77	0	0	0.00
FY06	1	168,854	0.59	0	0	0.00
FY07	6	159,582	3.76	0	0	0.00
FY08	4	143,964	2.78	0	0	0.00
FY09	2	143,806	1.39	0	0	0.00
FY10	1	124,357	0.80	0	0	0.00
FY11	1	100,848	0.99	0	0	0.00
FY12	3	95,445	3.14	0	215	0.00
FY13	1	79,100	1.26	0	1,283	0.00
FY14	2	91,550	2.18	1	2,664	37.54
FY15	3	107,441	2.79	0	7,467	0.00
FY16	2	103,553	1.93	0	11,343	0.00
FY17	1	105,778	0.95	0	22,714	0.00
FY18	1	100,878	0.99	2	30,514	11.90
FY19	2	106,315	1.88	0	41,573	0.00
FY20	2	95,603	2.09	2	53,211	3.76
FY21	1	88,143	1.13	0	54,465	0.00
Total	160.00	6,982,447	2.29	5.00	225,449	2.22

Legend: CY = Calendar Year; FY = Fiscal Year; N/A = Not Applicable.
Sources: AFSEC 2021, 2022.

Bird/Wildlife Aircraft Strike Hazards

BASH is another safety concern for aircraft operations. BASH constitutes a safety concern because of the potential for injury to aircrews or local populations and/or damage to aircraft. The USAF BASH program was established to minimize the risk for collisions of birds/wildlife and aircraft and the subsequent loss of life and property. Aircraft can encounter birds at nearly all altitudes up to 30,000 feet MSL; however, most birds fly close to the ground. Other wildlife that could impose BASH risks includes deer and coyotes; however, birds in particular pose the most significant threat to aircraft operations and are the focus of this analysis.

According to AFSEC, BASH statistics from FY 2000 through FY 2019 indicate that 40 percent occur below 2,500 feet (AFSEC 2019). Waterfowl present the greatest BASH potential due to their congregational flight patterns and because, when migrating, they can be encountered at altitudes up to 20,000 feet AGL. Raptors also present a substantial hazard due to their size and

soaring flight patterns. In general, the threat of bird/wildlife aircraft strikes increases during March and April and from August through November due to migratory activities.

AFI 91-202, *U.S. Air Force Mishap Prevention Program* (DAF 2022), requires each flying unit in the DAF (including the ANG) to develop a BASH plan to reduce hazardous bird/wildlife activity relative to airport flight operations. The intent of each plan is to reduce BASH issues at airfields by creating an integrated hazard abatement program through awareness, avoidance, monitoring, and actively controlling bird and animal population movements. Some of the procedures outlined in the plan include monitoring the airfield for bird and other wildlife activity, issuing bird hazard warnings, initiating bird/wildlife avoidance procedures when potentially hazardous bird/wildlife activities are reported, and submitting BASH reports for all incidents.

Commercial Airports that hold an Airport Operating Certificate under Title 14 CFR Part 139 must agree to certain operational policies established by the FAA to enhance public safety. To ensure compliance with 14 CFR Part 139, the FAA requires the airport operator to conduct a Wildlife Hazard Assessment (WHA) when a "triggering event" occurs. Triggering events are defined in 14 CFR Part 139 and include when a carrier has multiple wildlife strikes, a carrier aircraft experiences substantial damage from striking wildlife, a carrier aircraft experiences engine ingestion of wildlife, or if wildlife in size and number capable of causing an event are observed to have access to aircraft movement areas (14 CFR Chapter 1). Based on the findings presented in a WHA at a certified commercial airport, the FAA may determine that a Wildlife Hazard Management Plan (WHMP) is needed. WHAs were conducted and WHMPs have been developed and implemented at both BAF and FAT.

3.11.2 Analysis Methodology

The assessment of safety examines how the alternatives would affect safety at each of the fighter wing airfield locations and within the associated training airspace. Since no modifications or additions are proposed for the current airspace structure, the impact analysis focuses on changes in airspace use that would result from the addition or loss of annual airfield and airspace operations with the arrival of the F-35A or F-15EX and departure of the F15C/D aircraft.

Impacts on air traffic safety were assessed with respect to the potential for disruption of air traffic pattern and systems, and changes in existing levels of air traffic safety. Factors used to assess the impacts on air traffic included an alternative's potential to result in: increased numbers of flights such that they could not be accommodated within established operational procedures and flight patterns; need for an airspace modification; or increased air traffic that might increase collision potential between military and non-participating civilian operations.

AFSEC and Naval Safety Command do not track aircraft model specific data. Therefore, all models of F-15 and F-35 aircraft are consolidated in order to calculate mishap data as illustrated in Table 3.11-2. For APZs/RPZs and BASH, a comparative safety analysis was performed using the existing conditions and describing the expected changes as a result of implementing the Proposed Action.

The F-15EX is a ready now solution to replace the existing F-15C aircraft. The F-15EX utilizes advanced digital systems on an already proven F-15 airframe. The F-15 at the time of EIS publication has amassed 6,982,447 flight hours since its start in calendar year 1972 start in service. Currently, the F-15 has been involved in 160 Class A mishaps resulting in an average Class A mishap rate of 2.29.

The F-35A at the time of publication of this EIS has amassed 225,449 flight hours and a total of five Class A mishaps, resulting in a lifetime average Class A mishap rate of 2.22.

The ROI for safety includes the airfield at each of the fighter wing installations and their immediate vicinity. In addition, the ROI includes the SUA that would be used by each unit, and the land beneath it.

3.12 HAZARDOUS MATERIALS/WASTE

3.12.1 Definition of Resource

"Hazardous materials," "toxic substances," and "hazardous waste," broadly defined, can all be classified as "hazardous substances" as defined by the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 because they may present a threat to human health and/or the environment. The phrase "hazardous substance" is used in this document to describe any item or agent (i.e., biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment. More specific definitions of hazardous materials, toxic substances, and hazardous waste are summarized below.

3.12.1.1 Hazardous Materials

The term "hazardous materials" is defined under Section 1802 of the Hazardous Materials Transportation Act as "a substance or material in a quantity and form which may pose an unreasonable risk to health and safety or property when transported in commerce" (49 USC Sections 5101-5127). When discussed in this document, hazardous materials include petroleum, oils, and lubricants (POLs); cleaning agents; adhesives; paints; pesticides; and other products necessary to perform essential functions. Hazardous materials are frequently stored in bulk quantities (e.g., fuels, POLs) in aboveground storage tanks (ASTs) and underground storage tanks

(USTs) and distributed with pumps and pipelines. Fueling operations to support aircraft, watercraft, vehicle operations, and power generation require the storage of bulk quantities of these POLs. The storage areas for POLs represent potential sources of leaks, releases, or spills. Other types of hazardous materials (e.g., paints, pesticides, adhesives, cleaning agents) are frequently stored and distributed in smaller quantities such as drums, buckets, and bottles.

3.12.1.2 Hazardous Waste

Hazardous wastes are defined and regulated under the federal Resource Conservation and Recovery Act (RCRA) (EPA 2014). Hazardous wastes may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of wastes that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned may be a hazardous waste. The EPA defines several hazardous waste types: (1) listed wastes (wastes that the agency has determined are hazardous); (2) characteristic wastes (e.g., corrosive, ignitable, reactive, toxic wastes); (3) universal wastes (e.g., lamps, batteries, pesticides, mercury-containing equipment); and (4) mixed wastes (contains both radioactive and hazardous wastes) (EPA 2014).

3.12.1.3 Toxic Substances

Toxic substances are specific substances whose manufacture, processing, distribution, use, or disposal are restricted by the Toxic Substances Control Act (40 CFR Sections 700-766) because they may present unreasonable risk of personal injury or health of the environment. They include asbestos-containing materials (ACMs), lead-based paint (LBP), polychlorinated biphenyls (PCBs), and radon.

3.12.1.4 Contaminated Sites

Defense Environmental Restoration Program

The DoD conducts environmental restoration activities in accordance with CERCLA, also known as Superfund. In 1986, through adoption of the Superfund Amendments and Reauthorization Act, Congress established the Defense Environmental Restoration Program (DERP) that provides for the environmental restoration of sites under the jurisdiction of the Secretary of Defense (Secretary). Specifically, the DERP addresses the identification, investigation, research and development, and cleanup of contamination from hazardous substances, and pollutants and contaminants; environmental damage such as the detection and disposal of unexploded ordnance that creates an imminent and substantial endangerment to the public health or welfare or to the environment; and the demolition and removal of unsafe buildings and structures, including those at sites formerly under the jurisdiction of the Secretary. Within the DERP there are several program categories: the Installation Restoration Program (IRP), Military Munitions Response

Program, and the Building Demolition/Debris Removal program. In addition, response actions by the Army under the Formerly Used Defense Sites program, are conducted and funded under the DERP; and environmental restoration activities at installations being closed or realigned pursuant to the Base Realignment and Closure process are analogous to those conducted under the DERP, but with separate funding.

Resource Conservation and Recovery Act – Corrective Action Program

Under RCRA, the EPA has authority to control hazardous waste from cradle to grave. As adopted in 1976, this included the generation, transportation, treatment, storge, and disposal of hazardous waste. In 1986, amendments to RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. Under the RCRA Corrective Action Program, areas of concern (AOCs) are defined as an area at a facility or an off-site area, which is not known to be a Solid Waste Management Unit (SWMU), where hazardous waste and/or hazardous constituents are present as a result of a release from the facility. A SWMU is a discernable unit at which solid waste has been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Therefore, the distinction between SWMU and AOC is the origin of the hazardous waste or hazardous constituents – a SWMU results from the disposal or placement of solids wastes, whereas AOCs pertain to the release of hazardous waste and/or hazardous constituents. Under the RCRA corrective action process, AOCs may require investigation and remedial action.

Aqueous Film Forming Foam

Aqueous Film Forming Foam, or AFFF, is a fire-fighting agent used commercially and by the DoD, including the Air Force and ANG. Most commonly used to combat petroleum fires in aircraft accidents, hangars, and during live-fire training exercises, AFFF was found to contain perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) — two perfluorinated compounds that persist in the environment and are not known to degrade by any natural process (AFCEC 2017). Note that in 2020, the National Defense Authorization Act required all DoD facilities to shut down all hangar fire suppression systems that dispense AFFF by 1 October 2024. In response, the DAF established an AFFF Sundown Policy outlining the service's plan to lockout and tagout all AFFF hangar systems no later than 1 March 2023 (USAF 2023). Except for four hangars identified by the Assistant Secretary of the Air Force (Installations, Environment, and Energy) as "mission critical," all hangars will be converted to water only sprinkler systems. In addition, AFFF in fire vehicles will be replaced with a fluorine-free foam which is anticipated to be completed by September 2024 (USAF 2023).

Of note, on September 6, 2022, the EPA published a Notice of Proposed Rulemaking to designate certain per- and polyfluoroalkyl substances (PFAS) as CERCLA hazardous substances–these included PFOS and PFOA. Potential excavations of soil containing PFAS could be considered hazardous waste in the near future if designated as such by the EPA. This would also include dewatering that contains PFAS. In addition, the EPA is proposing a National Primary Drinking Water Regulation to establish legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water. PFOA and PFOS as individual contaminants, and perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluorobutane sulfonic acid (PFBS), and hexafluoropropylene oxide dimer acid (HFPA-DA) (commonly referred to as GenX Chemicals) as a PFAS mixture. The EPA is also proposing health-based, non-enforceable MCL Goals for these six PFAS (EPA 2023).

Massachusetts PFAS Standards, Regulations, and/or Guidance

Effective December 2019, the Massachusetts Department of Environmental Protection (MassDEP) updated the Massachusetts Contingency Plan that identifies six PFAS known as the PFAS6 (perfluorodecanoic acid, perfluoroheptanoic acid, PFHxS, PFNA, PFOA, and PFOS) as hazardous materials. In addition, the MassDEP established soil and groundwater standards for PFAS6 including:

- Groundwater that is potential drinking water – the Groundwater Standard of 20 nanograms per liter, or 20 parts per trillion was established for the sum of the individual PFAS within the PFAS6.
- Soil in locations where there are sensitive uses, moderate exposure, or restricted access are identified with individual standards for each of the PFAS6.

On October 2, 2020, the MassDEP published a PFAS drinking water MCL of 20 nanograms per liter (same as parts per trillion) as related to drinking water systems.

With regards to the MassDEP's policy for the management of PFAS-impacted soil and groundwater, in 2021 the PFAS Interagency Task Force evaluated PFAS issues facing Massachusetts and concluded the following (not a comprehensive list of their findings):

- There are concerns about spreading PFAS into the environment through soil disposal. Soil disposal in landfills may lead to the contamination of surface water and groundwater from landfill leachate containing PFAS if the leachate is not collected and treated.
- Granulated activated carbon and ion exchange resins were identified as capable of attaining the PFAS6 MCL of 20 parts per trillion for water treatment.

California PFAS Standards, Regulations, and/or Guidance

As of March 2023, the California Division of Drinking Water (DDW) has not yet established MCLs. However, the DDW previously requested that the Office of Environmental Health and Hazard Assessment establish Public Health Goals (concentration in drinking water that pose no significant health risk) for several PFAS. As a result, on July 22, 2021, Office of Environmental Health and Hazard Assessment released draft Public Health Goals for PFOA and PFOS. It is a priority of the DDW to ultimately establish MCLs for PFOA, PFOS, and other PFAS – the MCLs are based on Public Health Goals, matching them as closely as technologically and economically feasible as possible. Of note, the State of California does not use EPAs lifetime Health Advisories as a basis for developing their MCLs.

In addition, the DDW established Notification Levels and Response Levels for several PFAS (PFOA, PFOS, PFBS, and PFHxS). Notification levels are nonregulatory, health-based advisory levels established in California where MCLs have not yet been established. For drinking water systems, the Notification Levels represent the concentration at which notification is required, whereas Response Levels represent the recommended concentration at which water systems consider taking a water source out of service.

Also relevant to the investigation and remediation of PFAS in the environment, back in 2019 the California State Water Board's Division of Water Quality and DDW developed an investigative approach that has since led to investigative orders to commercial airports, municipal solid waste landfills, chrome plating facilities, public water systems, wastewater treatment plants, and oil refineries/bulk terminals. However, Regional Water Boards are tasked with overseeing PFAS investigations. On May 27, 2020, the San Francisco Bay Regional Water Quality Control Board issued a Technical Memorandum that presented Interim Final Environmental Screening Levels for PFOS and PFOA in soil and groundwater. These Environmental Screening Levels quantitatively evaluate potential human health risk and ecological issues at contaminated sites not only within the Regional Board's jurisdiction, but potentially across California. Note that depending on the location of a site within California, the local applicable regional water board may have additional requirements.

Louisiana PFAS Standards, Regulations, and/or Guidance

The State of Louisiana does not yet have PFAS standards, regulation, or guidance. As of March 2023, they defer to the May 2023 EPA proposed MCLs for six PFAS (PFOA, PFOS, PFNA, PFHxS, PFBS, and HFPA-DA, commonly known as Gen-X).

3.12.2 Analysis Methodology

A comparative analysis of existing and proposed hazardous materials and waste management practices was performed to evaluate impacts. For each of the fighter wing locations, the analyses included impacts due to proposed construction activities as well as the proposed operational activities for the F-15EX and F-35A. The analysis considered the magnitude of anticipated increases in hazardous waste generation considering historic levels, existing management practices, and storage capacity. For IRP or AOC sites, the methodology compares the proximity of the proposed construction actions to the contaminated sites and considers construction activities and operational uses of the facilities to determine the impacts on the IRP or AOC sites.

The ROI for hazardous materials and wastes consists of each of the fighter wing installations. The ROI does not include land beneath the SUA since no ground disturbance or construction would occur. In addition, ordnance delivery and flare use would not exceed current levels and would occur in locations already used and authorized for those purposes.

3.13 BIOLOGICAL RESOURCES/COASTAL RESOURCES/WETLANDS

3.13.1 Definition of Resource

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are generally referred to as *vegetation* and animal species are referred to as *wildlife*. Habitat can be defined as the resources and conditions present in an area that produces occupancy of a plant or animal (Hall et al. 1997). Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or are protected under federal or state law or statute. For purposes of this EIS, these resources are divided into four major categories: vegetation, wildlife, special status species, and wetlands.

Vegetation includes all existing terrestrial plant communities as well as their individual component species. The affected environment for vegetation includes only those areas potentially subject to ground disturbance.

Wildlife includes all fish, amphibian, reptile, bird, and mammal species with the exception of those identified as special status species (special status wildlife species are addressed separately due to their protected status).

Special Status Species are defined as those plant and animal species listed as endangered, threatened, and species proposed for listing by the U.S. Fish and Wildlife Service (USFWS) under

the Endangered Species Act (ESA), and by State agencies. Special status species also include birds protected under the federal Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act, and other species-specific conservation legal authorities.

The ESA protects federally listed endangered and threatened plant and animal species. Critical habitat is a term defined and used in the ESA. It is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Federally identified candidate species (species proposed for listing) are not protected under law; however, these species could become listed, and therefore, protected at any time. Their consideration early in the planning process may avoid future conflicts that could otherwise occur. Additionally, the corresponding State regulatory agencies (Massachusetts Division of Fisheries and Wildlife, California Department of Fish and Wildlife, and Louisiana Department of Wildlife and Fisheries) protect state-listed plant and animal species through State fish and wildlife administrative codes. Assessment of a project's effect on migratory birds places an emphasis on "species of concern" as defined by EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

Wetlands are considered sensitive habitats and are subject to federal regulatory authority under Sections 401 and 404 of the CWA and EO 11990, *Protection of Wetlands*. The U.S. Army Corps of Engineers (USACE) defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands generally include swamps, marshes, bogs, and similar areas.

Coastal resources include all natural resources occurring within coastal waters and their adjacent shorelands. Coastal resources include islands, transitional and intertidal areas, salt marshes, wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as fish and wildlife and their respective habitats within these areas. The Coastal Zone Management Act (CZMA) of 1972 (16 USC Section 1451 et seq.) was enacted to provide management of the nation's coastal resources and is administered by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management. The CZMA promotes the "effective management, beneficial use, protection, and development" of the nation's coastal zone; those goals are met through active state involvement to enact the CZMA.

The Coastal Barrier Resources Act of 1982 is administered by the USFWS to preserve the ecological integrity of areas that protect the U.S. mainland from storms, to provide important habitats for fish and wildlife, and to protect coastal barrier islands. The Act created the Coastal

Barrier Resources System barrier islands and coastal areas within 24 states, in which federal financial assistance for development-related activities in designated areas is prohibited.

EO 13158, issued in 2000, directs federal agencies to work with both governmental and nongovernmental agencies at the federal, state, local, and tribal levels, within existing legislation, to increase protection to ocean resources by strengthening and expanding a national system of Marine Protected Areas. Its goal is to protect and avoid harm to the extent practicable, those marine areas that are afforded special protection for reasons such as natural resource conservation or cultural resources preservation.

To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, federal lands, which are "lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents," are statutorily excluded from the State's "coastal uses or resources." If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, the DAF is required to determine whether its proposed activities would affect the coastal zone. This takes the form of a consistency determination, a negative determination, or a determination that no further action is necessary, which would be submitted to the appropriate state's Coastal Zone Management Program.

Further information on state-specific administered coastal resources programs is discussed within each fighter wing-specific Section 3.12.1, *Biological Resources/Coastal Resources/Wetlands* (e.g., LA3.12.1).

3.13.2 Analysis Methodology

Analysis of impacts on biological resources focused on whether and how components of the Proposed Action could affect biological resources. Additional discussion of noise impacts on wildlife can be found in Appendix B, *Noise Modeling, Methodology, and Effects*. The affected environment for biological resources consists of lands within the vicinity of the airfield at the fighter wing locations and the areas under the airspace used by the units. Determination of the significance of potential impacts on biological resources is based on:

- the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource,
- the proportion of the resource that would be affected relative to its occurrence in the region,

- the sensitivity of the resource to proposed activities, and
- the duration of ecological ramifications.

Impacts on biological resources would be considered significant if species or habitats of concern were significantly adversely affected over relatively large areas or disturbances resulted in reductions in the population size or distribution of a special status species, or if laws, codes, or ordinances protecting special status species were violated.

Impacts on listed species would be considered significant if the USFWS or National Marine Fisheries Service were to determine that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species, or would result in the destruction or adverse modification of federally designated critical habitat.

The ROI for biological resources primarily consists of each of the fighter wing installations, with additional information presented for the surrounding vicinity, where relevant. The ROI also includes areas under the airspace used by the units. Under the airspace, plant species, marine species, coastal resources, and wetlands were excluded from extensive review and analysis due to the nature of the Proposed Action and alternatives, under which there would be no new ground disturbance. Ordnance delivery and flare use would occur in previously approved locations and would not exceed current levels.

3.14 VISUAL IMPACTS

3.14.1 Definition of Resource

Visual effects deal broadly with the extent to which the Proposed Action or alternative(s) would either: (1) contrast with, or detract from, the visual resources and/or the visual character of the existing environment.; or (2) produce light emissions that create annoyance or interfere with activities.

3.14.1.1 Visual Resources and Visual Character

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s). In unique circumstances, the nighttime sky may be considered a visual resource.

Visual character refers to the overall visual makeup of the existing environment where the proposed action and alternative(s) would be located. For example, areas near densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts.

Some visual resources are protected under federal, state, or local regulations. Protected visual resources may include, but are not limited to federal, state, or local scenic roadways/byways; Wild and Scenic Rivers; National Scenic Areas; scenic easements; trails protected under the National Trails System Act or similar state or local regulations; biological resources parks, recreation areas, and wildlife/waterfowl refuges; historic properties; and features protected under other federal, state, or local regulations. Although there are no federal special purpose laws or requirements specific to light emissions and visual effects, there are special purpose laws and requirements that may be relevant. In addition to NEPA, laws protecting resources that may be affected by visual effects include Section 106 of the NHPA, Section 4(f) of the DOT Act, the Wild and Scenic Rivers Act, the CZMA, and state and regional coastal protection acts. Visual resources are also protected and managed on federal resource lands, such as under U.S. Forest Service Resource Management Plans and the Bureau of Land Management Visual Resource Management System. In addition, there may be state and local regulations, policies, and zoning ordinances that apply to visual effects.

3.14.1.2 Light Emissions

Light emissions include any light that emanates from a light source into the surrounding environment. Examples of sources of light emissions include airfield and apron flood lighting, NAVAIDs, terminal lighting, parking facility lighting, roadway lighting, and additional lighting to support nighttime flight operations. Glare is a type of light emission that occurs when light is reflected off a surface (e.g., window glass, solar panels, or reflective building surfaces).

3.14.2 Analysis Methodology

Visual effects can be difficult to define and assess because they involve subjectivity. Proposed aviation actions do not commonly result in adverse visual effects, but these effects may occur in certain circumstances. For clarity and uniformity, visual effects are broken into two categories: (1) Visual Resources and Visual Character, and (2) Light Emission Effects.

3.14.2.1 Visual Resources and Visual Character

Potentially affected visual resources and the visual character within the study area should be discussed to establish existing conditions. The aesthetic value and any unique aspects of the area,

including any protected visual resources, should be considered and discussed. Input from the community can be important in identifying visual resources.

Visual Resources and Visual Character effects include:

- the degree to which the action would have the potential to affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- the degree to which the action would have the potential to contrast with the visual resources and/or visual character in the study area; and
- the degree to which the action would have the potential to block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

3.14.2.2 Light Emissions

People, wildlife, and land uses that could be affected by light emissions from the Proposed Action and alternative(s) should be considered, including the extent to which they are currently affected by existing light emissions. A general discussion of the current level of light emissions, including glare, coming from aviation related and non-aviation related sources in a project area (e.g., residential developments, roadway lighting) should be included to establish existing conditions. Also, the unique resources of the area that could be affected by light emissions and unique characteristics of the area should be considered. Characteristics to consider include such things as the presence or absence of existing sources of light, vegetation that screens or filters light and glare, and urban sources of light. Unique resources may include both protected and unprotected visual resources.

Light Emissions effects include:

- the degree to which the action would have the potential to create annoyance or interfere with normal activities from light emissions; and
- the degree to which the action would have the potential to affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

The ROI for visual resources primarily consists of each of the fighter wing installations, with additional information presented for the surrounding vicinity, where relevant. Per FAA guidance (FAA 2023), the visibility of aircraft, contrails, or lights does not constitute an adverse effect unless it diminishes the integrity of a property's historic significance. Therefore, impacts on visual resources as a result of the Proposed Action's operations and airspace are not further analyzed in

this EIS except as they relate to cultural resources (see Section 3.10, *Cultural Resources*). Impacts on visual resources as they relate to construction and operations at the installation are analyzed.

FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Two of the fighter wings (104 FW at BAF and 144 FW at FAT) are tenants at a civil airport regulated under FAA and as such are required to undergo visual impacts analysis.

3.15 INFRASTRUCTURE/UTILITIES/NATURAL RESOURCES AND ENERGY SUPPLY/ TRANSPORTATION/PUBLIC TRANSPORTATION

3.15.1 Definition of Resource

Infrastructure refers to the system of public works, such as utilities and transportation, which provide the underlying framework for a community. Utilities include such amenities as water, power supply, and waste management. Transportation refers to roadway and street systems, the movement of vehicles on roadway networks, pedestrian and bicycle traffic, and mass transit.

Sections 1502.16(e) and (f) of the CEQ Regulations require that federal agencies consider energy requirements, natural depletable resource requirements, and the conservation potential of alternatives and mitigation measures in the Environmental Consequences section of NEPA documents. Additional requirements apply to federal facilities under the Energy Policy Act and the Energy Independence and Security Act (EISA) and EO 13834. Analysis of Natural Resources and Energy provides an evaluation of a project's consumption of natural resources (such as water, asphalt, aggregate, wood, etc.) and use of energy supplies (such as electricity; natural gas for heating; and fuel for aircraft or other ground vehicles). Consumption of natural resources and use of energy supplies may result from construction, operation, and maintenance of the proposed action or alternative(s).

All DoD installations are required to proactively plan for and assess all specific infrastructure and utility requirements and other essential services to ensure that proposed increases in personnel and their dependents can be accommodated. The installations routinely evaluate community facilities and services to account for fluctuations associated with new units assigned to the installation and the deployment of existing units. In addition, the installations identify infrastructure or utility needs within the scope of each corresponding project. If particular projects require additional infrastructure or utilities, they are incorporated as a part of that project. This process ensures that any infrastructure or utility deficiencies are identified in the initial planning stages.

3.15.2 Analysis Methodology

The infrastructure components evaluated include potable water, wastewater, stormwater, electrical, and natural gas systems; solid waste management; and the transportation network. Potential impacts on infrastructure elements at the fighter wing installations are assessed in terms of effects of the Proposed Action on existing service levels. Impacts on public services/utilities and transportation networks are assessed with respect to the potential for disruption or improvement of current utility systems and traffic circulation patterns and deterioration or improvement of existing levels of service on local roads. Impacts may arise from physical changes to circulation or utility corridors, construction activity, and introduction of construction-related traffic and utility use.

Effects as a result of energy and natural resources consumption may include disruption, degradation, or improvement of existing levels of service or potential change in demand for energy or natural resources. Adverse impacts on roadway capacities would be significant if roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of an action. Transportation effects may arise from changes in traffic circulation, delays due to construction activity, or changes in traffic volumes.

The ROI for infrastructure primarily consists of each of the fighter wing installations, with additional information presented for the surrounding vicinity, where relevant, including local and municipal sources of natural resources and energy. The ROI does not include land beneath the SUA since no ground disturbance, construction, or changes in infrastructure would occur.

4 Introduction to Fighter Wing Specific Sections

This page intentionally left blank.

4.0 INTRODUCTION TO FIGHTER WING-SPECIFIC SECTIONS

Each of the sections in Chapter 4.0 essentially comprises a sub-chapter dedicated to an individual fighter wing. For the reader's ease, all portions of these sub-chapters are labeled with a unique identifier based on the State in which they reside: 104 FW installation at BAF = MA; 144 FW installation at FAT = CA; and 159 FW installation at NAS JRB New Orleans = LA. In each installation-specific section, there is a detailed description of the particular facilities required for either an F-15EX or F-35A beddown decision as well as a decision to retain the legacy aircraft at that installation. For the 144 FW section, there is only a detailed description of the facilities required for the F-15EX beddown decision and the retention of the legacy aircraft. The description in Section XX2 for each installation includes the number of aircraft involved, construction required, amount of area disturbed, personnel changes, flight operations, and airspace use specific to each location. Within Section XX3 for each installation, the affected environment discussion is immediately followed by potential environmental consequences. This compares the potential consequences with the affected environment, or no action conditions. Lastly, cumulative effects of the proposed action at each location are examined.

Parallel environmental resource sections for each fighter wing installation permit rapid comparisons among the installations. For example, MA3.10, which addresses land use for the 104 FW installation and its environs, can be compared with land use at the 144 FW installation by turning to CA3.10.

Some elements of the Proposed Action have the potential to affect both the local area of the installation as well as the area beneath the SUA. Table 4-1 defines the resources associated with each affected area, installation, or airspace. As this table reveals, not all resources affected by the Proposed Action at the installation would be affected under the airspace. In accordance with the NEPA and CEQ Regulations, this EIS emphasizes those resources potentially affected by the Proposed Action and excludes discussion of resources not affected. This approach also applies to differentiating between the installation and the airspace. For example, construction and personnel changes would affect socioeconomics at the installation and in its environs, but no elements of the action would result in socioeconomic effects on lands under the airspace.

Table 4.0-1 Resources Analyzed in the EIS

Resource	*Resource Analyzed by: DAF//DON/FAA*	*Installation*	*Airspace*	*Justification If Not Analyzing under Airspace*	*Established Significance Threshold*
Noise	DAF DON FAA	Yes	Yes	N/A	FAA criteria: The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe. DAF and DON do not have established criteria.
Special Use Airspace	DAF DON	Yes	Yes	N/A	Significance threshold not established.
Air Quality/Climate Change	DAF DON FAA	Yes	Yes	N/A	The action would cause pollutant concentrations to exceed one or more of the NAAQS, or to increase the frequency or severity of any such existing violations.
Socioeconomics/Environmental Justice/Children's Health and Safety	DAF DON FAA	Yes	No	The ROI does not include land beneath the SUA since no ground disturbance or construction would occur. No new airspace or reconfigurations would be needed or proposed to support the beddown of either the F-15EX or the F-35A.	Significance threshold not established.

Resource	*Resource Analyzed by: DAF//DON/FAA*	*Installation*	*Airspace*	*Justification If Not Analyzing under Airspace*	*Established Significance Threshold*
Land Use/Noise Compatible Land Use	DAF DON FAA	Yes	No	No ground disturbance, construction, or changes in infrastructure would occur. The F-15EX and F-35A airframes would utilize existing training airspace. Potential for land use impacts under this alternative would be negligible and increased noise from overflight activity would be negligible relative to existing conditions/No Action Alternative under all aircraft basing scenarios. Changes in noise levels would not affect general land use patterns, land ownership, or management of lands or special use areas beneath the airspace.	FAA criteria: The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe. DAF and DON do not have established criteria.
Department of Transportation, Section 4(f)	FAA	Yes	No	The ROI does not include land beneath the SUA since no ground disturbance or construction would occur. No new airspace or reconfigurations would be needed or proposed to support the beddown of either the F-15EX or the F-35A. Additionally, per the DoD Reauthorization Act (Public Law 105-85, Div. A, Title X, Section 1079, Nov. 18, 1997, 111 Stat. 1916) and FAA Order 1050.1F, *Special Use Airspace*, actions, military flight operations, and designation of airspace for such operations are exempt from the requirements of Section 4(f) and as such will not be analyzed in this EIS (FAA 2020).	The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource.

Resource	*Resource Analyzed by: DAF//DON/FAA*	*Installation*	*Airspace*	*Justification If Not Analyzing under Airspace*	*Established Significance Threshold*
Water Resources/Floodplains/Wild and Scenic Rivers	DAF DON FAA	Yes	No	Groundwater, surface water, floodplains, and wild and scenic rivers would not be affected by changes in use of airspace due to the Proposed Action alternatives. Therefore, it is not discussed further in this analysis.	**Water Resources:** Exceed surface or groundwater quality standards established by federal, state, local, and tribal regulatory agencies; contaminate public drinking water supply such that public health may be adversely affected; contaminate an aquifer used for public water supply such that public health may be adversely affected. **Floodplains:** The action would cause notable adverse impacts on natural and beneficial floodplain values. **Wild and Scenic Rivers:** Significance threshold not established.
Geological Resources/Soils/Farmlands	DAF DON FAA	Yes	No	Impacts on airspace are not considered for this resource because the ROI for geological resources/soils/farmlands was considered to consist only of the 144 FW installation at FAT. The ROI does not include land beneath the airspace because no ground disturbance would occur.	**Farmlands**: The action would have the potential to convert important farmlands to nonagricultural uses, resulting in a total combined score on Form AD-1006, ("Farmland Conversion Impact Rating"), ranging between 200 and 260.
Cultural Resources	DAF DON FAA	Yes	Yes	N/A	The action would result in a finding of Adverse Effect through the Section 106 process.
Safety	DAF DON	Yes	Yes	N/A	Significance threshold not established.

Resource	*Resource Analyzed by: DAF//DON/FAA*	*Installation*	*Airspace*	*Justification If Not Analyzing under Airspace*	*Established Significance Threshold*
Hazardous Materials and Waste	DAF DON FAA	Yes	No	The ROI does not include land beneath the SUA since no ground disturbance, construction, maintenance activities or storage of hazardous materials or waste would occur.	Significance threshold not established.
Biological Resources/Coastal Resources/Wetlands	DAF DON FAA	Yes	Partial	Due to the nature of the actions proposed within the airspace, coastal resources, wetlands and plant species were excluded from extensive review and analysis because the proposed activities would not result in new ground disturbance, and ordnance delivery and chaff and flare use would not exceed current levels and would occur in locations already used and authorized for those purposes. In addition, marine species, invertebrates, and fish were excluded from review and analysis as they, too, would not likely be impacted by the Proposed Actions.	**Biological resources:** The USFWS or the National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species, or would result in the destruction or adverse modification of federally designated critical habitat. **Coastal Resources:** Significance threshold not established. **Wetlands:** Adversely affect a wetland's ability to protect water quality/quantity supplies; alter the hydrology necessary to sustain wetland function; be inconsistent with applicable municipal wetland plans.

Resource	*Resource Analyzed by: DAF//DON/FAA*	*Installation*	*Airspace*	*Justification If Not Analyzing under Airspace*	*Established Significance Threshold*
Visual Impacts	DAF DON FAA	Yes	No	The ROI for visual resources does not include land beneath the SUA since no ground disturbance, construction, or changes in infrastructure would occur. Per FAA guidance (FAA 2020), the visibility of aircraft, contrails, or lights does not constitute an adverse effect unless it diminishes the integrity of a property's historic significance. Potential for visual impacts would be minimal and overflight activity within the SUA would not change significantly relative to existing conditions/No Action Alternative; impacts on airspace are therefore not considered for this resource.	Significance threshold not established.
Infrastructure/Utilities/Natural Resources and Energy Supply/Transportation/Public Transportation	DAF DON FAA	Yes	No	The ROI for infrastructure does not include land beneath the SUA since no ground disturbance, construction, or changes in infrastructure would occur; impacts on airspace are therefore not considered for this resource.	Significance threshold not established.

Legend: 144 FW = 144th Fighter Wing; DAF = Department of the Air Force; dB = decibel; DNL = Day-Night Average Sound Level; DON = Department of the Navy; FAA = Federal Aviation Administration; FAT = Fresno Yosemite International Airport; N/A = Not Applicable; NAAQS = National Ambient Air Quality Standards; ROI = Region of Influence; SUA = Special Use Airspace; USFWS = United States Fish and Wildlife Service.

Sources: 32 CFR Part 989, 2023; 32 CFR Part 775, 2023; FAA 2020.

104 FW at Westfield-Barnes Regional Airport (BAF)

This page intentionally left blank.

MA1.0 104TH FIGHTER WING AT WESTFIELD-BARNES REGIONAL AIRPORT (BAF) OVERVIEW

This section presents an overview of the 104 FW at BAF, in Westfield, MA; the specifics of the Proposed Action as they relate to both the airfield and the associated airspace; construction and facility modifications required at the installation; and changes in personnel that would result if the F-15EX or F-35A were based at the 104 FW. Additionally, construction and facility modifications necessary to continue the 104 FW's mission with the currently based F-15C aircraft are evaluated in the event that the 104 FW is not selected for either the F-15EX or the F-35A.

The 104 FW of the Massachusetts Air National Guard (MAANG) is a tenant at BAF (Figure MA1.0-1). The 104 FW installation is 5 miles north of downtown Westfield, in Hampden County, MA. The installation comprises 219 acres on three separate lease holdings on the northwest (main cantonment) and northeast (munitions area) portions of the airport.

The 104 FW is tasked to carry out both federal and state missions. The federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and provide assistance during national emergencies (e.g., natural disasters or civil disturbances). The state mission is to provide protection of life, property, and preserve peace and order, and public safety as directed by the Governor of Massachusetts. The 104 FW currently flies and maintains 18 PAA F-15C fighter aircraft.

In the sections that follow, MA2.0 presents the installation-specific description of the Proposed Action at the 104 FW installation. Section MA3.0 addresses the affected environment and environmental consequences that could result if the 104 FW were selected to receive either the F-15EX, the F-35A, or retain their F-15C aircraft. Refer to Chapter 3.0 for a complete and detailed definition of resources and the methodology applied to identify potential impacts. Section MA4.0 identifies other, unrelated past, present, and reasonably foreseeable future actions in the affected environment and evaluates whether these actions could cause cumulatively significant effects when considered along with the F-15EX, F-35A beddown actions, or retaining their F-15C aircraft. This section also presents the irreversible and irretrievable resources that would be committed if either of these aircraft were beddown at the 104 FW installation.

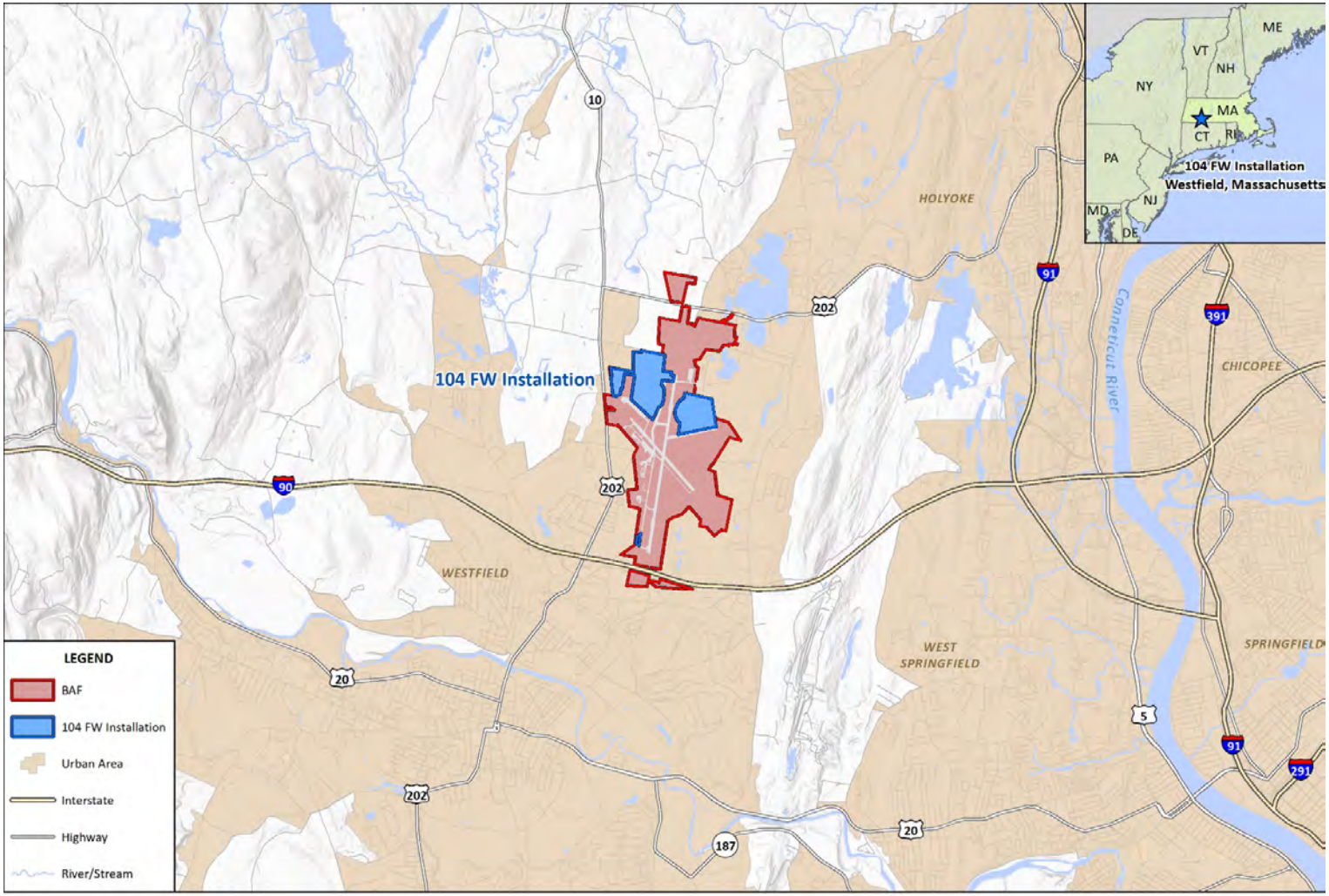


Figure MA1.0-1 Location of the 104 FW at Westfield-Barnes Regional Airport (BAF)

MA2.0 104TH FIGHTER WING ALTERNATIVE

Alternatives evaluated in this EIS for the 104 FW include:

- Conversion from 18 PAA F-15C to 21 PAA F-15EX aircraft
- Conversion from 18 PAA F-15C to 21 PAA F-35A aircraft
- Retention of the 18 PAA F-15C aircraft and construction related to this continuing mission
- No Action

If the 104 FW is selected to receive one squadron of F-15EX or F-35A aircraft, there are four components of this action at the 104 FW installation: (1) conversion from F-15Cs to F-15EXs or F-35As, (2) operations conducted at the airfield and within the SUA by either aircraft, (3) construction and facility modification projects to support beddown of either aircraft, and (4) personnel changes to meet the requirements for either aircraft. Each component is explained in more detail below. If the 104 FW is not selected to receive the F-15EX or F-35A aircraft, then the 104 FW could still implement construction and modifications to support and extend their legacy aircraft and mission.

MA2.1 104TH FIGHTER WING INSTALLATION AT WESTFIELD-BARNES REGIONAL AIRPORT (BAF)

MA2.1.1 Aircraft Conversion

Currently, the 104 FW has 18 F-15C PAA aircraft. If the 104 FW is selected to receive either the F-15EX or the F-35A, the aircraft would be based at the installation by FY 2027–2028 for the F-15EX and 2026 for the F-35A. Drawdown of the 104 FW's F-15C aircraft would be complete approximately 6 months prior to the initial arrival of the new aircraft. Table MA2.1-1 identifies the current type and number of aircraft at the 104 FW installation, the number of proposed F-15EX or F-35A aircraft, and the net change in aircraft.

Table MA2.1-1 Current and Proposed Aircraft Beddown Inventory

Aircraft Type	*Currently Assigned PAA/BAA/AR*	*Proposed PAA/BAA/AR*	*Net Change in Aircraft PAA/BAA/AR*
Based F-15C	18/2/1	0	0
F-15EX	0	21/2/1	3/0/0
F-35A	0	21/2/0	3/0/-1

Legend: AR = Attrition Reserve; BAA = Backup Aerospace Vehicle Authorized; PAA = Primary Aerospace Vehicle Authorized.

MA2.1.2 Airfield Operations

The 104 FW has a fighter mission that is assigned to the DAF ACC MAJCOM for their federal mission, and as such they implement a training syllabus associated with ACC. As an integral component of ACC, ANG units defend the homeland of the U.S., as well as deploy forces worldwide to meet threats to ensure the security of the U.S. To fulfill this role, the 104 FW pilots must train as they would fight, which means they must simulate battle conditions in a training environment.

Should the 104 FW be selected for either of these aircraft, the NGB anticipates that by FY 2027–2028, the 104 FW would be flying 21 F-15EX with up to 6,866 operations per year at the airfield; or by FY 2026 they would be flying 21 F-35A PAA aircraft with up to 6,866 operations per year at the airfield. These operations are compared to 4,100 annual operations currently flown with the F-15C (Table MA2.1-2). This would represent a 67 percent increase with either the F-15EX or the F-35A in 104 FW operations at the airfield, and a 6.7 percent increase in total operations at the airfield.

Table MA2.1-2 Current and Proposed Annual Airfield Operations at Westfield-Barnes Regional Airport (BAF)

Aircraft Type	*Total Current Operations (Legacy Aircraft)*	*Proposed F-15EX Operations*	*Proposed F-35A Operations*
Based F-15C	4,100	0	0
Proposed Aircraft	0	6,866	6,866
Other Aircraft	37,211	37,211	37,211
Total Airfield Operations	41,311	44,077	44,077
Percent Change at Airfield	N/A	6.7%	6.7%

Note: 104 FW F-15C military operations updated for FY 2021 based upon 8-year average (FY 2014–2021); Army National Guard Helicopter operations based on FY 2021; transient military and civil operations based on Part 150 forecasted 2024 scenario confirmed within 1 percent difference of the 3-year pre-COVID operations over 2017–2019. Existing aircraft operations assumed to continue relatively unchanged for the No Action Alternative estimated for 2026 and 2027.

Legend: % = percent; N/A = Not Applicable; BAF = Westfield-Barnes Regional Airport.

If the 104 FW is not selected to receive the F-15EX or the F-35A aircraft, then ANG operations at the airfield would not change from current operations for the foreseeable future.

In total, BAF currently supports 41,311 operations annually (including the military operations), with approximately 84 percent consisting of general aviation flights operating 365 days per year (as shown in Table MA2.1-2). Based on proposed requirements and deployment patterns, both the F-15EX and F-35A operational aircraft would fly some operations for exercises at other locations during deployments or in preparation for deployments. During such periods, home

station flying operations would be reduced accordingly. Some of the home station missions could involve inert ordnance delivery training at approved ranges.

The F-15EXs and F-35As would employ the same departure and landing flight tracks as currently used by the F-15C aircraft. F-15EX and F-35A operations would adhere to existing restrictions and noise abatement procedures currently in place at BAF, which includes actions such as following current "course rules" at the airfield; minimizing training during DNL nighttime hours; and minimizing use of afterburner take-offs. The F-15C aircraft at BAF currently fly 0.5 percent of the time between the hours of 10 p.m. and 7 a.m. (environmental night). At this percentage, the F-15C aircraft annually fly about 20 operations during DNL nighttime hours, with the majority of these operations associated with landing aircraft. In addition, overseas deployment departures may occur during environmental night, but would be infrequent. In contrast, the general aviation aircraft perform approximately 0.81 percent of their operations after 10 p.m., or about 313 operations per year. The 104 FW would plan to fly a schedule similar to what they currently do with regard to environmental night flights, although contingencies such as weather or special combat mission training may result in rare unplanned operations during this period. Typically, all required "after dark" operations could be achieved prior to 10 p.m.

MA2.1.3 Construction and Modification of Facilities

To support the proposed operations, additional infrastructure and facilities would be required at the 104 FW installation. These construction and modification projects would vary depending on the proposed aircraft selected as shown in Table MA2.1-3. For a more detailed description of individual construction projects, see Appendix C. Figures MA2.1-1 through MA2.1-3 identify the construction locations for the F-15EX, the F-35A, as well as the legacy construction projects, respectively. Table MA2.1-4 provides a summary of anticipated construction footprint.

Table MA2.1-3 Summary of Construction and Modification Projects

Project ID	*Project Name*	*F-15EX*	*F-35A*	*Legacy F-15C*
1.1 (Option 1) 1.2 (Option 2) 1.3 (Option 3)	Renovate Wing HQ (Building 1)/Construct Wing HQ	X	X	X
2	Alter Supply Warehouse (Building 54)	X	X	X
3	Construct Taxiway Juliet	X	X	X
4	Renovate POL Shop (Building 33)	X	X	X
5	Renovate Avionics Shop (Building 26)	X	X	X
6	Repair MNS	X	X	X
7	Construct Vehicle Operations Parking Sheds	X	X	X
8	Construct Redundant Utilities	X	X	X
9	Renovate JISCC Storage	X	X	X

Project ID	*Project Name*	*F-15EX*	*F-35A*	*Legacy F-15C*
10.1 (Option 1) 10.2 (Option 2)	Construct Running Track	X	X	X
11	Alter AAS Signage	X	X	X
12	Repair Base Roads and Parking Lots	X	X	X
13	Construct Base Engineer Storage Yard	X	X	X
14	Alter Civil Engineer Building (Building 40)	X	X	X
15.1 (Option 1) 15.2 (Option 2)	ADAL Dining Facility (Building 3)	X	X	X
16.1 (Option 1) 16.2 (Option 2)	Construct Flight Simulator Facility	X	X	
17	Repair HAZMAT HVAC (Building 52)	X	X	
18	ADAL WLT Door (Building 23)	X	X	
19	Demo Liquid Oxygen Facility (Building 38 & 39)	X	X	
20	Repair Munitions Administration Facility (Building 65)	X	X	
21	Construct PL3 Fence Line	X	X	
22.1 (Option 1) 22.2 (Option 2)	Construct Temporary Facility (Squadron Operations) (Building 25)	X	X	
23	Investigative Study for Squadron Operations (second floor and Simulator location) (Building 25)	X	X	
24	Add HVAC (Building 37)	X	X	
25	Repair MAC Pad	X	X	
26	Repair Maintenance Shops (Building 15)	X		
27	ADAL Fuel Cell (Building 27)	X		
28	ADAL Alert Crew Readiness (Building 48)	X		
29	ADAL Squadron Operations Facility (Building 25)	X		
30	Repair Avionics Facility (Building 26)	X		
31	Construct Aircraft Shelters and Shades		X	
32	Install Power Converters (Buildings 13, 27, 45, 46, 47)		X	
33	Repair Maintenance Shops (Building 15) (specific for F-35A)		X	
34	Convert Shelter to Wash Rack (Building 19)		X	
35	Repair LRS (Levelator, Building 54)		X	
36	Repair Squadron Operations (Building 25)		X	
37	Repair Avionics Facility (Building 26) (specific for F-35A)		X	
38	Repair Drop Tank Storage for AGE (Building 116)		X	

Legend: AAS = Airfield Arresting System; ADAL = Addition and Alteration; AGE = Aerospace Ground Equipment; HAZMAT = Hazardous Materials; HQ = Headquarters; HVAC = Heating, Ventilation, and Air Conditioning; JISCC = Joint Incident Site Communications Capability; LRS = Logistics Readiness Squadron; MAC = Munitions Assembly Conveyor; MNS = Mass Notification System; PL3 = Protection Level 3; POL = Petroleum, Oil, and Lubricants; WLT = Weapons Load Crew Training.

Sources: 104 FW n.d.; ACC and NGB 2021; NGB 2021a, 2021b.

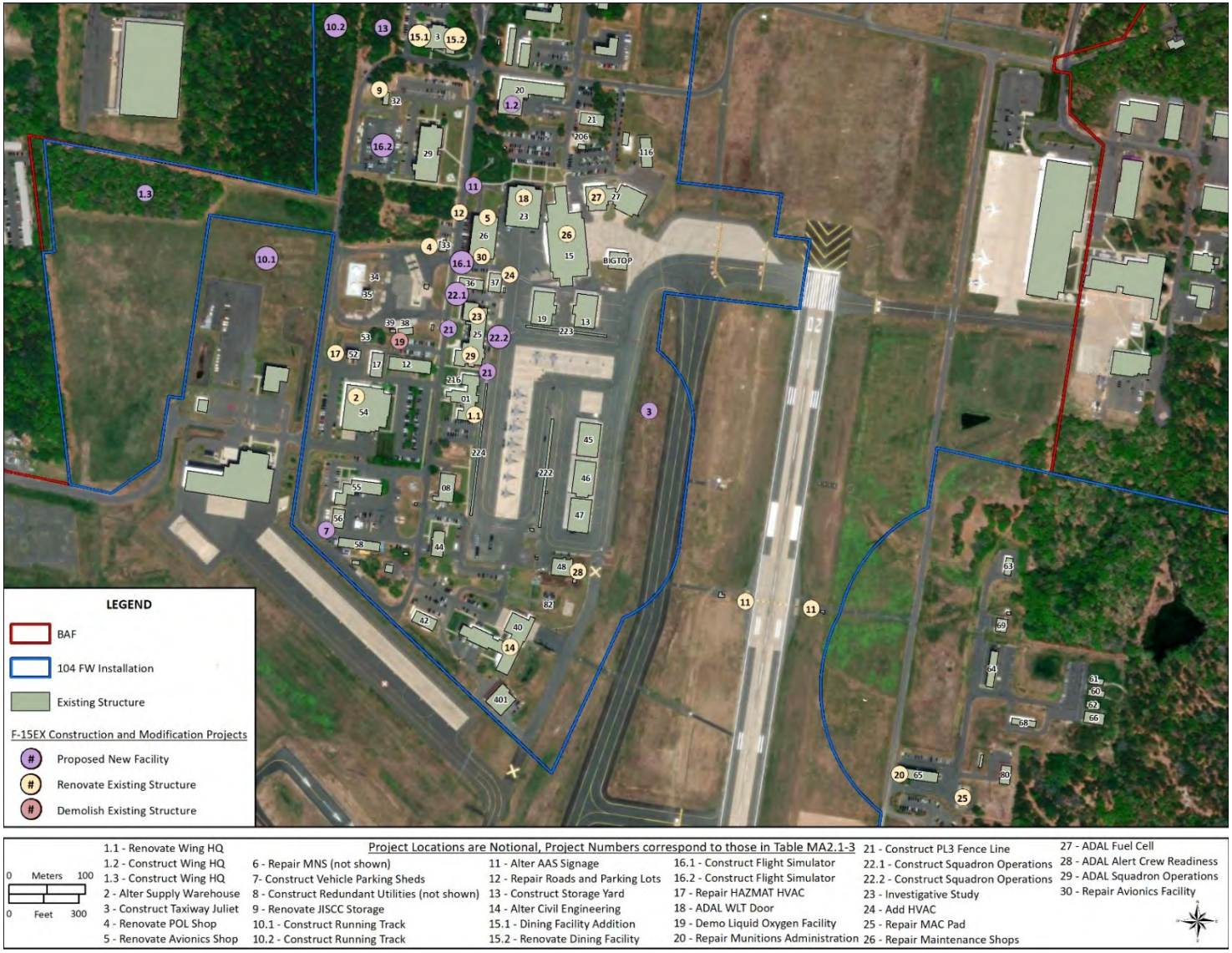


Figure MA2.1-1 Proposed Construction and Modifications for the F-15EX Beddown at the 104 FW at Westfield-Barnes Regional Airport (BAF)

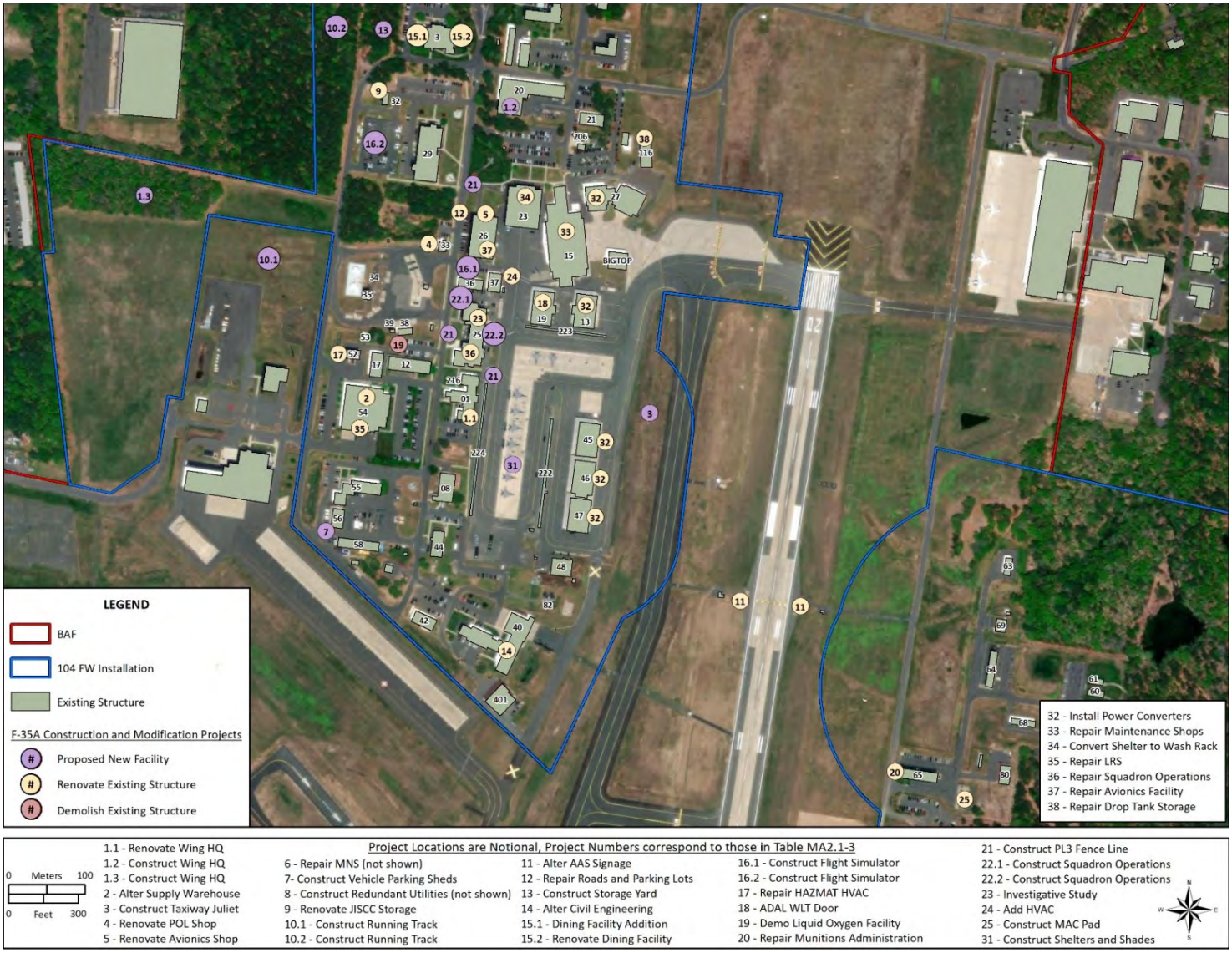


Figure MA2.1-2 Proposed Construction and Modifications for the F-35A Beddown at the 104 FW at Westfield-Barnes Regional Airport (BAF)

Figure MA2.1-3 Proposed Construction and Modifications for the Legacy Aircraft Mission at the 104 FW at Westfield-Barnes Regional Airport (BAF)

Table MA2.1-4 Summary of Construction Footprints

Aircraft Type	*Total SF Disturbance*	*Total SF Net New Impervious*	*Years of Construction*
Based F-15C	173,900	128,400	FY 2026–2033
F-15EX	218,100	148,000	FY 2024[1]–2033
F-35A	203,800	136,600	FY 2024–2033

Note: [1]2024 but no sooner than ROD signature.
Legend: FY = Fiscal Year; SF = square foot/feet.

It is anticipated that construction and modifications would begin shortly following the signature of the ROD for any of these proposed aircraft selected to support mission requirements.

MA2.1.4 Personnel

The 104 FW currently supports 99 civilian employees, 316 Active Guard Reserve (AGR), and 516 traditional guardsmen (UMass Donahue Institute 2020). The overall number of ANG personnel at the 104 FW installation would vary among the various aircraft beddown alternatives, with an addition of approximately 100 personnel under the F-15EX beddown and 80 personnel under the F-35A beddown. Table MA2.1-5 shows the changes in personnel by aircraft beddown alternative.

Table MA2.1-5 Proposed Personnel at the 104 FW Installation

Personnel Category	*F-15EX Proposed Increase in Personnel*	*F-35A Proposed Increase in Personnel*	*F-15C Change in Personnel*
Officers (including CSOs)	36	15	0
Enlisted	65	65	0
Change in Personnel	101	80	0

Legend: 104 FW = 104th Fighter Wing; BAF = Westfield-Barnes Regional Airport; CSO = Combat Systems Officer.

MA2.1.5 104th Fighter Wing: Training Airspace and Ranges

The 104 FW uses several airspace units (Table MA2.1-6 and Figure MA2.1-4), including overland MOAs, overlying ATCAAs, Restricted Areas, and Warning Areas. Chapter 2.0, Section 2.2.2.1, *Training Airspace and Range Operations*, provides definitions of these airspace units. The beddown of either the F-15EX or the F-35A would not require changes in SUA attributes, though there could be an increase in the use of SUA by the 104 FW.

Table MA2.1-6 104 FW Military Training Airspace

Complex	*Airspace Unit*	*Floor*[1]	*Ceiling*[1]
Adirondack MOA	Adirondack A MOA	6,000 ft MSL	18,000 ft MSL
	Adirondack B MOA	2,500 ft MSL	18,000 ft MSL
	Adirondack C MOA	100 ft AGL	18,000 ft MSL
	Adirondack D MOA	5,000 ft MSL	18,000 ft MSL
Carthage MOA	Carthage East MOA	100 ft AGL	18,000 ft MSL
	Carthage West MOA	6,000 ft MSL	18,000 ft MSL
Chugs MOA	Chugs MOA	9,000 ft MSL	18,000 ft MSL
Condor MOA	Condor 1 MOA	7,000 ft MSL	18,000 ft MSL
	Condor 2 MOA	7,000 ft MSL	18,000 ft MSL
Cranberry MOA	Cranberry MOA	500 ft AGL	6,000 ft MSL
Laser ATCAA	Laser East	18,000 ft MSL	60,000 ft MSL
	Laser North	18,000 ft MSL	60,000 ft MSL
	Laser South	18,000 ft MSL	60,000 ft MSL
	Laser West	18,000 ft MSL	60,000 ft MSL
Lightning ATCAA	Lightning 1	30,000 ft MSL	50,000 ft MSL
	Lightning 2	26,000 ft MSL	50,000 ft MSL
	Lightning 3	26,000 ft MSL	50,000 ft MSL
	Lightning 4	18,000 ft MSL	24,000 ft MSL
Lowville MOA	Lowville MOA	100 ft AGL	18,000 ft MSL
Scotty ATCAA	Scotty A	18,000 ft MSL	60,000 ft MSL
	Scotty B	18,000 ft MSL	60,000 ft MSL
	Scotty C	18,000 ft MSL	60,000 ft MSL
Tupper MOA	Tupper Central MOA	6,000 ft MSL	18,000 ft MSL
	Tupper East MOA	10,000 ft MSL	18,000 ft MSL
	Tupper South MOA	6,000 ft MSL	18,000 ft MSL
	Tupper North MOA	6,000 ft MSL	18,000 ft MSL
Yankee MOA	Yankee 1 MOA	9,000 ft MSL	18,000 ft MSL
	Yankee 2 MOA	100 ft AGL	9,000 ft MSL
R-5201	R-5201	0	23,000 ft MSL
R-5202	R-5202A	23,000 ft MSL	29,000 ft MSL
	R-5202B	6,000 ft MSL	29,000 ft MSL
W-105	W-105A	0	50,000 ft MSL
	W-105B	0	18,000 ft MSL

Notes: [1]MSL is the elevation (on the ground) or altitude (in the air) of an object, relative to the average sea level. The elevation of a mountain, for example, is marked by its highest point and is typically illustrated as a small circle on a topographic map with the MSL height shown in either feet, meters, or both. Because aircraft fly across vast landscapes, where points above the ground can and do vary, MSL is used to denote the "plane" on which the floors and ceilings of SUA are established and the altitude at which aircraft must operate within that SUA.

Legend: 104 FW = 104th Fighter Wing; AGL = above ground level; ft = foot/feet; MOA = Military Operations Area; MSL = mean sea level; R- = Restricted Area; W- = Warning Area.

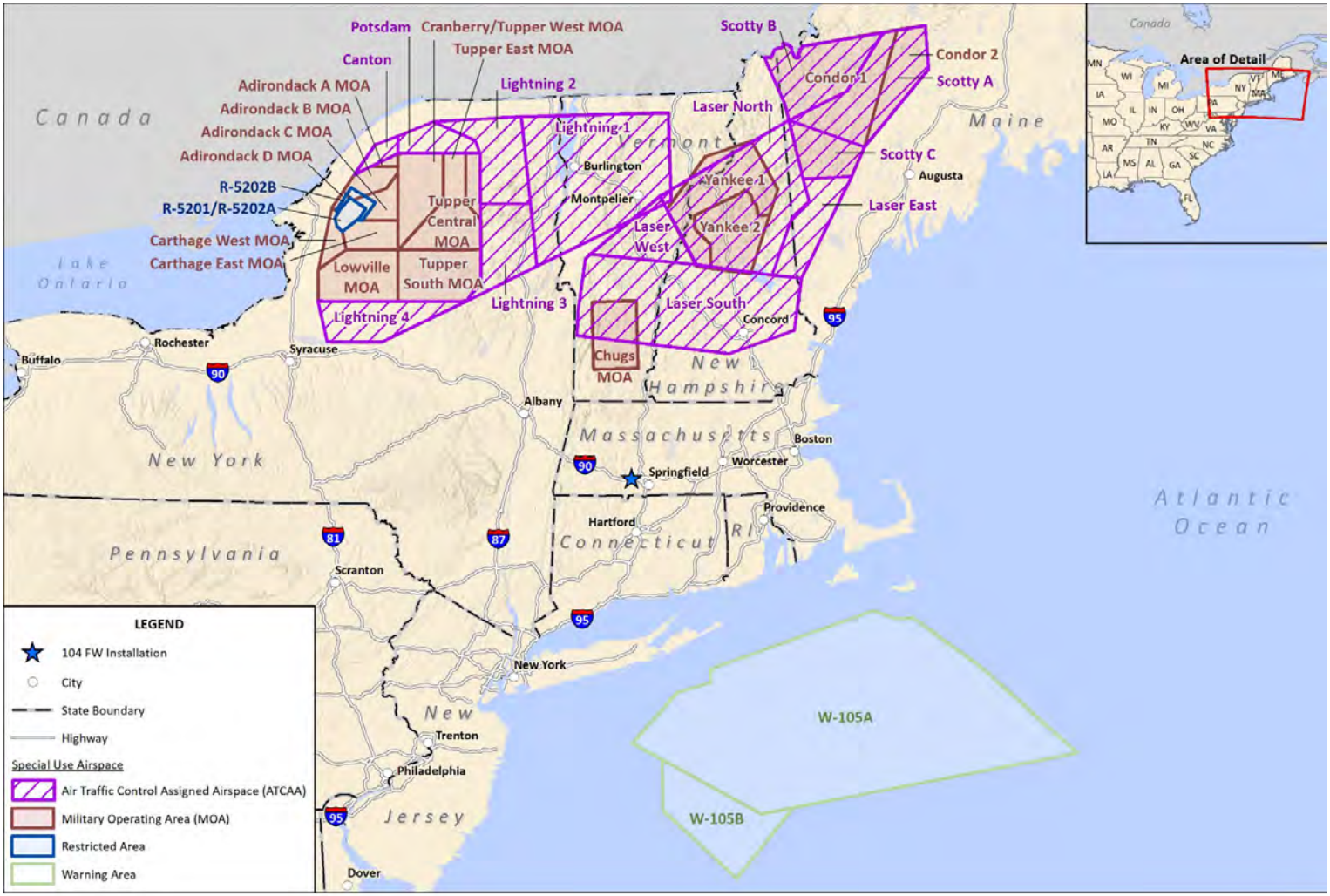


Figure MA2.1-4 Airspace Associated with the 104 FW

MA2.1.6 Airspace Use

All flight operations would take place in existing training airspace. No additions or alterations of training airspace are associated with the Proposed Action. The NGB expects that the F-15EX and F-35A would operate in the airspace currently used by the 104 FW. Although the F-15EX and F-35A aircraft would use the same airspace units as the current F-15C aircraft at the installation, the percentage of use by altitude and number of operations per airspace unit may vary slightly. Table MA2.1-7 provides a breakdown of the estimated percentage of use of each aircraft by altitude for current and proposed operations. All three aircraft fly only approximately 7 percent of the time below 10,000 feet MSL, and 93 percent of the time above 10,000 feet MSL. More details on different altitudes relative to different missions can be found in Chapter 2.0, Section 2.2.2.1, *Training Airspace and Range Operations*. Regardless of the altitude structure and percentage use indicated in Table MA2.1-7, F-15EX and F-35A aircraft (as with the F-15C) would adhere to all established floors and ceilings of airspace units.

Table MA2.1-7 Approximate 104 FW Current and Proposed Altitude Distribution

Altitude (feet)	*Percentage Use F-15C*	*Percentage Use F-15EX*	*Percentage Use F-35A*
500–3,000 AGL	1	1	1
3,000–5,000 AGL	1	1	1
5,000–10,000 MSL	5	5	5
10,000 MSL–18,000 MSL	36	38	24
18,000 MSL–30,000 MSL	17	30	58
Above 30,000	40	25	11

Legend: 104 FW = 104th Fighter Wing; AGL = above ground level; MSL = mean sea level.

MA2.1.7 Ordnance Use and Defensive Countermeasures

MA2.1.7.1 F-15C

The F-15C does not carry any air-to-ground ordnance since it does not support an air-to-ground mission. In support of air-to-air training missions, it can carry training missiles and instrument pods (which help record the aircraft's position for training purposes). These training aids do not release from the airplane. Ordnance currently used by the F-15C include AIM-120 and AIM-9 missiles as well as a 20mm gun system.

Legacy F-15C aircraft are also used to stand ACA missions in support of U.S. National Security. For these missions, the aircraft are loaded with actual air-to-air missiles, and the cannon is loaded with 20mm gun rounds. For ANG locations where the fighter squadron is located on a civil airport, there are strict regulations about the storage, loading, flying, and unloading of these items.

The F-15C aircraft also carries expendable defensive countermeasures for both training and for the ACA missions. These provide self-protection against radar-guided weapons, and infrared (IR)-guided weapons (also called "heat-seeking"). These countermeasures are also subject to strict rules on the storage, loading, flying, and unloading of the countermeasures. Their use in SUA (for training) is also subject to restrictions in terms of types, minimum release altitude, and other conditions.

MA2.1.7.2 F-15EX and F-35A

Most air-to-ground training for the F-15EX and F-35A would be simulated, where nothing is released from the aircraft, and target scoring is done electronically. As was discussed in Chapter 2.0, Section 2.2.2.5, *Ordnance Use*, however, the F-15EX and F-35A (like the F-15C) are capable of carrying and employing several types of air-to-air and air-to-ground ordnance (including strafing) and pilots would need training in their use. F-15EX and F-35A pilots would only use ranges and airspace authorized for the type of ordnance being employed and within the number already approved at a range and/or target. Ordnance to be used by the F-15EX and F-35A aircraft includes AIM-120, AIM-9, AIM-9X missiles, GBU-31 and GBU-39 JDAM as well as a 20mm cannon system (F-15EX) and 25mm cannon system (F-35A). If in the future the NGB identifies weapons systems that are either new or could exceed currently approved levels, appropriate NEPA documentation would need to occur prior to their employment.

The Adirondack Range (R-5201) contains varied target sets for supporting laser and practice/inert air-to-ground weapons training. It is expected that any live-fire training would be conducted during formal training exercises remotely from the 104 FW installation.

Both the F-15EX and F-35A would eventually be capable of conducting the ACA mission. Both aircraft would continue to have the potential requirement to load live air-to-air missiles, and live rounds in the gun, just like the legacy F-15C. They would continue to have the same restrictions on storage and use that exist now.

For air-to-ground ordnance, in locations where the ANG is a tenant on civilian airfields (such as BAF), the ANG squadrons would deploy to other locations to train with live air-to-ground ordnance. Local regulations on safety for storage, handling, and use of ordnance would all remain as they are now.

Like the F-15C, the F-15EX and F-35A would employ chaff and flares as defensive countermeasures in training. Chaff and flares are the principal defensive mechanisms dispensed by military aircraft to avoid attack by enemy air defense systems. Use of chaff and flares are permitted in all airspace units identified in Table MA2.1-6 and proposed for use by the F-15EX or the F-35A. Flares are not permitted to be released below 2,000 feet AGL over non-government-

owned or -controlled property. Based on the emphasis on flight at higher altitudes for the F-15EX and F-35A, roughly 90 percent of flare releases would occur above 15,000 feet MSL. At this altitude, most flares would be released more than seven times higher than the minimum release altitude permitted (2,000 feet AGL) over non-government-owned or -controlled property and ensure complete burnout before reaching the ground.

The use and allocation of defensive countermeasures would not be expected to change. They would be used for ACA missions, and would also be used in training, and would be used in the same places, subject to the same restrictions that exist now.

MA3.0 104TH FIGHTER WING AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

MA3.1 NOISE

MA3.1.1 Affected Environment

MA3.1.1.1 Installation

The predominant sources of noise at BAF are aircraft operations from an active airfield. Additionally, construction, ground support equipment, and vehicular traffic contribute to the noise environment, though these are transitory and provide a negligible contribution to the overall average noise level at BAF.

Based on historical data from FY 2014 through FY 2021, the 104 FW flew approximately 1,900 sorties annually with an ASD of 1.65 hours. Each sortie generates one departure and one arrival operation. Additionally, an average of three closed pattern events (each closed pattern event counts as two airfield operations) occurred 50 weeks per year. This activity results in 1,900 departure, 1,900 arrival, and 300 closed pattern operations per year or 4,100 total airfield operations, as detailed in Table MA3.1-1. The 104 FW avoids operating during the DNL nighttime (10 p.m. to 7 a.m.) as much as practical resulting in an average of 20 total operations per year during that period. Overall, the 104 FW accounts for 10 percent of BAF annual operations.

The Army National Guard based at BAF operates six Blackhawk UH-60 and two Lakota UH-72 helicopters as part of their Air Ambulance mission under the 3-126 General Support Aviation Battalion. As detailed in Table MA3.1-1, the unit generates 1,171 UH-60 and 293 UH-2 operations per year at BAF or 4 percent of total airfield operations.

Other BAF users include military transients, primarily C-130 turboprop aircraft, generating 2,658 operations or 6 percent of airfield operations and civil aircraft generating 34,553 operations or 84 percent of total airfield operations. Additional details of modeled airfield operations are provided in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

As a conservative estimate, this EIS assumed the air traffic at civilian airfields like BAF would return to pre-COVID conditions by the time any new aircraft would arrive (FY 2026–2027) while military operational training requirements and resulting military operations would remain the same as existing conditions. Thus, the No Action Alternative for this EIS is equivalent to the existing conditions in terms of aircraft operations.

Table MA3.1-1 Westfield-Barnes Regional Airport (BAF)
Existing Conditions – Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Total*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Total*
104 FW	F-15C	1,890	10	1,890	10	300	0	4,080	20	4,100
Army	UH-60	576	0	460	116	19	0	1,055	116	1,171
Army	UH-72	144	0	115	29	5	0	264	29	293
Military Other	Transients	69	2	69	2	1,052	0	1,190	4	1,194
Military	*Military Total*	*2,679*	*12*	*2,534*	*157*	*1,376*	*0*	*6,589*	*169*	*6,758*
Civil	Boeing 737-700 Series	23	2	23	2	-	0	46	4	50
	Bombardier Learjet 35A/36A (C-21A)	1,339	69	1,338	68	33	1	2,710	138	2,848
	Cessna 441 Conquest II	40	0	40	-0	0	0	80	0	80
	EADS Socata TB-9 Tampico	6,192	5	6,192	5	16,328	15	28,712	25	28,737
	Gulfstream IV-SP	1,355	64	1,355	64	-		2,710	128	2,838
Civil	*Civil Total*	*8,949*	*140*	*8,948*	*139*	*16,361*	*16*	*34,258*	*295*	*34,553*
Grand Total		9,018	142	9,017	141	17,413	16	40,847	464	41,311

Note: [1]Closed Patterns counted as two operations.

Figure MA3.1-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the existing conditions at BAF. Noise generated from aircraft operations at BAF occurs within and outside of the airfield. Portions of the 65 dB DNL contour extend north of the airfield by 1,700 feet and 1,200 feet west. Due to the irregular shape of the airport boundary, portions of the 65 dB DNL extend to the south and to the east in some areas.

Table MA3.1-2 shows the acreage (excluding water bodies) by noise contour band resulting in a total of 574 acres off-airport at BAF exposed to 65 dB DNL or greater for the existing conditions. That off-airport acreage is comprised of 403 acres exposed to 65 to 70 dB DNL, 143 acres to 70 to 75 dB DNL, 27 acres to 75 to 80 dB DNL, and 1 acre to 80 to 85 dB DNL. No areas off airport are exposed to DNL greater than 85 dB for the existing conditions.

Table MA3.1-2 Westfield-Barnes Regional Airport (BAF)
Existing Conditions – Noise Exposure Acreage

DNL Band (dB)	*Existing Conditions Acreage*		
	On Airport	*Off Airport*	*Total*
65–70	387	403	790
70–75	256	143	399
75–80	149	27	176
80–85	134	1	134
85+	107	0	107
Total >65dB	**1,033**	**574**	**1,607**

Legend: dB = decibel; DNL = Day-Night Average Sound Level.

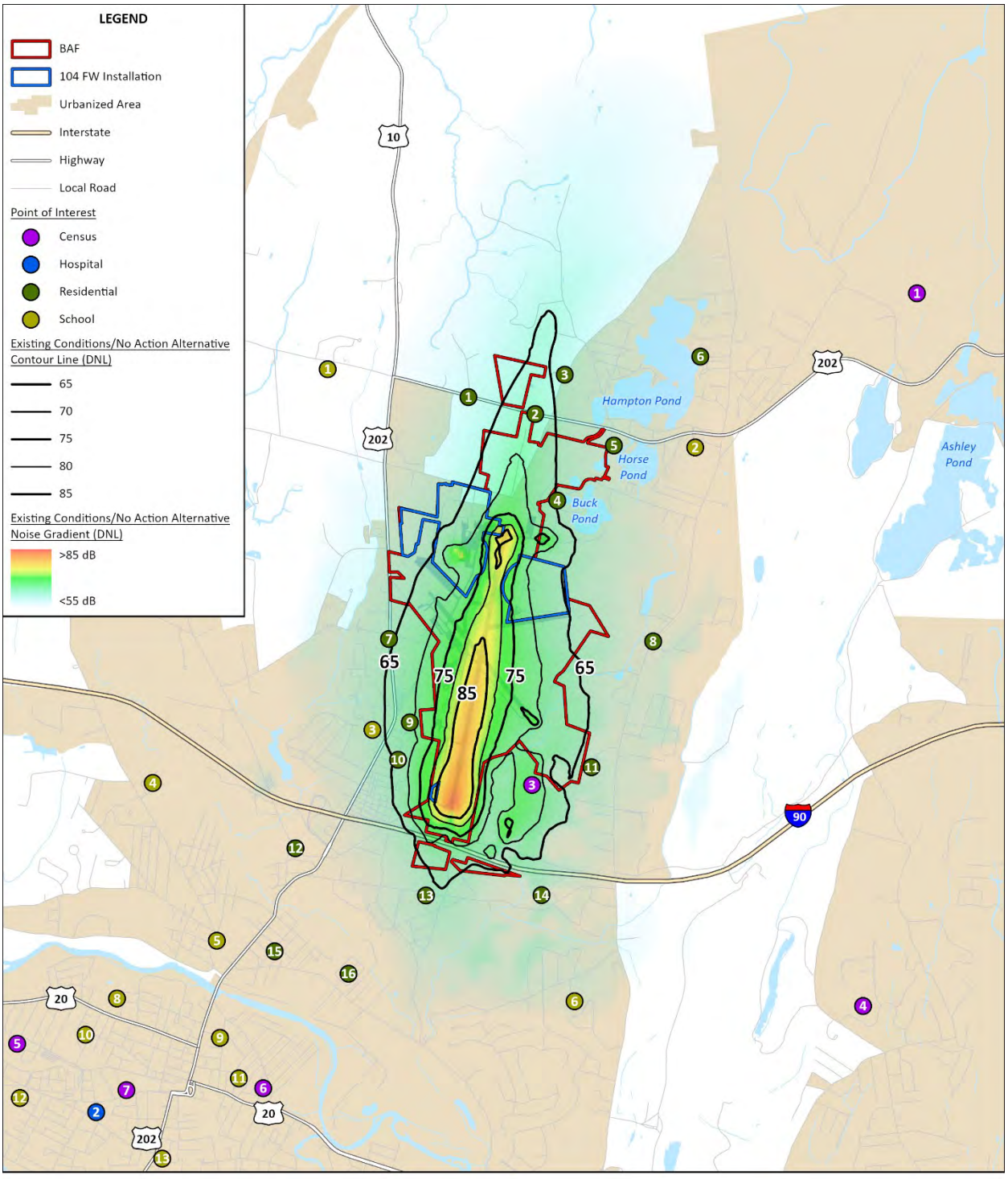


Figure MA3.1-1 Existing Conditions at Westfield-Barnes Regional Airport (BAF) – DNL Contours

The population and household analysis reviewed census block groups and included households and population for each block group that lies completely within each DNL contour (Table MA3.1-3). For block groups partially within a DNL contour band, the number of households and population metrics were scaled based on the proportion of block group area within each DNL contour band for levels from 65 to 80 dB because households in these areas are generally equally distributed throughout each block group. Households are counted manually for DNL bands of 80 dB and above because populations in these high noise areas are often not evenly distributed and 80 dB DNL is the threshold to screen for the potential for hearing loss analysis. Table MA 3.1-3 lists the estimated number of households and population off airport that lie within each DNL contour under existing conditions. Currently, 76 households and 214 people are within the 65 to 70 dB DNL contour band. A total of 29 households and 88 people are within the 70 to 75 dB DNL contour band and 4 households and 10 people occur within the 75 to 80 dB DNL contour band. The off-airport acreage exposed to 80 dB DNL contains only commercial or undeveloped land, so no households are affected.

Table MA3.1-3 Westfield-Barnes Regional Airport (BAF) Existing Conditions – Estimated Households and Population

DNL Band (dB)	*Existing Conditions*	
	Households	*Population*
65–70	76	214
70–75	29	88
75–80	4	10
80–85	0	0
85+	0	0
Total >65 dB	**109**	**312**

Legend: dB = decibel; DNL = Day Night Average Sound Level.

Table MA3.1-4 shows the DNL values at each of the POIs under the existing conditions. Values range from 40 to 73 dB DNL. Five POIs are currently exposed to 65 dB DNL or greater, the DoD threshold for land use recommendations for noise sensitive land uses: MA-C-03 Census Tract 8125, MA-R-02 Highway 202 near Old Stage Road, MA-R-04 Buck Pond Road, MA-R-07 Arbor Mobile Home Park, and MA-R-10 Springdale Street and Grove Avenue. The greatest DNL of 73 dB occurs at MA-C-03, the Census Tract 8125 represented by the centroid point, which is located just east of BAF. However, due to the low population with Census Tract 8125, no residences are located this close to the airfield. Therefore, the DNL experienced by residents of this tract is less than presented in Table MA3.1-4. Additional details describing the POI selection and categories are provided in Chapter 3.0, Section 3.2.5, *Analysis Methodology*.

Table MA3.1-4 Existing Conditions at Points of Interest Noise Exposure in the Vicinity of Westfield-Barnes Regional Airport (BAF)

Map ID	*Point Type*	*Named Point of Interest*[1]	*DNL*[2] *(dB)*
MA-C-01	Census Tract Centroid	Tract 8121.01	51
MA-C-02	Census Tract Centroid	Tract 8128	43
MA-C-03	Census Tract Centroid	Tract 8125	**73**
MA-C-04	Census Tract Centroid	Tract 8124.01	46
MA-C-05	Census Tract Centroid	Tract 8129.01	41
MA-C-06	Census Tract Centroid	Tract 8127.02	49
MA-C-07	Census Tract Centroid	Tract 8127.01	44
MA-H-01	Healthcare Facility	Western Massachusetts Hospital	44
MA-H-02	Healthcare Facility	Baystate Noble Hospital	43
MA-R-01	Residential Area	Highway 202 and Jaeger Drive	61
MA-R-02	Residential Area	Highway 202 near Old Stage Road	**68**
MA-R-03	Residential Area	Palma Lane and Old Stage Road	64
MA-R-04	Residential Area	Buck Pond Road	**65**
MA-R-05	Residential Area	Rider Road	60
MA-R-06	Residential Area	Beccari Lane and Aimee Avenue	56
MA-R-07	Residential Area	Egleston Road and Highway 202	64
MA-R-08	Residential Area	E. Mountain Road and Ridge Trail Road	58
MA-R-09	Residential Area	Arbor Mobile Home Park	**69**
MA-R-10	Residential Area	Springdale Street and Grove Avenue	**65**
MA-R-11	Residential Area	Stephanie Lane	62
MA-R-12	Residential Area	Arch Road and Lockhouse Road	53
MA-R-13	Residential Area	Holyoke Road near Dry Bridge Road	64
MA-R-14	Residential Area	Cara Lane and Holyoke Road	55
MA-R-15	Residential Area	The Moseley Apartments	49
MA-R-16	Residential Area	Powermill Village Apartments	52
MA-S-01	School	White Oak School	53
MA-S-02	School	Roots Learning Center	56
MA-S-03	School	Southampton Road Elementary/Westfield Intermediate School	63
MA-S-04	School	Westfield High School	48
MA-S-05	School	Prospect Hill School	47
MA-S-06	School	Paper Mill Elementary School	58
MA-S-07	School	Growing Tree Learning Center	40
MA-S-08	School	Franklin Avenue Elementary School	45
MA-S-09	School	St. Mary's Elementary School and St. Mary's High School	48
MA-S-10	School	Westfield Technical Academy	43
MA-S-11	School	Fort Meadow Early Childhood Center	48
MA-S-12	School	Highland Elementary School	41
MA-S-13	School	Abner Gibbs Elementary/Westfield Middle School	45

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding BAF where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section MA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to 65 dB DNL or greater.

Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification.

Although FAA Order 1050.1F specifies DNL as the primary metric for impact analysis while allowing supplemental metrics if pre-approved by the FAA, the supplemental metric analysis included in this EIS and presented below are included to conform with DoD policy described by DNWG (DNWG 2009a).

Table MA3.1-5 presents the classroom learning interference for schools S-01 through S-13 experienced under existing conditions. The 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), provides the same school metrics computed for all other POIs to cover any daycare facilities that could occur near other POIs, such as a daycare operated out of a personal residence. As described in the noise study, the school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior noise level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found classroom learning is affected (DNWG 2009b, 2013a). Existing conditions at BAF results in four schools at three POIs that are exposed to exterior $L_{eq(8hr)}$ greater than or equal to 60 dB (equates to interior $L_{eq(8hr)}$ 45 dB): MA-S-02 Roots Learning Center, VA-S-03 Southampton Road Elementary and Westfield Intermediate (co-located), and VA-S-06 Paper Mill Elementary School. Additional school impact analysis involves determining the number of noise-generated speech interfering events per school day hour that exceed an interior L_{max} of 50 dB (equivalent to an exterior L_{max} of 65 dB for windows open). The number of classroom interfering events at all schools is estimated at an average of one per school day hour, as presented in Table MA3.1-5. Time above an interior level of 50 dB (equivalent to an exterior of 65 dB with windows open) varies from none at four schools, 1 to 2 minutes at five schools, and 4 minutes at four schools.

Table MA3.1-5 Westfield-Barnes Regional Airport (BAF) Existing Conditions – Classroom Learning Interference

ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*[2]	*Number of Speech Interfering Events per School Day Hour*[3]	*Time above 50 dB per 8-hour school day (minutes)*[3]
MA-S-01	White Oak School	57	1	4
MA-S-02	Roots Learning Center	**60**	1	4
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	**67**	1	4
MA-S-04	Westfield High School	52	1	2
MA-S-05	Prospect Hill School	51	1	2
MA-S-06	Paper Mill Elementary School	**62**	1	4
MA-S-07	Growing Tree Learning Center	44	1	1
MA-S-08	Franklin Avenue Elementary School	49	1	2
MA-S-09	St. Mary's Elementary School and St. Mary's High School	52	1	2
MA-S-10	Westfield Technical Academy	47	1	0
MA-S-11	Fort Meadow Early Childhood Center	52	1	0

ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*[2]	*Number of Speech Interfering Events per School Day Hour*[3]	*Time above 50 dB per 8-hour school day (minutes)*[3]
MA-S-12	Highland Elementary School	45	1	0
MA-S-13	Abner Gibbs Elementary/ Westfield Middle School	48	1	0

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than or equal to 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
[3]Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
Legend: dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level.

Table MA3.1-6 presents the existing conditions for speech interference based upon the numbers of events per average hour during the DNL daytime period for both a windows open and windows closed condition. The number of speech interfering events with windows open ranges from none at 4 POIs, one per average hour at 27 POIs, and up to 3 events per average hour at 7 POIs. With windows closed, 25 POIs experience no interfering events per average hour, 1 event per average hour at 11 POIs, and up to 2 events per average hour at 2 POIs. The greatest of two events per hour with windows closed occurs at MA-R-02 Highway 202 near Old Stage Road and MA-R-04 Buck Pond Road.

Table MA3.1-6 Westfield-Barnes Regional Airport (BAF) Existing Conditions – Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	1	0
MA-C-02	Tract 8128	0	0
MA-C-03	Tract 8125	2	1
MA-C-04	Tract 8124.01	1	0
MA-C-05	Tract 8129.01	1	0
MA-C-06	Tract 8127.02	1	0
MA-C-07	Tract 8127.01	1	0
MA-H-01	Western Massachusetts Hospital	1	0
MA-H-02	Baystate Noble Hospital	1	0
MA-R-01	Highway 202 and Jaeger Drive	1	1
MA-R-02	Highway 202 near Old Stage Road	3	2
MA-R-03	Palma Lane and Old Stage Road	2	1
MA-R-04	Buck Pond Road	2	2
MA-R-05	Rider Road	1	0
MA-R-06	Beccari Lane and Aimee Avenue	1	1
MA-R-07	Egleston Road and Highway 202	2	1
MA-R-08	E. Mountain Road and Ridge Trail Road	1	0
MA-R-09	Arbor Mobile Home Park	2	1
MA-R-10	Springdale Street and Grove Avenue	1	1
MA-R-11	Stephanie Lane	1	1

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
MA-R-12	Arch Road and Lockhouse Road	1	0
MA-R-13	Holyoke Road near Dry Bridge Road	3	1
MA-R-14	Cara Lane and Holyoke Road	1	0
MA-R-15	The Moseley Apartments	1	0
MA-R-16	Powermill Village Apartments	1	0
MA-S-01	White Oak School	1	1
MA-S-02	Roots Learning Center	1	1
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	1	0
MA-S-04	Westfield High School	1	0
MA-S-05	Prospect Hill School	0	0
MA-S-06	Paper Mill Elementary School	1	0
MA-S-07	Growing Tree Learning Center	1	0
MA-S-08	Franklin Avenue Elementary School	0	0
MA-S-09	St. Mary's Elementary School and St. Mary's High School	0	0
MA-S-10	Westfield Technical Academy	1	0
MA-S-11	Fort Meadow Early Childhood Center	1	0
MA-S-12	Highland Elementary School	1	0
MA-S-13	Abner Gibbs Elementary/ Westfield Middle School	1	0

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; POI = Point of Interest.

Analysis of the potential for sleep disturbance involves determining the number and SEL of DNL nighttime aircraft events to estimate the PA metric. As detailed in the 104 FW Noise Study on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), and presented in Table MA3.1-7, PA with windows open ranges from negligible at 24 POIs and 1 to 7 percent at 14 POIs. PA with windows closed is negligible at 26 POIs and 1 to 4 percent at 12 POIs. With minimal DNL nighttime operations by 104 FW F-15C (approximately 20 operations per year), nearly all of the PA results from civil jet operations that generate nearly 20 times the number of DNL nighttime operations as the 104 FW.

Table MA3.1-7 Westfield-Barnes Regional Airport (BAF) Existing Conditions – Estimated PA

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	<1%	<1%
MA-C-02	Tract 8128	<1%	<1%
MA-C-03	Tract 8125	2%	1%
MA-C-04	Tract 8124.01	<1%	<1%
MA-C-05	Tract 8129.01	<1%	<1%
MA-C-06	Tract 8127.02	<1%	<1%
MA-C-07	Tract 8127.01	<1%	<1%
MA-H-01	Western Massachusetts Hospital	<1%	<1%
MA-H-02	Baystate Noble Hospital	<1%	<1%
MA-R-01	Highway 202 and Jaeger Drive	1%	1%

Map ID	*Named POI[1]*	*Windows Open[2]*	*Windows Closed[3]*
MA-R-02	Highway 202 near Old Stage Road	4%	3%
MA-R-03	Palma Lane and Old Stage Road	4%	2%
MA-R-04	Buck Pond Road	5%	3%
MA-R-05	Rider Road	1%	<1%
MA-R-06	Beccari Lane and Aimee Avenue	<1%	<1%
MA-R-07	Egleston Road and Highway 202	2%	1%
MA-R-08	E. Mountain Road and Ridge Trail Road	2%	1%
MA-R-09	Arbor Mobile Home Park	2%	1%
MA-R-10	Springdale Street and Grove Avenue	2%	1%
MA-R-11	Stephanie Lane	2%	1%
MA-R-12	Arch Road and Lockhouse Road	<1%	<1%
MA-R-13	Holyoke Road near Dry Bridge Road	7%	4%
MA-R-14	Cara Lane and Holyoke Road	<1%	<1%
MA-R-15	The Moseley Apartments	<1%	<1%
MA-R-16	Powermill Village Apartments	<1%	<1%
MA-S-01	White Oak School	<1%	<1%
MA-S-02	Roots Learning Center	1%	<1%
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	2%	1%
MA-S-04	Westfield High School	<1%	<1%
MA-S-05	Prospect Hill School	<1%	<1%
MA-S-06	Paper Mill Elementary School	<1%	<1%
MA-S-07	Growing Tree Learning Center	<1%	<1%
MA-S-08	Franklin Avenue Elementary School	<1%	<1%
MA-S-09	St. Mary's Elementary School/St. Mary's High School	<1%	<1%
MA-S-10	Westfield Technical Academy	<1%	<1%
MA-S-11	Fort Meadow Early Childhood Center	<1%	<1%
MA-S-12	Highland Elementary School	<1%	<1%
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	<1%	<1%

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.

Legend: % = percent; < = less than; ID = Identification; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to 80 dB DNL or greater (DNWG 2013b)[1]. As presented in Table MA3.1-2, only 1 acre outside of BAF is exposed to 80 dB DNL or greater, but that acre is located west of BAF in an industrial use area primarily comprising a recycling center. Because no people reside in this area, no additional analysis is warranted for the existing condition.

[1] DNWG 2013b. Noise-Induced Hearing Impairment Technical Bulletin. As part of the noise analysis in all future environmental impact statements, DoD components will use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss (PHL). DoD components will use as part of the analysis, as appropriate, a calculation of the PHL of the at-risk population.

MA3.1.1.2 Airspace

The 104 FW trains in SUA listed in Table MA2.1-6. This airspace is shared with other units including other services. The 104 FW currently flies 1,900 annual sorties divided across these SUA, with 93 percent of time spent above 10,000 MSL. In most of the locations, the 104 FW sorties contribute L_{dnmr} less than 35 dB to noise levels experienced beneath the SUA (35 dB is the lowest noise level that can be produced by noise modeling software). For reference, an L_{dnmr} of 35 dB is consistent with ambient noise levels typically found in rural or remote areas with minimal or no human sources of noise (e.g., vehicle traffic, regular or low altitude aircraft flights).

Because airspace use can vary, this analysis considers the 'worst-case' condition where all 104 FW flying activity would occur in overland airspace. Because the overwater Warning Area (W-) 105A/B is far from land, no amount of training there would generate significant noise impacts on land. Given these assumptions, noise levels generated by existing subsonic operations in overland SUA are 40 dB L_{dnmr}. The actual distribution of operations across multiple training areas makes the resulting noise much lower than this. However, those levels are too low to accurately assess given the lower noise limit of the modeling software.

To train with the full capabilities the F-15C, aircraft employ supersonic flight (flights that exceed the speed of sound) during a small portion of their sorties that occur at a minimum altitude of 30,000 feet MSL. The fuel demand when flying supersonic limits the amount of time the aircraft could travel supersonic before having to return to the base to refuel. In general, an aircraft would only travel supersonic for approximately 30 seconds. The existing supersonic activity performed by the 104 FW in their associated airspace was previously reviewed in the 2008 FAA final rule that modified and established the current Restricted Areas and Other Special Use Airspace, Adirondack (or "Viper") Airspace Complex used today (FAA 2008). That review found that supersonic activity did not generate noise issues at ground level, due to the minimum altitude of 30,000 feet MSL, and the lower altitude subsonic noise activity by aircraft like F-15C that generated the primary noise concerns and potential for impacts on people. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom),* the overpressures of booms that reach the ground due to supersonic activity at these altitudes are well below those that would begin to cause physical injury to humans or animals (National Aeronautics and Space Administration 2015).

MA3.1.2 Environmental Consequences

MA3.1.2.1 F-15EX

Installation

Under this alternative, the 104 FW would replace their 18 F-15C aircraft with 21 F-15EX aircraft. The following sections describe the noise effects resulting from construction, installation operations, and airspace operations associated with the F-15EX Alternative at BAF.

The F-15EX Alternative includes construction projects that would occur within the BAF property, which would generate temporary construction noise. The proposed construction sites would be on-installation in areas close to the BAF runways, which are currently exposed to 65 dB DNL or greater and land adjacent to BAF, which is primarily commercial. Therefore, the construction activity would not generate significant noise impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

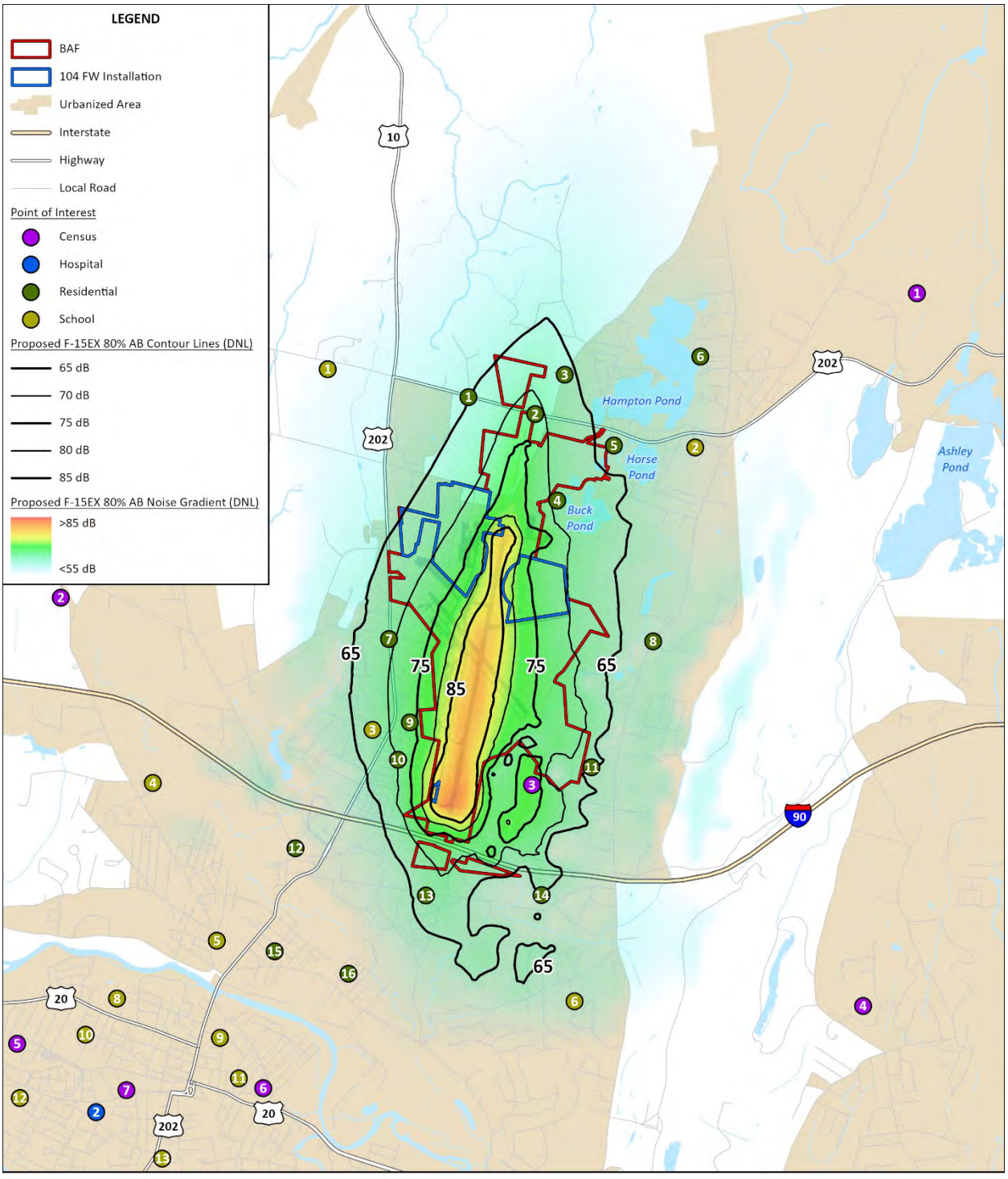
As summarized in Table MA3.1-8, F-15EX operations would amount to 3,182 departures, 3,182 arrivals, and 502 closed pattern resulting in a total of 6,866 annual operations at BAF. The proportion of DNL nighttime operations (10 p.m. to 7 a.m.) would remain consistent with existing F-15C 104 FW operations at less than 1 percent. F-15EX would use the same flight tracks and runways and operations by other aircraft (Army, transient military, and civil) would continue unchanged under this alternative. Additional noise modeling details are provided in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Figure MA3.1-2 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-15EX Alternative at BAF. As with current operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. Portions of the 65 dB DNL contour would extend north of the airfield by 1,500 feet, 2,600 feet west, 3,300 feet south, and 900 feet east. As depicted in Figure MA3.1-3, when compared with the existing conditions/No Action Alternative, the F-15EX Alternative at BAF would result in an increase in the width of the DNL contours to the west and east due to the greater noise generated by the F-15EX, as compared to the F-15C, at the start of departure operations. The reduction in contour size to the north would be due to the F-15EX climbing quicker than the F-15C so that the noise reaching the ground in these areas during departures would be reduced.

Table MA3.1-8 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) – Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Totals*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Total*
104 FW	F-15EX	3,167	15	3,167	15	502	0	6,836	30	6,866
Army	UH-60	576	0	460	116	19	0	1,055	116	1,171
Army	UH-72	144	0	115	29	5	0	264	29	293
Military Other	Transients	69	2	69	2	1,052	0	1,190	4	1,194
Military	*Military Total*	*3,956*	*17*	*3,811*	*162*	*1,578*	*0*	*9,345*	*179*	*9,524*
Civil	Boeing 737-700 Series	23	2	23	2	0	0	46	4	50
	Bombardier Learjet 35A/36A (C-21A)	1,339	69	1,338	68	33	1	2,710	138	2,848
	Cessna 441 Conquest II	40	0	40	0	0	0	80	0	80
	EADS Socata TB-9 Tampico	6,192	5	6,192	5	16,328	15	28,712	25	28,737
	Gulfstream IV-SP	1,355	64	1,355	64	0	0	2,710	128	2,838
Civil	*Civil Total*	*8,949*	*140*	*8,948*	*139*	*16,361*	*16*	*34,258*	*295*	*34,553*
Grand Total[2]		**9,018**	**142**	**9,017**	**141**	**17,413**	**16**	**43,603**	**474**	**44,077**

Notes: [1]Closed patterns counted as two operations.
[2]Numbers may not add up due to rounding.
Legend: 104 FW = 104th Fighter Wing.



0 Kilometers 1
0 Miles 0.5

Figure MA3.1-2 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) – DNL Contours and Gradient

Source: ESRI 2022, MA ANG 2022

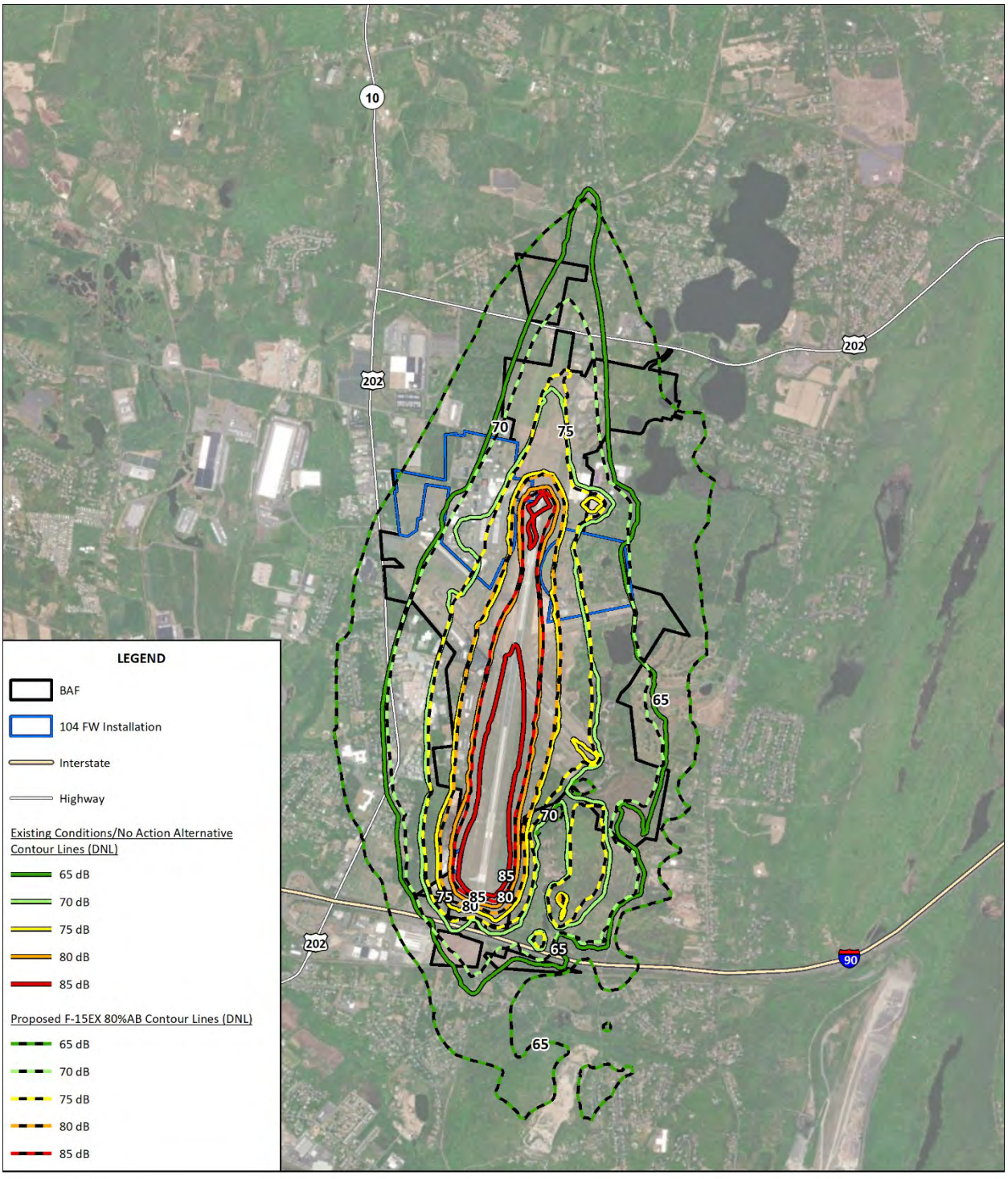


Figure MA3.1-3 F-15EX Alternative Comparison to Existing Conditions/No Action Alternative at Westfield-Barnes Regional Airport (BAF) – DNL Contours

Table MA3.1-9 shows the acreage breakdown (excluding water bodies) within each noise contour at BAF with a total of 1,419 off-airport acres that would be exposed to 65 dB DNL or greater noise levels for the F-15EX Alternative. That off-airport acreage would be comprised of 955 acres exposed to 65 to 70 dB DNL (an increase of 552 acres), 333 acres to 70 to 75 dB DNL (an increase of 190 acres), 115 acres to 75 to 80 dB DNL (an increase of 88 acres), and 17 acres to 80 to 85 dB DNL (an increase of 16 acres). No areas off airport would be exposed to DNL greater than 85 dB for the existing conditions/No Action Alternative.

Table MA3.1-9 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) – Noise Exposure Acreage

DNL Band (dB)	*F-15EX Alternative Acreage*			*Change Relative to Existing Conditions/No Action Alternative*		
	On Airport	*Off Airport*	*Total*	*On Airport*	*Off Airport*	*Total*
65–70	261	955	1,215	-127	+552	+425
70–75	349	333	682	+93	+190	+283
75–80	247	115	362	+98	+88	+186
80–85	155	17	172	+22	+16	+38
85+	220	0	220	+113	0	+113
Total >65 dB[1]	**1,233**	**1,419**	**2,651**	**+199**	**+845**	**+1,044**

Note: [1]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day Night Average Sound Level.

Table MA3.1-10 details the households and estimated population that would be exposed within each DNL contour band under the F-15EX Alternative at BAF. A total of 221 households and 610 people would be exposed to 65 to 70 dB DNL, an increase of 145 households and 396 people. This increase in width of the 65 dB DNL contour would be caused by the increased operations and the greater noise generated by the F-15EX engine. Table MA3.1-10 reflects an increase of 33 additional households and 91 people that would be exposed to 70 to 75 dB DNL and 19 additional households and 60 additional people that would be exposed to 75 to 80 dB DNL. Much of the newly exposed areas, particularly those above 75 dB DNL, would occur over undeveloped land, so the actual impacts may be less than estimated.

Table MA3.1-10 Westfield-Barnes Regional Airport (BAF) F-15EX Alternative Estimated Households and Population

DNL Band (dB)	*F-15EX Alternative*		*Change Relative to No Action Alternative*	
	Households	*Population*	*Households*	*Population*
65–70	221	610	+145	+396
70–75	62	178	+33	+91
75–80	23	70	+19	+60
80–85	0	0	0	0
85+	0	0	0	0
Totals	**306**	**858**	**+197**	**+547**

Note: Households and population estimated using proportion area of census block groups exposed to each contour band which may overestimate impacts in greater DNL bands.
Legend: dB = decibel; DNL = Day Night Average Sound Level.

Table MA3.1-11 illustrates the estimated DNL values at POIs for the F-15EX Alternative at BAF, and the change compared to the existing conditions/No Action Alternative. The values would range from 42 to 77 dB DNL. Eleven POIs would be exposed to 65 dB DNL or greater, 6 more than the existing conditions/No Action Alternative. Three POIs would experience no change in DNL, while the remaining 35 POIs would experience an increase ranging from 1 to 5 dB DNL.

Table MA3.1-11 DNL at POIs for F-15EX Alternative at Westfield-Barnes Regional Airport (BAF)

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-15EX Alternative DNL (dB)*[2]	*Change From Existing Conditions/ No Action Alternative DNL (dB)*
MA-C-01	Tract 8121.01	51	51	0
MA-C-02	Tract 8128	43	46	+3
MA-C-03	Tract 8125	**73**	**77**	+4
MA-C-04	Tract 8124.01	46	46	0
MA-C-05	Tract 8129.01	41	44	+3
MA-C-06	Tract 8127.02	49	49	0
MA-C-07	Tract 8127.01	44	46	+2
MA-H-01	Western Massachusetts Hospital	44	47	+3
MA-H-02	Baystate Noble Hospital	43	45	+2
MA-R-01	Highway 202 and Jaeger Drive	61	**65**	+4
MA-R-02	Highway 202 near Old Stage Road	**68**	**72**	+4
MA-R-03	Palma Lane and Old Stage Road	64	**66**	+2
MA-R-04	Buck Pond Road	**65**	**69**	+4
MA-R-05	Rider Road	60	64	+4
MA-R-06	Beccari Lane and Aimee Avenue	56	58	+2
MA-R-07	Egleston Road and Highway 202	64	**69**	+5
MA-R-08	E. Mountain Road and Ridge Trail Road	58	62	+4
MA-R-09	Arbor Mobile Home Park	**69**	**73**	+4
MA-R-10	Springdale Street and Grove Avenue	**65**	**69**	+4
MA-R-11	Stephanie Lane	62	**66**	+4
MA-R-12	Arch Road and Lockhouse Road	53	54	+1
MA-R-13	Holyoke Road near Dry Bridge Road	64	**68**	+4
MA-R-14	Cara Lane and Holyoke Road	55	59	+4
MA-R-15	The Moseley Apartments	49	51	+2
MA-R-16	Powermill Village Apartments	52	55	+3
MA-S-01	White Oak School	53	57	+4
MA-S-02	Roots Learning Center	56	59	+3
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	63	**68**	+5
MA-S-04	Westfield High School	48	50	+2
MA-S-05	Prospect Hill School	47	50	+3
MA-S-06	Paper Mill Elementary School	58	62	+4
MA-S-07	Growing Tree Learning Center	40	42	+2
MA-S-08	Franklin Avenue Elementary School	45	47	+2
MA-S-09	St. Mary's Elementary School and St. Mary's High School	48	50	+2
MA-S-10	Westfield Technical Academy	43	45	+2

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-15EX Alternative DNL (dB)*[2]	*Change From Existing Conditions/ No Action Alternative DNL (dB)*
MA-S-11	Fort Meadow Early Childhood Center	48	49	+1
MA-S-12	Highland Elementary School	41	44	+3
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	45	46	+1

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding BAF where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section MA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to 65 dB DNL or greater.
Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification; POI = Point of Interest.

Because the FAA, a cooperating agency, applies differing significance criteria for noise impact analysis, Figure MA3.1-4 depicts DNL differences at key thresholds according to FAA guidance described in FAA 1050.1F. These results, along with Table MA3.1-12, are included in this EIS to aid in significance determination under FAA criteria.

Table MA3.1-12 FAA DNL Exposure Thresholds Affecting Acreage, Population, and Households Under F-15EX Alternative

FAA Classification[1]	*Description*	*Acreage*	*Households*	*Population*
Significant	+1.5 dB (or higher) Change within 65+ dB DNL	1,389	304	852
Reportable	+3 dB (or higher) Change within 60–65 dB DNL	2,070	621	1,811

Note: [1]FAA 2023.
Legend: dB = decibel; DNL = Day-Night Average Sound Level, FAA = Federal Aviation Administration.

As shown in Figure MA3.1-4, areas primarily to the east and west of BAF would experience increases in DNL equal to or greater than 1.5 dB that would be exposed to 65 dB DNL. This would affect 10 POIs (BA-R-02, BA-R-03, BA-R-04, BA-R-07, BA-R-09, BA-R-10, BA-R-11, BA-R-13, BA-C-03, and BA-S-03) that would be considered under FAA 1050.1F guidelines to experience a significant noise impact. The FAA also requires reporting increases of 3 dB or greater in DNL that would occur at noise sensitive locations that would experience DNL between 60 and 65 dB. This reporting threshold would apply to 5 POIs (BA-R-01, BA-R-05, BA-R-08, BA-R-14, BA-S-06).

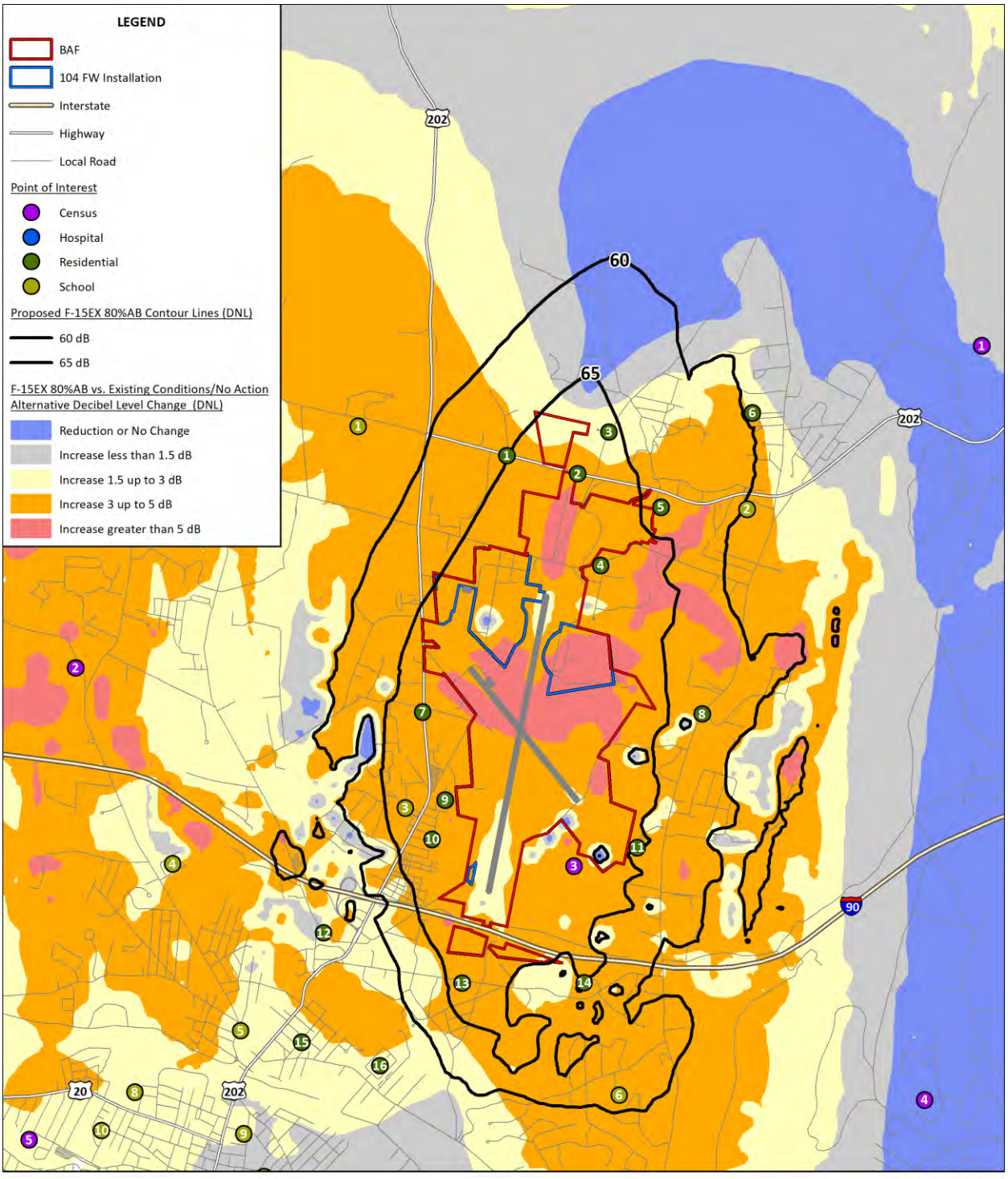


Figure MA3.1-4 F-15EX Difference Contours Relative to Existing Conditions/No Action Alternative at Westfield-Barnes Regional Airport (BAF) for FAA Analysis

Because the residential POI, denoted with '-R-', represents a neighborhood of multiple residential properties, Table MA3.1-12 quantifies the acreage, households, and population that would be affected. A total of 1,389 acres, 304 households, and an estimated 852 people would be exposed to greater than 65 dB DNL under the F-15EX Alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the existing conditions/No Action Alternative, which the FAA criteria would classify as a significant impact. A total of 2,070 acres, 621 households, and an estimated 1,811 people would be exposed to DNL between 60 and 65 dB under the F-15EX Alternative while experiencing an increase of 3 dB or greater in DNL relative to the existing conditions/No Action Alternative, which the FAA criteria would classify as a reportable change in noise exposure.

Table MA3.1-13 displays results for three metrics used to examine noise effects on classroom learning: exterior school day $L_{eq(8hr)}$ with threshold of 60 dB (equivalent to interior of 45 dB $L_{eq(8hr)}$ with windows open), number of classroom speech interfering events above 50 dB per school day hour (equivalent to 65 dB outside with windows open), and time above interior 50 dB per 8-hour school day (equivalent to exterior 65 dB). Under the F-15EX Alternative at BAF, the number of schools experiencing noise levels above the $L_{eq(8hr)}$ 60 dB exterior screening criteria would increase from 3 to 4. $L_{eq(8hr)}$ would increase at each school POI ranging from 1 to 5 dB greater than the existing conditions/No Action Alternative with the largest increase occurring at MA-S-03 Southampton Road Elementary/Westfield Intermediate School. The number of speech interfering events during the school day would increase by 1 event per hour at 2 schools and not change at the remaining 11 school POIs. The time above interior 50 dB (equivalent to exterior 65 dB) during a typical school day would range from less than 1 minute at 2 school POIs up to a maximum of 9 minutes at 2 school POIs (MA-S-02 Roots Learning Center and MA-S-03 Southampton Road Elementary/Westfield Intermediate School). When compared with the existing conditions/No Action Alternative, the duration of interfering time would increase by 1 to 5 minutes per average school day at 10 school POIs and not change 3 school POIs.

Table MA3.1-14 presents speech interference under this alternative based upon the number of events per average hour during the DNL daytime period for both a windows open and windows closed condition. Speech-interfering events would range from 1 to 3 per average hour with windows open. When compared with the existing conditions/No Action Alternative, the number of speech interfering events with windows open would increase by 1 event per hour at 4 POIs and not change at 34 POIs. With windows closed, the number of speech interfering events per average daytime hour would range from none to 2. When compared with the existing conditions/No Action Alternative, the number of speech interfering events with windows closed would increase by 1 event per hour at 12 POIs and not change at the remaining 26 POIs.

Table MA3.1-13 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) Classroom Learning Interference

Map ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*		*Number of Speech Interfering Events per School Day Hour*[2]		*Time above 50 dB per 8-hour school day (minutes)*[2]	
		F-15EX Alternative[3]	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*
MA-S-01	White Oak School	**61**	+4	1	0	8	+4
MA-S-02	Roots Learning Center	**63**	+3	2	+1	9	+5
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	**72**	+5	2	+1	9	+5
MA-S-04	Westfield High School	54	+2	1	0	7	+5
MA-S-05	Prospect Hill School	54	+3	1	0	6	+4
MA-S-06	Paper Mill Elementary School	**66**	+4	1	0	7	+3
MA-S-07	Growing Tree Learning Center	45	+1	1	0	1	0
MA-S-08	Franklin Avenue Elementary School	51	+2	1	0	4	+2
MA-S-09	St. Mary's Elementary School and St. Mary's High School	54	+2	1	0	5	+3
MA-S-10	Westfield Technical Academy	49	+2	1	0	0	0
MA-S-11	Fort Meadow Early Childhood Center	53	+1	1	0	1	+1
MA-S-12	Highland Elementary School	47	+2	1	0	0	0
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	50	+2	1	0	1	+1

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Assumes 90% of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
[3]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than or equal to 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
Legend: dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour equivalent sound level.

Table MA3.1-14 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*F-15EX Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	1	1	0	+1
MA-C-02	Tract 8128	1	0	+1	0
MA-C-03	Tract 8125	2	1	0	0
MA-C-04	Tract 8124.01	1	0	0	0
MA-C-05	Tract 8129.01	1	0	0	0
MA-C-06	Tract 8127.02	1	0	0	0
MA-C-07	Tract 8127.01	1	0	0	0
MA-H-01	Western Massachusetts Hospital	1	0	0	0
MA-H-02	Baystate Noble Hospital	1	0	0	0
MA-R-01	Highway 202 and Jaeger Drive	1	1	0	0
MA-R-02	Highway 202 near Old Stage Road	3	2	0	0
MA-R-03	Palma Lane and Old Stage Road	2	1	0	0
MA-R-04	Buck Pond Road	2	2	0	0
MA-R-05	Rider Road	1	1	0	+1
MA-R-06	Beccari Lane and Aimee Avenue	1	1	0	0
MA-R-07	Egleston Road and Highway 202	2	1	0	0
MA-R-08	E. Mountain Road and Ridge Trail Road	1	1	0	+1
MA-R-09	Arbor Mobile Home Park	2	1	0	0
MA-R-10	Springdale Street and Grove Avenue	1	1	0	0
MA-R-11	Stephanie Lane	1	1	0	0
MA-R-12	Arch Road and Lockhouse Road	1	1	0	+1
MA-R-13	Holyoke Road near Dry Bridge Road	3	1	0	0
MA-R-14	Cara Lane and Holyoke Road	1	1	0	+1
MA-R-15	The Moseley Apartments	1	1	0	+1
MA-R-16	Powermill Village Apartments	1	1	0	+1
MA-S-01	White Oak School	1	1	0	0
MA-S-02	Roots Learning Center	1	1	0	0
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	1	1	0	+1
MA-S-04	Westfield High School	1	1	0	+1
MA-S-05	Prospect Hill School	1	1	+1	+1
MA-S-06	Paper Mill Elementary School	1	1	0	+1
MA-S-07	Growing Tree Learning Center	1	0	0	0
MA-S-08	Franklin Avenue Elementary School	1	0	+1	0
MA-S-09	St. Mary's Elementary School and St. Mary's High School	1	1	+1	+1
MA-S-10	Westfield Technical Academy	1	0	0	0
MA-S-11	Fort Meadow Early Childhood Center	1	0	0	0
MA-S-12	Highland Elementary School	1	0	0	0
MA-S-13	Abner Gibbs Elementary/ Westfield Middle School	1	0	0	0

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR

Legend: ID = Identification; POI = Point of Interest.

The PA was calculated to estimate sleep disturbance resulting from DNL nighttime aircraft noise (Table MA3.1-15). Compared to the existing conditions/No Action Alternative, 3 of the 38 POIs would experience a 1 percent increase in PA for windows open and 2 POIs would experience a 1 percent increase with windows closed. The reason for this small change in PA is the percentage of proposed DNL nighttime operations would remain at the same small proportion (less than 1 percent of total operations) as the existing conditions/No Action Alternative. Civil jet DNL nighttime operations generate nearly all PA events in all scenarios at BAF.

Table MA3.1-15 F-15EX Alternative at Westfield-Barnes Regional Airport (BAF) Estimated PA

Map ID	*Named POI*[1]	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	<1%	<1%	0	0
MA-C-02	Tract 8128	<1%	<1%	0	0
MA-C-03	Tract 8125	2%	1%	0	0
MA-C-04	Tract 8124.01	<1%	<1%	0	0
MA-C-05	Tract 8129.01	<1%	<1%	0	0
MA-C-06	Tract 8127.02	1%	1%	1%	1%
MA-C-07	Tract 8127.01	<1%	<1%	0	0
MA-H-01	Western Massachusetts Hospital	<1%	<1%	0	0
MA-H-02	Baystate Noble Hospital	<1%	<1%	0	0
MA-R-01	Highway 202 and Jaeger Drive	1%	1%	0	0
MA-R-02	Highway 202 near Old Stage Road	5%	3%	1%	0
MA-R-03	Palma Lane and Old Stage Road	4%	2%	0	0
MA-R-04	Buck Pond Road	6%	3%	1%	0
MA-R-05	Rider Road	1%	<1%	0	0
MA-R-06	Beccari Lane and Aimee Avenue	<1%	<1%	0	0
MA-R-07	Egleston Road and Highway 202	2%	1%	0	0
MA-R-08	E. Mountain Road and Ridge Trail Road	2%	1%	0	0
MA-R-09	Klondike Avenue Trailer Park	2%	1%	0	0
MA-R-10	Springdale Street and Grove Avenue	2%	1%	0	0
MA-R-11	Stephanie Lane	2%	1%	0	0
MA-R-12	Arch Road and Lockhouse Road	<1%	<1%	0	0
MA-R-13	Holyoke Road near Dry Bridge Road	7%	5%	0	1%
MA-R-14	Cara Lane and Holyoke Road	<1%	<1%	0	0
MA-R-15	The Moseley Apartments	<1%	<1%	0	0
MA-R-16	Powermill Village Apartments	<1%	<1%	0	0
MA-S-01	White Oak School	<1%	<1%	0	0
MA-S-02	Roots Learning Center	1%	<1%	0	0
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	2%	1%	0	0
MA-S-04	Westfield High School	<1%	<1%	0	0
MA-S-05	Prospect Hill School	<1%	<1%	0	0
MA-S-06	Paper Mill Elementary School	<1%	<1%	0	0
MA-S-07	Growing Tree Learning Center	<1%	<1%	0	0
MA-S-08	Franklin Avenue Elementary School	<1%	<1%	0	0
MA-S-09	St. Mary's Elementary School	<1%	<1%	0	0

Map ID	*Named POI*[1]	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-S-10	Westfield Technical Academy	<1%	<1%	0	0
MA-S-11	Fort Meadow Early Childhood Center	<1%	<1%	0	0
MA-S-12	Highland Elementary School	<1%	<1%	0	0
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	<1%	<1%	0	0

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: % = percent; < = less than; ID = Identification; POI = Point of Interest

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels beginning at residential areas exposed to 80 dB DNL or greater (DNWG 2013b). As summarized in Table MA3.1-9, a total of 17 acres outside of BAF would be exposed to 80 dB DNL or greater. However, those 17 acres would be located west or east of BAF in an area immediately adjacent to the airfield covered by a recycling center or undeveloped land. Because no people reside in these areas, no PHL analysis was conducted.

Under FAA Order 1050.1F significance criteria standards, noise impacts under the F-15EX Alternative at BAF would be significant because noise sensitive areas that would be exposed to 65 dB DNL or greater would experience more than a 1.5 dB increase in DNL, relative to the existing conditions/No Action Alternative. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would also be significant.

Airspace

As tabulated in Section 3.2.5.2, *Special Use Airspace Noise Modeling*, while operating in airspace, the F-15EX would result in an increase of 2 to 3 dB SEL and 4 to 5 dB L_{max} than the existing F-15C, based on a typical flight profile (i.e., at 400 knots and at military power when comparing single-event noise levels). Individual flights within airspace would differ from noise levels because aircraft speeds and power settings would vary depending upon specific training exercises performed at that time.

Under this alternative, the 104 FW would be assigned F-15EX aircraft with a higher annual flying hour program, resulting in 3,182 sorties per year, a 67 percent increase above existing conditions/No Action Alternative. The F-15EX would continue to train in the airspace currently used by the 104 FW. The mix of types of training events and altitudes would remain approximately the same as the F-15C (Table MA2.1-7). Since air-to-ground ordnance delivery would be impractical when operating from BAF, it is likely that some portion of the training syllabus would

have to be flown from other bases. This analysis presents a 'worst-case' for noise impacts, assuming an entire year of training would occur in the SUA currently used by the 104 FW, with no training deployments elsewhere to achieve training requirements. Based on the increase in sorties of 67 percent along with the greater SEL of the F-15EX, both L_{dnmr} and DNL generated in each airspace that would be used by the F-15EX could increase up to 5 dB from the existing conditions/No Action Alternative for subsonic operations (see the 104 FW Noise Study, which can be found on the project website [URL address: www.angf15ex-f35a-eis.com/documents/]). The result would be L_{dnmr} ranging from 45 dB on the upper end down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain relatively low. Additionally, the 104 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most subsonic aircraft airspace sorties would likely not be noticed by any casual observer.

Under the F-15EX Alternative, the F-15EX would replace the F-15C for supersonic activity in both the W-105A/B overwater ranges and overland Viper Complex with no change to the airspace or minimum altitudes for supersonic flight. The frequency of supersonic activity in these areas would increase by 67 percent from the existing conditions/No Action Alternative, which would equate to an increase in CDNL of 2 to 3 dB. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the magnitude of noise generated by each sonic boom depends primarily by altitudes, which would not change. The shape and size of the aircraft plays a smaller role in the magnitude of sonic boom generated. Because the F-15EX and F-15C aircraft both share the same airframe and would operate similarly during supersonic operations, each supersonic generated noise event for the F-15EX would be the same as the existing F-15C. Therefore, the overall change to CDNL in W-105A/B and Viper Complex would be up to 3 dB greater than the existing conditions/No Action Alternative due to the increase in the number of supersonic sorties.

MA3.1.2.2 F-35A

Under this alternative, the 104 FW would replace their 18 F-15C aircraft with 21 F-35A aircraft. The following sections describe the noise impacts resulting from construction, installation operations, and airspace operations associated with the F-35A Alternative at BAF.

Installation

The F-35A Alternative at BAF includes construction projects that would occur within the BAF property, which would generate temporary construction noise. The proposed construction sites would be on-installation in areas close to runways, which are currently exposed to 65 dB DNL or greater and land adjacent to BAF, which is commercial. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

As summarized in Table MA3.1-16, F-35A operations would amount to 3,182 departures, 3,182 arrivals, and 502 closed pattern resulting in a total of 6,866 annual operations at BAF. The proportion of DNL nighttime operations (10 p.m. to 7 a.m.) would remain consistent with current F-15C 104 FW operations at less than 1 percent. F-35A would use the same flight tracks and runways and operations by other aircraft (Army, transient military, and civil) would continue unchanged under this alternative. Additional noise modeling details are provided in 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Table MA3.1-16 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) – Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Totals*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Total*
104 FW	F-35A	3,167	15	3,167	15	502	0	6,836	30	6,866
Army	UH-60	576	0	460	116	19	0	1,055	116	1,171
Army	UH-72	144	0	115	29	5	0	264	29	293
Military Other	Transients	69	2	69	2	1,052	0	1,190	4	1,194
Military	*Military Total*	*3,956*	*17*	*3,811*	*162*	*1,578*	*0*	*9,345*	*179*	*9,524*
Civil	Boeing 737-700 Series	23	2	23	2	0	0	46	4	50
	Bombardier Learjet 35A/36A (C-21A)	1,339	69	1,338	68	33	1	2,710	138	2,848
	Cessna 441 Conquest II	40	0	40	0	0	0	80	0	80
	EADS Socata TB-9 Tampico	6,192	5	6,192	5	16,328	15	28,712	25	28,737
	Gulfstream IV-SP	1,355	64	1,355	64	0	0	2,710	128	2,838
Civil	*Civil Total*	*8,949*	*140*	*8,948*	*139*	*16,361*	*16*	*34,258*	*295*	*34,553*
Grand Total[2]		**9,018**	**142**	**9,017**	**141**	**17,413**	**16**	**43,603**	**474**	**44,077**

Notes: [1]Closed patterns counted as two operations.
[2]Numbers may not add up due to rounding.
Legend: 104 FW = 104th Fighter Wing.

Figure MA3.1-5 shows the DNL contours from 65 to 85 dB in 5-dB increments for the F-35A Alternative at BAF. As with current operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. Portions of the 65 dB DNL contour would extend north of the airfield by 7,300 feet, west by 1,500 feet, south by 2,500 feet, and east by 300 feet. As depicted in Figure MA3.1-6, when compared with the existing conditions/No Action Alternative to the F-35A Alternative at BAF would result in an increase in the size of the DNL contours in all directions except to the west where a slight reduction would occur. This increase in area exposed is the result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C. The slight decrease in DNL to the west occurs because the F-35A would use afterburner, the loudest engine power setting, less often (5 percent of takeoffs) than the current F-15C operations (80 percent of takeoffs).

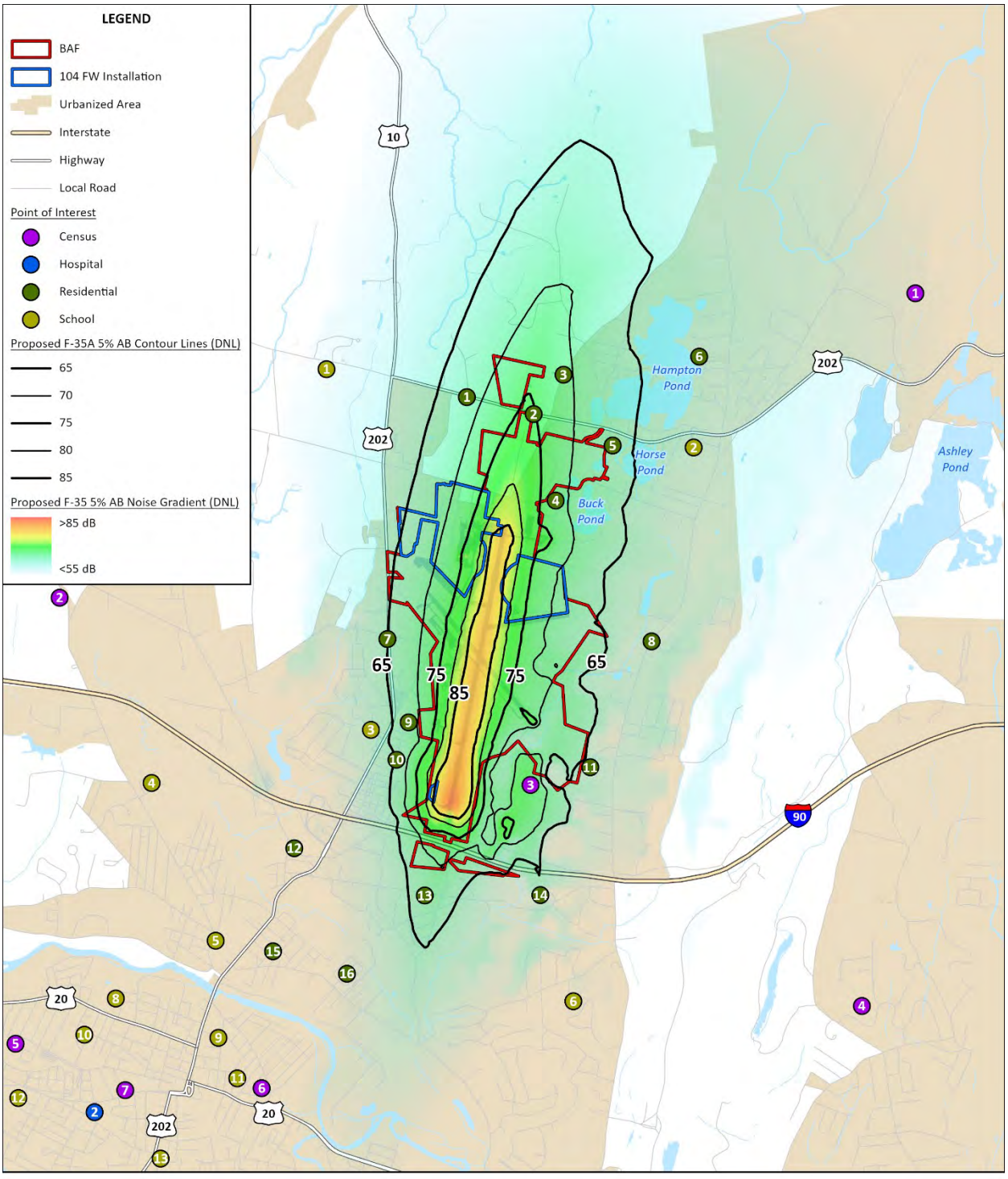


Figure MA3.1-5 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) – DNL Contours and Gradient

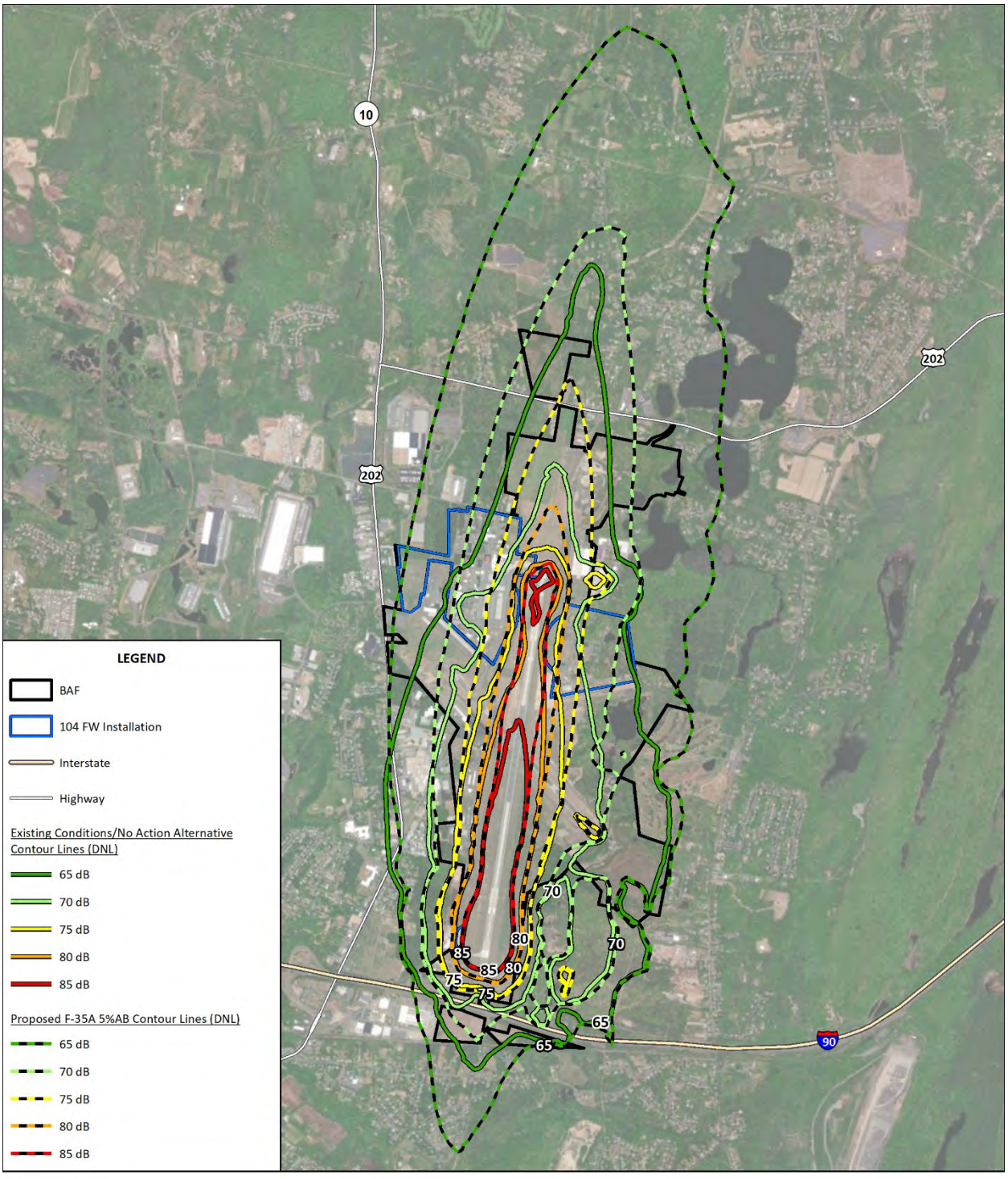


Figure MA3.1-6 F-35A Alternative Comparison to Existing Conditions/No Action Alternative at Westfield-Barnes Regional Airport (BAF) –

Table MA3.1-17 shows the acreage breakdown (excluding water bodies) within each noise contour at BAF with a total of 1,861 off-airport acres that would be exposed to 65 dB DNL or greater noise levels for the F-35A Alternative. That off-airport acreage would be comprised of 1,394 acres exposed to 65 to 70 dB DNL (an increase of 991 acres), 414 acres to 70 to 75 dB DNL (an increase of 271 acres), 50 acres to 75 to 80 dB DNL (an increase of 23 acres), and 3 acres to 80 to 85 dB DNL (an increase of 2 acres). No areas off airport would be exposed to greater than 85 dB DNL for the F-35A Alternative.

Table MA3.1-17 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) – Noise Exposure Acreage

DNL Band (dB)	*F-35A Alternative Acreage*			*Change Relative to Existing Conditions/ No Action Alternative*		
	On Airport	*Off Airport*	*Total*	*On Airport*	*Off Airport*	*Total*
65–70	298	1,394	1,693	-89	+991	+902
70–75	330	414	744	+74	+271	+345
75–80	265	50	315	+116	+23	+139
80–85	152	3	155	+19	+2	+21
85+	173	0	173	+66	0	+66
Total >65dB[1]	**1,219**	**1,861**	**3,080**	**+186**	**+1,288**	**+1,473**

Note: [1]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day Night Average Sound Level.

Table MA3.1-18 details the households and estimated population that would be exposed to each DNL contour band under the F-35A Alternative at BAF. A total of 288 households and 843 people would be exposed to 65 to 70 dB DNL, an increase of 212 households and 628 people. This increase would be due to the general increase in length of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-35A on departures. Table MA3.1-18 reflects an increase of 51 additional households and 141 people that would be exposed to 70 to 75 dB DNL and 4 additional households and 10 additional people that would be exposed to 75 to 80 dB DNL.

Table MA3.1-18 Westfield-Barnes Regional Airport (BAF) F-35A Alternative Estimated Households and Population

DNL Band (dB)	*F-35A Alternative*		*Change Relative to Existing Conditions/No Action Alternative*	
	Households	*Population*	*Households*	*Population*
65–70	288	843	+212	+628
70–75	80	229	+51	+141
75–80	8	20	+4	+10
80–85	0	0	0	0
85+	0	0	0	0
Totals	**368**	**1,092**	**+267**	**+779**

Note: Households and Population estimated using proportion area of census block groups exposed to each contour band which may overestimate impacts in greater DNL bands.
Legend: dB = decibel; DNL = Day Night Average Sound Level.

Table MA3.1-19 illustrates the estimated DNL values at POIs for the F-35A Alternative at BAF, existing DNL, and the change compared to existing conditions/No Action Alternative. The values would range from 43 to 75 dB DNL. Nine POIs would be exposed to 65 dB DNL or greater, 4 more than the existing conditions/No Action Alternative. Of these 9 POIs, 4 POIs (MA-C-03 Tract 8125, MA-R-02 Highway 202 near Old Stage Road, MA-R-03 Palma Lane and Old Stage Road, and MA-R-04 Buck Pond Road) would be exposed to DNL ranging from 71 to 75 dB. Four POIs would experience a decrease of 1 to 2 dB, 3 POIs no change, 9 POIs an increase of 1 to 3 dB, and 22 POIs an increase of 4 to 7 dB DNL.

Table MA3.1-19 DNL at POIs for F-35A Alternative at Westfield-Barnes Regional Airport (BAF)

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-35A Alternative DNL (dB)*[2]	*Change From Existing Conditions/ No Action Alternative DNL (dB)*
MA-C-01	Tract 8121.01	51	57	+6
MA-C-02	Tract 8128	43	46	+3
MA-C-03	Tract 8125	**73**	**74**	+1
MA-C-04	Tract 8124.01	46	51	+5
MA-C-05	Tract 8129.01	41	45	+4
MA-C-06	Tract 8127.02	49	54	+5
MA-C-07	Tract 8127.01	44	48	+4
MA-H-01	Western Massachusetts Hospital	44	48	+4
MA-H-02	Baystate Noble Hospital	43	47	+4
MA-R-01	Highway 202 and Jaeger Drive	61	**68**	+7
MA-R-02	Highway 202 near Old Stage Road	**68**	**75**	+7
MA-R-03	Palma Lane and Old Stage Road	64	**71**	+7
MA-R-04	Buck Pond Road	**65**	**72**	+7
MA-R-05	Rider Road	60	**66**	+6
MA-R-06	Beccari Lane and Aimee Avenue	56	62	+6
MA-R-07	Egleston Road and Highway 202	64	**65**	+1
MA-R-08	E. Mountain Road and Ridge Trail Road	58	61	+3
MA-R-09	Arbor Mobile Home Park	**69**	**67**	-2
MA-R-10	Springdale Street and Grove Avenue	**65**	64	-1
MA-R-11	Stephanie Lane	62	62	0
MA-R-12	Arch Road and Lockhouse Road	53	53	0
MA-R-13	Holyoke Road near Dry Bridge Road	64	**67**	+3
MA-R-14	Cara Lane and Holyoke Road	55	56	+1
MA-R-15	The Moseley Apartments	49	52	+3
MA-R-16	Powermill Village Apartments	52	57	+5
MA-S-01	White Oak School	53	57	+4
MA-S-02	Roots Learning Center	56	62	+6
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	63	62	-1
MA-S-04	Westfield High School	48	48	0
MA-S-05	Prospect Hill School	47	51	+4
MA-S-06	Paper Mill Elementary School	58	56	-2

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-35A Alternative DNL (dB)*[2]	*Change From Existing Conditions/ No Action Alternative DNL (dB)*
MA-S-07	Growing Tree Learning Center	40	43	+3
MA-S-08	Franklin Avenue Elementary School	45	48	+3
MA-S-09	St. Mary's Elementary School and St. Mary's High School	48	53	+5
MA-S-10	Westfield Technical Academy	43	47	+4
MA-S-11	Fort Meadow Early Childhood Center	48	53	+5
MA-S-12	Highland Elementary School	41	45	+4
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	45	49	+4

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding BAF where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section MA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to DNL of 65 dB or greater.
Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification.

Because the FAA, a cooperating agency, applies differing significance criteria for noise impact analysis, Figure MA3.1-7 depicts DNL differences at key thresholds according to FAA guidance described in FAA 1050.1F. These results, along with Table MA3.1-20, are included in this EIS to aid in significance determination under FAA criteria.

As shown in Figure MA3.1-7, areas to the north and south of BAF would experience increases in DNL greater than 1.5 dB that would be exposed to 65 dB DNL. This would affect 6 POIs (BA-R-01, BA-R-02, BA-R-03, BA-R-04, BA-R-05, and BA-R-13) that would be considered under FAA 1050.1F guidelines to experience a significant noise impact. The FAA also requires reporting increases of 3 dB or greater in DNL that would occur at noise sensitive locations that would experience DNL between 60 and 65 dB. This reporting threshold would apply to 3 POIs (BA-R-06, BA-R-08, and BA-S-02).

Because the residential POI, denoted with '-R-', represents a neighborhood of multiple residential properties, Table MA3.1-20 quantifies the acreage, households, and population that would be affected. A total of 2,283 acres, 429 households, and an estimated 1,212 people would be exposed to greater than 65 dB DNL under the F-35A Alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the existing conditions/No Action Alternative, which the FAA criteria would classify as a significant impact. A total of 3,143 acres, 885 households, and an estimated 2,406 people would be exposed to DNL between 60 and 65 dB under the F-35A Alternative while experiencing an increase of 3 dB or greater in DNL relative to the existing conditions/No Action Alternative, which the FAA criteria would classify as a reportable change in noise exposure.

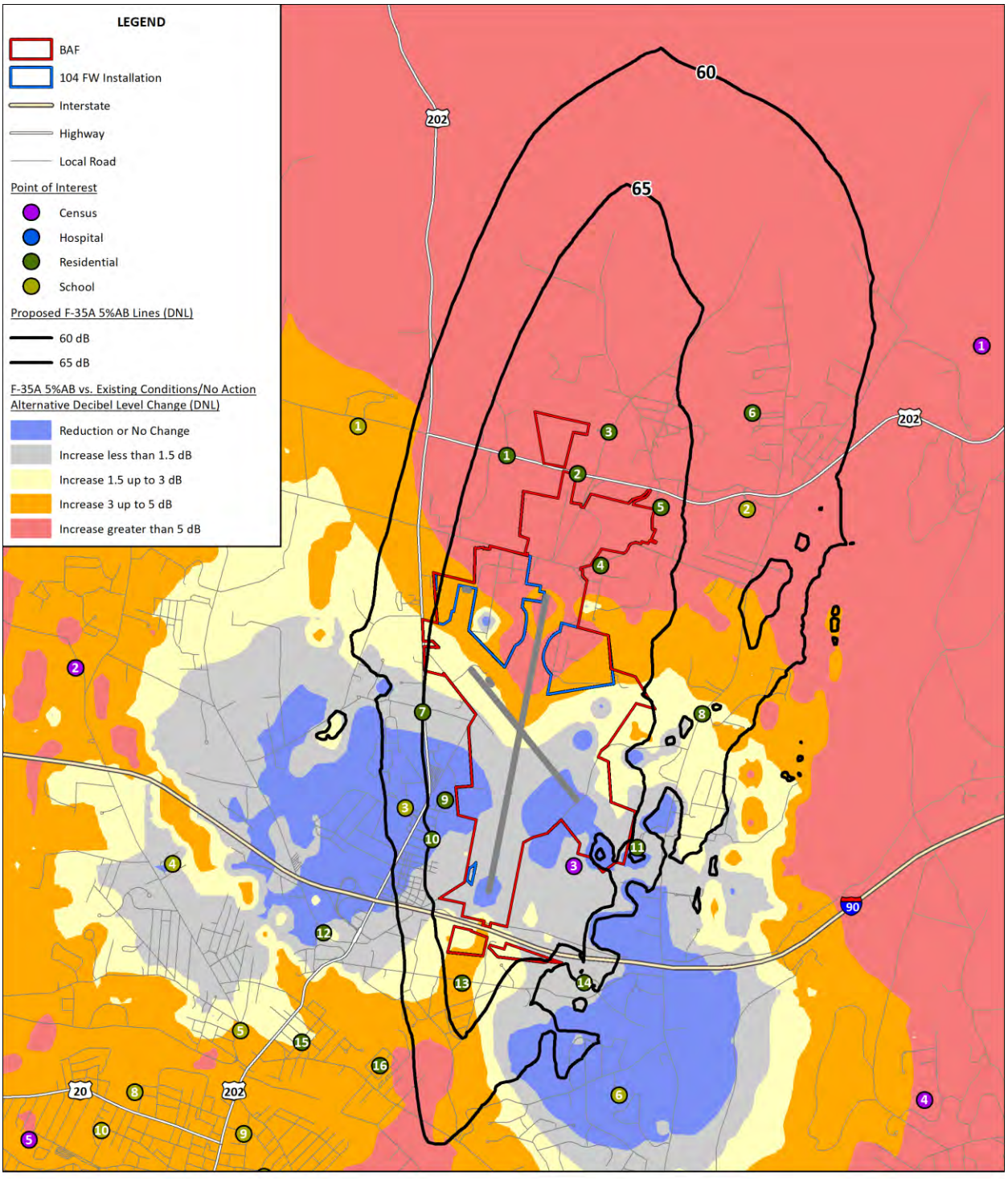


Figure MA3.1-7 F-35A Difference Contours Relative to Existing Conditions/No Action Alternative at Westfield-Barnes Regional Airport (BAF) for FAA Analysis

Table MA3.1-20 FAA DNL Exposure Thresholds Affecting Acreage, Population, and Households Under F-35A Alternative

FAA Classification[1]	*Description*	*Acreage*	*Households*	*Population*
Significant	+1.5 dB (or higher) Change within 65+ dB DNL	2,283	429	1,212
Reportable	+3 dB (or higher) Change within 60–65 dB DNL	3,143	885	2,406

Note: [1]FAA 1050.1F Desk Reference February 2020.
Legend: dB = decibel; DNL = Day-Night Average Sound Level, FAA = Federal Aviation Administration.

Table MA3.1-21 displays results for three metrics used to examine noise effects on classroom learning: exterior school day $L_{eq(8hr)}$ with threshold of 60 dB (equivalent to interior of 45 dB $L_{eq(8hr)}$ with windows open), number of classroom speech interfering events above 50 dB per school day hour (equivalent to 65 dB outside with windows open), and time above interior 50 dB per 8-hour school day (equivalent to exterior 65 dB). Under the F-35A Alternative at BAF, the number of school POIs experiencing noise levels above the interior $L_{eq(8hr)}$ 45 dB screening criteria (exterior $L_{eq(8hr)}$ 60 dB) would increase from 3 under existing conditions/No Action Alternative to 4, with MA-S-01 White Oak School newly above the criteria. Overall, $L_{eq(8hr)}$ would decrease by 1 dB at 2 schools, remain unchanged at 1, and increase 3 to 6 dB at 10 school POIs with the greatest increase occurring at MA-S-02 Roots Learning Center. The number of speech interfering events during the school day would decrease by 1 event per hour at 3 schools, no change at 7 schools, and an increase of 1 event per average hour at 3 schools. The time above interior 50 dB during a typical school day would range from less than 1 minute up to 8 minutes at 3 schools. When compared with existing conditions/No Action Alternative, the duration of interfering time would increase 1 to 6 minutes per average school day at 10 schools and either not change or decrease by up to 1 minute at 3 schools.

Table MA3.1-22 presents speech interference under this alternative based upon the number of events per average hour during the DNL daytime period for both a windows open and windows closed condition. Speech-interfering events would range from none to up to 4 per average hour with windows open. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows open would increase by 1 event per hour at 17 POIs, no change at 16 POIs, and decrease by 1 per average hour at 5 POIs. With windows closed, the number of speech interfering events per average daytime hour would range from none to 2. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows closed would increase by 1 event per hour at 13 POIs and not change at the remaining 25 POIs.

Table MA3.1-21 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) Classroom Learning Interference

Map ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*		*Number of Speech Interfering Events per School Day Hour*[2]		*Time above 50 dB per 8-hour school day (minutes)*[2]	
		F-35A Alternative[3]	*Change From Existing Conditions/ No Action Alternative*	*F-35A Alternative*	*Change From Existing Conditions/ No Action Alternative*	*F-35A Alternative*	*Change From Existing Conditions/ No Action Alternative*
MA-S-01	White Oak School	**61**	+4	2	+1	6	+2
MA-S-02	Roots Learning Center	**66**	+6	2	+1	6	+2
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	**66**	-1	2	+1	3	-1
MA-S-04	Westfield High School	52	0	1	0	8	+6
MA-S-05	Prospect Hill School	55	+4	1	0	8	+6
MA-S-06	Paper Mill Elementary School	**61**	-1	1	0	8	+4
MA-S-07	Growing Tree Learning Center	47	+3	0	-1	0	-1
MA-S-08	Franklin Avenue Elementary School	52	+3	1	0	5	+3
MA-S-09	St. Mary's Elementary School and St. Mary's High School	57	+5	1	0	7	+5
MA-S-10	Westfield Technical Academy	51	+4	0	-1	1	+1
MA-S-11	Fort Meadow Early Childhood Center	57	+5	1	0	6	+6
MA-S-12	Highland Elementary School	49	+4	0	-1	0	0
MA-S-13	Abner Gibbs Elementary/ Westfield Middle School	53	+5	1	0	4	+4

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Assumes 90% of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
[3]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than or greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.

Legend: dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour equivalent sound level.

Table MA3.1-22 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*F-35A Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	1	1	0	+1
MA-C-02	Tract 8128	1	1	+1	+1
MA-C-03	Tract 8125	3	1	+1	0
MA-C-04	Tract 8124.01	1	1	0	+1
MA-C-05	Tract 8129.01	0	0	-1	0
MA-C-06	Tract 8127.02	1	0	0	0
MA-C-07	Tract 8127.01	1	0	0	0
MA-H-01	Western Massachusetts Hospital	1	1	0	+1
MA-H-02	Baystate Noble Hospital	0	0	-1	0
MA-R-01	Highway 202 and Jaeger Drive	2	2	+1	+1
MA-R-02	Highway 202 near Old Stage Road	4	2	+1	0
MA-R-03	Palma Lane and Old Stage Road	3	2	+1	+1
MA-R-04	Buck Pond Road	3	2	+1	0
MA-R-05	Rider Road	2	1	+1	+1
MA-R-06	Beccari Lane and Aimee Avenue	1	1	0	0
MA-R-07	Egleston Road and Highway 202	2	1	0	0
MA-R-08	E. Mountain Road and Ridge Trail Road	2	1	+1	+1
MA-R-09	Arbor Mobile Home Park	2	1	0	0
MA-R-10	Springdale Street and Grove Avenue	2	1	+1	0
MA-R-11	Stephanie Lane	2	1	+1	0
MA-R-12	Arch Road and Lockhouse Road	1	0	0	0
MA-R-13	Holyoke Road near Dry Bridge Road	4	2	+1	+1
MA-R-14	Cara Lane and Holyoke Road	2	1	+1	+1
MA-R-15	The Moseley Apartments	1	0	0	0
MA-R-16	Powermill Village Apartments	1	0	0	0
MA-S-01	White Oak School	2	1	+1	0
MA-S-02	Roots Learning Center	1	1	0	0
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	2	1	+1	+1
MA-S-04	Westfield High School	1	1	0	+1
MA-S-05	Prospect Hill School	1	0	+1	0
MA-S-06	Paper Mill Elementary School	1	1	0	+1
MA-S-07	Growing Tree Learning Center	0	0	-1	0
MA-S-08	Franklin Avenue Elementary School	1	0	+1	0
MA-S-09	St. Mary's Elementary School and St. Mary's High School	1	0	+1	0
MA-S-10	Westfield Technical Academy	0	0	-1	0
MA-S-11	Fort Meadow Early Childhood Center	1	0	0	0
MA-S-12	Highland Elementary School	0	0	-1	0
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	1	0	0	0

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; POI = Point of Interest.

The PA was calculated to estimate sleep disturbance resulting from DNL nighttime aircraft noise (Table MA3.1-23). Compared to existing conditions/No Action Alternative, 35 of the 38 POIs would experience no change in PA for either windows open or closed with the remaining 3 POIs experiencing an increase of up to 1 percent PA for either or both window conditions. The reason for this relatively small increase is because the proposed 104 FW F-35A DNL nighttime operations would remain at the same small proportion (less than 1 percent of operations) as current F-15C operations, so civil jet DNL nighttime operations would generate nearly all PA events in all scenarios at BAF.

Table MA3.1-23 F-35A Alternative at Westfield-Barnes Regional Airport (BAF) Estimated PA

Map ID	*Named POI*[1]	*F-35A Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	<1%	<1%	0	0
MA-C-02	Tract 8128	<1%	<1%	0	0
MA-C-03	Tract 8125	2%	1%	0	0
MA-C-04	Tract 8124.01	<1%	<1%	0	0
MA-C-05	Tract 8129.01	<1%	<1%	0	0
MA-C-06	Tract 8127.02	1%	1%	+1%	0
MA-C-07	Tract 8127.01	<1%	<1%	0	0
MA-H-01	Western Massachusetts Hospital	<1%	<1%	0	0
MA-H-02	Baystate Noble Hospital	<1%	<1%	0	0
MA-R-01	Highway 202 and Jaeger Drive	1%	1%	0	0
MA-R-02	Highway 202 near Old Stage Road	5%	3%	+1%	0
MA-R-03	Palma Lane and Old Stage Road	4%	3%	0	0
MA-R-04	Buck Pond Road	6%	4%	0	0
MA-R-05	Rider Road	1%	<1%	0	0
MA-R-06	Beccari Lane and Aimee Avenue	<1%	<1%	0	0
MA-R-07	Egleston Road and Highway 202	2%	1%	0	0
MA-R-08	E. Mountain Road and Ridge Trail Road	2%	1%	0	0
MA-R-09	Arbor Mobile Home Park	2%	1%	0	0
MA-R-10	Springdale Street and Grove Avenue	2%	1%	0	0
MA-R-11	Stephanie Lane	2%	1%	0	0
MA-R-12	Arch Road and Lockhouse Road	<1%	<1%	0	0
MA-R-13	Holyoke Road near Dry Bridge Road	7%	5%	0	+1%
MA-R-14	Cara Lane and Holyoke Road	<1%	<1%	0	0
MA-R-15	The Moseley Apartments	<1%	<1%	0	0
MA-R-16	Powermill Village Apartments	<1%	<1%	0	0
MA-S-01	White Oak School	<1%	<1%	0	0
MA-S-02	Roots Learning Center	1%	<1%	0	0
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	2%	1%	0	0
MA-S-04	Westfield High School	<1%	<1%	0	0
MA-S-05	Prospect Hill School	<1%	<1%	0	0
MA-S-06	Paper Mill Elementary School	<1%	<1%	0	0
MA-S-07	Growing Tree Learning Center	<1%	<1%	0	0

Map ID	*Named POI*[1]	*F-35A Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
MA-S-08	Franklin Avenue Elementary School	<1%	<1%	0	0
MA-S-09	St. Mary's Elementary School and St. Mary's High School	<1%	<1%	0	0
MA-S-10	Westfield Technical Academy	<1%	<1%	0	0
MA-S-11	Fort Meadow Early Childhood Center	<1%	<1%	0	0
MA-S-12	Highland Elementary School	<1%	<1%	0	0
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	<1%	<1%	0	0

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: % = percent; < = less than; ID = Identification; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels for residential areas exposed to 80 dB DNL or greater (DNWG 2013b). As summarized in Table MA3.1-17, a total of 3 acres outside of BAF would be exposed to 80 dB DNL or greater. However, all of that area would be located just west of BAF in an industrial area primarily covered by a recycling center. No PHL analysis was conducted because no people reside in this area.

Under FAA Order 1050.1F significance criteria standards, noise impacts under the F-35A Alternative at BAF would be significant because noise sensitive areas that would be exposed to 65 dB DNL or greater would experience more than a 1.5 dB increase in DNL, relative to the existing conditions/No Action Alternative. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would also be significant.

Airspace

As tabulated in Section 3.2.5.2, *Special Use Airspace Noise Modeling*, while operating in airspace, the F-35A would result in an increase of 3 to 5 dB SEL and 6 to 8 dB L_{max} than the existing F-15C for a typical airspace flight profile (i.e., at 400 knots and at military power when comparing single-event noise levels). Individual airspace flights would differ from noise levels because aircraft speeds and power settings would vary depending upon specific training exercises performed at that time.

Under this alternative, the 104 FW would be assigned F-35A aircraft with a higher annual flying hour program, resulting in 3,182 sorties per year, a 67 percent increase above existing conditions/No Action Alternative. The F-35A would continue to train in the same airspace currently used by the 104 FW. The mix of types of training events and altitudes would remain

about the same as the F-15C (see Table MA2.1-7). Since air-to-ground ordnance delivery would be impractical when operating from BAF, it is likely that some portion of the training syllabus would be flown from other bases.

This analysis presents a 'worst-case' for noise impacts, assuming an entire year of training would occur in the SUA currently used by the 104 FW, with no training deployments elsewhere to achieve training requirements. Based on the increase in sorties of 67 percent along with the greater SEL of the F-35A, L_{dnmr} and DNL generated in each airspace that would be used by the F-35A could increase up to 7 dB from the existing conditions/No Action Alternative for subsonic operations (104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/). The result would be L_{dnmr} ranging from 47 dB down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain relatively low for subsonic operations. Additionally, the 104 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most subsonic aircraft airspace sorties would likely not be noticed by any casual observer.

Under the F-35A scenarios, the F-35A would replace the F-15C for supersonic activity in both the W-105A/B overwater ranges and overland Viper Complex. The frequency of supersonic activity in these areas would increase by 67 percent from the existing conditions/No Action Alternative, which would equate to an increase in CDNL of 2 to 3 dB. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the magnitude of noise generated by each sonic boom depends primarily by altitudes, which would not change. The shape and size of the aircraft plays a smaller role in the magnitude of sonic boom generated. Although BOOMAP96 does not include supersonic noise modeling data for the F-35A, noise data for a similar fifth generation fighter, the F-22, suggests that fifth generation fighters generate greater noise levels during supersonic activities than legacy aircraft, like F-15. Given that the dimensions of the F-35A are approximately 20 percent smaller than the F-22, noise levels due to the F-35A are estimated to fall between the F-22 and legacy aircraft like F-15. Using BOOMAP96, a midpoint value between the F-15 and F-22 would result in CDNL for the F-35A estimated to be approximately 4 to 5 dB greater than the F-15C under existing conditions/No Action Alternative. Therefore, the overall change to CDNL in W-105A/B and Viper Complex under the F-35A scenarios would be up to 7 dB greater than existing conditions/No Action Alternative due to a combination of the increase in supersonic sorties and different aircraft characteristics of the F-35A.

MA3.1.2.3 F-15C Legacy Aircraft

Under this alternative, the 104 FW would continue to operate F-15C aircraft at BAF. The following sections describe the impacts resulting from construction, installation operations, and airspace operations associated with maintaining existing F-15C aircraft at BAF.

Installation

Construction associated with this alternative would include projects that would occur within the BAF property, which would generate temporary construction noise. The proposed construction sites would be in areas close to the BAF runways, which are currently exposed to 65 dB DNL or greater and land adjacent to BAF, which is commercial. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

Under this alternative, 104 FW F-15C flight operations at BAF would continue and noise impacts associated with installation operations would be the same as the existing conditions/No Action Alternative. Therefore, impacts on noise at the airfield would not be significant.

Airspace

Under this alternative, airspace operations in 104 FW training areas would continue with the existing F-15C aircraft, so impacts associated with airspace operations would be the same as the existing conditions/No Action Alternative. Therefore, impacts on noise would not be significant.

MA3.1.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on noise at the airfield would not be significant.

MA3.1.3 Summary of Impacts

When compared with the existing conditions/No Action Alternative, the F-15EX basing at BAF would result in an increase of 845 additional acres outside of airport property that would be exposed to 65 dB or greater. A total of 197 additional households would be exposed to 65 dB DNL or greater and an estimated 547 additional people. The number of noise sensitive POIs exposed to 65 dB DNL or greater would increase by 6. The number of speech interfering events during the school day would increase by 1 event per hour at 2 schools. Existing F-15C and civil jet operations at BAF already create interfering events at many of these schools, so replacing the F-15C with the F-15EX that generates greater noise levels would not significantly change the amount of time of disruption during the school day, but instead would cause each military jet interfering event to be louder by several decibels. The number of speech interfering events with

windows open would increase by 1 event per hour at 4 POIs. The number of speech interfering events with windows closed would increase by 1 event per hour at 12 POIs. Three POIs would experience an increase of up to 1 percent PA for either or both window conditions. L_{dnmr} within the SUA would increase by up to 5 dB but remain in the 35 to 45 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and consistent with noise levels in many rural areas. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would be significant.

Under FAA Order 1050.1F significance criteria standards, the F-15EX Alternative at BAF would result in 10 POIs, 304 households and 852 people that would be significantly affected. Five POIs, 621 households, and 1,811 people would experience a reportable increase in noise according to FAA criteria.

When compared with the existing conditions/No Action Alternative, the F-35A basing at BAF would result in an increase of 1,288 additional acres outside of airport property that would be exposed to 65 dB or greater. A total of 267 additional households would be exposed to 65 dB DNL or greater and an estimated 779 additional people. The number of noise sensitive POIs exposed to 65 dB DNL or greater would increase by 4. The number of speech interfering events during the school day would increase by 1 event per average hour at 3 schools. Existing F-15C and civil jet operations at BAF already create interfering events at many of these schools, so replacing the F-15C with the F-35A that generates greater noise levels would not significantly change the amount of time of disruption during the school day, but instead would cause each military jet interfering event to be louder by several decibels. The number of speech interfering events with windows open would increase by 1 event per hour at 17 POIs. The number of speech interfering events with windows closed would increase by 1 event per hour at 13 POIs. Three POIs would experience an increase of up to 1 percent PA for either or both window conditions. L_{dnmr} within the SUA would increase by up to 7 dB but remain in a range of 35 to 47 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and consistent with noise levels in many rural areas. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would be significant.

Under FAA Order 1050.1F significance criteria standards, the F-35A Alternative at BAF would result in six POIs experiencing significant increases while 429 households and 1,212 people would be affected. Three POIs, 885 households, and 2,406 people would experience a reportable increase in noise according to FAA criteria.

Under the F-15C Legacy Alternative, 104 FW F-15C flight operations at BAF would continue and noise impacts associated with installation operations would be the same as the existing

conditions/No Action Alternative. Therefore, impacts on noise at the airfield would not be significant. Impacts under the No Action Alternative would be similar to the Legacy Alternative.

MA3.2 AIRSPACE

MA3.2.1 Affected Environment

To ensure the 104 FW personnel and fleet are combat mission ready, training is conducted at the airfield and in the airspace surrounding it, as well as utilizing several overland and overwater SUA that include MOAs, Warning Areas, Restricted Areas, and ATCAAs (Table MA2.1-6 and Figure MA2.1-4).

MA3.2.1.1 Installation

The 104 FW operates and is based at BAF, which has two operational runways. The airfield diagram in Figure MA3.2-1 depicts the runway and taxiway designations, field elevation, depiction of critical areas, and instrument hold lines. Runway 20 is BAF's only precision instrument runway. General runway details are provided below.

- **Runway 2** is 9,000 feet x 150 feet and is a non-precision instrument runway. The primary surface is grooved asphalt and concrete, with asphalt from the concrete to the edge of the runway.
- **Runway 20** is 9,000 feet x 150 feet and is a precision instrument runway. The primary surfaces are as described for Runway 2 above.
- **Runway 15** is 5,000 feet x 75 feet. The surface is asphalt. There is a 490-foot displaced threshold on the approach end of Runway 15. The F-15C cannot land on Runway 15/33 due to the length.
- **Runway 33** is 5,000 feet x 75 feet.

The airport provides and maintains the following lighting systems for air carrier operations during the hours of darkness or during conditions below VFR minimums. Runway 2/20 is served by high intensity runway edge lights. Runway 15/33 is served by medium intensity runway edge lights. Medium intensity taxiway lighting occurs on all taxiways. An airport rotating light beacon is located 1,000 feet south of the ATC Tower. The FAA operates and maintains a Medium Intensity Approach Light System that serves Runway 20. The FAA operates and maintains a Precision Approach Path Indicator that serves Runways 2/20 and 15/33.

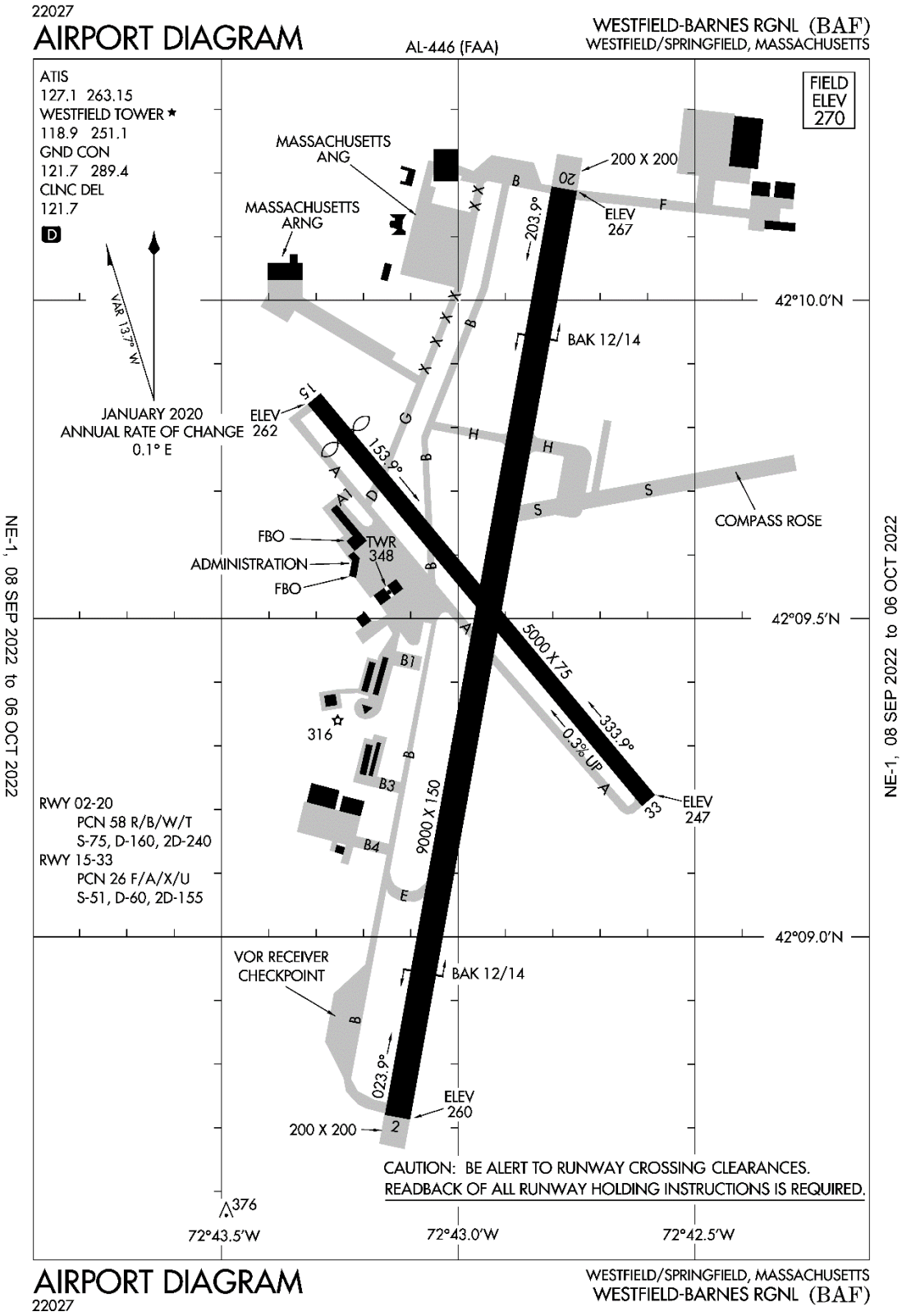


Figure MA3.2-1 Westfield-Barnes Regional Airport (BAF) Airfield Diagram

Aircraft Arresting Systems are equipped at BAF with a means of rapidly stopping military aircraft on a runway. BAF has the BAK 12/14 extended length tape aircraft arresting system located on Runway 2/20. Runway 20 arresting system is 1,440 feet from the threshold and Runway 2 is 1,400 feet from the threshold. The cable can be raised by ATC, the 104 FW/CP, or with prior coordination, manually.

Airspace Designation

BAF is surrounded by Class "D" Airspace located at N42°09.46' W72°42.94', elevation 270 feet. Class D airports need an ATC Tower to coordinate airport operations. The BAF Class D airspace is defined as the airspace extending from the surface to and including 2,800 feet MSL. The BAF Class D airspace is not a perfect circle due to the adjacent Westover Metro Class D airspace to the east. The Bradley International Airport Class C airspace outer shelf (2,100–4,200 feet) cuts into the southern portion of the BAF Class D airspace by 700 feet of altitude. To enter Class D airspace, two-way communication must be established prior to reaching the airspace border.

Air Traffic Control Facilities

BAF ATC Tower (Westfield Tower) is an FAA-contract control tower, operated daily from 6 a.m. to 9 p.m. Exceptions are posted by Notice to Air Missions. BAF is also serviced by the FAA's Yankee Terminal Radar Approach Control which controls the airspace surrounding BAF 10,000 feet and below. Boston ARTCC operates the airspace above Yankee Terminal Radar Approach Control's airspace.

Navigation Aids

BAF provides the following NAVAIDS: Very High Frequency Omnidirectional Range (VOR) Tactical Air Navigation (TACAN) System (VORTAC), Instrument Landing System, and Nondirectional Beacon. The FAA is responsible for the preventive maintenance inspection. BAF is serviced by seven separate instrument approach procedures, one standard instrument departure, and two standard terminal arrival routes.

Federal Airways

The Barnes VORTAC is utilized by both military and civil aircraft and links valuable navigation airways. Like highways in the sky, VOR or "Victor" airways link NAVAID to NAVAID to enable point-to-point pilot navigation. RNAV terminal transition routes, referred to as Tango or "T" routes allow GPS-equipped IFR operations to efficiently fly around certain airspace and provide a more direct route. The following routes are routed from and through the BAF VORTAC: V-146,

V-292, V-146, and V-405. RNAV terminal transition route T314 transitions the VORTAC to the northeast.

MA3.2.1.2 Airspace

Warning Areas

The 104 FW primarily uses the W-105 Warning Area. This overwater airspace is approximately 180 x 65 nautical miles and available from the surface to FL500, making it ideal for air-to-air missions. The airspace is located 150 nautical miles (a 20-minute flight) from the 104 FW installation at BAF, is available for exclusive use 95 percent of the time upon request, and is marginally impacted by weather or traffic. W-105 contains two air-to-air refueling tracks. Supersonic flight is approved above 10,000 MSL when greater than 15 nautical miles from land. Additionally, chaff and flares and electronic attack are authorized within the confines of the Warning Area.

Military Operations Areas

As the 104 FW's secondary airspace, the Adirondack Complex (call-sign "Viper") is an 80 nautical mile x 72 nautical mile airspace (including R-5201/2). Also located approximately 150 nautical miles from the installation it is shared with several other ANG units, mainly from Burlington, Vermont and Syracuse, New York. It utilizes floors that vary from 100 feet AGL to FL180 and a ceiling of FL500. The Adirondack Air-to-Ground Range, located in the western portion of the Adirondack Complex, is the East Coast's premier F-35 training ground. It contains a weapons impact scoring system, laser scoring system, and threat emitters including a wideband emitter. Aerial refueling is available in the southern portion of the Adirondack MOA in AR-609. There are two MTRs within the complex (VR-725 and IR-801).

Restricted Areas

The 104 FW utilizes R-5201 and R-5202, located within the Adirondack Airspace Complex and 4 nautical miles northeast of Fort Drum, New York. R-5201 and R-5202 is a 30-minute flight from the 104 FW installation at BAF. R-5201 altitudes are surface–FL230. R-5202 is split into two subsections: R-5202A (FL230–FL290) and R-5202B (6,000 MSL–FL290).

Air Traffic Control Assigned Airspace

The Lightning ATCAA is a 180 nautical mile x 75 nautical mile airspace extension developed specifically for long-range offensive counter air and suppression of enemy air defense missions against modern surface-to-air missile threat systems. It is collocated with the Adirondack MOA

complex and utilizes a floor that varies between FL180 and FL300 and a ceiling of FL500. Supersonic flight is allowed above FL300, infrared and electromagnetic countermeasures are allowed, and electronic attack and protection techniques may be employed.

The Laser and Scotty ATCAA is located northeast of BAF. The Laser and Scotty ATCAA is a 206 nautical mile x 95 nautical mile airspace which is above the Yankee and Condor MOAs and located within a 10-minute flight from BAF. It is the 104 FW's tertiary airspace, with a floor that varies from 7,000 MSL to FL180 and a ceiling of FL600. It is suitable for many different mission sets and air-to-air refueling is available in the southern portion of the complex with AR-631. Several MTRs transition through the Condor MOA (VR's-840, 841, 842, and IR's-800, 850, 851, 852).

MA3.2.2 Environmental Consequences

MA3.2.2.1 F-15EX

Installation

The F-15EX would conduct the same departure and arrival procedures as the current F-15C. The total number of airfield operations is taken into account when determining the impact to the airfield. As shown in Table MA2.1-2, the F-15EX would generate an additional 6.7 percent increase to the total airfield operations above the existing operations. The consequences of increased operations resulting in more air traffic are generally associated with flight delays at the airfield and/or ATC sector overload. However, the drawdown of F-15C aircraft prior to the arrival of the F-15EX would prevent any short-term overlap between F-15C and F-15EX aircraft within controlled airspace. Additionally, the minor increases in operations would have a minimal effect on the air traffic environment. Furthermore, F-15EX would not require any changes in local airspace, procedures, or airfield management.

ATC has various fail safes to use to prevent sector overload, traffic delays, and airspace congestion. These methods include de-combining control positions (reducing workload) or other aircraft-specific methods like holding or vectoring. Therefore, impacts on the local ATC environment would not be significant.

Through various methods of separating and sequencing aircraft as mentioned in the FAA Order 7110.65AA, there would be no significant impact to controlled airspace by basing the F-15EX at the 104 FW.

Airspace

There are no specific guidelines as to what quantifies SUA saturation point. For example, 4–6 bomber aircraft within a specific MOA could make the MOA be considered saturated, while 8 fighter type aircraft may not. Additionally, with the vast amount of SUA in the region, aircraft can be dispersed throughout the region instead of all being tasked to one SUA.

The proposed F-15EX beddown would not require any changes to the current lateral or vertical configurations of any Warning Area, MOA, Restricted Area, or ATCAA, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change, the impacts on the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the SUA activation times would remain the same. ATC would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Selection of the 104 FW for beddown of the 21 operational F-15EX aircraft would result in minimal impacts on SUA use throughout this region. Under this alternative, the F-15EX aircraft would conduct up to 3,182 annual sorties, an increase of 67 percent above the 1,900 currently flown by the F-15C. Based on the average sortie duration of 1.65 hours, beddown of the F-15EX would result in an increase in airspace use of approximately 2,115 hours annually.

Table MA3.2-1 illustrates the projected change in airspace use by altitude associated with the beddown of the F-15EX at BAF. The F-15EX would utilize altitudes below 10,000 MSL at the same rate as the current F-15C operations. Training at altitudes between 10,000 MSL to 30,000 MSL would increase, while use of altitudes above 30,000 MSL would decrease as shown in Table MA3.2-1.

Table MA3.2-1 Existing Conditions/No Action Alternative and Proposed Use by F-15EX by Altitude

Altitude (feet)	***Existing Conditions/ No Action Alternative Percentage Use F-15C***	***Proposed Percentage Use F-15EX***	***Change***
500–3,000 AGL	1	1	0
3,000–5,000 AGL	1	1	0
5,000–10,000 MSL	5	5	0
10,000 MSL–18,000 MSL	36	38	+2
18,000 MSL–30,000 MSL	17	30	+13
Above 30,000	40	25	-15

Legend: AGL = above ground level; MSL = mean sea level.

Implementation of this alternative represents the continuation of current SUA activities with increases only to the number of potential operations, which fall within previously analyzed parameters. Impacts would not be significant.

MA3.2.2.2 F-35A

Installation

The F-35A would conduct the same departure and arrival procedures as the current F-15C. Existing control methods would continue to be utilized by ATC to prevent sector overload, reduce traffic delays, and airspace congestion. Utilizing the various ATC methods of separating and sequencing aircraft as mentioned in the FAA Order 7110.65AA would ensure no significant impact to controlled airspace would be expected by the basing of the F-35A at the 104 FW.

Airspace

The proposed F-35A beddown would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, or ATCAA, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change, the impacts on the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the SUA activation times would remain the same. ATC would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Selection of the 104 FW for beddown of the F-35A aircraft would result in minimal impacts on SUA use throughout this region. Under this alternative, the F-35A aircraft would conduct up to 3,182 annual sorties, an increase of 67 percent above the 1,900 currently flown by the F-15C. Based on the average sortie duration of 1.65 hours, beddown of the F-35A would result in an increase in airspace use of approximately 2,115 hours annually.

Table MA3.2-2 illustrates the projected change in airspace use by altitude associated with the beddown of the F-35A at the 104 FW installation. The F-35A would utilize altitudes below 10,000 MSL at the same rate as the current F-15C operations. Training at altitudes between 10,000 MSL to 18,000 MSL and above 30,000 MSL would decrease, while use of altitudes between 18,000 and 30,000 MSL would increase as shown in Table MA3.2-2.

Table MA3.2-2 Existing Conditions/No Action Alternative and Proposed Use by F-35A by Altitude

Altitude (feet)	*Existing Conditions/ No Action Alternative Percentage Use F-15C*	*Proposed Percentage Use F-35A*	*Change*
500–3,000 AGL	1	1	0
3,000–5,000 AGL	1	1	0
5,000–10,000 MSL	5	5	0
10,000 MSL–18,000 MSL	36	24	-12
18,000 MSL–30,000 MSL	17	58	+41
Above 30,000	40	11	-29

Legend: AGL = above ground level; MSL = mean sea level.

Implementation of this alternative represents the continuation of current SUA activities with increases only to the number of potential operations, which fall within previously analyzed parameters. Impacts would not be significant.

MA3.2.2.3 F-15C Legacy Aircraft

Installation

Should the 104 FW not be selected for either new aircraft, they would retain the current fleet of 18 F-15C aircraft and would continue to operate at BAF. Aircraft operations would not change from existing conditions/No Action Alternative. The 104 FW would continue to support the F-15C mission currently being conducted. There would be no significant impacts on the controlled airspace associated with implementation of this alternative.

Airspace

Should the 104 FW not be selected for either new aircraft, they would retain the current fleet of 18 F-15C aircraft and would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur. Operations would continue to remain as described in MA2.1.2. There would be no significant impacts on airspace associated with implementation of this alternative.

MA3.2.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy

aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on airspace would not be significant.

MA3.2.3 Summary of Impacts

The replacement of the F-15C with the F-15EX or F-35A would not require changes in local airspace. Over time, the replacement of the F-15C aircraft at the installation could result in a 67 percent increase in 104 FW operations (and a 6.7 percent increase in total operations) at the airfield at BAF and in the SUA. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA by both installations would ensure safe air operations within the National Airspace System and SUA. In summary, impacts on controlled airspace and SUA associated with the beddown of either the F-15EX or F-35A would not generate any significant impacts. Similarly, retention of the F-15C aircraft or selection of the No Action Alternative would not have significant impacts on airspace.

MA3.3 AIR QUALITY/CLIMATE CHANGE

The following section describes the affected environment associated with the current operations of a 104 FW ANG squadron and examines the extent to which the beddown of an ANG squadron of F-15EX or F-35A at the 104 FW installation (at BAF) would be consistent with federal, state, and local air quality regulations. The climate change analysis is discussed in the context of cumulative impacts as presented in Section MA4.2.3, *Air Quality/Climate Change*.

MA3.3.1 Affected Environment

MA3.3.1.1 Installation

The affected environment for the air quality analysis includes portions of Hampden County, where the 104 FW is located. The MassDEP is responsible for developing air quality management plans and implementing control measures such as permitting and compliance programs in the state. Hampden County is part of the Hartford-New Haven-Springfield Interstate Air Quality Control Region (40 CFR 81.26) and the entire state of MA falls within the Ozone Transport Region boundary (40 CFR 81.457).

Hampden County is currently designated as a maintenance area for the NAAQS 8-Hour Ozone (due to the Springfield, Western Massachusetts "orphan maintenance area" that includes Berkshire, Franklin, Hampden, and Hampshire counties) (EPA 2022a). The area was determined to be in attainment in 2012 (EPA 2012), so the maintenance area designation would remain in place until 2032. Hampden County is designated as unclassifiable, attainment, or better than

national standards for all other NAAQS. The applicable General Conformity Rule *de minimis* levels for Hampden County are listed in Table MA3.3-1.

Table MA3.3-1 Applicable General Conformity *De Minimis* Thresholds (tons per year)

VOCs[1]	*NO_x*[1]	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
50	50	N/A[2]	N/A[2]	N/A[2]	N/A[2]

Notes: [1]Hampden County is a maintenance area for 8-Hour Ozone (1997) NAAQS and is within the ozone transport region. VOCs and NO_x are precursors to ozone.
[2]*De minimis* thresholds are not applicable because Hampden County is in attainment of the NAAQS. For attainment area criteria pollutants, this analysis uses the EPA's PSD permitting threshold of 250 tons per year as an initial indicator of the local significance of potential impacts on air quality.
Legend: CO = carbon monoxide; N/A = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; TPY = tons per year; VOC = volatile organic compound.
Source: 40 CFR 93.153.

Table MA3.3-2 presents the 2017 emission inventories for Hampden County, which are the most recent data available.

Table MA3.3-2 2017 Criteria Pollutant Emissions for Hampden County, Massachusetts (tons)

Location	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Hampden County, Massachusetts	209,603	105,230	620,162	6,040	66,052	25,320

Legend: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
Source: EPA 2022b.

In the Hampden County area, summers are warm and wet, the winters are freezing and snowy, and it is partly cloudy year-round. Over the course of the year, the temperature typically varies from 17°F to 84°F. The hottest month of the year is July, with an average high of 83°F and low of 62°F, and the coldest month of the year is January, with an average low of 18°F and high of 34°F. Average rainfall ranges between 2.6 and 4.7 inches per month (National Weather Service 2022). Wind conditions vary throughout the year, and instantaneous wind speed and direction vary more widely than hourly averages. Wind experienced at any given location is highly dependent on local topography and other factors. The predominant average hourly wind direction at BAF is from the west throughout the year. The windier part of the year lasts from mid-November to late April, with average wind speeds of more than 5.0 miles per hour and the windiest month is February, with an average hourly wind speed of 6.4 miles per hour (Weather Spark 2022).

As described in Section MA2.1.2, *Airfield Operations*, current airfield operations are performed by the 104 FW, which currently flies F-15C aircraft that could be replaced by either the F-15EX or F-35A. For the air quality analysis, only the aircraft to be replaced has been analyzed, as all other aircraft and their activities would remain the same. The existing emissions from the annual F-15C operations at BAF in Hampden County are presented in Table MA3.3-3. These emissions

are based on the average number of annual sorties (1,900) flown between FY 2014 and FY 2021. Other sources of air emissions associated with aircraft operations include aerospace ground equipment (AGE) such as generators, lifts, and service carts; and emissions generated from engine testing in a hush house. Emission estimates were developed for the F-15C aircraft, using the Pratt and Whitney F100-PW-220 engine. Aircraft operation emission estimates were derived from the DAF's ACAM version 5.0.18b, using installation-specific data including landings and takeoffs, closed patterns, and annual engine testing. Additionally, AGE operations emissions estimates were also derived from ACAM and NONROAD, using a representative AGE inventory.

Table MA3.3-3 Existing Annual F-15C Emissions Estimates for the 104 FW at Westfield-Barnes Regional Airport (BAF), Hampden County (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C Airfield Operations (mobile sources)	**24.67**	**36.22**	**148.38**	**5.75**	**3.69**	**3.35**	**15,059**
Jet Engine Test Cell (stationary source)	0.15	0.38	0.61	0.03	0.02	0.02	104
Total	**24.82**	**36.60**	**148.99**	**5.79**	**3.71**	**3.37**	**15,163**

Legend: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The 104 FW has developed an Air Quality Management Plan that provides the regulatory requirements applicable to stationary and mobile air emission sources that are operated within the ANG installation boundary and fall under the operational control of the Wing Commander (NGB and 104 FW 2020).

MA3.3.1.2 Airspace

The affected environment for air quality comprises the SUA associated with 104 FW flight operations that occur below the mixing height of 3,000 feet AGL, as shown in Table MA2.1-6. The F-15Cs currently fly approximately 1 percent of the time below 3,000 feet AGL, which is below the mixing height and where emissions from the flying aircraft can influence ground-level air quality. For the 104 FW SUA, this includes portions of the Adirondack MOA Complex, Lowville MOA, Carthage East MOA, and the Cranberry MOA which overlie parts of New York State. The NAAQS attainment status for these airspace units is presented in Table MA3.3-4.

Table MA3.3-4 NAAQS Attainment Status for Low-Level Airspace

Airspace	*County(ies)*	*Attainment Status*
Portions of the Adirondack MOA Complex: • Adirondack B MOA (floor is 2,500 feet MSL, so only those portions where the ground elevation is over 500 feet) • Adirondack C MOA (floor is 100 feet AGL)	Portions of St. Lawrence, Lewis (New York State)	Attainment/unclassifiable for areas under the airspace
Lowville MOA (floor is 100 feet AGL)	Portions of Lewis, Oswego, Jefferson, Oneida, Herkimer (New York State)	Jefferson County: Maintenance for 8-hour O_3; all other counties are attainment/unclassifiable for areas under airspace
Carthage East MOA (floor is 100 feet AGL)	Portions of Lewis, Jefferson, Herkimer, St. Lawrence (New York State)	Jefferson County: Maintenance for 8-hour O_3; all other counties are attainment/unclassifiable for areas under airspace
Cranberry MOA (floor is 500 feet AGL)	Portions of Hamilton, Herkimer, St. Lawrence (New York State)	Attainment/unclassifiable for areas under airspace

Legend: AGL = above ground level; MOA = Military Operations Area; MSL = mean sea level; O_3 = ozone; NAAQS = National Ambient Air Quality Standards.

MA3.3.2 Environmental Consequences

Air quality impacts within the affected environment were reviewed relative to federal, state, and local air pollution standards and regulations. Refer to Chapter 3.0, Section 3.4, *Air Quality*, for a detailed discussion of air quality resource definitions and the analytical methodology for evaluating impacts. As described in Section MA3.3.1, *Affected Environment*, Hampden County is currently designated as a maintenance area for the 8-hour O_3 NAAQS, and the General Conformity *de minimis* threshold for O_3 in an ozone transport region is 50 tons per year.

Proposed construction varies based on the F-15EX or the F-35A aircraft as well as the construction that would occur to support the legacy aircraft if the 104 FW is not selected for either the F-15EX or the F-35A. All proposed construction would occur within the footprint of the developed installation. To ensure the maximum annual emissions from construction are captured, the calculations have been performed to account for each construction project being completed within 12 months of the year it is programmed (e.g., if a project is planned for implementation in FY 2024, the construction is assumed to occur between January and December 2025), even though some projects would last longer than 12 months. The following assumptions were used for construction projects:

- New building foundations require excavation of at least 1 foot of grade soil.
- Airfield pavements require excavation of at least 3.5 feet of grade soil.

- For the purposes of calculating emissions based on building volume (cubic feet), buildings are assumed to have an average height of 14 feet to account for some variation in the heights across all the proposed projects.
- Parking areas for new buildings are assumed to be 50 percent and sidewalks assumed to be 10 percent of the new building square footage.
- New impervious surfaces are assumed to be concrete or asphalt.
- Where two options are under consideration, the option that would generate the greatest emissions was selected for analysis.

Construction emission estimates were prepared using the DAF air model ACAM. Emissions would primarily be generated by:

- diesel-powered construction equipment operating on-site,
- trucks removing or delivering materials from the construction areas,
- construction worker personal vehicles for travel to and from the work site each day,
- application of architectural coatings, and
- dust created by grading and other bare earth construction activities.

Standard construction equipment by phase were also applied and detailed information on the emissions estimates and assumptions can be found in Appendix D.

Construction would follow all applicable MassDEP Air Pollution Control Regulations, such as measures to alleviate dust, noise, and odor nuisance conditions that may occur. The measures would comply with the MassDEP's Bureau of Air and Waste Regulations 310 Code of Massachusetts Regulations (CMR) 7.01, 7.09, and 7.10. For construction equipment, all non-road engines would be operated using only ultra-low sulfur diesel (with a sulfur content of no greater than 15 parts per million) pursuant to 40 CFR 80.510.

ACAM (version 5.0.18b) was used to provide emissions estimates for current F-15C operations, the proposed F-15EX or F-35A operations, and additional employee commutes. ACAM provides estimated air emissions from proposed actions for specific criteria and precursor pollutants as defined in the NAAQS. For aircraft, operational modes (including taxi/idle [in and out], takeoff, climb out, and approach) are used as the basis of the emission estimates. Emission estimates were developed for the F-15C using two Pratt and Whitney F100-PW-220 engines, for the F-15EX aircraft using two General Electric F110-GE-129 engines, and for the F-35A using one Pratt and Whitney F135-PW-100 engine. Detailed information on the emissions estimates and assumptions can be found in Appendix D.

MA3.3.2.1 F-15EX

Installation

Construction projects would occur between 2025 and 2034 to support the beddown of the F-15EX, though all critical infrastructure would be completed prior to aircraft arrival. Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

Airfield operations for the F-15EX would be similar to those currently occurring with the F-15C at the 104 FW. The primary differences would be that the annual number of airfield operations is projected to increase. The net change in operational emissions at the 104 FW installation are presented in Table MA3.3-5 and assume that 100 percent of the F-15EX aircraft would be on-site and operational in 2027. The F-15EX operations would represent the new emission profile moving forward. The emissions account for the difference in the engine operations between the F-15C and the F-15EX, the increase in annual operations, and an increase in commuting personnel who would be assigned to the 104 FW installation as a result of the F-15EX beddown.

Table MA3.3-5 Annual Airfield Emissions Estimates for the 104 FW Beginning in 2027 (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C Current Airfield Operations Removed	**-24.67**	**-36.22**	**-148.38**	**-5.75**	**-3.69**	**-3.35**	**-15,059**
F-15EX Aircraft Operations Added	**33.49**	**34.66**	**161.91**	**5.46**	**10.47**	**9.48**	**14,002**
Net Change in Airfield Emissions – F-15EX	**8.82**	**-1.55**	**13.53**	**-0.29**	**6.79**	**6.13**	**-1,056**
F-15EX Additional Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
Total	**8.96**	**-1.46**	**15.38**	**-0.29**	**6.79**	**6.13**	**-845**

Legend: 104 FW = 104th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The total annual emissions for both construction and F-15EX operations occurring in a calendar year are presented in Table MA3.3-6. No construction projects with a ground disturbance footprint are planned to begin in 2032, and no construction projects are planned to begin after 2034. The total emissions that would occur in each year from both construction and operational activities are evaluated against the applicable *de minimis* or comparative threshold for the criteria pollutant.

Table MA3.3-6 Total Annual Emissions Estimates for Construction and Operations with the F-15EX Conversion at the 104 FW (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.37	0.91	1.54	0.00	0.03	0.03	333
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.91	0.95	1.81	0.00	0.21	0.03	376
Net Change – F-15EX Operations Emissions (50% transition)	4.41	-0.78	6.77	-0.15	3.39	3.07	-528
Commuter Emissions (50% transition)	0.07	0.05	0.92	0.00	0.00	0.00	106
2026 Total Net Change Emissions[1]	**5.39**	**0.22**	**9.50**	**-0.14**	**3.61**	**3.10**	**-46**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.42	0.95	1.57	0.00	0.45	0.03	350
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2027 Total Net Change Emissions[1]	**9.38**	**-0.52**	**16.95**	**-0.29**	**7.24**	**6.16**	**-495**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.75	1.24	1.82	0.00	1.47	0.04	403
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2028 Total Net Change Emissions[1]	**9.71**	**-0.22**	**17.20**	**-0.29**	**8.26**	**6.18**	**-442**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.33	0.91	1.51	0.00	0.13	0.03	328
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2029 Total Net Change Emissions[1]	**9.29**	**-0.55**	**16.89**	**-0.29**	**6.92**	**6.16**	**-517**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2030 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.57	1.14	1.67	0.00	0.63	0.04	352
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2030 Total Net Change Emissions[1]	**9.53**	**-0.32**	**17.06**	**-0.29**	**7.42**	**6.17**	**-493**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2031 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.17	0.60	0.89	0.00	0.17	0.02	211
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2031 Total Net Change Emissions[1]	**9.13**	**-0.86**	**16.27**	**-0.29**	**6.96**	**6.16**	**-634**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2032 Estimated Annual Net Change Air Emissions							
Construction Emissions[2]	-	-	-	-	-	-	-
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2032 Total Net Change Emissions[1]	**8.96**	**-1.46**	**15.38**	**-0.29**	**6.79**	**6.13**	**-845**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2033 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.23	1.27	1.71	0.00	21.29	0.05	425
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2033 Total Net Change Emissions[1]	**9.19**	**-0.20**	**17.09**	**-0.29**	**28.08**	**6.18**	**-419**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2034 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.21	1.14	1.58	0.00	1.83	0.04	376
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2034 Total Net Change Emissions[1]	**9.17**	**-0.32**	**16.96**	**-0.29**	**8.62**	**6.18**	**-469**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2035 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change – F-15EX Operations Emissions	8.82	-1.55	13.53	-0.29	6.79	6.13	-1,056
Commuter Emissions	0.14	0.09	1.85	0.00	0.00	0.00	211
2035 (Steady State) Total Net Change Emissions[1]	**8.96**	**-1.46**	**15.38**	**-0.29**	**6.79**	**6.13**	**-845**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.
[2]No construction projects are proposed to occur in calendar year 2032.
Legend: 104 FW = 104th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The net change is the difference in emissions resulting from basing the F-15EX as compared to retaining the F-15C aircraft. Based on the calculations, the construction and F-15EX operational emissions associated with the 104 FW would not exceed the *de minimis* thresholds for volatile organic compounds (VOCs) and nitrogen oxides (NO_x), which are the precursors to O_3. Because the VOC and NO_x emissions do not exceed the thresholds, the General Conformity Applicability Analysis for airfield operations is complete and these activities as described are exempt from the General Conformity Regulations. The change in criteria pollutant emissions associated with basing the F-15EX at the 104 FW installation would not have a significant effect on air quality. A Record of Conformity Applicability for VOC and NO_x emissions is included in Appendix D as a record demonstrating that General Conformity does not apply to the Proposed Action. In addition, a Record of Air Analysis for the remaining criteria pollutants has been prepared and can be found in Appendix D.

Airspace

As described in Section MA3.2.1, *Airspace*, with the conversion to the F-15EX aircraft, operations in the SUA would increase compared to the current F-15C operations, resulting in airspace use of approximately 2,115 hours annually. The percentage of time flown below 3,000 feet AGL during F-15EX operations would remain at 1 percent (refer to Table MA3.2-1) and thus the net change in time flown below 3,000 feet AGL annual could increase by approximately 21.2 hours annually. The operations within the SUA would be infrequent and sporadic. Thus, even though there is a slight increase in time spent flying below 3,000 feet AGL, the emissions from the F-15EX operations would not have a significant effect on regional air quality in the SUA.

MA3.3.2.2 F-35A

Installation

Construction projects would occur between 2025 and 2034 to support the beddown of the F-35A, though all critical infrastructure would be completed prior to aircraft arrival. Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

Airfield operations for the F-35A would be similar to those currently occurring with the F-15C at the 104 FW. The primary differences would be that the annual number of airfield operations is projected to increase. The net change in operational emissions at the 104 FW installation are presented in Table MA3.3-7 and assume that 100 percent of the F-35A aircraft would be on-site and operational in 2026. The F-35A operations would represent the new emission profile moving forward. The emissions account for the difference in the engine operations between the F-15C and the F-35A, the increase in annual operations, and an increase in commuting personnel who would be assigned to the 104 FW installation as a result of beddown of the F-35A.

Table MA3.3-7 Annual Airfield Emissions Estimates for the 104 FW Beginning in 2026 (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C Current Airfield Operations	**-24.67**	**-36.22**	**-148.38**	**-5.75**	**-3.69**	**-3.35**	**-15,059**
F-35A Airfield Operations	1.14	52.96	82.14	7.90	12.36	11.18	21,861
Net Change in Aircraft Emissions – F-35A	**-23.54**	**16.74**	**-66.24**	**2.15**	**8.67**	**7.83**	**6,803**
F-35A Additional Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
Total	**-23.42**	**16.82**	**-64.77**	**2.15**	**8.68**	**7.83**	**6,970**

Legend: 104 FW = 104th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The total annual emissions for both construction and operations occurring in a calendar year are presented in Table MA3.3-8. No construction projects with a ground disturbance footprint are planned to begin in 2032, and no construction projects are planned to begin after 2034. The total emissions that would occur in each year from both construction and operational activities are evaluated against the applicable *de minimis* or comparative threshold for the criteria pollutant.

Table MA3.3-8 Total Annual Emissions Estimates for Construction and Operations with the F-35A Conversion at the 104 FW (tons per year)

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.47	0.90	1.56	0.00	0.03	0.03	333
Net Change in Aircraft Emissions – F-35A (50% transition)	-11.77	8.37	-33.12	1.07	4.34	3.91	3,401
Commuter Emissions (50% transition)	0.06	0.04	0.73	0.00	0.00	0.00	84
2025 Total Net Change Emissions[1]	**-11.24**	**9.30**	**-30.83**	**1.08**	**4.37**	**3.94**	**3,817**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.91	0.95	1.81	0.00	0.21	0.03	376
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2026 Total Net Change Emissions[1]	**-22.51**	**17.77**	**-62.96**	**2.15**	**8.89**	**7.86**	**7,346**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.42	0.95	1.57	0.00	0.45	0.03	350
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2027 Total Net Change Emissions[1]	**-23.00**	**17.76**	**-63.20**	**2.15**	**9.13**	**7.86**	**7,320**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	1.18	1.34	2.07	0.00	1.47	0.04	468
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2028 Total Net Change Emissions[1]	**-22.24**	**18.15**	**-62.70**	**2.15**	**10.15**	**7.88**	**7,438**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.26	0.90	1.48	0.00	0.12	0.03	321
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2029 Total Net Change Emissions[1]	**-23.17**	**17.72**	**-63.30**	**2.15**	**8.80**	**7.86**	**7,291**

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2030 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.51	1.14	1.65	0.00	0.57	0.04	347
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2030 Total Net Change Emissions[1]	**-22.91**	**17.95**	**-63.13**	**2.15**	**9.25**	**7.87**	**7,317**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2031 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.17	0.60	0.89	0.00	0.17	0.02	211
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2031 Total Net Change Emissions[1]	**-23.25**	**17.42**	**-63.89**	**2.15**	**8.85**	**7.85**	**7,181**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2032 Estimated Annual Net Change Air Emissions							
Construction Emissions[2]	-	-	-	-	-	-	-
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2032 Total Net Change Emissions[1]	**-23.42**	**16.82**	**-64.77**	**2.15**	**8.68**	**7.83**	**6,970**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2033 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.23	1.27	1.71	0.00	21.29	0.05	425
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2033 Total Net Change Emissions[1]	**-23.19**	**18.08**	**-63.06**	**2.15**	**29.97**	**7.88**	**7,395**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2034 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.21	1.14	1.58	0.00	1.83	0.04	376
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2034 Total Net Change Emissions[1]	**-23.21**	**17.96**	**-63.20**	**2.15**	**10.50**	**7.88**	**7,346**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2035 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change in Aircraft Emissions – F-35A	-23.54	16.74	-66.24	2.15	8.67	7.83	6,803
Commuter Emissions	0.11	0.07	1.46	0.00	0.00	0.00	167
2035 (Steady State) Total Net Change Emissions[1]	**-23.42**	**16.82**	**-64.77**	**2.15**	**8.68**	**7.83**	**6,970**
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.
[2]No construction projects are proposed to occur in calendar year 2032.
Legend: 104 FW = 104th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The net change is the difference in emissions resulting from basing the F-35A as compared to retaining the F-15C. Based on the calculations, the construction and F-35A operational emissions associated with the 104 FW installation would not exceed the *de minimis* thresholds for VOCs and NO_x, which are the precursors to O_3. Because the VOC and NO_x emissions do not exceed the thresholds, the General Conformity Applicability Analysis for airfield operations is complete and these activities as described are exempt from the General Conformity Regulations. The change in criteria pollutant emissions associated with the basing of the F-35A at the 104 FW installation would not have a significant effect on air quality. A Record of Conformity Applicability for VOC and NO_x emissions is included in Appendix D as a record demonstrating that General Conformity does not apply to the Proposed Action. In addition, a Record of Air Analysis for the remaining criteria pollutants has been prepared and can be found in Appendix D.

Airspace

The use of the airspace with the conversion to the F-35A would be the same as described above for the F-15EX, and thus would not have a significant effect on regional air quality in the SUA.

MA3.3.2.3 F-15C Legacy Aircraft

Installation

Should the 104 FW retain the F-15C legacy aircraft, impacts from construction activities would be slightly less intensive in magnitude than the basing of the F-15EX or the F-35A. Construction projects required to sustain the current mission would be implemented, and the emissions from the construction activities are shown in Table MA3.3-9. No construction projects with a ground disturbance footprint are currently planned to begin in 2025, 2032, or after 2034. The year with the highest level of emissions from construction would be 2028, when construction of numerous

projects would occur, such as the new Wing Headquarters, new vehicle operations parking sheds, and aircraft shelters and shades. No additional personnel would be added to the 104 FW installation and the F-15C airfield operations would remain the same as existing conditions/No Action Alternative.

Table MA3.3-9 Annual Construction Emissions Estimates for the 104 FW Installation with Construction for Legacy F-15C (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2026 Construction Emissions	0.60	0.93	1.69	0.00	0.05	0.03	356
2027 Construction Emissions	0.42	0.95	1.57	0.00	0.45	0.03	350
2028 Construction Emissions	0.75	1.24	1.82	0.00	1.47	0.04	403
2029 Construction Emissions	0.18	0.90	1.46	0.00	0.03	0.03	321
2030 Construction Emissions	0.26	1.12	1.53	0.00	0.17	0.04	324
2031 Construction Emissions	0.21	0.60	0.90	0.00	0.12	0.02	212
2032 Construction Emissions[1]	-	-	-	-	-	-	-
2033 Construction Emissions	0.23	1.27	1.71	0.00	21.29	0.05	425
2034 Construction Emissions	0.21	1.14	1.58	0.00	1.83	0.04	376
de minimis or Comparative Threshold	50	50	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]No construction projects are proposed to occur in calendar year 2032.
Legend: 104 FW = 104th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

These emissions would result from retaining the F-15C aircraft and implementing construction projects in support of that aircraft. Based on the calculations, construction emissions associated with the 104 FW installation would not exceed the *de minimis* thresholds for VOC and NO_x, which are the precursors to O_3. Because the VOC and NO_x emissions do not exceed the thresholds, the General Conformity Applicability Analysis for airfield operations is complete and these activities as described are exempt from the General Conformity Regulations. The change in criteria pollutant emissions associated with the construction projects at the 104 FW installation would not be significant. A Record of Conformity Applicability for VOC and NO_x emissions is included in Appendix D as a record demonstrating that General Conformity does not apply to the Proposed Action. In addition, a Record of Air Analysis for the other criteria pollutants has been prepared and can be found in Appendix D.

Airspace

Should the 104 FW not be selected for either new aircraft, they would retain the current fleet of F-15C aircraft and would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur, and the existing conditions for air quality, as described in Section MA.3.3.1, *Affected Environment*, would remain the same and there would be no impact to regional air quality.

MA3.3.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative would not have a significant effect on air quality.

MA3.3.3 Summary of Impacts

The net change in emissions resulting from implementation of the F-15EX, the F-35A, or retention of the F-15C alternatives would not exceed the *de minimis* thresholds for VOC and NO_x, and thus these activities as described are exempt from the General Conformity Regulations. Implementation of the aircraft beddown alternatives or the construction projects required to support the legacy F-15C aircraft mission would not create significant impacts on air quality. Similarly, the No Action Alternative would not have a significant effect on air quality.

MA3.4 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE/CHILDREN'S HEALTH AND SAFETY

MA3.4.1 Affected Environment

MA3.4.1.1 Installation

Hampden County is considered the ROI for socioeconomic effects of the Proposed Action at the 104 FW installation. Socioeconomic data provided in this section are presented for Hampden County, the Commonwealth of Massachusetts, and the U.S. to characterize existing socioeconomic conditions, which are used to gauge the level of impacts that are associated with project activities. Additional data are presented for the city of Springfield in some locations for reference. Data have been collected from documents published by federal, state, and local agencies and from state and national databases (e.g., USCB and U.S. Bureau of Labor Statistics).

The ROI for socioeconomic effects is in part driven by access points and built infrastructure that determines where people who work at the installation live, spend money, and pay taxes. However, the analysis of impacts on Environmental Justice, Children's Health and Safety, and the Elderly includes a review of all potential adverse impacts on these communities as discussed in other resource sections of this EIS and the ROI is determined by the extent of the adverse impacts identified. For the Proposed Action, the ROI for Environmental Justice, Children's Health and Safety, and the Elderly includes areas surrounding the 104 FW installation that would experience significant noise increases as identified in Section MA3.1.2, *Environmental Consequences*, including portions of both Hampden and Hampshire counties.

Population

In 2020, Hampden County had a total population of 465,825 which was a 0.5 percent increase over the previous 10 years (see Table MA3.4-1). This is a slower growth rate than both the Commonwealth of Massachusetts (7.4 percent) and the U.S. (7.4 percent).

Table MA3.4-1 Population in the ROI over Time

Area	*2010*	*2020*	*Percent Change*
United States	308,745,538	331,449,281	7.4
Massachusetts	6,547,629	7,029,917	7.4
Hampden County	463,490	465,825	0.5
Springfield	153,060	155,929	1.9

Legend: ROI = Region of Influence.
Sources: USCB 2010, 2020a.

Housing

As shown in Table MA3.4-2, in 2020 Hampden County had a total of 193,713 housing units, 13,221 of which were vacant. The rental vacancy rate (3.4 percent) is slightly higher than Massachusetts (3.3 percent), but lower than the U.S. (5.8 percent). The median value of owner-occupied housing units was $216,100 and the median gross rent was $920 per month.

Table MA3.4-2 Housing in the ROI (2020)

Area	*Total Housing Units*	*Vacant Housing Units*	*Rental Vacancy Rate*	*Median Value of Owner-Occupied Housing Units*	*Median Gross Rent*	*Persons per Household*
United States	138,432,751	16,078,532	5.8%	$229,800	$1,096	2.6
Massachusetts	2,913,009	266,029	3.3%	$398,800	$1,336	2.5
Hampden County	193,713	13,221	3.4%	$216,100	$920	2.5
Springfield	61,668	4,864	4.2%	$162,900	$908	2.6

Legend: % = percent; ROI = Region of Influence.
Source: USCB 2020b.

Schools

There are a total of 163 public schools in Hampden County and 28 private schools (see Table MA3.4-3). The public schools have a student-teacher ratio of 11.8 and the private schools have a student-teacher ratio of 9.1. In total, Hampden County has 72,683 students in kindergarten through 12th grade.

Table MA3.4-3 Public and Private Schools in Hampden County

School Type	*Number of Schools*	*Number of Students*	*Number of Teachers*	*Student Teacher Ratio*
Public	163	68,493	5,824.9	11.8
Private	28	4,190	461.3	9.1
Total	191	72,683	6,286.2	11.6

Note: Public School data is from 2020–2021 and Private School data is from 2019–2020.
Sources: National Center for Education Statistics 2020, 2021.

Employment and Income

Table MA3.4-4 shows the Bureau of Labor Statistics' employment data for Hampden County in August 2022 as compared to employment information from Massachusetts and the U.S. Hampden County's unemployment rate (4.9 percent) is higher than both the state (3.5 percent) and national levels (3.8 percent).

Table MA3.4-4 Employment in the ROI (August 2022)

Area	*Civilian Labor Force*	*Employed*	*Unemployed*	*Unemployment Rate*
United States	164,971,000	158,714,000	6,256,000	3.8%
Massachusetts	3,775,122	3,643,196	131,926	3.5%
Hampden County	223,597	212,615	10,982	4.9%

Legend: % = percent; ROI = Region of Influence.
Sources: Bureau of Labor Statistics 2022a, 2022b, 2022c.

In 2020, Median and mean household incomes as well as per-capita income in Hampden County are lower than the state and national levels (Table MA3.4-5). Median earnings for workers in Hampden County are lower than the state level, but higher than the national level.

Table MA3.4-5 Incomes in the ROI

Area	*Median Household Income*	*Mean Household Income*	*Median Earnings for Workers*	*Per Capita Income*
United States	$64,994	$91,547	$36,280	$35,384
Massachusetts	$84,385	$115,964	$44,845	$45,555
Hampden County	$57,623	$79,369	$36,984	$31,483

Legend: ROI = Region of Influence.
Source: USCB 2020b.

Environmental Justice

Table MA3.4-6 displays the total population, total and percentage of minority, low-income, children under 18 years of age, and elderly populations in the ROI. Table MA3.4-7 displays the same information for those populations affected by the existing noise contours associated with the F-15C aircraft.

Table MA3.4-6 Total Population, Minority, Low-income, Children, and Elderly Populations in the ROI

Geographic Area	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
United States	326,569,308	130,317,933	40%	40,821,164	13%	73,296,738	22%	52,362,817	16%
Massachusetts	6,873,003	1,993,171	29%	756,030	11%	1,374,601	20%	1,168,411	17%
Hampden County	466,647	177,326	38%	74,664	16%	102,662	22%	79,330	17%
Hampshire County	161,361	27,431	17%	17,750	11%	24,204	15%	27,431	17%

Legend: % = percent; ROI = Region of Influence.
Source: USCB 2020b, 2021.

Table MA3.4-7 Total Current Population, Minority Low-income, Children and Elderly Populations Affected by Noise Greater than 65 dB DNL

Noise Contour	*Affected Population*	*Low-Income Population*	*Percent Low-Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	214	23	11%	20	9%	61	29%	37	17%
70–75	88	10	11%	7	8%	27	31%	14	16%
75–80	10	1	10%	2	20%	3	30%	2	20%
80–85	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0
Total	312	34	11%	29	9%	91	29%	53	17%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Areas within each noise contour that have a higher percentage of their population that are low-income than their reference county are considered to be a low-income area. Areas where 50 percent of the population or more are from a minority group, or are higher than the reference county, are considered a minority area.

In 2020, an estimated 16 percent of the households in Hampden County and 11 percent of the households in Hampshire County had incomes below the poverty level. An estimated 38 percent of the residents of Hampden County and 17 percent of the residents of Hampshire County were a member of a minority group in 2020. Comparing these reference groups to those persons affected by the current noise contours shown in Table MA3.4-7, 11 percent of those individuals are considered to be low-income, which is lower than both of the reference groups; and 9 percent are recognized as a member of a minority group, which is also below both of these reference groups.

Children's Health and Safety and the Elderly

Table MA3.4-7 shows the population in Hampden and Hampshire counties that are under 18 years of age, and those that are 65 years of age or older. Hampshire and Hampden counties have populations of 15 percent and 22 percent, respectively, of children under the age of 18. Comparing these reference groups to those persons affected by the current noise contours associated with the F-15C aircraft, 29 percent are considered to be children under 18, which is higher than these reference groups.

Hampshire and Hampden counties both have populations of 17 percent elderly persons. Comparing these reference groups to those persons affected by the current noise contours associated with the F-15C aircraft, 17 percent are considered to be elderly, which is equivalent to these reference groups.

MA3.4.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.4.2 Environmental Consequences

MA3.4.2.1 F-15EX

Installation

Construction and modification projects required for the beddown of the F-15EX would include approximately 30 projects between FY 2024 and FY 2030 and would include a total of 218,100 square feet (SF) of disturbance (see Tables MA2.1-3 and MA2.1-4).

Under operations of the F-15EX beddown, 101 new personnel would be supported at the 104 FW installation and total airfield operations would increase by approximately 6.7 percent (see Tables MA2.1-5 and MA2.1-2).

Population

The population base and established construction industry in the city of Springfield and Hampden County in Massachusetts would be able to support most of the required construction workforce. Additional population and construction workforce are within commuting distance in the Hartford, Connecticut area. Any required relocation of workers to the area would be temporary during the construction period. Therefore, any impacts on population during construction of the F-15EX beddown would be minor, temporary, and not significant.

During operation of the F-15EX beddown, 101 new personnel would be based at the 104 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of approximately 0.1 percent in Hampden County (see Table MA3.4-1). Therefore, any impacts on population as a result of the F-15EX beddown would not be significant.

Housing

During construction, most workers would come from the local area or from within commuting distance of BAF. Specialized workers coming from outside the ROI or workers drawn to the area for employment opportunities may utilize temporary housing options such as hotels, motels, recreational vehicle parks, or housing rentals. This would create a minor increase in demand for

housing in the ROI; however, as most workers would be expected to live within commuting distance, this would be an insignificant temporary impact.

The increase of 101 new personnel along with their families could create a demand for an additional 101 housing units in the ROI. This would be roughly 0.1 percent of the total housing units in Hampden County and 0.8 percent of the vacant housing units (see Table MA3.4-2). Therefore, any impacts on housing as a result of the F-15EX beddown would not be significant.

Schools

As described above, most construction workers would come from the local area or from within commuting distance, so they would not be bringing new dependent school-aged children to the ROI. The limited number of workers that would come from outside the area would likely not bring families because of the temporary nature of the construction work. Therefore, the number of workers that would relocate to the area during construction and enroll their children in the school system would be small and would be an insignificant temporary impact.

According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), 64.7 percent of ANG family members are children, so there would be an expected 104.6 children relocating to the ROI during operation of the F-15EX beddown. Although not all the children would be school-aged, for a conservative estimate if all the children entered the local school system in Hampden County, this would be a 0.1 percent increase in the total number of students (see Table MA3.4-3). This would be an insignificant permanent impact.

Employment and Income

Preliminary estimates of the construction required under this F-15EX Alternative place the cost of construction between $50 and $60 million. Hiring local construction workers would be beneficial for local employment and income. Local construction spending on materials and equipment would also further stimulate the local economy providing jobs and income to suppliers in the ROI. This would be a temporary beneficial impact.

The increase of 101 new positions during operation of the F-15EX beddown would be a permanent increase in employment in the ROI. The incomes from the new positions would contribute to the local tax base and spending on local goods and services which would further stimulate the local economy. The 101 positions would represent less than 0.1 percent of the total employment in Hampden County (see Table MA3.4-4). Increases in employment and income would be a minor permanent beneficial impact.

Environmental Justice

During construction, adverse impacts from construction noise and traffic would predominantly occur at the installation or on airport property which are not in a minority or low-income area. As shown in Table MA3.4-8, 9 percent of the population within the projected noise contours associated with the F-15EX are a member of a minority group and 10 percent of the population have incomes below the poverty level. These levels are either the same or below the reference communities (9 percent minority and 11 percent low-income). Therefore, there would not be disproportionately adverse health or environmental effects on minority and low-income populations under this alternative.

Table MA3.4-8 Total Current and Proposed Population, Minority, Low-income, Children, and Elderly Populations Affected by Noise Greater than 65 dB DNL Under the F-15EX Alternative

Noise Contour	*Affected Population w/ F-15C*	*Affected Population w/ F-15EX*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	214	610	58	10%	55	9%	145	24%	113	19%
70–75	88	178	20	11%	16	9%	53	30%	30	17%
75–80	10	70	8	11%	5	7%	22	31%	11	16%
80–85	0	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0	0
Total	312	858	86	10%	76	9%	220	26%	154	18%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Children's Health and Safety and the Elderly

Table MA3.4-8 shows the percentage of the populations that are under the age of 18. Under the F-15EX beddown, 858 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 26 percent are under the age of 18, which is higher than the reference communities of Hampden and Hampshire counties (22 and 15 percent, respectively). Therefore, children under the age of 18 would be disproportionately impacted by the F-15EX Alternative.

Older adults have been identified as sensitive receptors to potential adverse impacts due to physiological and behavioral changes that come with age (AFCEC 2020). Table MA3.4-8 shows the percentage of the population that would be affected that are elderly. Of the total population exposed to these noise levels, approximately 18 percent are considered elderly, which is higher than the Hampden and Hampshire reference counties, which are both 17 percent. Therefore, applying DoD criteria, the F-15EX Alternative would disproportionately impact the elderly population.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.4.2.2 F-35A

Installation

Under the beddown of the F-35A, construction impacts would be similar to those described for the beddown of the F-15EX. Construction projects would have a slightly smaller footprint, but overall investment and spending would be larger. Preliminary estimates of the construction required under this F-35A Alternative place the cost of construction between $85 and $102 million. Construction workforce impacts would be the same as those described for the beddown of the F-15EX. Therefore, during construction, local spending and employment would be minor beneficial impacts.

During operation of the F-35A beddown, impacts would be similar to those described for beddown of the F-15EX. The number of new personnel would be 80 rather than the 101 proposed under the F-15EX beddown, so impacts on population, housing, schools, and employment and income would be approximately 20 percent lower.

During construction, adverse impacts from construction noise and traffic would predominantly occur at the installation or on airport property which are not in a minority or low-income area. As shown in Table MA3.4-9, 6 percent of the population within the projected noise contours associated with the F-35A are a member of a minority group and 8 percent of the population have incomes below the poverty level. These levels are both below the reference communities (9 percent minority and 11 percent low-income). Therefore, there would not be disproportionately adverse health or environmental effects on minority and low-income populations under this alternative.

Table MA3.4-9 Total Current and Proposed Population, Minority, Low-income, Children, and Elderly Populations Affected by Noise Greater than 65 dB DNL Under the F-35A Alternative

Noise Contour	*Affected Population w/ F-15C*	*Affected Population w/ F-35A*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	214	843	63	7%	47	6%	189	22%	149	18%
70–75	88	229	22	**10%**	18	8%	60	26%	40	17%
75–80	10	20	2	20%	3	15%	5	25%	4	20%
80–85	0	0	0	0%	0	0%	0	0	0	0
85+	0	0	0	0%	0	0%	0	0	0	0
Total	312	***1,092***	***87***	8%	***68***	6%	254	23%	193	18%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Under the F-35A beddown, 1,092 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 23 percent are under the age of 18, which is higher than the reference communities of Hampden and Hampshire counties (22 and 15 percent, respectively). Therefore, children under the age of 18 would be disproportionately impacted by the F-35A Alternative.

Older adults have been identified as sensitive receptors to potential adverse impacts due to physiological and behavioral changes that come with age (AFCEC 2020). Table MA3.4-9 shows the percentage of the population that would be affected that are elderly. Of the total population exposed to these noise levels, approximately 18 percent are considered elderly, which is higher than the Hampden and Hampshire reference counties, which are both 17 percent. Therefore, applying DoD criteria, the F-35A Alternative would disproportionately impact the elderly population.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.4.2.3 F-15C Legacy Aircraft

Installation

If neither of the beddown options are selected, the existing F-15C flying mission would remain in place at the 104 FW installation until the projected end of the airframe mission or future required mission change proposals are presented. Under this alternative, some construction would be required to sustain the mission and construction impacts would be similar to those described for the F-15EX beddown; however, impacts would be lower due to the lower level of construction.

Preliminary estimates of the construction required under this legacy aircraft alternative place the cost of construction between $10 and $12 million. During operations, existing conditions described in Section MA3.4.1, *Affected Environment*, would remain unchanged, and no significant impacts would occur. Therefore, as with the beddown alternatives, construction spending would be a minor beneficial impact on economic activity, employment, and wages. There would be no disproportionately adverse health or environmental effects on minority and low-income populations during construction or operation; there would be no environmental health and safety risks that would disproportionately affect children; and there would be no disproportionate impacts on the elderly during construction or operation.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.4.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on socioeconomics, environmental justice, and children's health and safety would not be significant.

MA3.4.3 Summary of Impacts

Construction projects under all of the alternatives would lead to minor beneficial impacts on the local economy and employment. A significant portion of the workforce could be supplied by the local construction industry, so impacts from non-local construction workers moving into the area would be minimal. Under both the F-15EX and F-35A Alternatives, impacts on minority or low-income populations would not be disproportionate. However, there is a higher percentage of children and elderly within the projected noise contours than compared to the Hampden and Hampshire reference counties; and therefore, children under 18 years of age would be disproportionately impacted; applying DoD criteria, the elderly would also be disproportionately impacted. Should the F-15C or the No Action Alternative be selected, impacts on socioeconomics and environmental justice communities would not change from existing conditions.

MA3.5 LAND USE/NOISE COMPATIBLE LAND USE

In order to provide a comparable data set between proposed siting alternatives across all fighter wing locations considered for the Proposed Action, local zoning categories were consolidated and/or renamed. Table MA3.5-1 provides a cross-reference between the State of Massachusetts classifications and those used in this analysis.

Table MA3.5-1 Zoning Classification Used in EIS Analysis

State of Massachusetts[1] Zoning Classification	*EIS Land Use Classification*
Agriculture	Agriculture
Commercial	Commercial
Industrial	Industrial
Mixed Use: other, primarily residential, primarily commercial	Mixed Use
Recreation, Open Land, Forest, Water	Open Space/Recreation/Forest
Residential: multi-family, other, single family	Residential
Right-of-way	Transportation
Unknown	Unknown
Right-of-way, highway	Transportation
Tax Exempt (open space, public facilities)	Public

Note: [1]Hampden County is considered a historical geographic region and has no county government. All former county functions were assumed by state agencies in 1998; therefore, state GIS data was used for this analysis.
Legend: EIS = Environmental Impact Statement.
Source: State of Massachusetts 2022.

MA3.5.1 Affected Environment

MA3.5.1.1 Installation

The 2014 Valley Planning Commission Regional Land Use Plan (Pioneer Valley Planning Commission 2014) characterizes the regions' land uses, existing urban growth, and community boundaries, as well as the goals and objectives of the plan. The city of Westfield has a Noise Mitigation Program and associated 2018 zoning map (City of Westfield 2018), including the Airport Development District Overlay special use zones that manage land uses surrounding the airport.

Figure MA3.5-1 shows the land use and existing noise contours in the vicinity of BAF. While situated completely within BAF, the 104 FW installation is bisected by the airport's runway. Lands neighboring the two parcels include the ANG property, wooded areas, and land devoted to residential and light industrial uses. Land use surrounding BAF is comprised primarily of open space to the east and a mix of industrial, commercial, unknown, open space, and residential to the south, west, and north. The 'unknown' land use designation includes areas of land within the study area that the State of Massachusetts has not designated as a specific land use category.

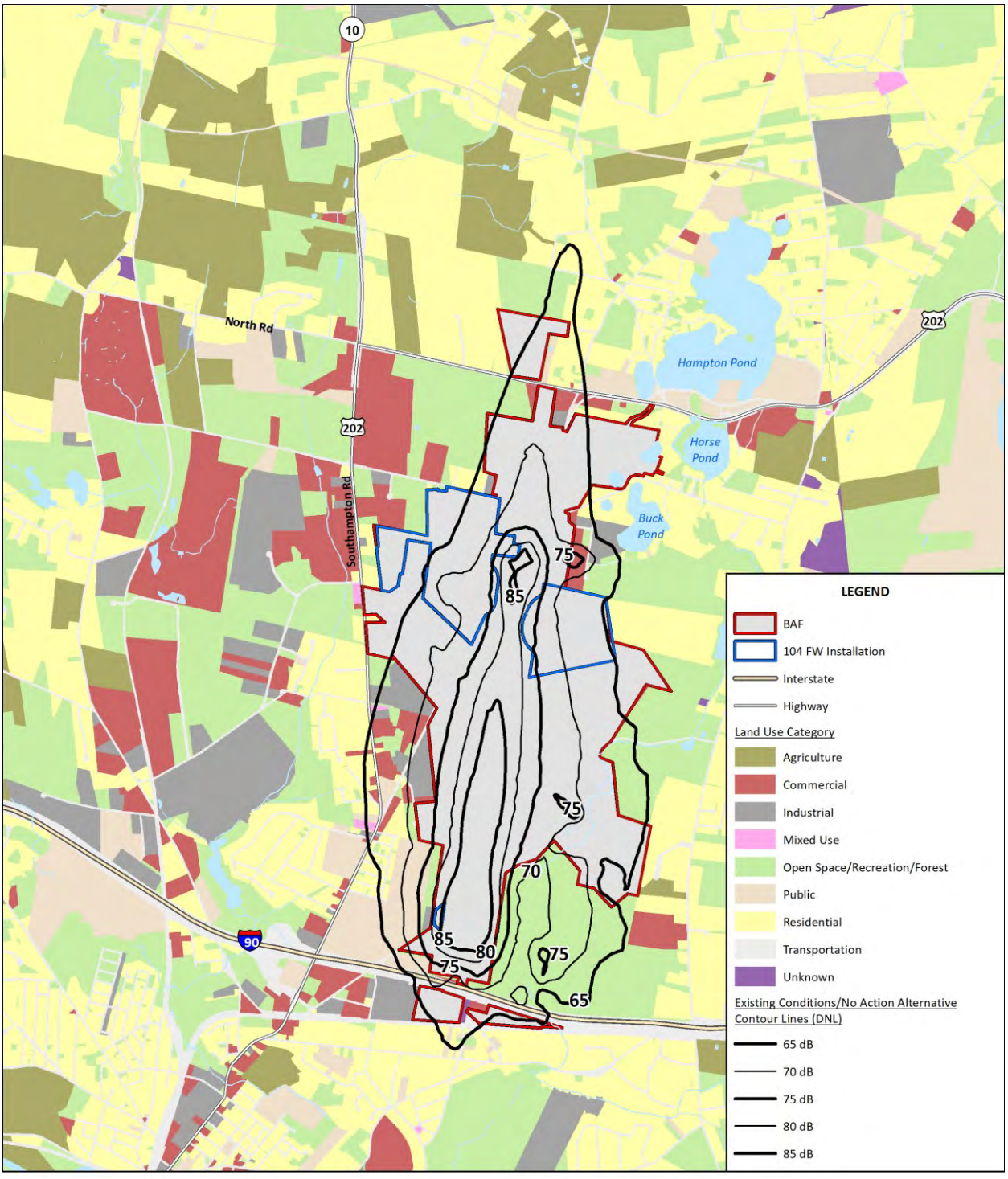


Figure MA3.5-1 Land Uses and Existing Noise Contours within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Source: ESRI 2022, MA ANG 2022, MASSGIS 2022

Noise sensitive land uses typically include public use buildings such as schools, hospitals, and health care facilities and residential properties or properties on or eligible for inclusion in the NRHP. Land uses surrounding BAF are typical of airport environs and include the airport itself, roadways, industrial, commercial, and residential activities. Land uses that are normally compatible with various noise exposure levels are listed in Appendix A (Table 1) of 14 CFR Part 150. Based on these designations, all land uses are considered compatible with noise levels less than 65 dB DNL.

Currently, 574 acres of off-airport areas of mixed use, industrial, commercial, open space/recreation/forest, transportation, unknown, and residential land uses are exposed to noise levels between 65 and 85 dB DNL. Section MA3.1.1, *Noise*, discusses existing noise levels at POIs such as schools and churches located within the 65 dB and greater DNL off-airport noise contour areas. Figure MA3.5-1 shows that existing noise contours extend off-airport primarily to the north and along the southern half of the airport. In each direction, contours 65 dB DNL and above overlap with residential, commercial, open space/recreation/forest, unknown, transportation, mixed-use, public, and industrial uses.

As shown on Figure MA3.10-1 (see Section 3.10.1, *Safety*), RPZs associated with the southern end of Runway 2/20 extends off airport property. The land uses beneath the RPZs consist of commercial, open space/recreation/forest, unknown, transportation, and public land uses.

MA3.5.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.5.2 Environmental Consequences

MA3.5.2.1 F-15EX

Installation

Land use immediately surrounding the 104 FW installation is comprised of commercial, open space/recreation/forest, residential, transportation, and industrial uses. No land use changes would be proposed and existing land use would not be affected by the proposed construction footprint (218,100 SF) as all construction and modification activities would occur within the installation boundaries. Additionally, there would be no change to the existing airfield-related RPZs. Proposed construction activities would be short term and intermittent but may cause minor traffic and/or noise disruptions to local businesses as well as employees at the 104 FW installation. However, construction activities would be temporary (between FY 2024 and 2033) and would occur during normal business hours (i.e., between 7 a.m. and 5 p.m., Monday through Friday).

The proposed construction activities would improve efficiency in daily operations by providing more efficient and secure operations for the 104 FW. Land uses would be consistent with current functions on the installation and the airport. All facilities would be designed and sited to be compatible with existing land uses and safety guidelines. There would be no significant impacts on land use related to construction as a result of basing the F-15EX aircraft at the 104 FW installation.

The 104 FW installation is not an active-duty DAF installation and thus is not required to have a DoD AICUZ program; however, the 104 FW supports BAF's use of land use compatibility guidelines established in 14 CFR Part 150 (104 FW 2020a). At noise levels greater than or equal to 65 dB DNL, different land uses are either considered compatible, compatible with recommended sound attenuation materials incorporated into the construction, or not recommended. Based on Table 1, Appendix A in 14 CFR Part 150, all land uses are considered to be compatible with noise levels less than 65 dB DNL. Therefore, mitigation measures considered for aviation noise typically address land uses in the 65 dB DNL noise contour or greater.

Annual airfield operations for the 104 FW would increase by 67 percent with the new F-15EX aircraft, while total airfield operations would increase by 6.7 percent at BAF. The land use analysis compares the proposed noise contours to current noise contours, which show the existing noise environment. The comparison of the proposed contours to the current contours shows potential change in noise conditions and land use compatibility (Table MA3.5-2 and Figure MA3.5-2). Basing of the F-15EX at the 104 FW installation would result in an overall increase in the off-airport area affected by noise levels greater than or equal to 65 dB DNL by approximately 845 acres.

As shown in Table MA3.5-2, an additional 287 acres of residential land use would be within the 65 to 70 dB DNL and 23 acres within the 70 to 75 dB DNL. Residential uses are an incompatible and unmitigable land use over 75 dB DNL; no residential land uses are impacted above 75 dB DNL. Residential uses from 65 to 75 dB DNL are generally discouraged but could be mitigated with noise level reduction measures achieved through the incorporation of noise attenuation. The use of noise level reduction criteria would not eliminate outdoor noise increases. Impacts on residential land uses would be considered a significant impact.

Table MA3.5-2 Off-Airport Land Use Acreage Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Land Use Category	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*	*Current 75–80 dB DNL*	*Proposed 75–80 dB DNL*	*Change in Acres*	*Current 80–85 dB DNL*	*Proposed 80–85 dB DNL*	*Change in Acres*
Residential	60	347	**287**	0	23	**23**	0	0	**0**	0	0	**0**
Commercial	41	32	**-9**	11	43	**32**	2	9	**7**	0	1	**1**
Industrial	35	36	**1**	17	33	**16**	2	16	**14**	0	2	**2**
Open Space/Recreation/ Forest[1]	180	384	**204**	85	163	**78**	18	65	**47**	1	13	**12**
Unknown[1, 2]	2	0	**-2**	0	2	**2**	0	0	**0**	0	0	**0**
Agriculture	0	1	**1**	0	0	**0**	0	0	**0**	0	0	**0**
Public	36	67	**31**	23	32	**9**	4	22	**18**	0	1	**1**
Transportation	46	83	**37**	7	36	**29**	1	4	**3**	0	0	**0**
Mixed-use	2	4	**2**	0	1	**1**	0	0	**0**	0	0	**0**
Total[3]	403	955	**552**	143	333	**190**	27	115	**88**	1	17	**16**

Notes: [1]Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not considered under Part 150 guidance.
[2]The 'unknown' land use designation includes areas of land within the study area that the State of Massachusetts has not designated as a specific land use category.
[3]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day-Night Average Sound Level.

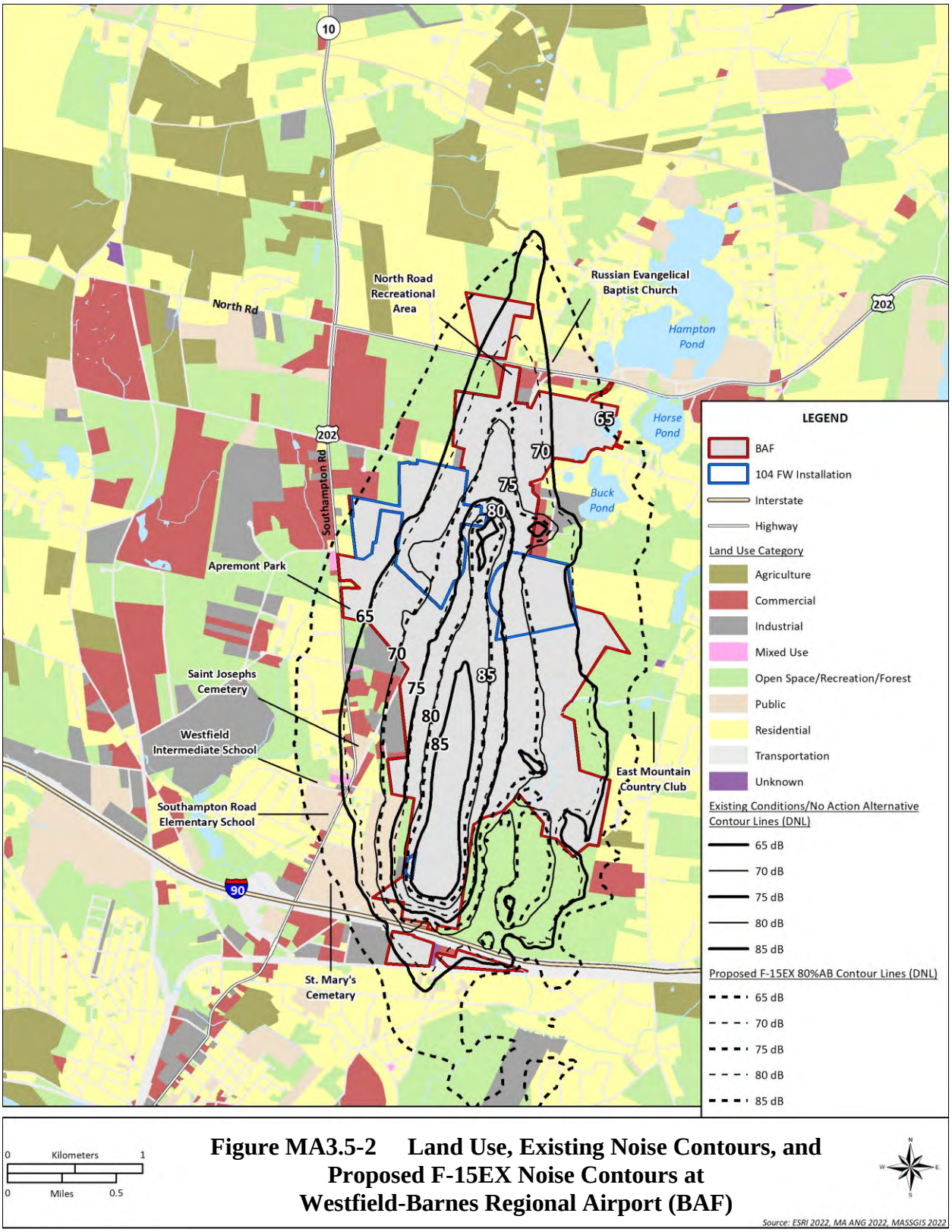


Figure MA3.5-2 Land Use, Existing Noise Contours, and Proposed F-15EX Noise Contours at Westfield-Barnes Regional Airport (BAF)

An additional 32 acres of commercial land uses would be within the 70 to 75 dB DNL, 7 additional acres within the 75 to 80 dB DNL, and 1 acre within the 80 to 85 dB DNL. An additional 16 acres of Industrial land use would be within the 70 to 75 dB DNL, 14 acres within the 75 to 80 dB DNL, and 2 acres within the 80 to 85 dB DNL. Part 150 guidance states that most commercial uses up to 80 dB are compatible with noise level reduction measures that would be achieved through the incorporation of noise attenuation; certain commercial land uses above 80 dB DNL are considered an incompatible and unmitigable land use. Wholesale, hardware, and farm equipment uses are compatible up to 85 dB with mitigation. Similarly, most industrial uses are compatible up to 85 dB DNL with appropriate noise level reduction measures. The 1 acre of commercial land use within the 80 to 85 dB DNL and the 2 acres of industrial land use within the 80 to 85 dB DNL are located on land adjacent to the installation boundary along the southwestern portion of the installation and are comprised primarily of open space and an industrial facility. Unclassified land (e.g., unknown/other, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural uses are not considered under Part 150 guidance. Impacts on industrial and commercial land uses would be significant.

An additional 204 acres of open space/recreation/forest land use would be within the 65 to 70 dB DNL, 78 acres within the 70 to 75 dB DNL, 47 acres within the 75 to 80 dB DNL, and 12 acres within the 80 to 85 dB DNL. Off-installation open space/recreation/forest land uses within the proposed noise contours are primarily comprised of undeveloped open space. Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural uses are not considered under Part 150 guidance. Two on-installation parks open to the public (North Road Recreational Area and Apremont Park) would have 6 acres of newly exposed land within the 70 to 75 dB DNL noise contours and 5 acres of newly exposed land within 65 to 70 dB DNL, respectively. Park uses are incompatible and unmitigable over 75 dB DNL. In addition, East Mountain Country Club would be within the 65 to 75 dB DNL. Impacts on recreational land uses would not be significant.

The public land use category typically includes various types of public facilities and amenities that can include government services (including schools and medical facilities), transportation, parking, open spaces and public parks, and water features (including reservoirs and wetlands). There would be 31 additional acres of Public land use within the 65 to 70 dB DNL noise contours, 9 acres within the 70 to 75 dB DNL, 18 acres within the 75 to 80 dB DNL, and 1 acre within 80 to 85 dB DNL primarily associated with open space, cemetery, and school land uses along the southwestern portion of the installation (St. Mary's Cemetery and Saint Joseph's Cemetery) and areas adjacent to North Road. Cemeteries and open space are not a regulated land use under 14 CFR Part 150.

Several sensitive land uses are located within the public land use category, including Russian Evangelical Baptist Church (newly exposed within the 65 to 70 and 70 to 75 dB DNL noise contours) and Westfield Intermediate School and Southampton Elementary School (newly exposed to the 65 to 70 dB DNL noise contour). School facilities are discouraged within the 65 to 75 dB DNL contour; however, where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor noise level reduction of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. School uses are an incompatible and unmitigable land use over 75 dB DNL; no school facilities are exposed to noise over 75 dB DNL. Church land uses are considered compatible up to 75 dB DNL with appropriate noise level reduction measures. Barring appropriate noise level reduction measures, impacts on public land uses would be considered significant. See Section MA3.1, *Noise*, for a detailed analysis of noise impacts related to households, schools, churches, and other sensitive land uses.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.5.2.2 F-35A

Installation

Basing the F-35A aircraft at the 104 FW installation would be similar in nature to the F-15EX aircraft and would include a construction footprint of 203,800 SF. Impacts would be slightly less intensive in magnitude as overall there would be a smaller construction footprint (14,300 less SF or 7 percent less than the F-15EX) associated with the basing of the F-35A. There would be no significant impacts on land use related to construction as a result of basing the F-35A aircraft at the 104 FW installation.

Annual airfield operations for the 104 FW would increase by 67 percent with the new F-35A aircraft, while total airfield operations would increase by 6.7 percent at BAF. The land use analysis compares the proposed noise contours to current noise contours, which show the existing noise environment. The comparison of the proposed contours to the current contours shows potential change in noise conditions and land use compatibility (Table MA3.5-3 and Figure MA3.5-3). Basing the F-35A at the 104 FW installation would result in an overall increase in the off-airport area affected by noise levels greater than or equal to 65 dB DNL by approximately 1,288 acres.

Table MA3.5-3 Off-Airport Land Use Acreage Affected by Noise Levels 65 dB and Greater for the F-35A Aircraft within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Land Use Category	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*	*Current 75–80 dB DNL*	*Proposed 75–80 dB DNL*	*Change in Acres*	*Current 80–85 dB DNL*	*Proposed 80–85 dB DNL*	*Change in Acres*
Residential	60	509	**449**	0	109	**109**	0	2	**2**	0	0	**0**
Commercial	41	50	**9**	11	21	**10**	2	11	**9**	0	0	**0**
Industrial	35	33	**-2**	17	33	**16**	2	5	**3**	0	0	**0**
Open Space/Recreation/Forest[1]	180	512	**332**	85	185	**100**	18	23	**5**	1	2	**1**
Unknown[1, 2]	2	1	**-1**	0	1	**1**	0	0	**0**	0	0	**0**
Agriculture	0	145	**145**	0	0	**0**	0	0	**0**	0	0	**0**
Public	36	55	**19**	23	32	9	4	8	**4**	0	0	**0**
Transportation	46	89	**43**	7	32	25	1	2	**1**	0	0	**0**
Mixed Use	2	1	**-1**	0	0	**0**	0	0	**0**	0	0	**0**
Total[3]	403	1,394	**991**	143	413	**270**	27	51	**24**	1	2	**1**

Notes: [1]Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not considered under Part 150 guidance.
[2]The 'unknown' land use designation includes areas of land within the study area that the State of Massachusetts has not designated as a specific land use category.
[3]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day-Night Average Sound Level.

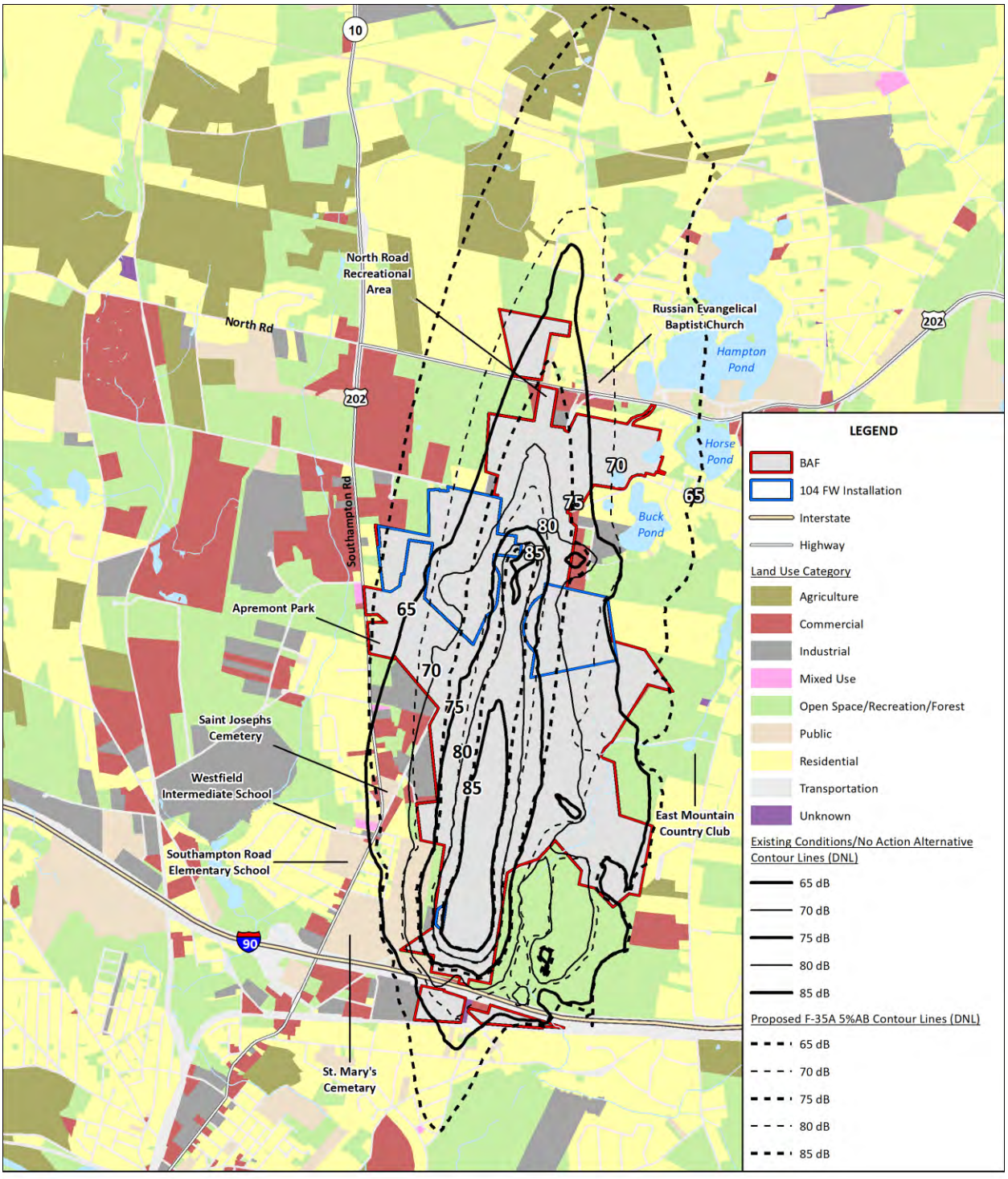


Figure MA3.5-3 Land Use, Existing Noise Contours, and Proposed F-35A Noise Contours within the Vicinity of Westfield-Barnes Regional Airport (BAF)

As shown in Table MA3.5-3, an additional 449 acres of residential land use would be within the 65 to 70 dB DNL, 109 acres within the 70 to 75 dB DNL, and 2 acres within the 75 to 80 dB DNL. Residential uses are an incompatible and unmitigable land use over 75 dB DNL. The 2 acres of residential land use within the 75 to 80 dB DNL are located north of the installation, adjacent to State Highway 202/North Road. Residential uses from 65 to 75 dB DNL are considered incompatible and generally discouraged but could be mitigated with noise level reduction measures achieved through the incorporation of noise attenuation. The use of noise level reduction measures would not eliminate outdoor noise increases. Incompatibility does not constitute a federal determination that any land use is acceptable or unacceptable under federal, state, or local law, nor are they used to determine if a structure is habitable or uninhabitable. Impacts on residential land uses would be considered a significant impact. See Section MA3.1, *Noise,* for a detailed analysis of noise impacts related to households, schools, churches, and other sensitive land uses.

An additional 9 acres of commercial land use would be within the 65 to 70 dB DNL noise contours, 10 acres within the 70 to 75 dB DNL, and 9 acres within the 75 to 80 dB DNL. Similarly, an additional 16 acres of industrial land use would be within the 70 to 75 dB DNL and 3 acres within the 75 to 80 dB DNL noise contours. Part 150 guidance states that most commercial uses up to 80 dB are compatible with noise level reduction measures that would be achieved through the incorporation of noise attenuation; commercial land uses above 80 dB DNL are considered an incompatible and unmitigable land use. Industrial, transportation, and most agricultural uses are compatible up to 85 dB DNL with appropriate noise level reduction measures. Impacts on these land uses would not be considered a significant impact.

There would be an additional 332 acres of open space/recreation/forest land use within the 65 to 70 dB DNL, 100 acres within the 70 to 75 dB DNL, 5 acres within the 75 to 80 dB DNL, and 1 acre within the 80 to 85 dB DNL noise contours. Off-installation open space/recreation/forest land use acreage within the proposed noise contours are primarily comprised of undeveloped open space. Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not considered under Part 150 guidance. Two on-installation parks open to the public (North Road Recreational Area and Apremont Park) would have an additional 6 acres of newly exposed land located within the 75 to 80 dB DNL and 4 acres of newly exposed land located within the 65 to 70 dB DNL, respectively. Park uses are incompatible and unmitigable over 75 dB DNL. In addition, East Mountain Country Club would be located within 65 to 70 dB DNL. Impacts on recreational land uses related to North Road Recreational Area would be significant.

The public land use category typically includes various types of public facilities and amenities that can include government services (including schools and medical facilities), transportation,

parking, open spaces and public parks, and water features (including reservoirs and wetlands). Public land use acreages would increase by 19 acres within the 65 to 70 dB DNL noise contours, 9 acres within the 70 to 75 dB DNL, and 4 acres within the 75 to 80 dB DNL, primarily associated with open space and cemetery land uses along the southwestern portion of installation (St. Mary's Cemetery and Saint Joseph's Cemetery) and areas adjacent to North Road. Cemeteries and open space are not considered under Part 150 guidance. The Russian Evangelical Baptist Church would be located within newly exposed noise contours between 70 to 75 dB DNL. Church land uses are considered compatible up to 75 dB DNL with implementation of appropriate noise level reduction measures. Impacts on these public land uses would be considered significant without implementation of appropriate noise level reduction measures. See Section MA3.1, *Noise*, for a detailed analysis of noise impacts related to households, schools, churches, and other sensitive land uses.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.5.2.3 F-15C Legacy Aircraft

Installation

Should the 104 FW retain the 18 F-15C legacy aircraft, impacts would be less intensive in magnitude than the basing the F-15EX or the F-35A. Construction for the F-15C legacy aircraft would include a construction footprint of 173,900 SF (25 percent and 17 percent less, respectively, than the F-15EX and the F-35A). Impacts related to construction would remain similar to the basing the F-15EX or F-35A and impacts related to operations would remain the same as existing conditions/No Action Alternative; impacts on land use would not be significant. No land use changes are proposed as a result of the proposed construction.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.5.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not

meet the purpose and need of the NGB and DAF. Impacts on land use would not be significant. No land use changes are proposed as a result of the proposed construction.

MA3.5.3 Summary of Impacts

Under the aircraft beddown alternatives at the 104 FW installation, off-airport property experiencing noise levels greater than or equal to 65 dB DNL would increase by approximately 845 to 1,288 acres for the F-15EX and F-35A, respectively. Under the F-15EX, residential land use acreage would increase by 287 acres within the 65 to 70 dB DNL and 23 acres within the 70 to 75 dB DNL. Impacts on residential land uses would be considered significant without implementation of appropriate noise level reduction measures. Under the F-35A, residential land use acreage would increase by 449 acres within the 65 to 70 dB DNL, 109 acres within the 70 to 75 dB DNL, and 2 acres within the 75 to 80 dB DNL. Impacts on residential land uses would be considered significant. Under the F-35A, significant impacts would also occur to recreational land use that would have an additional 6 acres within the 75 to 80 dB DNL associated with the North Road Recreational Area.

Should the F-15C legacy aircraft alternative or the No Action Alternative be selected, there would be no new impacts on land use.

Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.

MA3.6 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

MA3.6.1 Affected Environment

Section 4(f) properties were identified within the vicinity of BAF by reviewing the following data sources:

- Park location data from USFWS, National Park Service, State of Massachusetts, Hampden County, City of Westfield Water Department, and the City of Westfield Parks and Recreation Department.
- GIS and Google Earth mapping depicting publicly owned properties such as National Parks, state forests, wildlife management areas, trails, cemeteries, zoos, tribal lands, and local preserves and conservation areas managed by federal agencies, agencies of the State of Massachusetts, Hampden County, and city of Westfield.
- Information obtained from the NRHP and the Massachusetts Historic Commission.
- The cultural resources assessment that was prepared for this project (see Section MA3.9, *Cultural Resources*).

MA3.6.1.1 Installation

Section 4(f) Parks, Recreation Areas, and Refuges

To adequately capture all publicly owned parks, recreation areas, or wildlife/waterfowl refuges potentially eligible for protection under Section 4(f), the ROI includes: (1) areas where *permanent incorporation* (a qualifying 4(f) property is partially or completely acquired and permanently incorporated into a transportation facility) could occur; (2) areas of *temporary occupancy* (short-term construction impacts related to temporary construction roads and material staging); and (3) areas of *constructive use* (indirect impacts related to construction, noise, vibration impacts, or impairment of property access), including areas where noise impacts from construction activities and/or operations as a result of implementation of the Proposed Action alternatives are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired.

An initial screening of the ROI was conducted to identify all properties eligible for protection under Section 4(f) that might have the potential to be affected by the Proposed Action. Each property was evaluated to determine if it is publicly owned; is open and accessible to the public; has a major or primary purpose and is considered "*significant"* for park, recreation, or refuge activities. The primary purpose of the Westfield Intermediate School North Athletic Fields and Southampton Road Elementary School Playground are to serve as a facility for students at the school and are not considered facilities fully open to the general public; therefore, these resources were not carried forward for further analysis. As shown on Table MA3.6-1 and Figure MA3.6-1, four Section 4(f) resources were identified in the vicinity of BAF.

Section 4(f) Historic Sites

As shown on Table MA3.6-2 and Figure MA3.6-1, there are 15 historic sites of national, state, and/or local significance considered Section 4(f) resources located within the APE at the 104 FW. Fourteen of these resources are buildings or structures currently located at BAF, while the one off-airport resource is a 'New York, New Haven, and Hartford' Railroad Bridge (WSF.937). None of these resources are listed in the NRHP. There are no archaeological sites, traditional cultural resources, historic or archaeological districts, historic transportation sites, or historic trails located with the APE.

Table MA3.6-1 Section 4(f) Properties within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Section 4(f) Resource	*Description*	*Owned by*	*Open to the Public?*
Hampton Ponds Playground	A 17-acre municipal public park consisting of a full-size baseball diamond, an outdoor basketball court, two tennis courts, and limited playscape equipment. Primary purpose is recreation.	City of Westfield, Parks and Recreation Department	Full Public Access
Hampton Ponds State Park/ Old Apremont Way Trail	State public park that offers water-based activities including swimming, motorized and non-motorized boating with boat ramp, fishing, swimming, and facilities for picnicking. Primary purpose is recreation and conservation. Old Apremont Way Trail consists of a paved road that is now part of the state park.	State of Massachusetts, Department of Parks and Recreation	Full Public Access
North Road Recreational Area (Woronoco Soccer Fields)	A 6-acre municipal public recreation area located within the BAF property boundary consisting of three soccer/football fields. Primary purpose is recreation.	City of Westfield, Parks and Recreation Department	Full Public Access
Apremont Memorial Park	A 5-acre municipal public park located within the BAF property boundary consisting of open space and a memorial dedicated to the 104th U.S. Infantry and benches. The park is also used to honor veterans on special occasions.	City of Westfield, Parks and Recreation Department	Full Public Access
Westfield Intermediate School North Athletic Fields	A public intermediate school in the Westfield Public School District located to the southwest of BAF. The primary purpose of the recreational facility is to serve the students at the school. Facility includes athletic fields and walking path that is surrounded by a chain link fence with portions open to the public.	Westfield Public School District	Partial Public Access
Southampton Road Elementary School Playground	A public elementary school in the Westfield Public School District located to the southwest of BAF. The primary purpose of the recreational facility is to serve the students at the school and the facility is enclosed by a chain link fence. Facility includes elementary school playground.	Westfield Public School District	No public access

Legend: BAF = Westfield-Barnes Regional Airport.
Source: State of Massachusetts 2022.

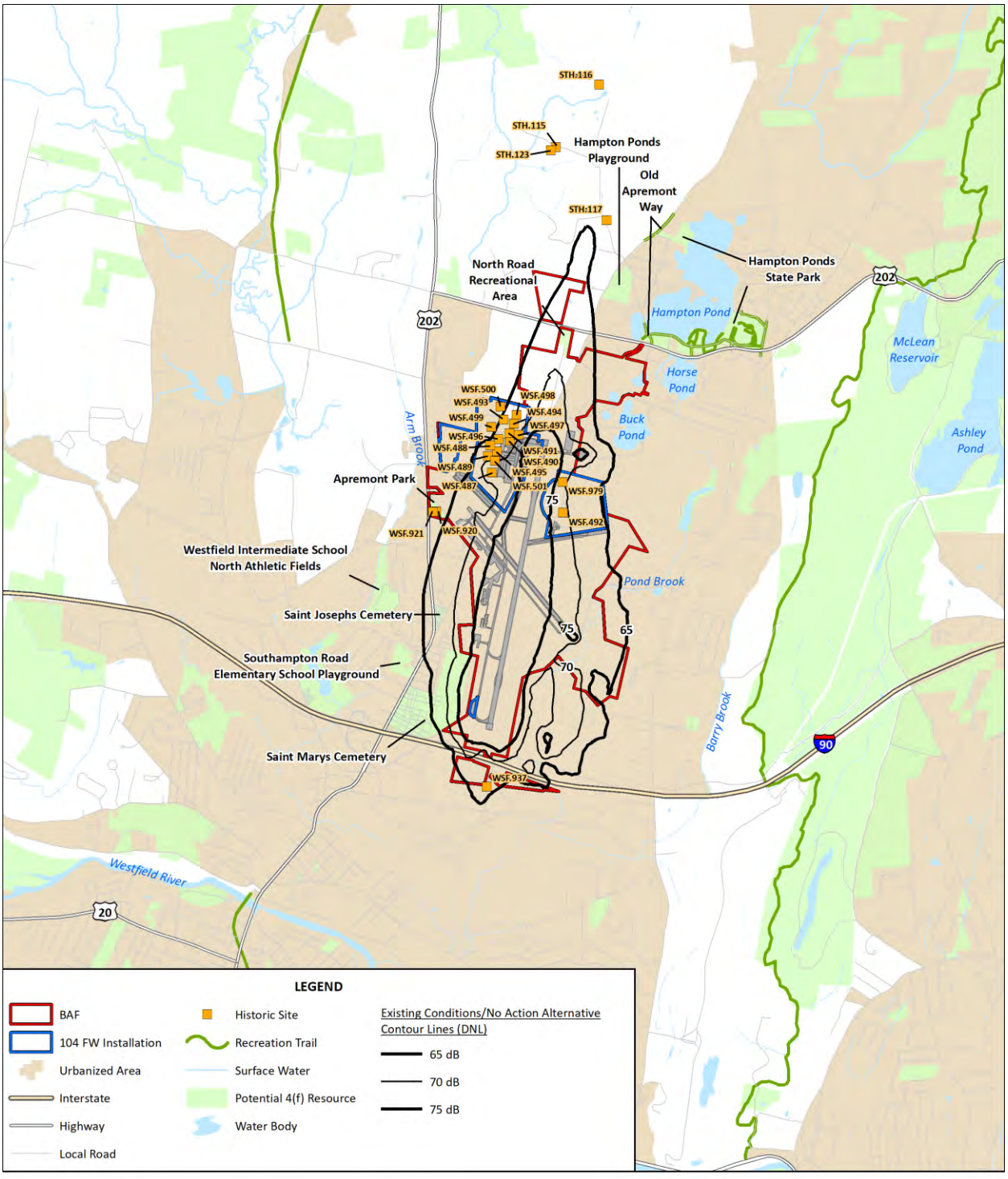


Figure MA3.6-1 Section 4(f) Properties within Existing Noise Contours within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Table MA3.6-2 Section 4(f) Historic Sites within the Vicinity of Westfield-Barnes Regional Airport (BAF)

MHC Number	*Building Number*	*Location/Common Name*
WSF.487	Building #008	104 FW Installation – Airmen's Dining Hall
WSF.488	Building #010	104 FW Installation – Aircraft Fueling Pump Station
WSF.489	Building #012	104 FW Installation – Administration - Parts Warehouse
WSF.490	Building #015	104 FW Installation – Aircraft Maintenance Hangar
WSF.491	Building #016	104 FW Installation – Boiler Plant and Annex
WSF.492	Building #019	104 FW Installation – Segregated Bay Ammo Magazine
WSF.493	Building #020	104 FW Installation – Aircraft Maintenance Shop
WSF.494	Building #021	104 FW Installation – Engine Inspection Shop
WSF.495	Building #025	104 FW Installation – Squadron Operations Facility
WSF.496	Building #026	104 FW Installation – Avionics - Weapons Release Shop
WSF.497	Building #027	104 FW Installation – Fuel Maintenance Control Facility
WSF.498	Building #028	104 FW Installation – Munitions Maintenance Facility
WSF.501	Building #001	104 FW Installation – Administration - Operations Building
WSF.979	Building #014	104 FW Installation – Firing-In Butt – Target Butt
WSF.937	New York, New Haven, and Hartford Railroad Bridge (Bridge #1.90)	Dry Bridge located over rail line

Legend: 104 FW = 104th Fighter Wing; MHC= Massachusetts Historic Commission.
Source: Massachusetts Historic Commission 2022.

Two cemeteries, Saint Joseph's and Saint Mary's, are located within the 65 dB noise contours. Saint Joseph's Cemetery is a 4-acre private non-profit cemetery that currently holds about 1,256 burials that is owned by the Saint Joseph Polish National Catholic Cemetery. Saint Mary's Cemetery is a 90-acre private non-profit cemetery that was established in 1862 and currently holds about 13,000 burials. The Roman Catholic Bishop of Springfield owns this cemetery.

MA3.6.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.6.2 Environmental Consequences

Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant. See Section MA3.1, *Noise*, for a detailed discussion on noise impacts.

MA3.6.2.1 F-15EX

Installation

Section 4(f) Parks, Recreation Areas, and Refuges

The 104 FW uses the FAA Part 150 guidance for land use compatibility (104 FW 2020a). At levels greater than or equal to 65 dB DNL, different land uses are either considered compatible, compatible with recommended sound attenuation materials incorporated into the construction, or not compatible. Based on FAA's guidelines, noise sensitive land uses (e.g., residential dwellings, churches, schools, and nursing homes) are considered compatible with aircraft noise at levels below 65 dB DNL. Hence, noise mitigation measures at airports have generally been focused on areas exposed to noise of 65 dB DNL or greater where noise level reduction through incorporation of sound attenuation into the design and construction of a structure may be necessary to achieve compatibility. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB DNL. Golf courses and water recreation uses are compatible up to 80 dB DNL with noise level reduction measures implemented for structures associated with these facilities. Cemetery land uses are not considered under Part 150 guidance.

Annual 104 FW operations would increase by 67 percent with the new F-15EX airframe; and overall airport operations would increase by 6.7 percent. The Section 4(f) analysis compares the proposed noise contours to current noise contours, which shows potential change in noise conditions and land use compatibility that could result in *constructive use* of Section 4(f) resources. As shown on Table MA3.6-3 and Figure MA3.6-2, there are three Section 4(f) resources that fall within the proposed 65 dB DNL noise contours, North Road Recreational Area (Woronoco Soccer Fields), Hampton Ponds Playground, and Apremont Park. Hampton Ponds Playground and Apremont Park would have an additional 4 and 5 acres, respectively, of land located within the 65 to 70 dB DNL noise contour. North Road Recreational Area would have an additional 6 acres of land located within the 70 to 75 dB DNL noise contour. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB DNL. Therefore, there are no incompatible land uses under this alternative.

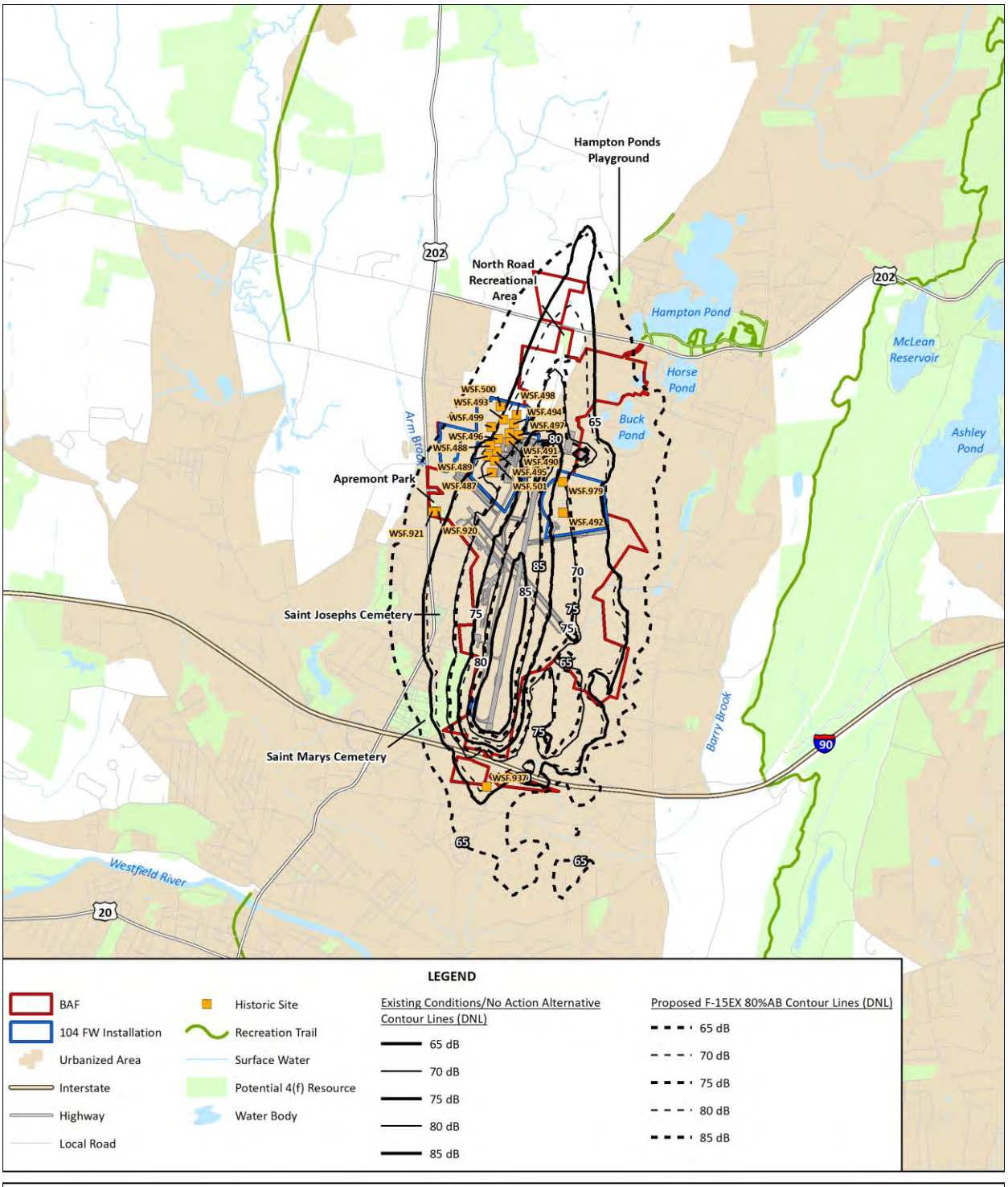


Figure MA3.6-2 Section 4(f) Properties within Existing and Proposed F-15EX Noise Contours within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Source: ESRI 2022, MA ANG 2022, MassGIS 2004, MassGIS 2015, MassGIS 2022

Table MA3.6-3 Acreage of Section 4(f) Properties Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Section 4(f) Resource	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*
North Road Recreational Area (Woronoco Soccer Fields)	6	0	**-6**	0	6	**6**
Apremont Park	0	5	**5**	0	0	**0**
Hampton Ponds Playground	0	4	**4**	0	0	**0**

Legend: dB = decibel; DNL = Day Night Average Sound Level.

A proposed *constructive use* of these areas would not be of such magnitude as to effectively act as a permanent incorporation or to substantially impair usability because:

1. The existing acoustic environment is an airport environment (lack of a quiet setting). It is likely that other human-caused noises are perceived on a regular basis, including automobiles, aircraft, and noises associated with an urban and industrial environment.
2. The 4(f) resources are currently surrounded by existing urban development with transportation, residential, industrial, and commercial uses.
3. Active users would experience direct airplane noise intermittently and for a short duration.

Indirect impacts on Section 4(f) properties as a result of noise from operations would not be considered significant.

Historic Sites

Under this alternative, four additional Section 4(f) historic sites would fall within the 65 dB DNL noise contours (Table MA3.6-4 and Figure MA3.6-2). All four properties are located within the BAF property boundary and include Building #029, Building #030, the Apremont Monument, and Apremont Park. Apremont Park was once the training site of the Massachusetts State Militia and Apremont Monument is a memorial dedicated to the 104th U.S. Infantry Division that trained on the grounds between August and October 1917 (Historical Marker Project 2022).

Table MA3.6-4 Section 4(f) Historic Sites Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of Westfield-Barnes Regional Airport (BAF)

MHC Number	*Name*	*Description*
WSF.920	Apremont Monument	Memorial dedicated to the 104th U.S. Infantry
WSF.921	Apremont Park	Once the training site of the Massachusetts State Militia where the Apremont Monument is located
WSF.499	Building #029	104 FW Installation – Administration Operations
WSF.500	Building #030	104 FW Installation – Guard Shack

Legend: 104 FW = 104th Fighter Wing; dB = decibel; MHC = Massachusetts Historical Commission.

No permanent incorporation of land, direct use, or temporary occupancy of Section 4(f) resources under this alternative would occur as no construction would occur near or within the boundaries of the Section 4(f) historic sites or the two cemeteries (Saint Joseph's Cemetery and Saint Mary's Cemetery). Additionally, there would be no direct impact to the two cemeteries or the historic sites and vibration from construction (e.g., heavy equipment operation) would be far enough away that there would be no indirect effects.

None of these historic sites or cemeteries are listed in or eligible for the NRHP nor are they of national, state, or local significance. For historic sites, a finding of "no historic properties affected" in the Section 106 process automatically means that there is no constructive use, according to the Section 4(f) regulations; no further analysis is required, and cemetery land uses are not considered under Part 150 guidance. Therefore, impacts on Section 4(f) resources would not be considered significant. DAF is currently seeking concurrence from the SHPO regarding its finding of no historic properties affected for the Proposed Action (see Section MA3.9, *Cultural Resources*, for detailed analysis on historic properties).

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.6.2.2 F-35A

Installation

Section 4(f) Parks, Recreation Areas, and Refuges

No permanent incorporation of land, direct use, or temporary occupancy of Section 4(f) resources under this alternative would occur as no construction would occur near or within the boundaries of the Section 4(f) resources.

Annual 104 FW operations would increase by 67 percent with the new F-35A aircraft; and overall airport operations would increase by 6.7 percent at BAF. The Section 4(f) analysis compares the proposed noise contours to current noise contours, which shows potential change in noise conditions and land use compatibility that could result in *constructive use* of Section 4(f) resources (Table MA3.6-5 and Figure MA3.6-3). The land use compatibility guidelines in 14 CFR Part 150 may be relied upon by the FAA to determine whether there is a *constructive use* under Section 4(f) where the land uses specified in the Part 150 guidelines are relevant to the value, significance, and enjoyment of the Section 4(f) lands in question. No other resources, including visual resources and air or water quality would result in a *constructive use* to land use.

As shown on Table MA3.6-5 and Figure MA3.6-3, there are four Section 4(f) recreational resources that fall within the proposed noise contours from 65 to 80 dB DNL: the Hampton Ponds Playground, North Road Recreational Area (Woronoco Soccer Fields), Hampton Ponds State Park/Old Apremont Way Trail, and Apremont Memorial Park. There would be an additional 14, 7, and 4 acres, respectively, of Hampton Ponds Playground, Hampton Ponds State Park, and Apremont Park that would be newly exposed within the 65 to 70 dB DNL noise contour. Hampton Ponds Playground would have an additional 3 acres within the 70 to 75 dB DNL noise contour. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB DNL. North Road Recreational Area (Woronoco Soccer Fields) would have an additional 6 acres of newly exposed land located within the 75 to 80 dB DNL noise contours, which is considered an incompatible land use. Cemetery land uses are not considered under Part 150 guidance.

A proposed *constructive use* of these areas would not be of such magnitude as to effectively act as a permanent incorporation or to substantially impair usability because:

1. The existing acoustic environment is an airport environment (lack of a quiet setting), it is likely that other human-caused noises are perceived on a regular basis including automobiles, aircraft, and noises associated with an urban and industrial environment.
2. North Road Recreational Area is located within the BAF property boundary, is immediately adjacent to State Highway 202 and other commercial and industrial land uses, and currently experiences noise levels on 6 acres from 65 to 70 dB DNL.
3. Active users of either facility would experience direct airplane noise intermittently and for a short duration.

Indirect impacts on Section 4(f) resources related to noise impacts from operations would not be considered significant.

Historic Sites

Under this alternative, eight additional Section 4(f) historic sites would fall within the 65 dB DNL noise contours (Table MA3.6-6 and Figure MA3.6-3). Four of the properties, Building #029, Building #030, the Apremont Monument, and Apremont Park are located within the BAF property boundary. Apremont Park was once the training site of the Massachusetts State Militia and Apremont Monument is a memorial dedicated to the 104th U.S. Infantry Division that trained on the grounds between August and October 1917 (Historical Marker Project 2022). Three of the remaining properties are single family homes and one is an agricultural outbuilding (Table MA3.6-5). One of the single-family homes is the Sidney Gridley house, built in 1851, and is the only dated brick Greek Revival home in Southampton, MA (Edwards Public Library 2022).

Table MA3.6-5 Acreage of Section 4(f) Properties Affected by Noise Levels 65 dB and Greater for the F-35A Aircraft within the Vicinity of Westfield-Barnes Regional Airport (BAF)

Section 4(f) Resource	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*	*Current 75–80 dB DNL*	*Proposed 75–80 dB DNL*	*Change in Acres*
Hampton Ponds Playground	0	14	**14**	0	3	**3**	0	0	**0**
North Road Recreational Area (Woronoco Soccer Fields)	6	0	**-6**	0	0	**0**	0	6	**6**
Hampton Ponds State Park/Old Apremont Way Trail	0	8	**8**	0	0	**0**	0	0	**0**
Apremont Memorial Park	0.1	4	**4**	0	0	**0**	0	0	**0**

Legend: dB = decibel; DNL = Day Night Average Sound Level.

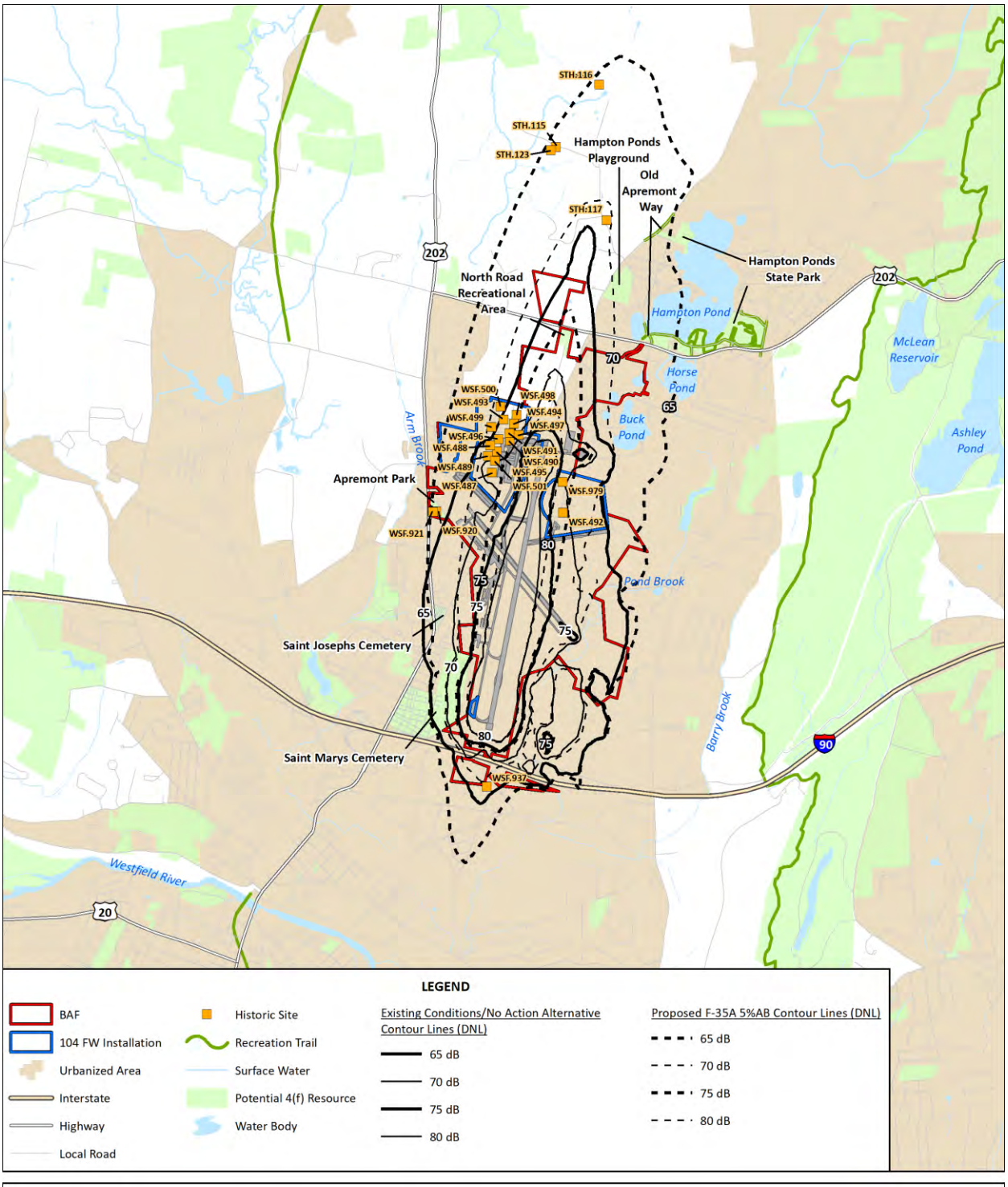


Figure MA3.6-3 Section 4(f) Properties within Existing and Proposed F-35A Noise Contours at Westfield-Barnes Regional Airport (BAF)

Source: ESRI 2022, MA ANG 2022, MassGIS 2004, MassGIS 2015, MassGIS 2022

Table MA3.6-6 Section 4(f) Historic Sites Affected by Noise Levels 65 dB and Greater for the F-35A Aircraft at Westfield-Barnes Regional Airport (BAF)

MHC Number	*Name*	*Description*
STH.115	N/A	Agricultural; Single Family Dwelling House
STH.116	N/A	Single Family Dwelling House
STH.117	Sidney Gridley House	Greek Revival; Single Family Dwelling House
STH.123	N/A	Agricultural; Out Building
WSF.499	Building #029	104 FW Installation – Administration Operations
WSF.500	Building #030	104 FW Installation – Guard Shack
WSF.920	Apremont Monument	Memorial dedicated to the 104th U.S. Infantry
WSF.921	Apremont Park	Once the training site of the Massachusetts State Militia where the Apremont Monument is located

Legend: 104 FW = 104th Fighter Wing; dB = decibel; MHC = Massachusetts Historical Commission; N/A = Not Applicable.

No permanent incorporation of land, direct use, or temporary occupancy of Section 4(f) resources under this alternative would occur as no construction would occur near or within the boundaries of the Section 4(f) historic sites or the two cemeteries (Saint Joseph's Cemetery and Saint Mary's Cemetery). Additionally, there would be no direct impact to the cemeteries or historic sites and vibration from construction (e.g., pile driving) would be far enough away that there would be no indirect effects.

None of these historic sites or cemeteries are listed in or eligible for the NRHP nor are they of national, state, or local significance. For historic sites, a finding "no historic properties affected" in the Section 106 process automatically means that there is no constructive use, according to the Section 4(f) regulations; no further analysis is required, and cemetery land uses are not considered under Part 150 guidance. Therefore, impacts on Section 4(f) resources would not be considered significant. DAF is currently seeking concurrence from the SHPO regarding its finding of no historic properties affected for the Proposed Action (see Section MA3.9, *Cultural Resources*, for detailed analysis on historic properties).

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.6.2.3 F-15C Legacy Aircraft

Installation

Should the 104 FW retain the F-15C legacy aircraft, impacts would be less intensive in magnitude than basing the F-15EX or the F-35A. Construction for the F-15C legacy aircraft would include a construction footprint of 173,900 SF (25 percent and 17 percent less, respectively, than the F-15EX and the F-35A) and there would be no increase in operations. Impacts related to construction would remain similar to basing the F-15EX or F-35A and impacts related to operations would

remain the same as existing conditions/No Action Alternative. There would be no direct impact as a result of construction to any Section 4(f) resource or secondary impact related to noise. No impacts on Section 4(f) resources would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.6.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on Section 4(f) resources would not be significant.

MA3.6.3 Summary of Impacts

Construction and operations associated with the F-15EX or F-35A beddown or construction associated with retaining the legacy F-15C aircraft would not have appreciable effects to Section 4(f) resources, including historic sites. No permanent incorporation of land, direct use, or temporary occupancy of Section 4(f) resources under the F-15EX or F-35A beddown alternatives would occur as no construction would occur near or within the boundaries of the Section 4(f) resources. Impacts would not be significant.

Under the F-15EX Alternative, there are three Section 4(f) resources that fall within the proposed 65 dB DNL noise contours, North Road Recreational Area (Woronoco Soccer Fields), Hampton Ponds Playground, and Apremont Park under the F-15EX. Hampton Ponds Playground and Apremont Park would have an increase of 4 and 5 acres, respectively, of land located within the 65 to 70 dB DNL noise contour. North Road Recreational Area would have an increase of 6 acres exposed to the 70 to 75 dB DNL noise contour. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB DNL. There are no incompatible land uses under this alternative. A proposed *constructive use* of this area would not be of such magnitude as to effectively act as a permanent incorporation or to substantially impair usability and indirect impacts on Section 4(f) resources would not be considered significant.

For the F-35A, there are four Section 4(f) resources that fall within the proposed 65 dB DNL noise contours: North Road Recreational Area (Woronoco Soccer Fields), Hampton Ponds Playground,

Hampton Ponds State Park, and Apremont Park. Hampton Ponds Playground, Hampton Ponds State Park, and Apremont Park, which would have increases of 14, 7, and 4 acres, respectively, of land located within the 65 to 70 dB DNL noise contour. Hampton Ponds Playground would have an increase of 3 acres within the 70 to 75 dB DNL noise contour. North Road Recreational Area (Woronoco Soccer Fields) would increase by 6 acres within the 75 to 80 dB DNL noise contours, which is considered an incompatible land use. However, a proposed *constructive use* of this area would not be of such magnitude as to effectively act as a permanent incorporation or to substantially impair usability and indirect impacts on Section 4(f) resources would not be considered significant. Additionally, per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant. See Section MA3.1, *Noise*, for a detailed discussion on noise impacts. Further, should either the F-15C legacy aircraft alternative or the No Action Alternative be selected, there would be no new impacts on Section 4(f) resources.

MA3.7 WATER RESOURCES/FLOODPLAINS/WILD AND SCENIC RIVERS

MA3.7.1 Affected Environment

MA3.7.1.1 Installation

Groundwater

The 104 FW installation overlies the Barnes Aquifer, recognized as one of Massachusetts' most important regional groundwater supplies. The aquifer is more than 12 miles long and is the primary source of potable water for the surrounding communities, including the towns of Easthampton, Holyoke, Southampton, and Westfield (ANG 2019). The Barnes Aquifer has a capacity for withdrawal of more than 21 million gallons per day. Two public wells (Westfield Well # 08G and Westfield Well # 07G) are located near the airport (Figure MA3.7-1) (FAA 2022). The majority of BAF is located within a MassDEP Approved Zone II (a protected area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated [180 days of pumping at safe yield, with no recharge from precipitation]) for the Barnes Aquifer (Figure MA3.7-1). The Barnes Aquifer recharge area lies beneath a major portion of the northeast quadrant of the city of Westfield. The airport and industrial zoned areas of the 104 FW installation are located directly above the aquifer (FAA 2022).

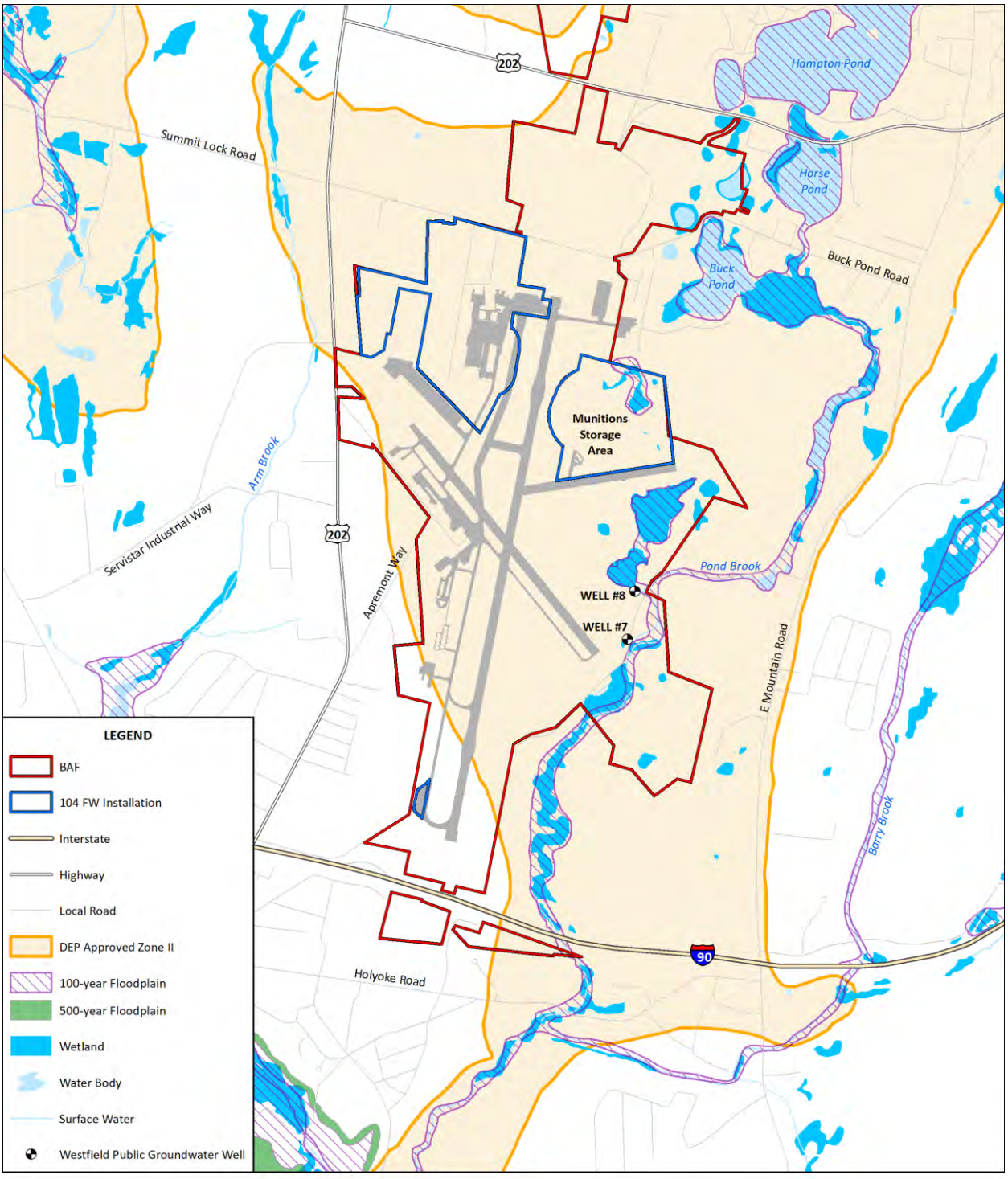


Figure MA3.7-1 Water Resources at Westfield-Barnes Regional Airport (BAF)

Surface Water

The 104 FW installation and BAF lie within three drainage basins. The Connecticut Lowland basin drains to the Connecticut River approximately 4 miles east of BAF. The Westfield River sub-basin, which includes most of the city of Westfield, drains to the Westfield River approximately 1.5 miles south of the 104 FW installation. The Manhan River sub-basin drains to the Manhan River approximately 2 miles northwest of the airport (ANG 2019). Surface water drainage at the 104 FW installation is influenced by a topographic high point, serving as a watershed divide that runs north-south along Runway 02/20. The west side of the airport (including the 104 FW west parcel) predominantly flows west toward Arm Brook. The east side of the airport (including the 104 FW east parcel) flows east toward Pond Brook (ANG 2019). Both Arm Brook and Pond Brook flow south and discharge into the Westfield River and eventually joins the Connecticut River.

There are no jurisdictional waters of the U.S., including wetlands, within the 104 FW installation. All surface waters at the installation have been reviewed by the USACE and none were determined to be jurisdictional (ANG 2019); therefore, they are not discussed further in the 104 FW analysis (see Section MA3.12.1.1, *Installation,* for discussion of wetlands).

Floodplains

The Northeast portion of the 104 FW Munitions Storage Area (MSA) is designated as being within a 100-year floodplain (see Figure MA3.7-1). This area is located downslope of the munitions storage complex and receives surface runoff from the 104 FW installation. No other mapped floodplain areas are located within the installation (ANG 2019; Federal Emergency Management Agency [FEMA] 2014). Additionally, BAF is located more than 50 miles from any coastal waters and impacts from sea level rise would not be expected.

Wild and Scenic Rivers

There are no wild and scenic rivers located near the 104 FW installation (National Park Service 2022a). The closest wild and scenic river is the West Branch Farmington River to the southwest in Connecticut. Therefore, no further discussion of wild and scenic rivers will be included in this analysis.

MA3.7.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.7.2 Environmental Consequences

MA3.7.2.1 F-15EX

Installation

Groundwater

Construction activities, as shown in Figure MA3.7-2, and operations under the F-15EX beddown would include stormwater runoff protection measures that would also serve to protect groundwater quality. Please see Section MA3.11, *Hazardous Materials/Waste* for more information on PFAS. By implementing best management practices (BMPs) identified in a site-specific Storm Water Pollution Protection Plan (SWPPP), to be prepared in adherence with the Construction General Permit (see below under Surface Water), stormwater pollutant loading potential would be minimized and thus pollution loading potential to the underlying groundwater basins would be minimized during construction.

Impacts on groundwater recharge would be minimized through implementation of low impact development (LID) technologies (see below under Surface Water) that would ensure predevelopment hydrology is maintained. Site grading and construction activities would not reach depths at which groundwater would be affected. Personnel numbers would increase by approximately 101 at the 104 FW installation under this alternative. Therefore, there would be a minor increase in demand on potable water supplies. After construction, adherence to the BAF Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity and associated SWPPP (BAF 2021), which also covers the 104 FW installation, would help prevent stormwater pollutant loading potential to the underlying groundwater basins. Implementation of stormwater runoff protection measures, as necessary and appropriate, would ensure that impacts on groundwater under this action alternative at the 104 FW installation would not be significant.

Figure MA3.7-2 Water Resources within the Vicinity of F-15EX Construction and Modification Projects at Westfield-Barnes Regional Airport (BAF)

Surface Water

In accordance with the CWA, the 104 FW would need to file a Notice of Intent with EPA, Region 1, to obtain coverage under a Construction General Permit in accordance with NPDES requirements prior to implementation of individual projects. Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation. A site-specific SWPPP would be prepared in compliance with the Construction General Permit and would include BMPs to minimize potential impacts associated with erosion, runoff, and sedimentation during and following the construction period. These BMPs could include straw bales, sandbags, silt fencing, earthen berms, tarps or water spraying, soil stabilization, temporary sedimentation basins, and re-vegetation with native plant species, where possible, to decrease erosion and sedimentation. Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. Additionally, post construction operations would adhere to the BAF SWPPP to manage stormwater runoff.

As a result of the F-15EX beddown, there would be approximately 148,000 SF of net new impervious surfaces from the proposed facility construction and modification activities, as shown in Figure MA3.7-2. While an increase of 148,000 SF of impervious surface is relatively minor, any increase in impervious surface could result in an associated increase in stormwater runoff volume and intensity and total suspended particulates to nearby surface waters. However, in accordance with Unified Facilities Criteria (UFC) 3-210-10, *Low Impact Development (LID)* (as amended, 2015) and EISA Section 438, any increase in surface water runoff as a result of the Proposed Action would be attenuated through the use of drainage management features such as use of bioretention, filter strips, vegetated buffers, grassed swales, infiltration trenches, water harvesting, and other applicable BMPs. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area. In addition, implementing LID into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. All new facilities would be in compliance with the BAF Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity and associated SWPPP.

Implementation of surface runoff measures, as necessary and appropriate, would ensure that impacts on surface water as a result of implementation of this action alternative would be minimal and not significant.

Floodplains

Proposed construction activities at the installation would not occur within the 100-year floodplain, as shown in Figure MA3.7-2. As such, there would be no impacts on floodplains under this alternative.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.7.2.2 F-35A

Installation

Construction and modification projects under the F-35A Alternative, shown in Figure MA3.7-3, would be similar to those described for the F-15EX beddown and would have approximately 136,600 SF of new impervious surfaces. As such, the impacts related to groundwater, surface water, and floodplain resources would be similar to those described under the F-15EX beddown and would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.7.2.3 F-15C Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects, shown in Figure MA3.7-4, to sustain the current mission and would create approximately 128,400 SF of new impervious surfaces. There would be less new impervious surfaces as compared to the other two alternatives. Impacts on groundwater resources would be minimal. Increased surface water runoff would be managed by implementing LID strategies, implementation of BMPs, adherence to the SWPPP, and implementing surface runoff measures, as necessary and appropriate, and would ensure that impacts on surface water would be minimal. No construction or modification projects are located within any floodplains, and there would be no impacts on floodplains under this alternative.

Figure MA3.7-3 Water Resources within the Vicinity of F-35A Construction and Modification Projects at Westfield-Barnes Regional Airport (BAF)

Source: 104FW 2022c, FEMA 2021, MA ANG 2022, USFWS 2020

Figure MA3.7-4 Water Resources within the Vicinity of Legacy Construction and Modification Projects at Westfield-Barnes Regional Airport (BAF)

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.7.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on water resources would not be significant.

MA3.7.3 Summary of Impacts

Under the Proposed Action alternatives, proposed construction and modification activities would result in up to 148,000 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. None of the proposed construction or modification projects are located within the 100-year floodplain. Impacts on water resources as a result of the proposed beddown of the F-15EX, F-35A, retention of the F-15C aircraft, or the No Action Alternative at the 104 FW installation would not be significant.

MA3.8 GEOLOGICAL RESOURCES/SOILS/FARMLANDS

MA3.8.1 Affected Environment

MA3.8.1.1 Installation

Topography and Geology

The 104 FW installation is bounded to the west by Berkshire Hills and to the east by the low hills of the Worcester Plateau. The primary topographic feature in the area is the Connecticut River and its associated level floodplains and gently sloping terraces. The installation is predominantly flat with an elevation of approximately 260 feet above MSL. The greatest relief exists along the eastern portion of the installation where the elevation drops off to a small pond and a marshy area (ANG 2019).

BAF and the 104 FW installation lie within the Hartford Basin, a large Mesozoic structure filled with Triassic and Jurassic sediments and basalts in the Connecticut River Valley. The Mesozoic sediments were mostly formed on land, with some being "fluvial" or formed in rivers, and other layers are "lacustrine" or formed in lakes. Basalt lava flows poured across the land from enormous volcanic fissures, now represented by dikes. There are three large lava flows in the Hartford Basin (ANG 2019).

Soils

There are three primary soils that occur where construction and modification projects would occur: Hinckley loamy sand, Windsor loamy sand, and Urban Land (Figure MA3.8-1). These soil types are described in detail in Table MA3.8-1.

Table MA3.8-1 Soil Types and Characteristics at 104 FW Installation

Soil Type	*Description/Characteristics*
Hinckley Series-Hinkley loamy sand	The Hinckley series consists of very deep excessively drained soils formed in glaciofluvial sand and gravel derived principally from granite, gneiss, and schist. They are nearly level through very steep soils on terraces, outwash plains, and deltas with slopes ranging from 0–8% on the installation, although in some places the slope can range from 8–25%. Permeability of this soil is very rapid, while available water capacity is very low. The hazard of erosion of this soil is slight. This soil has few limitations to most urban uses in areas with slopes generally less than 8%.
Windsor loamy sand	Windsor loamy sand is a very deep, nearly level, excessively drained soil with a dark brown loamy sand surface layer, with slopes ranging from 0–8% on the installation. The subsoil is typically about 16 inches thick with yellowish brown loamy sand in the upper part and yellowish-brown sand in the lower part. The substratum is very pale brown sand to a depth of 60 inches or more. A management concern for this soil is moisture stress to vegetation caused by the limited available water capacity. This soil has no major limitations for building site development and for local roads and streets.
Urban land	Urban land exists in dense developments and encompasses any large area completely covered by impervious surfaces such as asphalt, concrete, or rooftop. These lands are typically so altered by man or obscured by urban works that identification of soils is not possible. Much of the cantonment area is categorized as urban land soils.

Legend: % = percent; 104 FW = 104th Fighter Wing.
Sources: ANG 2019; Natural Resources Conservation Service 2022.

Farmlands

There is no Prime Farmland present on the 104 FW installation. However, a majority of the installation is designated as Farmland of Statewide Importance, with the exception of the runway area (NRCS 2022) (Figure MA3.8-1).

MA3.8.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

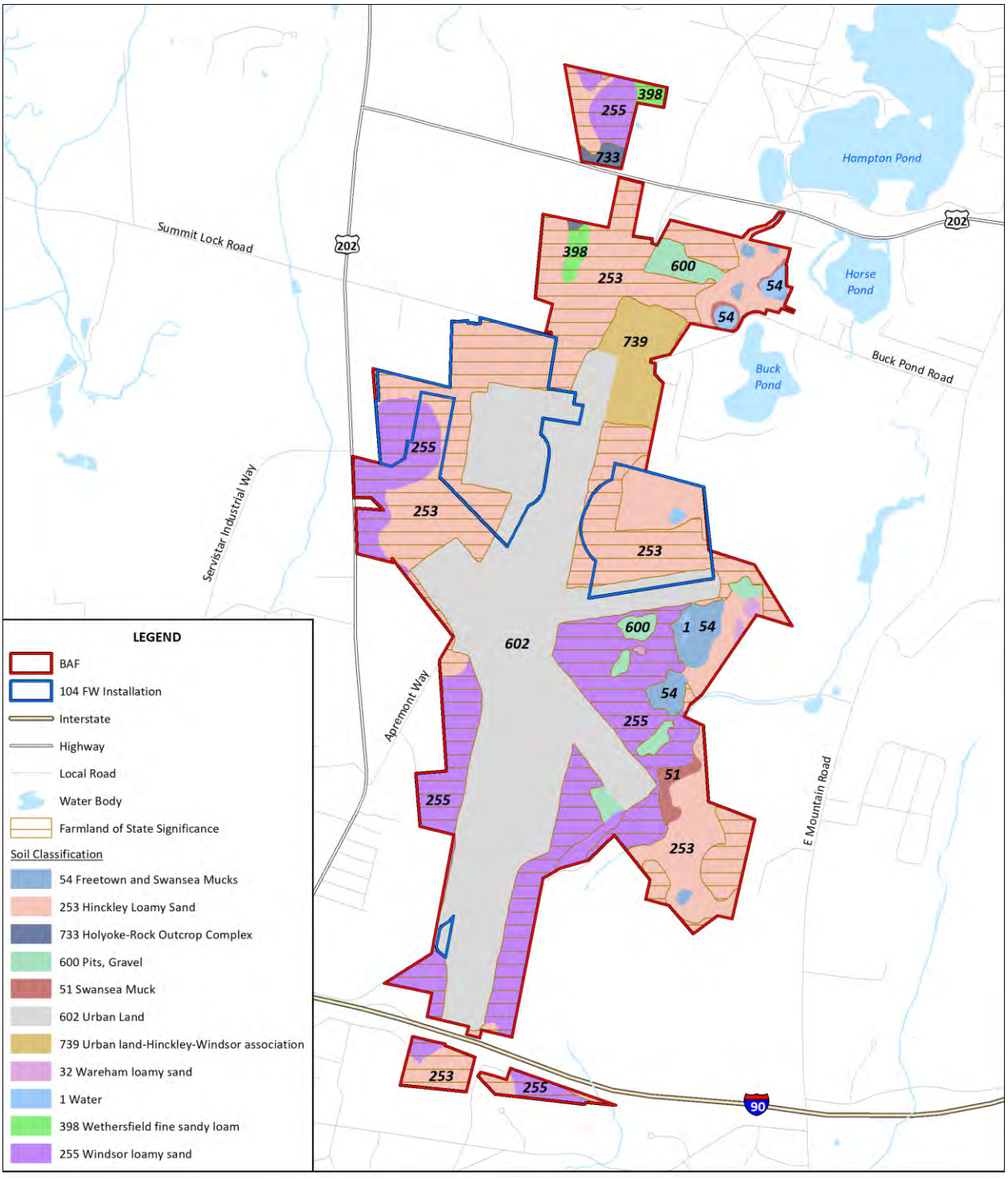


Figure MA3.8-1 Geological Resources at Westfield-Barnes Regional Airport (BAF)

MA3.8.2 Environmental Consequences

MA3.8.2.1 F-15EX

Installation

Topography and Geology

Proposed construction and modification activities under this alternative would result in approximately 218,100 SF of ground disturbance and would require some modification of terrain by cut and fill techniques and other minor grading. However, no obvious topographic features would be affected as a result of implementation of construction and modification activities. Implementation of proposed construction and modifications would not substantially affect the geologic units underlying the installation, as no unique geologic features or geologic hazards are present. Although ground disturbance would occur during construction and modification activities, the majority of construction and modifications would occur over previously disturbed surfaces.

Soils

As shown in Figure MA3.8-1, proposed construction and modification activities under this alternative would only occur on three different soil types, including Hinckley loamy sand, Windsor loamy sand, and Urban Land. It is likely that grading of existing soils and placement of structural fill for new facilities would not substantially alter existing soil conditions at the 104 FW installation and adjacent BAF property because much of the property has been previously disturbed or altered as a result of prior development.

As discussed in Section MA3.7, *Water Resources/Floodplains/Wild and Scenic Rivers*, construction activities would be in compliance with the Construction General Permit and include implementation of BMPs, identified within the site-specific SWPPP, to minimize the potential for exposed soils or other contaminants from construction activities on the installation to reach nearby surface waters. The site-specific and detailed SWPPP would coordinate the timing of soil disturbing activities with the installation of soil erosion and runoff controls in an effective way of controlling erosion while soil is exposed and subject to construction activity. Such BMPs could include the use of effective wind erosion controls, stabilization for all disturbed soils prior to storm events, maintaining effective perimeter controls, and stabilizing site entrances and exits. Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. Additionally, post construction, the 104 FW would adhere to the BAF SWPPP (BAF 2021) to minimize impacts during operations. Implementation of these measures,

as necessary and appropriate, would ensure that impacts on geological resources under this action alternative at BAF, including the 104 FW installation, would not be significant.

Farmlands

Multiple construction and modification activities under this alternative would only occur on soils designated by the NRCS as farmland of statewide importance, defined as being a farmland designation protected under the Farmland Protection Policy Act. Farmland of statewide importance in Massachusetts are those soils that fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber, or forage crops. However, all proposed construction projects would occur within the BAF boundary and there would be no conversion of farmland to non-agricultural uses as the land within the airport property has been previously disturbed and is used for industrial activities. Therefore, no impacts on farmland are expected under this alternative.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.8.2.2 F-35A

Installation

Under the F-35A beddown, new construction and modification projects would result in approximately 203,800 SF of ground disturbance. There would be less ground disturbance than the F-15EX beddown; however, impacts on topography and geology would be generally similar to those described above. Proposed construction and modification activities under this alternative would occur on the same soil types and impacts would be similar to those described above. Construction and modification activities would be in compliance with the Construction General Permit, site specific SWPPP, and associated BMPs. BMPs, as described in the BAF SWPPP, would be implemented following the construction period. Impacts on farmlands would be similar to those described above for the F-15EX beddown. Therefore, significant impacts on geological resources from implementation of this alternative would not be expected.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.8.2.3 F-15C Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would create 173,900 SF of ground disturbance. There would be less ground disturbance as compared to the other two alternatives. All ground disturbance would happen on previously disturbed land; therefore, significant impacts on geological resources would not be expected.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.8.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on geological resources would not be significant.

MA3.8.3 Summary of Impacts

Under the Proposed Action alternatives at BAF, proposed construction and modification activities would result in up to 218,100 SF of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Construction and modification activities would only occur on soils designated by the NRCS as farmland of statewide importance. However, there would be no conversion of farmland to non-agricultural uses as the land within the BAF boundary has been previously disturbed and is not currently being used as farmland. Impacts on geological resources as a result of the proposed beddown of the F-15EX, F-35A, retention of the F-15C aircraft, or the No Action Alternative at the 104 FW installation on BAF, would not be significant.

MA3.9 CULTURAL RESOURCES

MA3.9.1 Affected Environment

MA3.9.1.1 Installation

Archaeological Resources

The 104 FW maintains an Integrated Cultural Resources Management Plan (ICRMP) to aid in management of cultural resources on the installation in accordance with appropriate federal laws and other applicable ANG regulations (ANG 2021).

A comprehensive cultural resources survey of the 104 FW installation was conducted in 2007 (ANG 2021), which surveyed the entirety of the installation's 220 acres. A total of 30 acres, which were determined minimally disturbed, were intensively surveyed for archaeological resources. The remaining 190 acres consist of the built environment or have been disturbed by construction activities. The survey resulted in the identification of one NRHP-eligible archaeological site (ANG 2021). The site is in a restricted area that is protected from disturbance from both planned construction and casual human use. There are no NRHP-listed archaeological sites at the 104 FW installation (ANG 2021). The Massachusetts SHPO concurred with the 2021 ICRMP.

Architectural Resources

The 104 FW installation has been used as an airfield since 1939, first by the MA National Guard Air Squadron, and then by the DAF and the National Guard following World War II. The majority of its buildings were constructed between 1950 and 1987. The 2007 cultural resources survey inventoried and evaluated the NRHP eligibility of all architectural resources, and none were found to be eligible (ANG 2021). There are no NRHP-eligible or listed architectural properties, historic districts, or historic landscapes at the 104 FW installation (ANG 2021). The Massachusetts SHPO concurred with the 2021 ICRMP.

Traditional Cultural Resources

Government-to-government consultation between the 104 FW and each federally recognized Tribal Nation associated with the 104 FW installation is being conducted for this action to afford the Tribal Nations the opportunity to provide input in the decision-making process in recognition of their status as sovereign nations, to provide information regarding Tribal concerns per Section 106 of the NHPA to the 104 FW, and to provide information on traditional cultural resources that may be present at the 104 FW.

To date, no traditional cultural resources or Native American sacred places have been identified at the 104 FW installation (ANG 2021). There are six federally recognized Tribal Nations that claim affiliation with the 104 FW installation and/or the geography in which the installation occurs: Delaware Tribe of Indians; Mashpee Wampanoag Tribe; Mohegan Tribe of Indians of Connecticut; Narragansett Indian Tribe; Stockbridge Munsee Community, Wisconsin; and Wampanoag Tribe of Gay Head (Aquinnah) (ANG 2021; New York SHPO 2022). Government-to-government consultation letters have been sent to the 10 federally recognized Tribal Nations. See Appendix A for all Section 106 and government-to-government correspondence.

Off-Installation

A desktop review was conducted utilizing the Massachusetts Historic Commission and the NRHP in order to identify historic properties present within the 65 dB DNL. It was determined that there are no historic properties within a half mile of BAF (Massachusetts Historic Commission 2022; National Park Service 2022b) and this is beyond the 65 dB DNL. Therefore, analysis under the category 'Off-Installation' is not carried forward.

MA3.9.1.2 Airspace

Table MA3.9-1 presents the NRHP-listed sites on lands beneath the existing airspace associated with 104 FW in Maine, (232 sites), New Hampshire (409 sites), New York (307 sites), and Vermont (540 sites) (National Park Service 2022b). These historic properties include historic residential districts, private residences, farms, cottages, hotels, post offices, municipal buildings, churches, schools, railroads, bridges, mills, recreational camps, coastal lighthouses, fire observation lookouts, and a national preserve. One of the NRHP-listed sites is the Adirondack Forest Preserve, which is also designated as a National Historic Landmark. The Adirondack Forest Preserve, created in 1892, is the largest National Historic Landmark in the U.S. (National Park Service 2022c). This preserve is the largest publicly protected area in the contiguous U.S. (The Cultural Landscape Foundation 2022).

Table MA3.9-1 NRHP Historic Properties Associated with 104 FW SUA

SUA	***Number of NRHP Properties Under Airspace[1]***
Maine	
Condor 1 MOA	58
Condor 2 MOA	24
Laser East ATCAA	60
Laser North ATCAA	9
Scotty A ATCAA	42
Scotty B ATCAA	8
Scotty C ATCAA	31

SUA	*Number of NRHP Properties Under Airspace*[1]
New Hampshire	
Laser East ATCAA	5
Laser North ATCAA	81
Laser South ATCAA	224
Laser West ATCAA	3
Yankee 1 MOA	65
Yankee 2 MOA	31
New York	
Adirondack A MOA	1
Adirondack B MOA	5
Adirondack C MOA	3
Carthage East MOA	7
Carthage West MOA	4
Cranberry MOA	8
Lightning 1 ATCAA	95
Lightning 2 ATCAA	78
Lightning 3 ATCAA	12
Lightning 4 ATCAA	29
Lowville MOA	27
R-5201	1
R-5202A	1
R-5202B	1
Tupper Central MOA	8
Tupper East MOA	11
Tupper South MOA	13
Tupper West MOA	3
Vermont	
Clugs MOA	47
Laser North ATCAA	28
Laser South ATCAA	147
Laser West ATCAA	44
Lightning 1 ATCAA	248
Yankee 1 MOA	26

Note: [1]Many of the same historic properties are located beneath multiple SUA and across state lines.
Legend: 104 FW = 104th Fighter Wing; ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operations Area; R- = Restricted Area; SUA = Special Use Airspace; NRHP = National Register of Historic Places.
Source: National Park Service 2022b.

No national historic trails, national historic monuments, or national historic battlefields are located under the existing SUA (National Park Service 2022d, 2022e, 2022f).

Government-to-government consultation between the NGB and the 10 federally recognized Tribal Nations associated with the SUA associated with the 104 FW installation (New York SHPO 2022; HUD 2022) is being conducted to afford the Tribal Nations the opportunity to provide input in the decision-making process in recognition of their status as sovereign nations, to provide information regarding Tribal concerns per Section 106 of the NHPA, as well as to provide information on

traditional cultural resources that may be present on lands underlying the SUA. See Appendix A for all Section 106 and government-to-government correspondence.

To date, no traditional cultural resources or Native American sacred places have been identified beneath the SUA associated with the 104 FW installation.

MA3.9.2 Environmental Consequences

MA3.9.2.1 F-15EX

Installation

Implementation of the F-15EX beddown at the 104 FW installation would include new construction, building demolitions, and site and utility improvements resulting in approximately 218,100 SF of ground disturbance. The entirety of the project area has been surveyed for archaeological resources. There are no NRHP-eligible or listed archaeological resources within the construction footprint. It is not expected that undiscovered archaeological resources would be found during implementation of the F-15EX beddown at the 104 FW installation. 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 104 FW Environmental Manager. The Environmental Manager and Security Officer would secure the location and ensure that all cultural items are left in place and that no further disturbance is permitted to occur. The Environmental Manager would then contact the ANG's Cultural Resources Subject Matter Expert who would inspect the site and continue to follow Standard Operating Procedure No. 6.3, *Inadvertent Discoveries*, as outlined in the 104 FW installation ICRMP (ANG 2021). No traditional cultural resources have been identified at the 104 FW installation. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of this alternative would involve the interior modification of 11 buildings, 6 buildings would undergo additions and/or external building or site modifications, and 4 buildings would be demolished. However, none of the buildings are eligible or are listed in the NRHP (ANG 2021). Therefore, no architectural resources would be impacted by the F-15EX beddown.

No known historic properties are present within the APE at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1).

Airspace

Under this alternative, the 104 FW would conduct up to 3,182 annual sorties. Based on this, the time spent in the airspace by the 104 FW would increase by approximately 67 percent. With the vast amount of SUA in the region, aircraft can be dispersed throughout instead of all tasked to one SUA. The F-15EX would conduct 76 percent more training in the altitudes 18,000 feet MSL through 30,000 feet MSL than the F-15C, which would be above standard MOA altitudes. Noise modeling results suggest an increase of 67 percent of events could increase up to 5 dB from the existing conditions/No Action Alternative (see Section MA3.1.2.1, *F-15EX*). The result would be L_{dnmr} ranging from 45 dB on the upper end down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain relatively low.

Visual intrusions under this alternative would be minimal and would not result in significant impacts on the settings of cultural resources or adverse effects to historic properties. Due to the high altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft would not be readily visible to observers on the ground.

No ground disturbance would occur under the airspace. Use of ordnance and defensive countermeasures would continue in areas currently authorized. Flares deployed from the aircraft would not pose a visual intrusion, as they are small and burn for a few seconds and are released at high altitude, making them virtually undetectable on the ground. Use of chaff and flare results in residual materials that fall to the ground in a dispersed fashion. However, these residual materials do not collect in quantities great enough to adversely affect the NRHP status of historic properties (DAF 2023).

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-15EX beddown would not result in significant impacts on cultural resources. There are no known historic properties located at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1) and no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

MA3.9.2.2 F-35A

Installation

Implementation of the F-35A beddown at the 104 FW installation would result in approximately 203,800 SF of ground disturbance. The entirety of the project area has been surveyed for

archaeological resources. There are no NRHP-eligible or listed archaeological resources within the construction footprint. It is not expected that undiscovered archaeological resources would be found during implementation of the F-35A beddown at the 104 FW installation. However, in the event of an inadvertent discovery during ground-disturbing operations, the 104 FW would follow the steps as described above under the F-15EX proposed beddown. No traditional cultural resources have been identified at the 104 FW installation.

Implementation of the F-35A beddown at the 104 FW installation would involve the interior modification of 16 buildings, 7 buildings would undergo additions and/or external building or site modifications, and 4 buildings would be demolished. None of the buildings are eligible or are listed in the NRHP (ANG 2021). Therefore, no architectural resources would be impacted by the F-35A beddown.

No known historic properties are present within the APE at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1).

Airspace

Under the F-35A Alternative, the 104 FW would conduct up to 3,182 annual sorties. Based on this, the time spent in the airspace by the 104 FW would increase by approximately 67 percent. The F-35A would conduct 58 percent of its training within the altitudes 18,000 feet MSL through 30,000 feet MSL. In comparison, the F-15C only conducts 17 percent of training activities within the same altitude block. Based on the increase in sorties of 67 percent along with the greater SEL of the F-35A, L_{dnmr} in each airspace that would be used by the F-35A could increase up to 7 dB from the existing conditions/No Action Alternative (see Section MA3.1.2.2, *F-35A*). The result would be L_{dnmr} ranging from 47 dB on the upper end down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain relatively low.

Visual impacts and use of ordnance and defensive countermeasures within the airspace would be the same as described for the F-15EX.

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-35A beddown would not result in significant impacts on cultural resources. There are no known historic properties located at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1) and no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

MA3.9.2.3 F-15C Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would result in approximately 173,900 SF of ground disturbance. The entirety of the project area has been surveyed for archaeological resources. There are no NRHP-eligible or listed archaeological resources within the construction footprint. It is not expected that undiscovered archaeological resources would be found during implementation of the F-15C legacy beddown at the 104 FW installation. However, in the event of an inadvertent discovery during ground-disturbing operations, the 104 FW would follow the steps as described above under the F-15EX and F-35A proposed beddowns. No traditional cultural resources have been identified at the 104 FW installation.

Implementation of this alternative would involve the demolition of two buildings (Buildings 1 and 56) and the interior modification of five buildings. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. Two of these resources (Buildings 3 and 40) would also undergo building additions. None of the buildings included in the construction plans for this alternative are eligible or are listed in the NRHP (ANG 2021). Therefore, no architectural resources would be impacted by the F-15C beddown.

No known historic properties are present within the APE at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1).

Airspace

Under this alternative, the 104 FW's current fleet of 18 F-15C aircraft would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur. Operations would remain as described in MA2.1.2; therefore, no significant impacts on cultural resources or adverse effects to historic properties would occur per 36 CFR Section 800.5(b). The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

MA3.9.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from the existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy

aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF; however, impacts on cultural resources would not be significant and there would be no adverse effects to historic properties.

MA3.9.3 Summary of Impacts

There are no known archaeological sites within any of the proposed construction footprints at the 104 FW installation. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. No buildings associated with the proposed construction have been determined to be eligible for listing in the NRHP. No traditional cultural resources have been identified at the 104 FW installation. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. There would be no noise impacts on NHRP listed or eligible resources within the APE because none are present. Use of the SUA under the F-15EX or F-35A aircraft alternatives would increase but would be similar in nature to ongoing operations.

No known historic properties are present within the APE at the installation; therefore, implementation of the F-15EX, F-35A, F-15C, or No Action Alternatives at the 104 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b). The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

MA3.10 SAFETY

MA3.10.1 Affected Environment

MA3.10.1.1 Installation

Fire/Crash Response

The 104 FW fire department responds to all aircraft accidents on BAF. If increased response is required, the 104 FW fire department is a member of the Hampden County Mutual Aid Association that includes 23 communities within the county that can assist during public safety incidents, as needed. Additionally, the department has been incorporated into the automatic response matrices for the town of Easthampton and the city of Westfield and are also included as a secondary alarm for the towns of Russell, Southwick, and Southampton (Dugan 2023).

Hanscom AFB, located approximately 90 miles east of BAF in Bedford, MA also provides emergency response, as required (104 FW 2019a).

Accident Potential Zone/Runway Protection Zone

BAF has established RPZs at Runway 2/20 (Figure MA3.10-1). Currently, the northern RPZ for Runway 2/20 occurs entirely within airport boundaries. The southern RPZ occurs primarily within airport boundaries; however, it does extend outside of the airport boundary over commercial, industrial, transportation, and open space/recreation/forest land use areas. Interstate 90 crosses through the RPZ just outside of the southern airport boundary.

Explosive Safety

The 104 FW stores, maintains, and uses munitions required for executing their mission (see Section MA2.1.7, *Ordnance Use and Defensive Countermeasures*). The MSA at the 104 FW installation is located within the eastern parcel of the installation and currently includes four earth-covered magazines (Buildings 60–62 and 66), two segregated magazine storage buildings (Buildings 63 and 67), Explosive Ordnance Disposal (EOD) proficiency range (Building 127), EOD range holding pad (Building 126), Munitions Holding Area, and munitions Maintenance and Inspection facility (Building 64). Figure MA3.10-2 shows QD arcs established for these facilities. Additional areas outside of the MSA where munitions handling may occur and QD arcs have been established include Taxiways Bravo and Sierra, North D-ARM cargo pad area, aircraft apron/taxiway, and Runway 15/33 (DAF 2021).

Anti-terrorism/Force Protection

Many of the military facilities at the 104 FW were constructed before AT/FP considerations became a critical concern. Thus, many facilities do not currently comply with all current AT/FP standards. However, as new construction occurs and as facilities are modified, the 104 FW incorporates these standards to the maximum extent practicable during project planning and design phases.

MA3.10.1.2 Airspace

Flight Safety Procedures

Aircraft flight operations conducted by the 104 FW are governed by standard flight rules set forth under AFI 11-2F-15 Volume 3 and Airfield Operations Instruction 13-1. In addition to DAF regulations, pilots are required to operate in accordance with and follow all FAA regulations.

BAF is serviced by the Westfield ATC Tower, which under the rules and regulations governed by the FAA Order 7110.65 provides separation and sequencing to the airfield.

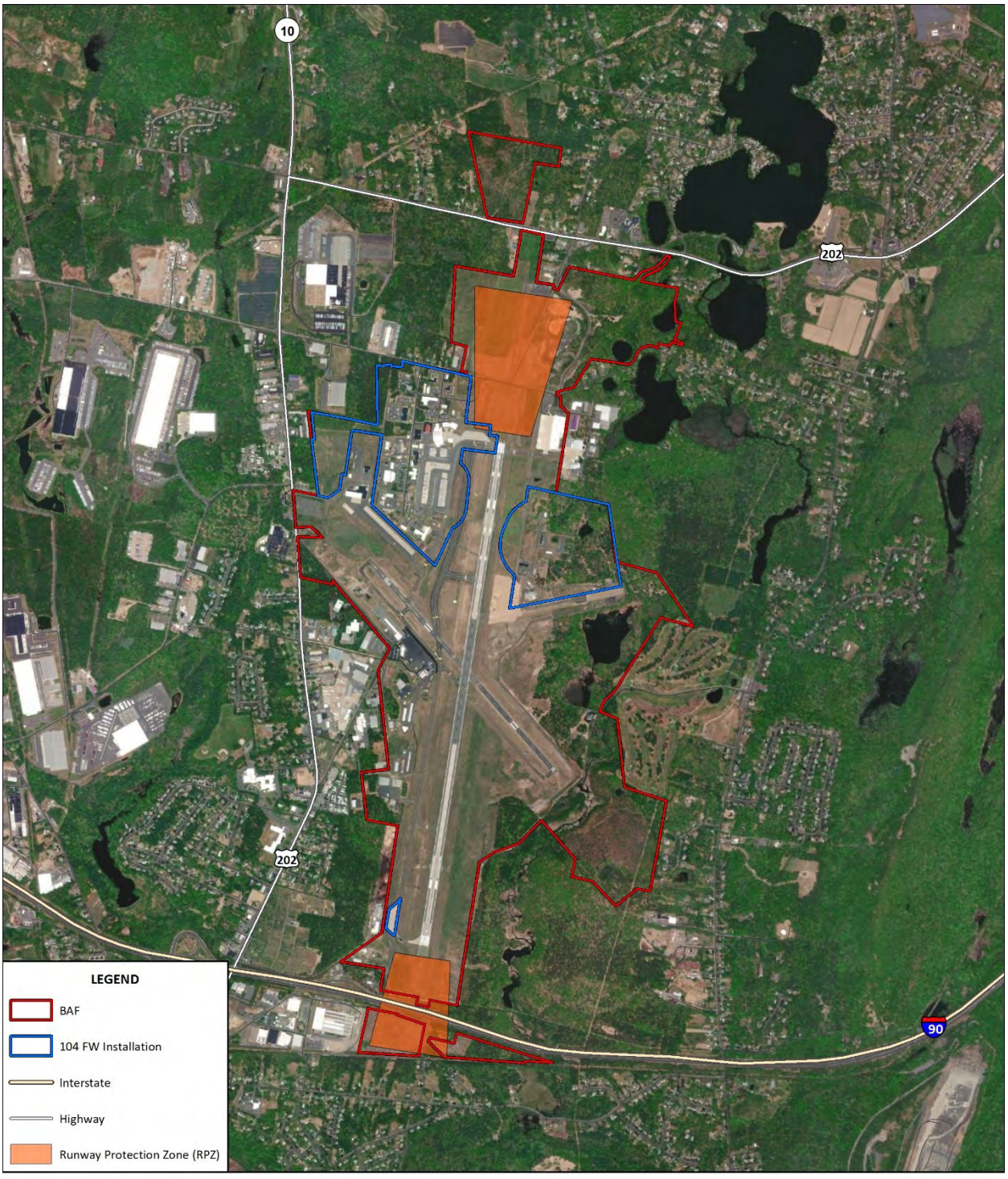


Figure MA3.10-1 FAA-controlled RPZs Established at Westfield-Barnes Regional Airport (BAF)

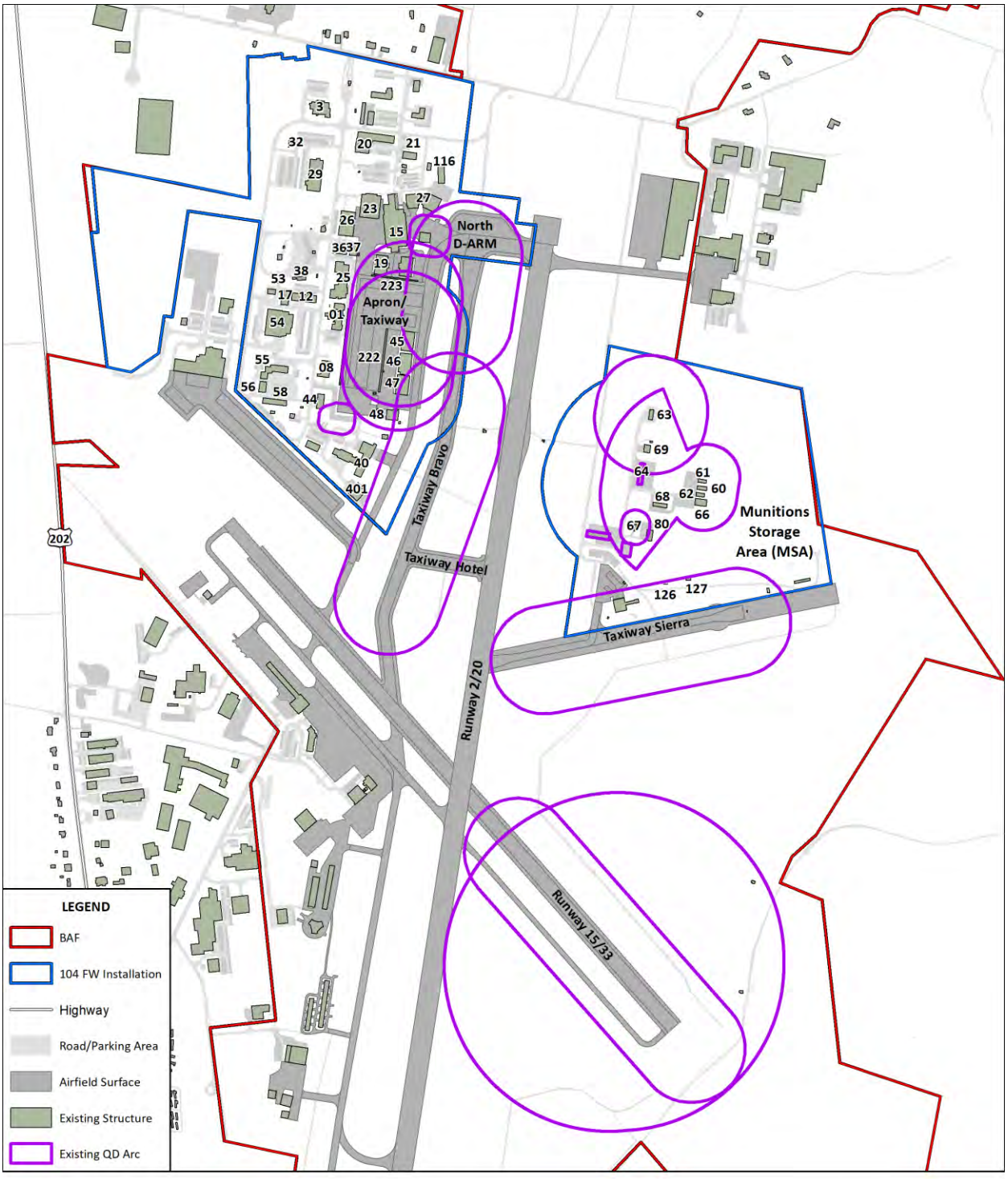


Figure MA3.10-2 QD Arcs Established at Westfield-Barnes Regional Airport (BAF)

Aircraft Mishaps

The 104 FW currently flies and maintains 18 PAA F-15C aircraft. The F-15 aircraft (all models) have flown 6,982,447 hours since the aircraft entered the DAF inventory in 1972. Over that period, 160 Class A mishaps have occurred, and 127 aircraft have been destroyed. This results in a lifetime Class A mishap rate of 3.20 annual mishaps per 100,000 flight hours and a lifetime destroyed aircraft rate of 1.82 annual aircraft destroyed per 100,000 flight hours (AFSEC 2021). From 2016 through 2020, the 104 FW installation has had 0 Class A mishaps, 3 Class C mishaps, and 11 Class D mishaps and 1 Class E mishap (104 FW 2021a).

According to the NTSB, BAF has had 16 total aircraft mishaps. Of these, four were Class A mishaps with the last occurring in July 2002 (National Transportation Safety Board 2022). These accidents all involved civilian general aviation aircraft.

The 104 FW Mishap Response and Investigation Plan is designed to provide rapid and positive investigative response to all 104 FW flight, weapons, and ground mishaps requiring comprehensive safety investigations and reporting (104 FW 2019a). The 104 FW is responsible for the initial mishap response involving military and civilian aircraft in the immediate vicinity of the 104 FW installation.

Bird/Wildlife Aircraft Strike Hazards

BAF maintains a WHMP as required by the FAA. The BAF WHMP defines site-specific roles, responsibilities, and authorities; as well as, wildlife hazard management strategies and procedures, training, evaluation, and monitoring.

Since December 2015, there have been three reported BASH incidents with the 104 FW's F-15C aircraft (104 FW 2021b). The 104 FW actively implements the *104 FW Bird-Aircraft Strike Hazard Plan 91-212* in accordance with 14 CFR Part 139.337 FAA guidelines, in addition to the wildlife management activities conducted by BAF personnel under the approved WHMP, thereby reducing the potential for a bird strike to occur. Key elements of the plan include monitoring the airfield for bird and other wildlife activity, issuing bird hazard warnings, initiating bird/wildlife avoidance procedures when potentially hazardous bird/wildlife activities are reported, and submitting BASH reports for all incidents (104 FW 2019a). Additionally, bird watch conditions which are addressed in the 104 FW BASH Plan are broken down into three categories (severe, moderate, and low) based on concentration and location of birds (i.e., if the birds are on or immediately above the active runway). When conditions are in the moderate or severe range, it represents an increased potential for a bird strike and further awareness and mission evaluation is required on the part of the aircrew.

MA3.10.2 Environmental Consequences

MA3.10.2.1 F-15EX

Installation

Under the F-15EX Alternative, total flight operations at BAF would increase by 2,766, or 6.7 percent over current operations. The 104 FW fire department would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations under F-15EX Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 104 FW fire department.

There would be no changes required to the established RPZs at BAF. In addition, no construction projects would occur within the established RPZs and new construction projects would not result in new airfield obstructions; therefore, no impacts on RPZs would occur under the F-15EX Alternative.

Three construction projects would occur within the boundaries of existing QD arcs under the F-15EX Alternative: Project 3 (Construct Taxiway Juliet), Project 25 (Repair Munitions Assembly Conveyor Pad), and Project 28 (Addition and Alteration Alert Crew Readiness) (see Figure MA2.1-1 and Appendix C for project location and detailed descriptions). All construction-related projects would occur in accordance with AFMAN 91-201, *Explosive Safety Standards*. Additionally, no explosives would be handled during construction or demolition activities. Therefore, no additional risk to explosive safety would be expected as a result of implementation of this alternative.

AT/FP compliance would increase under the F-15EX Alternative as all new construction and modification projects would be conducted in accordance with current AT/FP requirements.

Airspace

F-15EX aircrews would follow the local and federal regulations which govern flight within controlled, uncontrolled, and SUA. The F-15EX would continue to follow all guidelines according to the F-15 Local Operations Procedures (104 FW 2015).

The F-15EX utilizes the same airframe as the current and familiar F-15C model. The avionics are more advanced for the F-15EX, thus the increase in automation and technology would aid the pilots in reducing total workload, therefore, improving situational awareness.

The F-15EX would operate in the same airspace environment as the F-15C currently operates. The F-15EX is the same size as the F-15C. Additionally, operations would increase by 6.7 percent over existing conditions/No Action Alternative which could increase the potential for bird strikes; however, F-15EX aircrew would be expected to follow applicable rules and procedures outlined in the 104 FW BASH Plan, which when followed, reduces the overall risk of a potential BASH event. Local bird watch conditions would still be briefed and adhered to in an effort to reduce the likelihood of a bird strike. Therefore, the overall potential for a bird strike event with the F-15EX would not be anticipated to be statistically different from the current F-15C.

MA3.10.2.2 F-35A

Installation

As with the F-15EX Alternative, the 104 FW fire department would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations under the F-35A Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 104 FW fire department.

Proposed renovation and infrastructure improvement projects related to this alternative would not impact aircraft takeoff and landings or penetrate any RPZs. New construction projects are not proposed within RPZs; therefore, construction activity would not result in any greater safety risk or obstructions to navigation. Operations would fall within the same general types as those that have historically occurred at the 104 FW installation. For example, the F-35A would follow established local approach and departure patterns used. Therefore, flight activity and subsequent operations would not require changes to RPZs.

Seven construction projects would occur within the boundaries of existing QD arcs under the F-35A Alternative: Project 3 (Construct Taxiway Juliet), Project 18 (Addition and Alteration Weapons Load Crew Training Door), Project 20 (Repair Munitions Administration Facility), Project 25 (Repair Munitions Assembly Conveyor Pad), Project 28 (Addition and Alteration Alert Crew Readiness), Project 31 (Construct Aircraft Shelters and Shades), and Project 32 (Install Power Convertors) (see Figure MA2.1-2 and Appendix C for project location and detailed descriptions). All construction-related projects would occur in accordance with AFMAN 91-201,

Explosive Safety Standards. Additionally, no explosives would be handled during construction or demolition activities. Therefore, no additional risk to explosive safety would be expected as a result of implementation of this alternative.

AT/FP compliance would increase under the F-35A Alternative as all new construction and modification projects would be conducted in accordance with current AT/FP requirements.

Airspace

F-35A aircrews would follow the local and federal regulations which govern flight within controlled, uncontrolled, and SUA. It is expected that the 104 FW would develop a F-35A Local Operating Manual as they have already done for their F-15C aircraft. This manual would provide Commander's guidance for the safe operation of the aircraft and local procedures.

The F-35A has been operational since 2012 and has amassed 225,449 flight hours (AFSEC 2022) with five Class A mishaps to date. History has shown that over time, Class A mishap rates for new aircraft decrease over time. This is due to increased familiarity, training, and exposure on the F-35A aircraft, systems, and flight processes. The 104 FW has not had any Class A mishaps. The F-35A platform fly-by-wire and advanced systems aid in cockpit management and improved situational awareness for pilots.

The F-35A would operate in the same airspace environment as the F-15C. The F-35A is smaller than the F-15C and therefore, the overall potential for a bird strike event can be anticipated to be different from current F-15C due to the reduced surface area exposure of the aircraft. Overall operations at BAF would increase by 6.7 percent over existing conditions/No Action Alternative which could increase the potential for bird strikes; however, F-35A aircrew would be expected to follow all applicable rules and procedures outlined in the 104 FW BASH Plan, which when followed, reduces the overall risk of a potential BASH event. Local bird watch conditions would still be briefed and adhered to in an effort to reduce the likelihood of a bird strike.

MA3.10.2.3 F-15C Legacy Aircraft

Installation

Under the F-15C legacy aircraft alternative, aircraft replacement would not occur; however, construction and modification projects that are required to maintain the current F-15C aircraft would occur. The 104 FW fire department would continue to respond to all ANG-related fire and emergency incidents, which are not expected to increase as annual operations remain identical to existing conditions/No Action Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. Any

increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 104 FW fire department; therefore, no impacts on fire/crash safety would be expected under the legacy aircraft alternative.

Under the legacy aircraft alternative, Project 3 (Construct Taxiway Juliet) (see Figure MA2.1-3 and Appendix C for project location and description) would occur within existing QD arcs. No munitions movement or handling would occur during construction-related activities. There would be no change to the amount, type, or handling of munitions at the installation under the legacy aircraft alternative; therefore, no impacts related to explosive safety would occur.

There would be no change in aircraft under the legacy aircraft alternative, thus, there would be no changes to the established RPZs under this alternative. In addition, there would be no new construction or modification projects occurring within the RPZ footprints; therefore, no impacts on the RPZs would occur under the legacy aircraft alternative.

Construction and modification projects associated with the legacy aircraft alternative would be conducted in accordance with all AT/FP requirements, thus positive impacts on AT/FP would occur under the legacy aircraft alternative.

Airspace

Under this alternative, the 18 F-15C legacy aircraft would continue to operate as described in Section MA2.1.2, *Airfield Operations*. BASH and mishaps would continually be mitigated through the 104 FW BASH Plan, safety training, technology, and ATC services.

MA3.10.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on safety could emerge since F-15C aircraft may experience increased maintenance needs as the legacy aircraft continue to age.

MA3.10.3 Summary of Impacts

Fire and crash response would continue to be conducted by the 104 FW fire department under all alternatives. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident

response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 104 FW fire department. No construction would occur within the RPZs and there would be no new airfield obstructions created by construction or modification projects. QD arcs would not be expected to change from the existing conditions/No Action Alternative. While there are some planned constructions that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements as mandated by the DoD and would increase overall AT/FP compliance.

Each installation has published rules, regulations, and procedures in place to ensure flight safety. The lifetime Class A mishap rates for the F-15 and F-35 are 2.29 and 2.22 per 100,000 hours flown, respectively. The F-15EX would utilize the same airframe as the current and familiar F-15C model. The avionics for the F-15EX are more advanced, thus the increase in automation and technology would aid the pilots in reducing total workload, therefore, improving situational awareness. Additionally, the F-35A platform fly-by wire and advanced systems also aid in cockpit management and improved situational awareness. Reduced workload, improved situational awareness, training, and familiarity would only continue to help reduce the chances of mishaps. The DoD's detailed BASH plan would continue to be followed to mitigate and reduce the chances of a BASH event from occurring.

No significant impacts on safety would be expected with implementation of any of the action alternatives. Under the No Action Alternative, as the F-15C aircraft continue to age, maintenance and resulting safety issues could emerge.

MA3.11 HAZARDOUS MATERIALS/WASTE

MA3.11.1 Affected Environment

MA3.11.1.1 Installation

Hazardous Materials

Hazardous materials and petroleum products are used throughout the 104 FW installation to support aircraft maintenance; aerospace ground equipment maintenance; ground vehicle maintenance; and POLs management and distribution. Types of hazardous substances found on the 104 FW installation include POLs, solvents, fire-fighting agents (AFFF and high-expansion foam [HEF]), antifreeze, detergents, batteries, aerosols, recovered fuels, hydraulic fluid, paints, and paint strippers, cleaning products and pesticides, and adhesives and sealants. Handling of hazardous materials is in accordance with DoD, federal, state, and local regulations.

The 104 FW has established a Hazardous Materials Pharmacy (HAZMART) for issue and control of designated hazardous materials at the installation. The HAZMART is operated in accordance with AFI 32-7002, Chapter 3, *Hazardous Materials Management.* The HAZMART serves to ensure hazardous materials are evaluated prior to acquisition; that the most environmentally preferable materials are used to perform a given task; that the quantities issued are those needed to perform the designated tasks; and that unused materials are returned to the HAZMART for reissue and/or disposal (104 FW 2008).

The 104 FW currently has one UST regulated under 40 CFR 280. The 1,000-gallon double-walled product recovery UST contains Jet A fuel and is located in the POL Storage Area. Jet A, diesel fuel, gasoline, waste oils, transformer mineral oil, hydraulic fluids, and solvents, as well as antifreeze, detergents, fire suppression agents are also stored in ASTs. In addition, POL is stored in self-propelled mobile refuelers, fuel bowsers (towed mobile refuelers), generator day tanks, electrical transformers, and 55-gallon drums on the installation. Currently, there are 51 ASTs on the 104 FW installation. Individual storage tanks/containers and their location, contents, capacity, tank material, and installation date are described in detail in the *Final Spill Prevention, Control, and Countermeasure Plan* dated 20 September 2021 (104 FW 2021c).

Hazardous Waste

The 104 FW *Final Spill Prevention, Control, and Countermeasure Plan* establishes responsibilities, actions, and responses to spills of hazardous materials that the 104 FW would implement to comply with the requirements of 40 CFR 112, *Oil Pollution Prevention*. The plan also addresses the requirements of Title 310 of the CMR, *Chapter 30: Hazardous Waste; Title 310 of the CMR, Chapter 40: Massachusetts Contingency Plan*; Title 502 of the CMR, *Chapter 5: Permit and Inspection Requirements of Aboveground Storage Tanks of More Than Ten Thousand Gallon Capacity*; and Title 527 of the CMR, *Chapter 9: Tanks and Containers*, which address the requirements for contingency response planning, as well as construction and inspection requirements for bulk storage tanks in the Commonwealth of Massachusetts (104 FW 2021c).

Hazardous and petroleum wastes are generated throughout the installation during various operations, including aircraft maintenance and repair, painting and corrosion prevention operations, and vehicle maintenance and repair. These hazardous and petroleum wastes include paints, solvents, lubricants, oils, jet fuel, and fuel oil. The 104 FW *Hazardous Waste Management Plan* (HWMP) outlines procedures for controlling and managing hazardous wastes from the point where they are generated until they are disposed. In addition, it includes guidance for compliance with all applicable federal, military, state, and local laws and regulations pertaining to hazardous waste. The HWMP also discusses pollution prevention at the installation with the goal of reducing or eliminating the use of toxic or hazardous substances and the generation of

hazardous waste wherever possible through source reduction and environmentally sound recycling (104 FW 2008).

The 104 FW is regulated as a Large Quantity Generator of hazardous waste and maintains EPA Identification Number MA6570025902. The munitions side of 104 FW is regulated as a Very Small Quantity Generator (EPA Identification Number MV4135689151) of hazardous waste. A hazardous waste generation point is where a hazardous waste is initially created or generated. Subsequent to generation, the hazardous waste must be accumulated at or near the point of generation at an Initial Accumulation Point or transferred immediately to the Hazardous Waste Accumulation Site (HWAS). Waste cannot be accumulated at the generation point unless the area has been designated as an approved Initial Accumulation Point. There are 29 Initial Accumulation Points located in 21 buildings/locations (Buildings 15, 20, 23, 25, 26, 27, 28, 30, 31, 34, 35, 37, 40, 42, 45, 55, 65, 77, 107, 222 ACA, and Flight Line) at the 104 FW installation. As a Large Quantity Generator, the 104 FW is allowed to accumulate hazardous waste in containers for a period up to 90 days at each HWAS. One of the two HWAS at the 104 FW installation is located in Building 25 and the other is located in the MSA near Building 107 (104 FW 2008).

Oil/water separators (OWSs) are used to separate oils, fuels, sand, and grease from wastewater and to prevent contaminants from entering the sanitary sewer and stormwater drainage systems. Currently, there are 15 OWSs on the 104 FW installation.

Toxic Substances

Regulated toxic substances typically associated with buildings and facilities include asbestos, LBP, and PCBs. An asbestos survey has been conducted on the installation. Results indicated that Buildings 1, 8, 12, 15, 20, 60, and 67 have ACM present (104 FW 2011).

An LBP survey has not been conducted at the 104 FW installation, so any buildings on the installation constructed prior to 1978 are presumed to contain LBP and would be tested for LBP prior to demolition or renovation.

The 104 FW does not have any known PCB-containing equipment or materials on the installation (104 FW 2008).

Contaminated Sites

Defense Environmental Restoration Program

Under the DERP, the IRP is designed to identify, evaluate, and remediate sites where activities may threaten public health, welfare, or the environment and is the basis for response actions at the 104 FW installation under the provisions of CERCLA, as amended.

The installation began conducting activities under the IRP in 1987 and a Preliminary Assessment was completed in March 1988. Seven IRP sites (Sites 1-7) were identified in the Preliminary Assessment. After a Site Inspection was performed, Remedial Investigations were conducted for Sites 3, 5, 6, and 7. With the exception of IRP Site 2, the Former UST/Tank Sludge Disposal Area, the sites have been closed and issued permanent solution statements (formerly referred to as Response Action Outcome statements, analogous to No Further Action Planned designations) from the MassDEP (104 FW 2022a). The IRP Site 2 is currently still open and undergoing long-term monitoring activities. A Permanent Solution Statement with Conditions is currently being evaluated through a feasibility evaluation, risk characterization, and consideration of a potential notice of activity and use limitations for IRP Site 2 (104 FW 2022b). The active IRP site is shown in Figure MA3.11-1.

In response to PFAS (e.g., PFOS and PFOA) and other emerging contaminants, AFCEC, the unit responsible for environmental management and response across the DAF, established a program to systematically identify potential releases, respond to drinking water contamination, and prevent future contamination. Eight potential AOCs related to PFAS contamination were identified at the 104 FW installation in January 2016 during a Preliminary Assessment which included a review of documented fire training and other areas suspected or known to have had a release of AFFF to the environment. Seven of the eight were recommended for further investigation to characterize potential PFAS contamination. These sites are Former Fire Training Area (IRP Site 1), Stormwater Drainage Basin (IRP Site 4), Hangars 27A and 27B (AOC 4), Former Fire Station (AOC 5, Building 4), Current Fire Station (AOC 6, Building 40), Hush House (AOC 7), and Fire Department Equipment Test Area (AOC 8). A Final Report, *FY 2016 Regional Site Inspections for PFAS* was prepared that presents the results of investigations at seven Potential Release Locations (PRLs). The report recommended no further action at one PRL (AOC 3) and further investigations at the remaining six PRLs. (Note: the AOCs were previously referred to as PRLs, but as PFAS was reported in media at several of the sites, they are more accurately referred to as AOCs [104 FW 2020b). However, based on comments from MassDEP, it was determined that all seven AOCs required further investigation (104 FW 2020b).

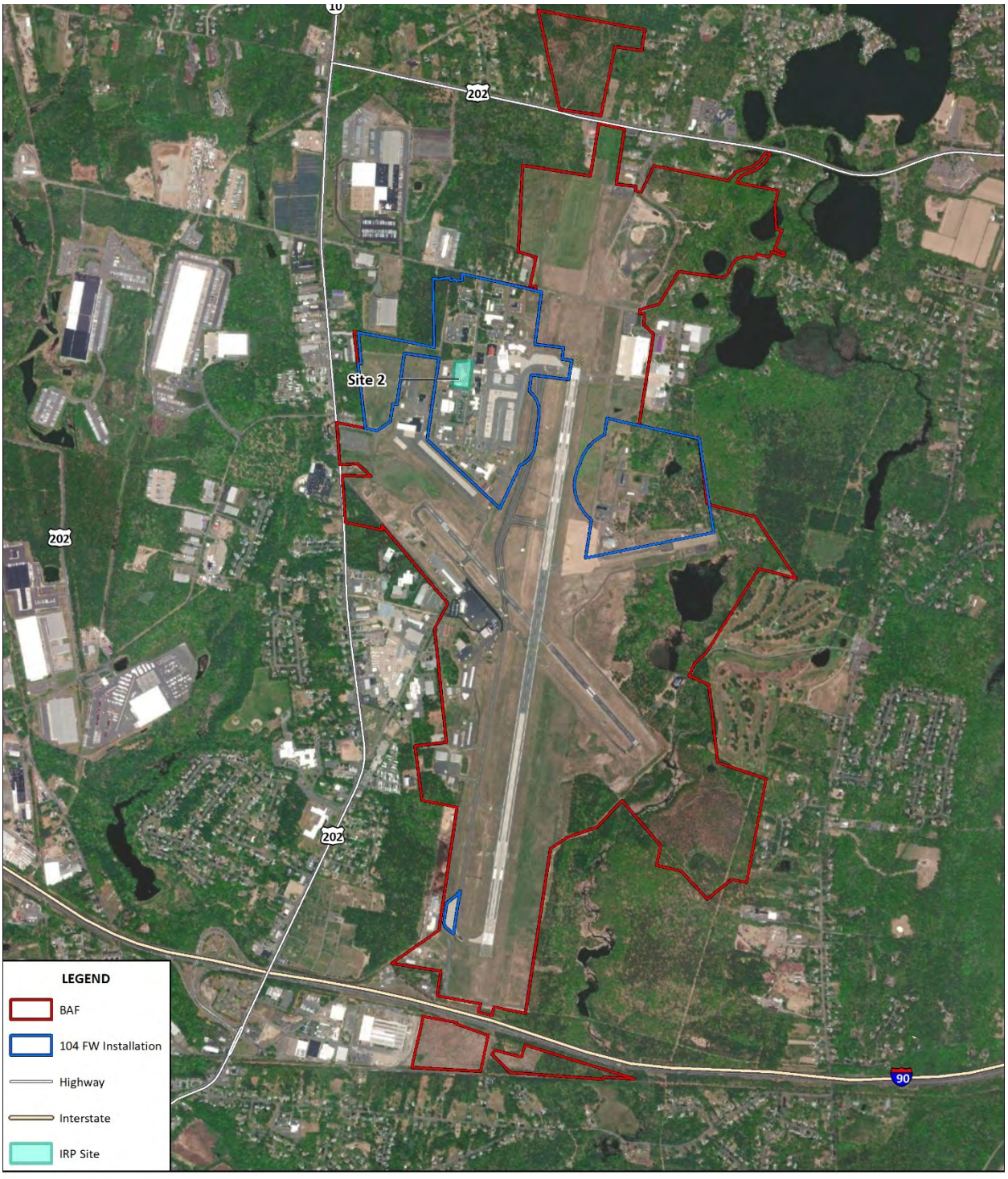


Figure MA3.11-1 Active IRP Site at the 104 FW Installation

An Expanded Site Investigation for the seven PFAS AOCs listed above was completed between May 2019 and November 2019 (104 FW 2020c). These areas are where PFAS may have historically been used and/or released (i.e., at fire stations, firefighter training areas, etc.). Analytical results from groundwater wells on-installation and at BAF indicated that the primary source area is the area that includes AOC 1 (Former Fire Training Area, IRP Site 1) and AOC 6 (Current Fire Station, Building 40), although AOC 1 is the likely primary source. Secondary source areas include AOC 4 (Hangars 27A and 27B), AOC 5 (Former Fire Station), AOC 7 (Hush House), and AOC 8 (Department Equipment Test Area). AOC 3 (Storm Drainage Basin, IRP Site 4) is not a PFAS source. Regionally, on-installation and down-gradient PFAS results indicate that PFAS was found at all well cluster locations and at all depths within the Barnes aquifer. The results indicate the presence of a continuous PFAS plume that extends from the 104 FW installation south to the end of Runway 2/20 at BAF and beyond the Massachusetts Turnpike to the south (104 FW 2020c).

Table MA3.11-1 provides details for the AOCs at the 104 FW installation and the recommendations based upon the 2020 Expanded Site Investigation results and Figure MA3.11-2 shows the location of the AOCs.

MA3.11.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.11.2 Environmental Consequences

MA3.11.2.1 F-15EX

Installation

Hazardous Materials

Under the F-15EX Alternative, the quantities of hazardous materials and petroleum substances used throughout the installation could increase over the long term due to the potential increase in aircraft operations. Construction and modification activities under the proposed beddown of the F-15EX at BAF would cause short-term increases in the quantities of hazardous materials (e.g., paint) and petroleum products (e.g., vehicle fuel) used and stored on the installation. Currently, the majority of the F-15C aircraft maintenance takes place at the 104 FW installation.

Table MA3.11-1 PFAS AOCs at the 104 FW Installation

AOC/ PRL ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1]
1	Former Fire Training Area (FTA) (IRP Site 1)	AOC 1 is a former FTA used from approximately 1950 through 1987 that lies approximately 400 feet south of the current base boundary. The site consisted of a burn pit, a fire extinguisher training pit, a drum storage area, and a bermed area. AVGAS, waste oils, solvents, and JP-4 were used as accelerants during fire training exercises. AFFF was used as fire suppression agent. The site was identified during the 1988 Preliminary Assessment. In the spring of 2000, impacted soils from previous fire training activities were excavated and removed from the site. Groundwater investigation activities were conducted, and the results indicated that the groundwater at the site was not impacted by fuel and chlorinated constituents likely used during fire training exercises. Site closure was obtained in 2002. During the IRP activities, PFAS were not COCs and thus no soil or groundwater samples were analyzed by the laboratory for PFAS compounds.	**Soil:** Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing FSS, documented AFFF leaks, and suspicion of an accidental release. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
3	Stormwater Drainage Basin (IRP Site 4)	The installation stormwater drainage retention basin is located in the northwestern portion of the western 104 FW installation. The retention basin is approximately 100 feet wide by 200 feet long and 15 feet deep, lined with crushed rock and dirt. Stormwater which enters the drainage basin percolates to the subsurface through the sandy surface soils. Discussions with installation personnel indicated the installation utilized septic systems for all sanitary wastes up until the early 1980s when portions of the installation were converted to the City sanitary sewer system. Completion of the conversion from septic to sanitary sewers occurred in the early 1990s. Prior to connection to the sanitary sewer, floor drains within the hangars and buildings in the flight line area would have all drained to the drainage basin at IRP Site 4. Although there are no known releases of AFFF to the stormwater drainage basin, AFFF releases had the potential to impact the basin. The floor drains currently discharge to the sanitary sewer system. The site was investigated under the IRP and closed in 1998 with no further action determined. There are no documented AFFF releases to the drainage basin.	**Soil:** No further sampling needed. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.

AOC/ PRL ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1]
4	Hangars 27A and 27B	Hangars 27A and 27B serve as the Installation Fuels and Corrosion Control Facilities. Hangar 27A Corrosion Hangar was constructed in 1997. These hangars, which were renovated in the late 1990s, currently have automatic HEF fire suppression systems, which were installed in the early 2000s. In addition, manually operated AFFF deck guns (two located in Building 27A and two located in Building 27B) are also present. Each AFFF deck gun has an approximate 50-gallon AFFF reservoir. AFFF was removed from all four deck guns on 17 August 2018. There are no documented releases of AFFF within these facilities. Releases that occurred in flight line area buildings before the early 1990s would have drained to the building floor and trench drains that drained to the drainage retention basin located at AOC 3 (discussed above). Building floor drains now go to the sanitary sewer system via an OWS system.	**Soil:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for the hangars to have soil impacts. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
5	Former Fire Station (Building 004)	The former installation fire station was in use from the 1940s until approximately 1992 when the new fire station was built. Incidental spills and releases within the old fire station would likely have drained to the floor drains and entered the sanitary sewer system; prior to connection to the city's sanitary sewer system, the floor drains likely discharged to a dry well.	**Soil:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for the fire department to have soil impacts. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
6	Current Fire Station (Building 040)	AFFF is stored by the fire department at the current crash fire station (Building 040) which was built in 1992 and has been occupied since that time. Renovations to the building were conducted in 2010. There are three fire department crash trucks that hold 3 percent AFFF for a total of approximately 320 gallons of AFFF. If needed, there are also 5-gallon totes of 3 percent AFFF solution (approximately 250 gallons total) in inventory to refill the crash trucks. All the trucks and AFFF storage areas are contained inside the fire station. The AFFF transfers occur via hand: either manually pouring the 5-gallon AFFF totes into the crash trucks or via a hand transfer pump within the fire station. There were no floor drains present during the Preliminary Assessment site visit; however, the fire station originally contained floor drains which discharged to the sanitary sewer via an OWS. The floor drains were eliminated as part of the facility upgrade in 2010.	**Soil:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for the fire department to have soil impacts. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.

AOC/ PRL ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1]
7	Hush House	The installation jet engine test cell facility or Hush House was assembled in approximately 1995. It is located in the eastern 104 FW installation adjacent to Sierra Taxiway. Initially, the Hush House had an AFFF fire suppression system from 1995 until the early 2000s when the system was converted to HEF. Floor drains are present which discharge to the sanitary sewer system through an OWS.	**Soil:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for the hush house to have soil impacts. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
8	Fire Department Equipment Test Area	Fire department equipment testing occurred at the far east end of the Sierra Taxiway located immediately south of the eastern 104 FW installation. Testing was predominately done on the paved taxiway area with resulting spills or releases draining off the edges of the taxiway onto the ground surface or infiltrating through cracks in the paved surface.	**Soil:** Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing FSS, documented AFFF leaks, and suspicion of an accidental release. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
Upgradient		Upgradient wells on the western portion of the installation indicate a potential contribution of PFAS from off-site sources to the north (e.g., air crashes where AFFF was used).	**Soil:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing FSS, documented AFFF leaks, and suspicion of an accidental release. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.

AOC/ PRL ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1]
Downgradient		Regionally, on-installation and downgradient PFAS results indicate that PFAS was found at all well cluster locations and at all depths within the Barnes aquifer.	**Soil/Sediment:** Initial surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing FSS, documented AFFF leaks, and suspicion of an accidental release. **Groundwater/Surface Water/Sediment:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.

Notes: [1]Final Expanded Site Inspection Report for PFAS at Barnes ANGB, Westfield, Massachusetts for further details regarding the investigation of the PRLs.
Legend: 104 FW = 104th Fighter Wing; AFFF = aqueous film-forming foam; AOC = area of concern; AVGAS = Aviation Gasoline; COC = contaminant of concern; FSS = fire suppression system; FSS = fire suppression system; FTA = Fire Training Area; HEF = high expansion foam; ID = Identification; IRP = Installation Restoration Program; JP-4 = jet-propellant fuel #4; OWS = oil/water separator; PFAS = per- and polyfluoroalkyl substances; PRL = Potential Release Location.
Sources: 104 FW 2020b, 2020c.

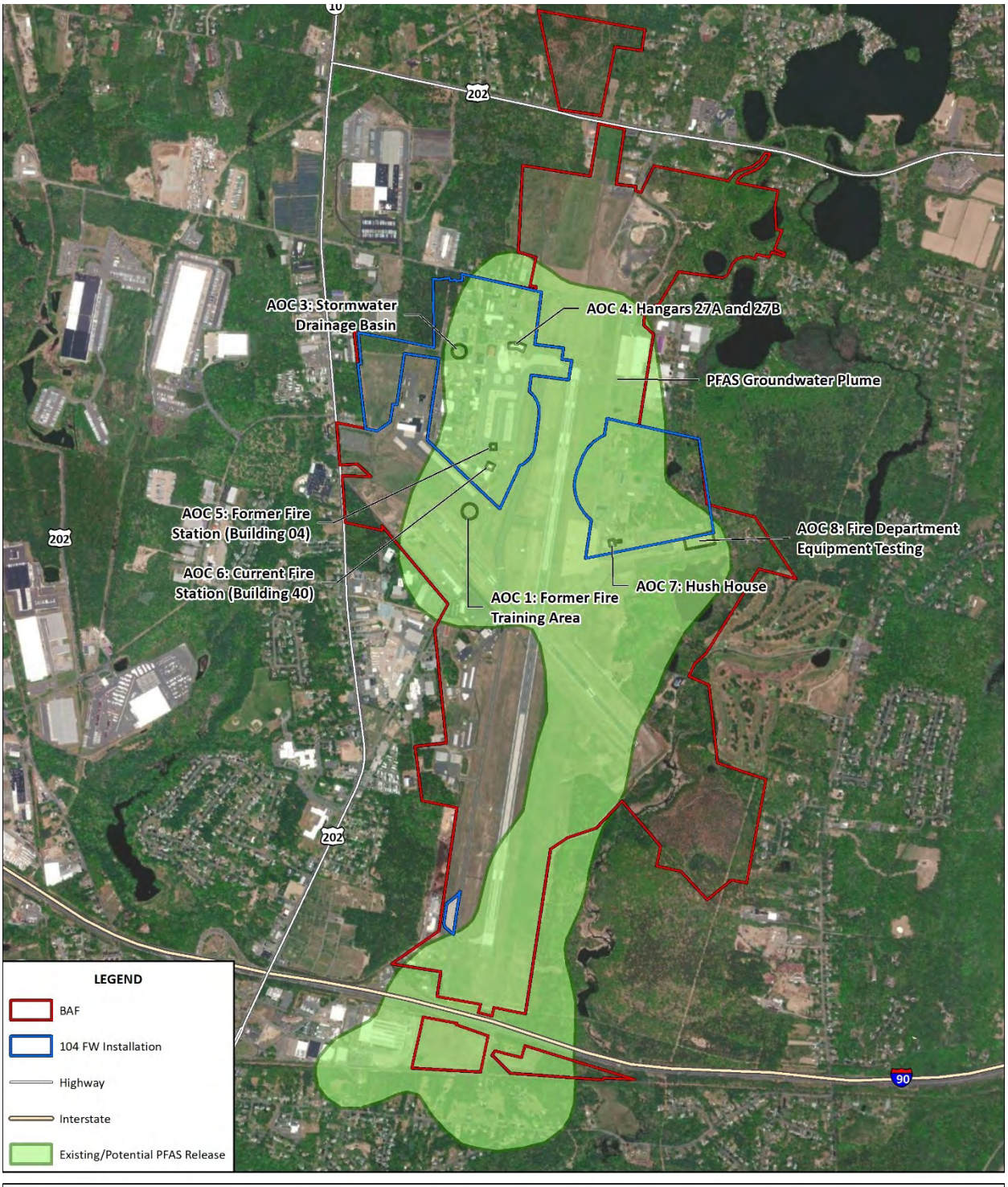


Figure MA3.11-2 PFAS AOCs at the 104 FW Installation

Under the F-15EX Alternative, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous material streams would be expected to increase. The 104 FW is responsible for managing these materials in accordance with all applicable federal, military, state, and local laws and regulations to protect their employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community. The operating location would be responsible for the safe storage and handling of hazardous materials used in conjunction with all construction activities. Additional aircraft, vehicles, and equipment would increase consumption of operating fluids and fuel; however, the long-term impacts are expected to be minor with the implementation of the aforementioned hazardous materials management procedures and practices. No direct work would be performed on the ASTs and no additional ASTs are proposed to be installed. Possible impacts associated with these projects include tank ruptures or leaks during construction. The 104 FW has in place a Spill Prevention, Control, and Countermeasures Plan, which would address these impacts should they occur (104 FW 2021c). No significant impacts are anticipated.

Hazardous Waste

Implementing the F-15EX Alternative would have short-term minor impacts on hazardous waste accumulation. There would be an increase in temporary construction-related hazardous wastes. All construction hazardous waste would be managed by the contractors and would be applicable to all federal and state rules and regulations. The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C fleet; therefore, the waste streams generated would be similar as well. Note that in August 2022, the EPA proposed to designate PFAS as hazardous substances under CERCLA. If this designation is finalized, it would impact the management requirements for excavated material (i.e., soil and groundwater) generated during construction. The volume of waste generated would be tracked and analyzed to determine whether each type of waste is hazardous. The DoD management of PFAS is evolving and a recent Office of the Secretary of Defense decision impacted management requirements. On July 7, 2023, the Assistant Secretary of Defense for Energy, Installations, and Environment, issued a memo "Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States" that directs DoD installations to dispose PFAS-containing materials in hazardous waste landfills, or specialized solid waste landfills with environmental permits, that have composite liners, and gas and leachate collection and treatment systems (Assistant Secretary of Defense for Energy, Installations, and Environment 2023). All waste would be properly disposed of in accordance with all applicable federal, military, state, and local laws and regulations. No trash or other solid waste would be buried, burned, or otherwise disposed of at the project site. The F-15EX Alternative would not result in any adverse long-term environmental impacts that would affect the installation. Hazardous waste generation would continue to be managed in accordance with the

installation's HWMP and all applicable federal, military, state, and local laws and regulations. Additionally, no changes to the installation's Large Quantity Generator status would be expected. Under the F-15EX Alternative, the total number of airfield operations would increase; therefore, throughput of hazardous waste streams would be expected to increase but no significant impacts are anticipated.

Toxic Substances

Toxic substances typically associated with buildings and facilities include ACM, LBP, and/or PCBs. No new toxic substances would be used or stored due to the implementation of the F-15EX beddown. There is a proposed construction project to either renovate the existing Wing Headquarters (Building 1) (Project 1.1) or construct a new Wing Headquarters at either the previous location of Building 20 (this building would be demolished) (Project 1.2) or on undeveloped land (in wooded area of newly acquired parcel by new Entry Control Point Gatehouse and Road) (Project 1.3). If either of the projects to construct a new Wing Headquarters is selected, the existing Wing Headquarters (Building 1) would be demolished. ACM is present in Buildings 1 and 20. ACM is also present in Building 15 in the maintenance shop, which is proposed to have repairs made to the existing building (Project 26). If ACM is discovered within a building that is to be renovated or demolished, the proper federal, military, and state rules and regulations would be followed, including but not limited to, 40 CFR 61.145, *Standard for Demolition and Renovation* and 29 CFR 1926.1101, *Asbestos Construction Standard*.

An LBP survey has not been conducted on the 104 FW buildings. All buildings on the 104 FW installation constructed prior to 1978 are presumed to contain LBP and would be tested for LBP prior to demolition or renovation (104 FW 2008). As a BMP, contractors who renovate or demolish buildings testing positive for LBP should be certified by the EPA and follow lead-safe work practices. LBP would be managed and disposed of in accordance with Toxic Substances Control Act, OSHA regulations, Massachusetts requirements, and established ANG procedures.

The abovementioned state and federal rules and regulations as well as BMPs would be followed by the 104 FW during construction; therefore, there would be no significant impacts with respect to toxic substances with the implementation of the F-15EX beddown.

Contaminated Sites

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

In accordance with AFI 32-7020, *The Environmental Restoration Program*, construction, modifications, and/or additions to existing buildings can occur on or in proximity to existing IRP sites. Accordingly, the appropriate organizations (e.g., installation planners, remedial project

managers, design engineers) must consider a compatible land use based on current site conditions and the selected or projected remedial action alternatives. If the potential for uncharacterized IRP sites exists, the 104 FW would be responsible for identifying existing contamination at the proposed construction sites to avoid unknowingly locating construction projects in contaminated areas.

There are two overlapping areas between one of the IRP sites and the proposed construction or modification projects (Figure MA3.11-3). Project 4 involves internal modifications to improve POL testing and administration in POL Shop (Building 33) and Project 19 involves the demolition of the Liquid Oxygen Facility (Building 38 and 39). Both of these projects overlap with IRP Site 2 (the Former UST/Tank Sludge Disposal Area). The 2019 Release Abatement Measure Completion Report recommended long-term monitoring at IRP Site 2 until a permanent solution is achieved. Long-term monitoring activities will be completed in accordance with 310 CMR 40.0892 (104 FW 2021c). Proposed construction and associated excavations would additionally need to consider potential construction dewatering and its impact on nearby IRP sites with contaminated groundwater.

Two PFAS AOCs (AOC 4 and AOC 6) overlap with three of the proposed projects (Figure MA.3.11-4). AOC 4 overlaps with Building 27, which involves the addition of an external pad for drop tank storage (Project 27). Project 14 involves alteration of the Civil Engineering Building (Building 40) and it overlaps with AOC 6. There is also a PFAS groundwater plume resulting from multiple sources that underlies the majority of the 104 FW installation including all of the proposed construction and modification projects with the exception of five (Projects 1.3, 10.1, 10.2, 13, and 17) located along the western boundary of the installation.

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities, work would cease until 104 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing IRP or AOC sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination, including from potential construction dewatering wherein contaminants (e.g., PFAS) could be drawn toward the excavation. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. Therefore, no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would occur.

Figure MA3.11-3 IRP Site within the Vicinity of the Proposed Construction for the F-15EX at the 104 FW Installation

Figure MA3.11-4 PFAS AOCs within the Vicinity of the Proposed Construction for the F-15EX at the 104 FW Installation

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.11.2.2 F-35A

Installation

Construction and modification projects and operations under the F-35A Alternative would be similar to those described for the F-15EX beddown with a small increase in the number of proposed projects (see Table MA2.1-3). Thus, the F-35A Alternative would involve similar hazardous material usage, generate similar amounts of hazardous waste and would require similar ACM (Projects 1.1, 1.2, and 1.3) and/or LBP removal as described under the F-15EX beddown. Project 33 also involves repairs to the maintenance shops in Building 15 specific for the F-35A Alternative (Project 33). Projects 1 and 4, which would be implemented for the F-15EX Alternative, would also be implemented for the F-35A Alternative; therefore, the same IRP site (IRP 2) would potentially be impacted (Figure MA3.11-5). In regard to PFAS AOCs, the only difference between the F-15EX Alternative is that AOC 4 overlaps with Project 32 which also involves Building 27 but for a different project (installing a power converter) (Figure MA3.11-6). As such, the impacts related to contaminated sites also would be similar to those described under the F-15EX beddown.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.11.2.3 F-15C Legacy Aircraft

Installation

Under this alternative, the planned construction and repair projects required for the current mission would be implemented (see Table MA2.1-3). Construction impacts would be smaller in magnitude than the proposed F-15EX and F-35A Alternatives as overall there would be less construction and modification projects. In addition, there would be no additional aircraft, vehicles, and equipment and hence there would be no change in use of operating fluids and fuel. Thus, this alternative would involve less hazardous material usage, generate less hazardous waste than the F-15EX and F-35A Alternatives. It would require similar ACM (Projects 1.1, 1.2, and 1.3) and/or LBP removal as described under the F-15EX beddown.

Figure MA3.11-5 IRP Site within the Vicinity of the Proposed Construction for the F-35A at the 104 FW Installation

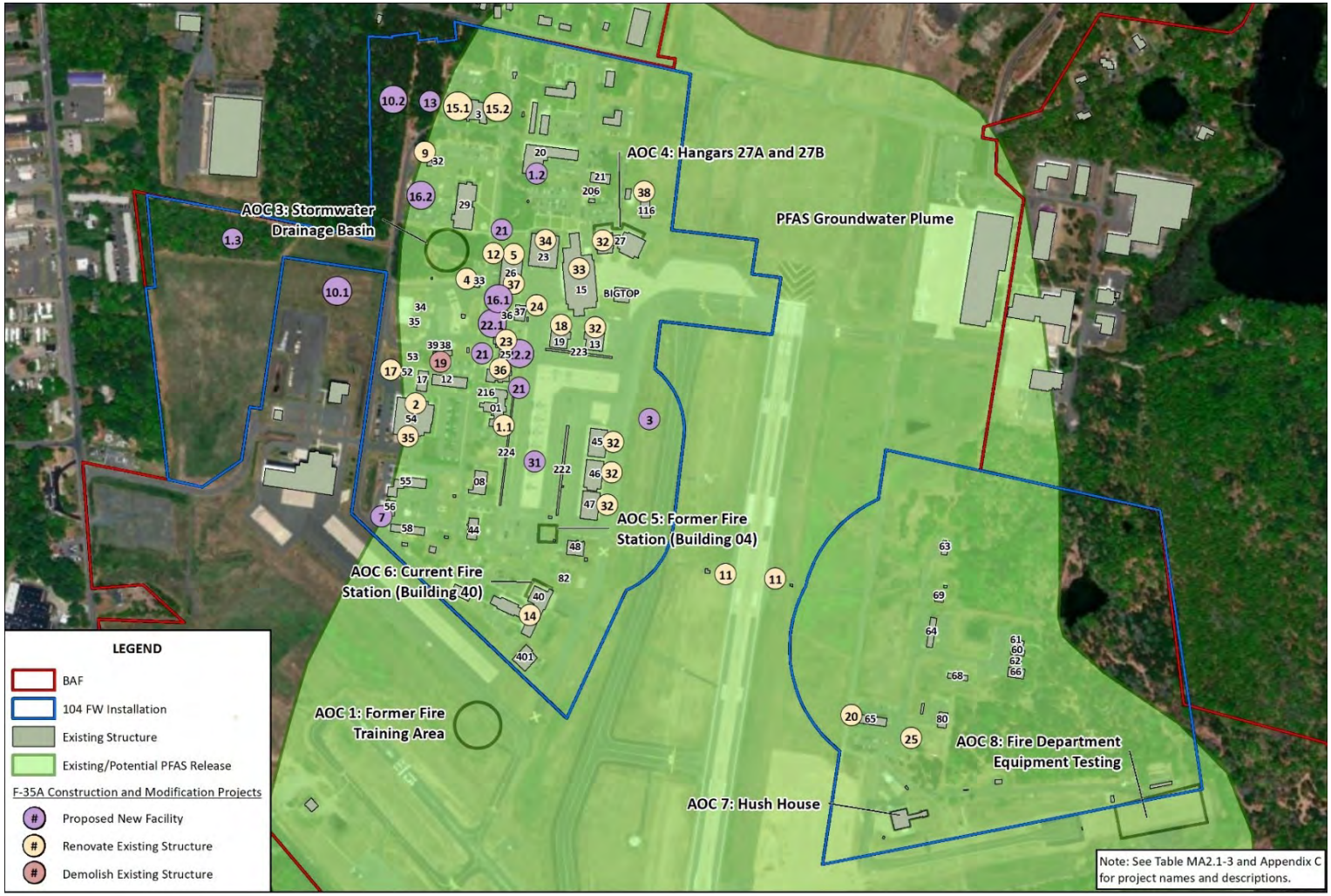


Figure MA3.11-6 PFAS AOCs within the Vicinity of the Proposed Construction for the F-35A at the 104 FW Installation

In regard to the contaminated sites, Projects 1 and 4, which would be implemented for the F-15EX Alternative, would also be implemented for the F-15C legacy aircraft alternative; therefore, the same IRP site (IRP 2) would potentially be impacted (Figure MA3.11-7). In addition, 13 of the construction and modification projects proposed under this alternative overlap with the large PFAS groundwater plume underlying the majority of the 104 FW installation (MA3.11-8). These 13 projects are also included in the F-15EX and F-35A Alternatives.

Therefore, impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would be less than those described for the F-15EX and F-35A Alternatives. Overall, no significant impacts would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.11.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would not be significant.

MA3.11.3 Summary of Impacts

The types of hazardous materials needed for maintenance and operation of the F-15EX and F-35A would be similar to those currently used for maintenance and operation of the F-15C fleet. Under the F-15EX and F-35A Alternatives, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action would occur. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP and would include any construction-related materials or waste associated with aircraft operations. Additionally, no changes to the installation's Large Quantity Generator status would be expected to occur despite the increase in hazardous waste generation from aircraft operations. Any projects proposed for renovations and/or demolitions would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

Figure MA3.11-7 IRP Sites within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 104 FW Installation

Figure MA3.11-8 PFAS AOCs within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 104 FW Installation

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation for installation of building footers) for proposed construction activities, work would cease until 104 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing IRP or AOC sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. As such, there would be no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites with the implementation of F-15EX, F-35A, the F-15C legacy aircraft, or the No Action Alternatives.

MA3.12 BIOLOGICAL RESOURCES/COASTAL RESOURCES/WETLANDS

MA3.12.1 Affected Environment

MA3.12.1.1 Installation

Vegetation

A vegetation survey completed for the majority of the 104 FW installation in 2021 documented the presence and extent of vegetative communities and other land cover on the installation (104 FW 2021d). The survey concluded that the 104 FW installation was comprised primarily of landscaped, disturbed, disturbed riparian, woodland, and wetland habitats. Table MA3.12-1 provides a summary of each of these habitat types and their extent on the installation. The far western portion of the installation was not surveyed during the 2021 survey. This parcel is an open, mowed grassy field with a small portion of woodland habitat on the northern end. No rare plants and 11 invasive plant species, including common reeds (*Phragmites australis*) (a high priority species) and tree of heaven (*Ailanthus altissima*) (medium priority species), have been documented on the 104 FW installation (ANG 2019; 104 FW 2021d).

Table MA3.12-1 Vegetative Communities Surveyed in 2021 on the 104 FW Installation

***Habitat* Type**	***Dominant Vegetation***	***Acres***
Landscaped	Includes turf lawn and maintained landscaping areas around buildings (lawn, garden, and recreational vegetation).	38
Disturbed	Dominated primarily by woody scrubs bristly dewberry (*Rubus hispidus*), and bear oak (*Quercus ilicifolia*) with small amounts of winged sumac (*Rhus copallinum*), sweet fern (*Comptonia peregrina*), and Sericea lespedeza (*Lespedeza cuneata*). This area was heavily disturbed and included 45 percent bare ground with rocky, sandy, and xeric conditions.	52
Disturbed Riparian	Located in disturbed drainage channels and consist of upland grass species as well as scattered trees such as sugar maple (*Acer saccharum*), autumn olive (*Elaeagnus umbellata*), and northern red oak (*Quercus rubra*).	9
Woodland	Includes (1) pitch pine (*Pinus rigida*) woodlands, dominated by pitch pine and bur oak (*Quercus macrocarpa*); (2) woodland habitat dominated by eastern white pine, northern red oak, and pitch pine; (3) hardwood forest dominated by pitch pine, bur oak, and northern red oak; and (4) mesic hardwood forest dominated by red maple (*Acer rubrum*), eastern white pine, and pignut hickory (*Carya glabra*).	70
Wetland	Forest wetland areas dominated by red maple.	35
	Total Acres Surveyed	**204**

Legend: 104 FW = 104th Fighter Wing.
Source: 104 FW 2021d.

Wildlife

The majority of the wildlife present at the airport and the 104 FW installation consists of species that are highly adapted to developed and disturbed areas. A fauna survey was conducted in 2021 on the 104 FW installation and documented 30 bird, 13 mammal, and 1 amphibian species. The amphibian observed is the boreal chorus frog (*Pseudacris maculata*), and examples of mammals encountered include woodchucks (*Marmota monax*), white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), and gray squirrel (*Sciurus carolinensis*). Four bat species observed include the big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and little brown bat (*Myotis lucifugus*). Fish have been observed in the wetland on the east side of the airfield, but no species-specific surveys have been conducted for fish. Common birds observed at the 104 FW installation include mourning doves (*Zenaida macroura*), killdeer (*Charadrius vociferous*), red-tailed hawks (*Buteo jamaicensis*), European starling (*Sturnus vulgaris*) and chimney swifts (*Chaetura pelagica*) (104 FW 2019b; 2021d).

Threatened, Endangered, and Special Status Species

No critical habitats are located within the 104 FW installation. Federally listed species and those species proposed for federal listing that have been observed or have the potential to occur on the 104 FW installation are summarized in Table MA3.12-2 and include northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), small whorled pogonia (*Isotria medeoloides*), and Eastern black rail (*Laterallus jamaicensis jamaicensis*). Because the

installation is located within the boundaries of BAF, little or no quality habitat exists for these species. Off-installation to the northwest and southeast, there are approximately 4 acres of average to low value wetlands for the Eastern black rail and no mid-successional hardwood canopies under which the small-whorled pogonia could grow (ANG 2019). Although bat species could make use of the urban environment and any tree cover present, regular noise disturbance from airport activities would limit the number of bats that choose habitat under these operational noise levels.

Table MA3.12-2 Federal and State Listed Species Potentially Occurring on the 104 FW Installation and Under the Airspace

Common Name	*Scientific Name*	*Status*	*Potential Occurrence on the Installation*	*Potential Occurrence Under Airspace*
Birds				
Eastern black rail	*Laterallus jamaicensis jamaicensis*	T	P	P
Grasshopper sparrow	*Ammodramus savannarum*	ST	P	P
Upland sandpiper	*Bartramia longicauda*	SE	P	P
Vesper sparrow	*Pooecetes gramineus*	ST	P	P
Mammals				
Canada lynx	*Lynx canadensis*	T, SE		P
Indiana bat	*Myotis sodalis*	E, SE		P
Little brown bat[1]	*Myotis lucifugus*	SE	O	P
Northern long-eared bat	*Myotis septentrionalis*	E, SE	P	P
Tricolored bat[1]	*Perimyotis subflavus*	PE	P	P
Reptiles and Amphibians				
Marbled salamander	*Ambystoma opacum*	ST	P	P
Invertebrates				
Monarch butterfly	*Danaus plexippus*	C	P	N/A
New Jersey tea inchworm	*Apodrepanulatrix liberaria*	SE	P	N/A
Plants				
Small whorled pogonia	*Isotria medeoloides*	T, SE	P	N/A

Notes: [1]While these bat species are not currently federally listed, their statuses are currently under review by the USFWS.
Legend: 104 FW = 104th Fighter Wing; E = Federally Endangered; PE = Federally Proposed Endangered; N/A = Not applicable as these groups are not being analyzed under the airspace; P = Potential; O = Observed; SE = State Endangered; ST = State Threatened; T = Federally Threatened.
Sources: Massachusetts Division of Fisheries and Wildlife 2022; Maine Department of Inland Fisheries and Wildlife 2022; USFWS 2022; 104 FW 2019b, 2021d; New York Department of Environmental Conservation 2022.

One state listed species, the little brown bat, was documented on the 104 FW installation during a 2020 bat survey (104 FW 2021d). Three state listed bird species, upland sandpiper (*Bartramia longicauda*), grasshopper sparrow (*Ammodramus savannarum*), and vesper sparrow (*Pooecetes gramineus*) have been documented breeding on BAF, but not on the 104 FW installation. These species occur primarily within open fields on the airport that are left unmowed during the majority of the growing season (May 1 to July 31) specifically to promote the preservation of these species. Two state listed species, the New Jersey tea inchworm (*Apodrepanulatrix liberaria*) and the marbled salamander (*Ambystoma opacum*), have the potential to occur on the 104 FW installation.

Priority Habitat for the New Jersey tea inchworm, as defined under the Massachusetts Endangered Species Act (MESA), is located within the western portion of the 104 FW installation. Habitat alteration within Priority Habitats is subject to review by the Massachusetts Natural Heritage and Endangered Species Program for MESA compliance (Natural Heritage and Endangered Species Program 2023).

Seventeen migratory birds that occur on the USFWS Birds of Conservation Concern list have been observed or have the potential to occur at the 104 FW installation (Table MA3.12-3) and also includes the bald eagle (*Haliaeetus leucocephalus*). Although it is not protected under the ESA, this table still outlines the potential presence of this species because of protections afforded to it under and federal Bald and Golden Eagle Protection Act (BGEPA) in addition to the MBTA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to disturb eagles. No bald eagles are known to have been observed at this installation.

Table MA3.12-3 Migratory Birds of Conservation Concern that Could Potentially Occur within the 104 FW Installation and Under the Airspace

Common Name	***Scientific Name***	***Season***	***Potential Occurrence on the Installation***	***Potential Occurrence Under the Airspace***
American golden plover	*Pluvialis dominica*	Fall		P
American woodcock	*Scolopax minor*	Summer	O	P
Bald eagle[1]	*Haliaeetus leucocephalus*	Year-round	P	P
Belted kingfisher	*Megaceryle alcyon*	Year-round	O	P
Bicknell's thrush	*Catharus bicknelli*	Summer		P
Black-billed cuckoo	*Coccyzus erythropthalmus*	Summer	P	P
Black-capped chickadee	*Parus atricapillus*	Year-round	O	P
Blue-winged warbler	*Vermivora pinus*	Summer	P	P
Bobolink	*Dolichonyx oryzivorus*	Summer	P	P
Canada warbler	*Wilsonia canadensis*	Summer	P	P
Cape May warbler	*Setophaga tigrina*	Summer		P
Cerulean warbler	*Dendroica cerulea*	Summer	P	P
Chimney swift	*Chaetura pelagica*	Summer	P	P
Eastern meadowlark	*Sturnella magna*	Summer		P
Eastern whip-poor-will	*Antrostomus vociferus*	Summer	P	P
Evening grosbeak	*Coccothraustes vespertinus*	Year-round		P
Golden eagle	*Aquila chrysaetos*	Summer		P
Golden-winged warbler	*Vermivora chrysoptera*	Summer		P
Great blue heron	*Ardea herodias*	Summer/ Winter	O	P
Hudsonian godwit	*Limosa haemastica*	Fall		P
King rail	*Rallus elegans*	Summer		P
Lesser yellowlegs	*Tringa flavipes*	Summer		P
Long-eared owl	*Asio otus*	Summer/Fall		P
Olive-sided flycatcher	*Contopus cooperi*	Summer		P
Prairie warbler	*Dendroica discolor*	Summer	P	P

Common Name	*Scientific Name*	*Season*	*Potential Occurrence on the Installation*	*Potential Occurrence Under the Airspace*
Prothonotary warbler	*Protonotaria citrea*	Summer		P
Purple sandpiper	*Calidris maritima*	Fall		P
Red-headed woodpecker	*Melanerpes erythrocephalus*	Summer		P
Ruddy turnstone	*Arenaria interpres morinella*	Summer		P
Rusty blackbird	*Euphagus carolinus*	Spring/ Fall	P	P
Short-billed dowitcher	*Limnodromus griseus*	Summer		P
Song sparrow	*Melospiza melodia*	Year-round	O	P
White-breasted nuthatch	*Sitta carolinensis*	Year-round	O	P
Willet	*Tringa semipalmata*	Summer		P
Wood thrush	*Hylocichla mustelina*	Summer	P	P

Note: [1]This is not a Bird of Conservation Concern in this area, but warrants attention because of the Bald and Golden Eagle Protection Act.
Legend: 104 FW = 104th Fighter Wing; O = Observed; P = Potential.
Sources: 104 FW 2019b; ANG 2019; USFWS 2021, 2022.

Wetlands

There are a total of 4.04 acres of wetland on the 104 FW installation, consisting of four wetlands and three detention ponds (104 FW 2022c, Figure MA3.7-1 and Table MA3.12-4). These provide varying amounts of habitat, from being sparsely vegetated and relatively low value to providing dense mixed vegetative cover for numerous species of fish and wildlife. Such plant species include cattails (*Typha latifolia*), ragweed (*Ambrosia artemisiifolia*), soft rushes (*Juncus effusus*), and various hardwoods. While the USACE determined that the wetlands were not jurisdictional, wetlands 1 and 3 are regulated by the Commonwealth of Massachusetts. Table MA3.12-4 summarizes wetlands delineated on the 104 FW installation.

Table MA3.12-4 Wetlands Delineated on the 104 FW Installation

Delineated Features	*Field Observation*	*Acres in Project Area*
Wetland 1	Freshwater Forested/Shrub Wetland	0.07
Wetland 2	Freshwater Forested/Shrub Wetland	0.03
Wetland 3	Freshwater Emergent Wetland and Freshwater Forested/Shrub Wetland	3.77
Wetland 4	Freshwater Emergent Wetland/ Freshwater Forested/Shrub Wetland	0.17

Legend: 104 FW = 104th Fighter Wing.

Coastal Resources

In Massachusetts, the Coastal Water Quality Program is administered by the Massachusetts Office of Coastal Zone Management. The primary authority for the Coastal Water Quality Program is the federal CZMA of 1972, as amended. The Office of Coastal Zone Management regulates development activities and manages the resources of the Coastal Zone, especially those which

have a direct and significant impact on coastal waters. It is the function of the Office of Coastal Zone Management, through its staff, to maintain, protect, develop, and restore or enhance the invaluable coastal region of the state of Massachusetts. Section 306 of the CZMA contains the procedures for the allocation of grants and the adoption and approval of state coastal management programs.

The 104 FW installation is not located within any Coastal Zone boundary. Therefore, coastal resources are excluded from further review.

MA3.12.1.2 Airspace

Due to the nature of the actions proposed within the airspace, coastal resources, wetlands, and plant species were excluded from extensive review and analysis because the proposed activities would not result in new ground disturbance, and ordnance delivery and chaff and flare use would not change from current levels and would occur in locations already used and authorized for those purposes. In addition, marine species, invertebrates, and fish were excluded from review and analysis as they, too, would not likely be impacted by the Proposed Action.

Wildlife

The airspace associated with the 104 FW operations covers over 27,700 square miles of land within Maine, New Hampshire, New York, and Vermont. Wildlife within these areas occur within the Connecticut River Valley. While the valley floor is primarily agricultural or built land and is not preferable habitat, central hardwoods and transition hardwood forests cover the ridges and a wide variety of wildlife species are found within this habitat. Such species include woodchucks, mice, white-tailed deer, red fox, coyotes, and various species of voles (ANG 2019).

Threatened, Endangered, and Special Status Species

Table MA3.12-2 lists federally threatened, endangered, candidate, and state listed species observed within or which may occur within the airspace. Four federally listed and candidate species (one bird and three mammals) and an additional five state listed species (three birds, two mammals, and one amphibian) have been observed in or may potentially occur under the airspace. There is no critical habitat for these species under the airspace. In addition, 35 migratory birds that occur on the USFWS Birds of Conservation Concern list have the potential to occur within the airspace (see Table MA3.12-3). Bald eagles and golden eagles, which have additional protection under the BGEPA, also have potential to occur within the airspace.

MA3.12.2 Environmental Consequences

MA3.12.2.1 F-15EX

Installation

Vegetation

Construction of new facilities for the F-15EX at the 104 FW installation would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in an estimated maximum increase of 148,000 SF (3.4 acres) of impervious surfaces. Most new construction would occur within currently landscaped, dirt or other disturbed areas, and all land that would be permanently impacted is adjacent to disturbed and developed habitats. However, construction of three proposed new structures (Projects 1.3, 10.2, and 13) could disturb up to 2.9 acres of woodland if all the project options are chosen, which represents a disturbance of up to approximately 4.1 percent of total woodland habitat on the installation. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Noise associated with construction may cause wildlife to temporarily avoid the area, including those that are protected under the MBTA. Noise associated with construction activities, as well as an increase in general industrial activity and human presence, could evoke reactions in birds. Disturbed nests in the immediate vicinity of construction activity would be susceptible to abandonment and depredation. Additional discussion of noise impacts on animals are provided in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/). However, bird and wildlife populations in the vicinity of the airport where project components would occur are accustomed to elevated noise associated with aircraft and general military industrial use. As a result, indirect impacts from construction noise are expected to be minimal because the ambient noise levels within the vicinity are already high under the affected environment and would be unlikely to substantially increase by the relatively minor and temporary nature of the proposed construction and modifications. Therefore, under the F-15EX Alternative at the 104 FW installation, impacts to wildlife due to construction would not be significant.

Operational noise levels at the 104 FW installation would be expected to increase from the affected environment with the conversion to the F-15EX aircraft. With the basing of the F-15EX, only the number of aircraft operations would change; there would be no change in where or when individual aircraft operate. Total annual airfield operations by the 104 FW are proposed to increase 67 percent. As a result of the aircraft conversion and the increase in operations, an additional 845

acres of land off the airport property would be exposed to noise levels greater than or equal to 65 dB DNL. The majority of this area is open space and agricultural lands, which are generally regarded as low-quality habitat and not preferable by wildlife. Changes in operational noise are not expected to impact wildlife species in the area because species on and near the installation are likely accustomed to elevated noise levels associated with aircraft and military operations (Bowles 1995).

An increase in airfield operations may result in a slight increased opportunity for bird/wildlife aircraft strikes to occur, including those with migratory birds. However, adherence to the existing BASH program would minimize the risk of bird/wildlife aircraft strikes (see Section MA3.10, *Safety*). The 104 FW has developed procedures designed to minimize the occurrence of bird/wildlife aircraft strikes and has documented detailed procedures to monitor and react to heightened risk of bird/wildlife aircraft strikes. When risk increases, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for increased bird/wildlife aircraft strikes within the airspace. The airport also actively seeks to deter birds and other wildlife away from the airport. The BASH program uses various methods to deter wildlife from entering the aviation area including hazing, removal of pests, dead animals, vegetation, and other potential food items and cover objects. In addition, the airport maintains a WHMP that seeks to keep birds and other wildlife away from the airport to reduce wildlife strikes. The plan uses various methods to frighten and deter wildlife from entering the aviation area including hazing, removing roosting/perching opportunities, and managing vegetation in order to decrease attractiveness for wildlife. Therefore, impacts to wildlife from implementation of the F-15EX Alternative would not be significant.

Threatened, Endangered, and Special Status Species

No federally listed species in Table MA3.12-2 have been observed at the 104 FW installation. Although the federally threatened Eastern black rail, endangered Northern long-eared bat, and threatened small whorled pogonia have the potential to occur on the installation, habitat for federally listed species within the installation boundaries is generally extremely limited or nonexistent. The proposed development would occur adjacent to the airfield in a highly disturbed and managed area where little to no native vegetation exists that could support any of these species. Therefore, the proposed activities that would occur at BAF would have no effect on any of these species or their habitat.

One state listed species, the little brown bat, was documented on the 104 FW installation and three state listed bird species, the upland sandpiper, grasshopper sparrow, and the vesper sparrow, have been known to nest within open grassy areas near the airfield and near the proposed construction

of the running track (Project 10.1). In addition, one state listed species of moth, New Jersey inchworm, has the potential to be found on the airport property and has Priority Habitat located within the proposed running track construction (Project 10.1).

To minimize impacts on tree roosting bat species, tree removal and trimming, if necessary, would be conducted outside the maternity season (May 1 to August 30) to the extent feasible. Prior to implementation of construction, a MESA project review checklist and required filing materials would be submitted to the Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries and Wildlife for review pursuant to 321 CMR 10.18.

Because of the potential occurrence of the state listed bird species, construction of Project 10.1 would not occur during the birds' combined breeding season (approximately April through August), or if this time period cannot be avoided, a pre-construction nest survey in impact areas with appropriate habitat for these species would be conducted. In addition, prior to construction, a habitat assessment for the state listed moth species would be conducted, including flora surveys for host plants within proposed project areas that have potential habitat for this species.

The Eastern black rail has some potential to exist on or adjacent to the installation due to the proximity of wetland habitat outside of the airport. However, it is considered low value and is unlikely to be preferable by this species. Given the area's low value as habitat and the subsequent unlikelihood for the Eastern black rail to occur, the Proposed Action may affect, but is not likely to adversely affect, the Eastern black rail.

Bald eagles have some potential to occur on or within the vicinity of the 104 FW installation because of the limited existence of habitat. For the reasons previously described, it is expected that BMPs would continue to effectively negate strike risks associated with bald eagles, and those that would be found in this area are habituated to aircraft noise and any slight to moderate increase in noise levels would not rise to the level of "take" as defined by the BGEPA.

Annual airfield operations at the 104 FW installation are projected to increase under this alternative and there would be some temporary noise associated with construction. Generally, impacts on potentially occurring state listed species at BAF would be similar to those described under wildlife. That is, studies indicate that wildlife species, whether they are common or protected species, already occupying lands exposed to airfield noise are generally not affected by slight to moderate increases in ambient noise levels, as they have already habituated to periodic to frequent loud overflight noise (Bowles 1995). Therefore, although state listed species may be exposed to impacts from implementation of the F-15EX Alternative, such impacts would not be significant.

The military is authorized to take birds covered under MBTA during military readiness activities, provided the military implements necessary avoidance, minimization, and conservation measures

if such readiness activities may significantly impact a population(s) of MBTA-covered species. These avoidance and conservation measures should be developed in coordination with USFWS. Regardless, migratory birds occurring on the installation would not be expected to be impacted by the noise from the F-15EX since they would already be habituated to aircraft noise from existing operations. An increase in airfield operations may result in a slight increased opportunity for bird/wildlife aircraft strikes to occur, including those with migratory birds. However, adherence to the existing BASH program and the WHMP would minimize the risk of bird/wildlife aircraft strikes (see Section MA3.10, *Safety*).

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure MA3.7-2).

Airspace

Wildlife

No construction would occur beneath the training airspace; however, inert ordnance would be deployed in ranges authorized for their use. Existing range management procedures and vegetation removal guidelines would be adhered to and vegetation management measures currently in place would persist. Impacts on wildlife habitat would not be significant. Chaff and flare deployment is expected to remain the same as current levels conducted by F-15C aircraft and would occur within the same training areas. Current restrictions on the amount or altitude of chaff and flare use would continue to apply. As a result, chaff and flare deployment associated with the F-15EX Alternative would have no significant impact on wildlife underlying the 104 FW airspace.

In general, animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and in the case of bird species, whether the animals are in the incubation/nesting phase. Additional analysis for noise impacts on biological resources are provided in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/). Noise modeling results suggest subsonic noise levels would increase approximately 2 to 3 dB SEL and 4 to 5 dB L_{max} within the airspace and would be approximately 45 L_{dnmr}; well below the 112 dB shown to elicit major biological responses. Long-

term impacts are anticipated to be negligible. Therefore, impacts on wildlife associated with increased noise under the airspace would not be significant.

Section MA3.10, *Safety*, established that bird aircraft strikes are currently rare in the airspace and would not be expected to increase substantially under this alternative. The F-15EX would fly predominantly above 5,000 feet AGL, which is above where 95 percent of strikes occur. Adherence to the BASH Plan would further reduce the likelihood of bird strike in training airspace.

Overall, impacts on wildlife from proposed changes in subsonic and supersonic operations would not be significant for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-15EX operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 15,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL.

Threatened, Endangered and Special Status Species

Impacts on potentially occurring federally or state listed species (underlying the 104 FW airspace) would be similar to those described within the wildlife section. Under the F-15EX Alternative for the 104 FW, the amount of time the 104 FW would conduct operations in the associated airspace would increase by approximately 67 percent.

Chaff and flare deployment would be expected to remain the same as current levels conducted by F-15C aircraft and would occur within the same training areas. Current restrictions on the amount or altitude of chaff and flare use would continue to apply. As a result, chaff and flare deployment associated with the F-15EX Alternative would have no effects on potentially occurring federally or state listed species underlying the 104 FW airspace.

No significant impacts to migratory birds would be anticipated due to noise from the F-15EX under the 104 FW airspace. As described previously for wildlife and listed species, migratory birds already occupying lands exposed to airfield noise are generally not affected by minor increases in ambient noise levels as they have already habituated to frequent loud overflight noise (Bowles 1995). Additional analysis for noise impacts on biological resources are provided in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Overall, federally and state listed species would not be affected by the proposed change in subsonic and supersonic operations for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be very low due to the random nature of

flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-15EX operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 15,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL.

Therefore, pursuant to section 7 of the ESA, proposed activities under the airspace would have no effect on federally listed species or their habitats. Overall, impacts to biological resources (including threatened, endangered, and special status species), coastal resources, and wetlands would not be significant under the F-15EX Alternative.

MA3.12.2.2 F-35A

Installation

Vegetation

Construction of new facilities for the F-35A at the 104 FW installation would cause similar impacts as under the F-15EX Alternative. It would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in an estimated maximum increase of 136,600 SF (43.1 acres) of impervious surfaces. Most new construction would occur within currently landscaped, dirt or other disturbed areas, and all land that would be permanently impacted is adjacent to disturbed and developed habitats. However, construction of three proposed new structures (Project 1.3, 10.2, and 13) could disturb up to 2.9 acres of woodland if all the project options are chosen, which represents a disturbance of up to approximately 4.1 percent of total woodland habitat on the installation. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Impacts from noise associated with construction and flight operations would be similar to the effects described under the F-15EX Alternative. Operational noise levels under this alternative at the 104 FW installation would also be similar to the F-15EX Alternative with the conversion to the F-35A aircraft. Under this alternative, the number of aircraft operations would also remain the same as under the F-15EX Alternative. An additional 1,288 acres of land off the airport property would be exposed to noise levels greater than or equal to 65 dB DNL. The majority of this area is open space and agricultural lands, which are generally regarded as low-quality habitat and not preferable by wildlife. Changes in operational noise are not expected to impact the few wildlife species that occupy the area because these species on or near the installation are likely accustomed to elevated noise levels associated with aircraft and military operations (Bowles 1995).

Threatened, Endangered, and Special Status Species

Impacts from noise associated with construction and operations to threatened, endangered, and special status species would be similar to those described under the F-15EX Alternative. No federally or state listed species have been observed at the 104 FW installation and there is little to no habitat for these species within the installation boundaries. Therefore, pursuant to section 7 of the ESA, there would be no effects on potentially occurring federally listed species on the 104 FW installation under the F-35A Alternative. Similarly, impacts to state listed species and birds protected under the MBTA would not be significant as discussed under the F-15EX Alternative.

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure MA3.7-3).

Airspace

Wildlife

Under the F-35A Alternative, no construction would occur beneath the training airspace. Impacts from operations to wildlife under the F-35A Alternative would be similar to those described under the F-15EX Alternative. Noise modeling results suggest subsonic noise levels would increase approximately 3 to 5 dB SEL and 6 to 8 dB L_{max} within the airspace and would be approximately 47 dB L_{dnmr}; well below the 112 dB shown to elicit major biological responses. Long-term impacts are anticipated to be negligible. Therefore, impacts to wildlife under the airspace would not be significant.

Threatened, Endangered and Special Status Species

Impacts on potentially occurring federally or state listed species underlying the 104 FW airspace would be similar to those described under the F-15EX Alternative. Under the F-35A Alternative for the 104 FW, the amount of time the 104 FW would conduct operations in the associated airspace would increase by approximately 67 percent.

Overall, federally and state listed species would not be affected by the proposed change in subsonic and supersonic operations for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-35A operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur

above 15,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL. Therefore, pursuant to section 7 of the ESA, activities under the F-3A5 alternative would have no effect to potentially occurring federally listed species under the airspace. In addition, impacts to state listed species and birds protected under the MBTA would not be significant as discussed under the F-15EX Alternative.

MA3.12.2.3 F-15C Legacy Aircraft

Installation

Vegetation

Construction of new facilities for the F-15C legacy aircraft at the 104 FW installation would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in an estimated maximum increase of 128,400 SF (2.9 acres) of impervious surfaces. Most new construction would occur within currently landscaped, dirt or other disturbed areas, and all land that would be permanently impacted is adjacent to disturbed and developed habitats. However, construction of three proposed new structures (Project 1.3, 10.2, and 13) could disturb up to 2.9 acres of woodland if all the project options are chosen, which represents a disturbance of up to approximately 4.1 percent of total woodland habitat on the installation. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Impacts from noise associated with construction would be similar to that described under the F-15EX Alternative. However, there would be no impacts from increased operational noise levels since operations of the F-15C legacy aircraft would remain the same as current operations. No significant changes in impacts from existing conditions would be anticipated.

Threatened, Endangered, and Special Status Species

Impacts from noise associated with construction would be similar to those described under the F-15EX Alternative. However, pursuant to section 7 of the ESA, there would be no effects to federally listed species and impacts to state listed species and bird species protected under the MBTA would not be significant since operations of the F-15C legacy aircraft would remain the same as current operations and there would be no increase in operational noise levels.

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure MA3.7-4).

Airspace

Wildlife

Under the F-15C legacy aircraft alternative, no construction would occur beneath the training airspace. In addition, operations would be the same as current operations. Therefore, there would be no impacts on wildlife under this alternative.

Threatened, Endangered and Special Status Species

Impacts on potentially occurring federally or state listed species underlying the 104 FW airspace would be the same as current operations. Therefore, pursuant to section 7 of the ESA, there would be no effects on federally listed species under this alternative, and state listed species and bird species protected under the MBTA would not be impacted.

MA3.12.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on biological resources would not be significant.

MA3.12.3 Summary of Impacts

No sensitive vegetation exists at the proposed construction sites for the 104 FW, so construction activities would not significantly affect the flora on the installation under any of the aircraft beddown alternatives. Noise associated with construction activities and/or aircraft operations would be unlikely to affect wildlife or special status species because they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not be expected to impact biological resources. Therefore, pursuant to section 7 of the ESA, there would be no effects on federally listed species as a result

of the beddown of the F-15EX or F-35A, retention of the F-15C, or the No Action Alternative at the 104 FW installation. Impacts on biological resources would not be significant.

MA3.13 VISUAL IMPACTS

MA3.13.1 Affected Environment

MA3.13.1.1 Installation

Visual Character

The city of Westfield began as an agricultural community before becoming an industrial center. The area contains fertile agricultural lands around the Connecticut River; industrial centers in Westfield, Springfield, Holyoke, and Chicopee; and recreational areas associated with the Berkshire Mountains. The Westfield area is in a narrow portion of the Connecticut Valley and is bounded by East Mountain to the east and the Berkshire Mountains to the west.

BAF is surrounded by level terrain that consists primarily of privately owned land including a mixture of agriculture, commercial, industrial, mining, recreation, residential, transportation, and undeveloped/open space land uses. Most of the lands to the east are naturally vegetated with evergreen and deciduous trees, including a recreational facility (East Mountain Country Club/Golf Course). Lands to the west are designated for commercial use and small residential areas that are designated for rural residential use.

The visual environment at the 104 FW installation at BAF is characteristic of a military installation; most structures are one- to two-story buildings constructed primarily of beige brick-tone masonry or beige corrugated metal. Grass lawn areas and ornamental trees and shrubs are prevalent throughout the installation and serve as buffers between buildings, roads, and other developed areas. The area immediately surrounding the installation is characterized primarily by level terrain, industrial and commercial land use, and wooded areas. To the east and south of the 104 FW main cantonment area, the viewshed encompasses the runways, the control tower, and other support facilities of BAF. Offsite views of the 104 FW main cantonment area are limited to a few scattered residences and motorists along Falcon Drive to the north. There are no substantial natural landforms or man-made structures dominating the viewshed.

Light Emissions

Existing light emissions at BAF are associated with runway and taxiway edge lighting, rotating beacons, approach lighting systems, and other visual safety navigational aids. Additionally, apron

ramp lighting, building security lighting, and street lighting on access roadways create light emissions from BAF. The surrounding community produces light emissions associated with:

- Street lighting for nearby highways (Interstate 90 and State Highway 202)
- Street lighting on arterial/collector roads
- Headlights/brake lights from automobiles
- Neighboring residential, commercial, and industrial areas (building security lighting, household/commercial interior and exterior lighting)
- City of West Springfield and Springfield urban sky glow
- Lighted parking lots or sports fields

MA3.13.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.13.2 Environmental Consequences

MA3.13.2.1 F-15EX

Installation

Visual Character

Construction associated with the basing of the F-15EX would not have appreciable effects to visual resources at the 104 FW installation, BAF, or the immediate surrounding community. There are no aesthetically sensitive locations or designated historic districts within the viewshed of the proposed construction areas. There would be a construction footprint of 218,100 SF, and all proposed construction would be located entirely within the 104 FW installation and would be visually consistent with the appearance of existing infrastructure. Most land uses directly adjacent to the installation boundary where construction could occur are forested areas/open space or commercial. There are several residential homes located to the north of the installation; however, potential off-installation views of proposed construction would be covered by vegetation and trees that occur along the installation boundary.

During the proposed construction and demolition activities at the installation, the visual characteristics of areas undergoing development would be temporarily altered by the use of construction equipment, and the delivery and stockpiling of construction materials. At the completion of construction, the proposed facilities and associated infrastructure would remain as permanent visual features within the viewshed; however, the principal visual features of the facility

would remain consistent with the existing military setting and visual character of the 104 FW installation.

Basing of the 21 F-15EX to replace the existing 18 F-15C at the 104 FW installation and the approximate 6.7 percent increase in total airfield operations would not have appreciable effects to visual resources. The existing visual character is consistent with that of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through BAF would not be markedly different from existing conditions/No Action Alternative.

Light Emissions

Basing of the 21 F-15EX to replace the existing 18 F-15C at the 104 FW installation would not substantially increase off-airport light emissions or create visual effects. Construction of new facilities, parking lots, and roads within the 104 FW installation would include security lighting and street lighting, as applicable. The proposed new taxiway (Project #3 Construct Taxiway Juliet) would include taxiway edge lighting and other visual safety navigational aids. The existing environment as it relates to light emissions is characteristic of an industrial airfield environment. The characteristics of most airport lighting systems create potential sources of annoyance to nearby residents, such as visual NAVAIDS, edge lights, and others, which emanate light emissions. DNL nighttime flights at the 104 FW would remain consistent with existing conditions/No Action Alternative and would continue to follow current "course rules" at the airfield including minimizing training during DNL nighttime hours. There would be no appreciable net increase of lighting emissions that is inconsistent with the current BAF airport environment and no significant impacts.

Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.13.2.2 F-35A

Installation

Basing of the F-35A aircraft at the 104 FW installation would be similar in nature to the basing of the F-15EX aircraft and would include a construction footprint of 203,800 SF. Impacts related to the visual effects of construction would be slightly less intensive in magnitude as overall there would be a smaller construction footprint (14,300 less SF or 7 percent less than the F-15EX basing) associated with the basing of the F-35A. Effects related to operations would be similar to those

described under the basing of the F-15EX as they both increase operations by 6.7 percent compared to existing conditions/No Action Alternative.

Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.13.2.3 F-15C Legacy Aircraft

Installation

Construction for the F-15C Legacy aircraft would include a construction footprint of 173,900 SF (25 percent and 17 percent less, respectively, than the F-15EX and the F-35A) and there would be no increase in operations. Impacts related to the visual effects of construction would be slightly less intensive in magnitude as overall there would be a smaller construction footprint associated with the basing of the F-15EX or F-35A. Effects related to operations would remain similar to existing conditions/No Action Alternative.

Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.13.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on visual resources would not be significant.

MA3.13.3 Summary of Impacts

Construction and operations associated with the F-15EX or F-35A beddown or construction associated with retaining the F-15C legacy aircraft would not have appreciable effects to visual resources at the 104 FW installation, BAF, or the immediate surrounding community. The proposed facilities and associated infrastructure associated with all three alternatives would remain consistent with the existing visual character of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through BAF would not be markedly different from existing

conditions/No Action Alternative. Basing of the 21 F-15EX or F-35A to replace the existing 18 F-15C at the 104 FW installation and associated construction and operations would not substantially increase off-airport light emissions or create visual effects. Similarly, retaining the F-15C or implementing the No Action Alternative would not alter light emissions or create visual effects. No significant effects are anticipated.

MA3.14 INFRASTRUCTURE/UTILITIES/NATURAL RESOURCES AND ENERGY SUPPLY/ TRANSPORTATION/PUBLIC TRANSPORTATION

MA3.14.1 Affected Environment

MA3.14.1.1 Installation

Potable Water

Potable water for BAF (including the 104 FW installation) is provided by the city of Westfield. Potable water in the area is supplied from a variety of sources, primarily from Granville Reservoir (maximum capacity of 782 million gallons) and eight groundwater wells sourced from the Barnes Aquifer for additional capacity. The city of Westfield also purchases water from the Springfield Regional Water System to meet consumer demands during peak use. The City of Westfield Water Division supplies water to over 11,000 residential and commercial customers (Association of Dam Safety Officials 2022). In 2021, 4.8 million gallons of potable water were supplied to the 104 FW installation (104 FW 2021e).

Wastewater

The 104 FW installation generates wastewater from sanitary and industrial processes. This includes OWS discharge, wash rack discharge, floor wash-down, latrines, sinks, and showers. Wastewater generated within the 104 FW installation is conveyed into the municipal sewage system to the City of Westfield Sanitary Sewer System, which has an average flow capacity of 6.1 million gallons per day (City of Westfield 2022).

Stormwater

The 104 FW installation has a stormwater drainage conveyance system that consists of an underground piping network that discharges into various perimeter drainage swales to retention ponds used to collect stormwater runoff. These ponds serve as infiltration basins, and therefore, surface runoff is not discharged outside the installation (104 FW 2021e). The stormwater drainage system has been designed to collect and transport surface water runoff from storm events to prevent flooding within the installation and is a separate system from the wastewater (sewage) system.

Electrical and Natural Gas

Electricity and natural gas are supplied to BAF (including the 104 FW installation) by Westfield Gas & Electric. Electricity consumption for 2021 at the 104 FW installation was 4,816,800 kilowatt-hours (104 FW 2021e). Natural gas consumption for 2021 at the 104 FW installation was 215,335 hundred cubic feet (104 FW 2021e).

Solid Waste

Municipal solid waste at the 104 FW installation is managed in accordance with the 104 FW Integrated Solid Waste Management Plan (104 FW 2020d) and guidelines specified in AFI 32-7042, *Waste Management*. The 104 FW installation generates solid waste in the form of office trash, nonhazardous industrial wastes, normal municipal waste, and construction debris. These nonhazardous solid wastes are collected in dumpsters located throughout the 104 FW installation and transported by an approved contractor to the Republic Services McNamara Transfer Station. Collection is then redistributed to various landfills in Massachusetts (104 FW 2020d). In the Springfield area, there are three active landfills with a combined capacity of 327,746 tons per year (MassDEP 2020).

Transportation

Regional access to the 104 FW installation is provided by a combination of regional and local access roadways, including several highways, such as Interstate 90 to the south, State Highway 202 (Southampton Road) to the west, East Mountain Road to the east, and North Road to the north. At BAF, a variety of automobile parking and rental car facilities are provided, as well as accommodations for other ground transportation services such as taxis, shuttles, and transportation network companies. The 104 FW installation is served primarily by local arterial roads and access to the installation is achieved from Falcon Drive, an east-west roadway, on the northern side of the base.

MA3.14.1.2 Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.14.2 Environmental Consequences

MA3.14.2.1 F-15EX

Installation

During operation of the F-15EX beddown, 101 new personnel would be based at the 104 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of approximately 0.1 percent in Hampden County (see Table MA3.4-1).

Potable Water

Water consumption would be expected to increase slightly as a result of the small increase in personnel; however, an increase of up to approximately 101 personnel on the installation and 0.1 percent in Hampden County would not be expected to impact local or regional water supply. Additionally, the demand for water (e.g., if used to control dust) could also increase during demolition and construction phases. However, this increase would be temporary and intermittent and would not be expected to impact regional water supply. No significant effects are anticipated.

Wastewater

Wastewater generation would be expected to increase slightly as a result of the increase of up to approximately 101 personnel on the installation. However, there have been no deficiencies identified with the existing system, and it is expected that the existing sanitary sewer system is generally adequate to serve the facilities proposed under this alternative. No significant effects are anticipated.

Stormwater

Under the basing of the F-15EX at the 104 FW installation, there would be up to 218,100 SF of temporary soil disturbance, including up to 148,000 SF of new impervious surface as a result of proposed construction. In accordance with the EISA Section 438, any temporary increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The proposed construction activities could temporarily impact the quality of stormwater runoff (see Section MA3.7.2, *Environmental Consequences*). However, implementation of appropriate standard construction practices (as described previously), preventative maintenance, and periodic inspections and

sampling to detect risk to stormwater, especially during active construction activity, would minimize these potential impacts. Therefore, impacts on the existing stormwater drainage system as a result of the proposed construction would be minimal. No significant effects are anticipated.

Electrical and Natural Gas

Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in 101 personnel, and the building space and facilities to be constructed would require additional electricity. However, any new facilities and additions associated with this alternative would be implemented with more energy-efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate Leadership in Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. Therefore, average energy consumption would be expected to stay the same or decrease compared to energy consumption associated with existing facilities. An increase of up to 101 personnel on the installation and 0.1 percent in Hampden County would not be expected to impact local or regional energy supply. No significant effects are anticipated.

Construction activity associated with the basing of the F-15EX aircraft could result in some interruptions of utility services during construction. These impacts would be temporary, occurring briefly during active construction periods. In addition, the demand for energy (primarily electricity) could increase slightly during demolition and construction phases. The energy supply at the installation and in the region is adequate and would not be affected by this temporary increase in demand.

Solid Waste

The building space and facilities to be constructed would generate construction and demolition debris requiring landfill disposal. Proposed increases in personnel and equipment use would also contribute to an increase in solid waste generation. However, impacts on local landfills would not be expected to exceed the permitted throughput or contribute significantly to the remaining capacity. Off-installation contractors completing construction and demolition projects at the 104 FW installation would be responsible for disposing of waste generated from these activities. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the installation. Much of this material can be recycled or reused, or otherwise diverted from landfills. All non-recyclable construction and demolition waste would be collected in a dumpster until removal. Construction and demolition waste contaminated with hazardous waste, ACM, LBP, or other undesirable components would be managed in accordance with AFI 32-7042, *Waste Management* (2017).

Transportation

Construction equipment would be driven to proposed construction areas and would be kept on-site for the duration of the respective activity. Construction workers would drive daily in their personal vehicles to and from the construction site. The peak year of construction is anticipated to occur in 2028, when up to 10 workers per day would be on site at one time. Additionally, up to five daily truck trips for deliveries or the import and export of material from the construction areas would be anticipated during peak construction. In general, construction traffic would result in increases in the use of on-installation roadways during construction activities; however, increases would be temporary and intermittent (between FY 2024 and 2033), occurring only during active construction periods.

The number of authorized personnel on the installation would increase by up to approximately 101 under this alternative. The increase in personnel would create a potential of 101 additional one-way vehicle trips to and from the installation during morning and evening peak periods for these additional personnel. Assuming that each person makes two, one-way trips per day, the implementation of this alternative would add an additional 202 trips onto the existing roadway network after the construction phase is complete. However, regional roads used to access the installation, as well as those located on the installation, have sufficient capacity to manage this increase in traffic without substantial impacts on circulation. Therefore, impacts on transportation infrastructure would not be significant under this alternative.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.14.2.2 F-35A

Installation

Basing of the F-35A aircraft at the 104 FW would be similar in nature to the basing of the F-15EX aircraft and would include a construction footprint of 203,800 SF. Impacts would be slightly less intensive in magnitude as overall there would be a smaller construction footprint (14,300 less SF or 7 percent less than the F-15EX basing) associated with the basing of the F-35A.

In addition, after basing of the F-35A aircraft, electricity consumption at the installation could increase by up to 8 percent associated with increased flight simulator demands and additional cooling requirements. This projected increase is based on prior utility billing data and interviews with installations that previously converted to the F-35A aircraft. Increases are variable depending upon the installation climate and resulting heating, ventilation, and air conditioning demands.

Increased energy efficiency resulting from the proposed new facilities and additions would partially offset increased use attributable to the change in aircraft (NGB 2023).

Natural gas use is also expected to increase after basing of the F-35A aircraft, particularly in climates with cold winters and attendant heating demands. The increase in natural gas demand to accommodate the F-35A is estimated to be approximately 40,000 hundred cubic feet annually, an 18 percent increase from existing natural gas demand at the installation (NGB 2023).

The energy supply at the installation and in the region is adequate and would not be affected by this increase in demand. In addition, basing of the F-35A aircraft would include an addition of 80 personnel, 21 fewer personnel stationed at the 104 FW installation when compared to the F-15EX Alternative. Impacts related to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes related to increases in personnel would be similar in nature to those impacts described for the F-15EX aircraft but would be slightly less intensive in magnitude as there would be fewer personnel being stationed at the installation. As such, impacts would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.14.2.3 F-15C Legacy Aircraft

Installation

Should the 104 FW retain the F-15C legacy aircraft, impacts would be less intensive in magnitude than the basing of the F-15EX and the F-35A. Construction for the F-15C legacy aircraft would include a construction footprint of 173,900 SF (25 percent and 17 percent less, respectively, than the F-15EX and the F-35A). In addition, no personnel increase would occur; impacts related to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes would remain similar to existing conditions/No Action Alternative. No significant effects are anticipated.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

MA3.14.2.4 No Action Alternative

Under the No Action Alternative, the 104 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change

in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on infrastructure, utilities, transportation, natural resources, and energy supplies would not be significant.

MA3.14.3 Summary of Impacts

Under all aircraft basing alternatives, there would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel would not significantly impact regional natural resources or energy supply or existing systems at the 104 FW installation. Impacts on infrastructure as a result of implementing the beddown of the F-15EX aircraft would be slightly more intensive in magnitude when compared to the F-35A as there would be 21 more personnel and up to a 7 percent larger construction footprint (additional 14,300 SF). Retaining the F-15C legacy aircraft would have the least impacts on infrastructure as no additional personnel would be stationed and the 173,900 SF construction footprint is 25 percent and 17 percent less, respectively, than the F-15EX and the F-35A basing. While construction and operation of the F-15EX or F-35A beddown or retaining the F-15C legacy aircraft at the 104 FW would require the use of natural resources and energy supply, the Proposed Action would not have the potential to cause demand to exceed available or future supplies of applicable resource. Impacts on infrastructure at the 104 FW installation as a result of the proposed F-15EX or F-35A beddown, retaining the F-15C legacy aircraft, or the No Action alternative would not be significant.

MA4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

According to CEQ regulations, the cumulative effects analysis of an EIS should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar timeframe. The effects may then be incremental and may result in cumulative impacts. Actions overlapping with or in close proximity to the Proposed Action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same timeframe tend to offer a higher potential for cumulative effects.

This EIS addresses cumulative impacts by assessing the incremental contribution of the F-15EX, F-35A, and the F-15C Legacy Alternatives to impacts on affected resources from all factors. The NGB and DAF have made an effort to identify actions on or near the affected areas that are under consideration and in the planning stage at this time. These actions are included in the cumulative effects analysis, drawn from the level of detail that exist now. Although the level of detail available for those future actions varies, this approach provides the decision-maker with the most current information to evaluate the consequences of the three aircraft beddown alternatives.

MA4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

In this section, an effort was made to identify past and present actions in the region and those reasonably foreseeable actions that are in the planning phase at this time. Actions that have a potential to interact with the Proposed Action alternatives are included in this cumulative analysis. This approach enables decision-makers to have the most current information available so that they can evaluate the environmental consequences of the potential beddown of the F-15EX, F-35A, or retention of the F-15C legacy aircraft at the 104 FW installation and training in associated airspace.

The 104 FW is an active military installation that undergoes changes in mission and in training requirements in response to defense policies, current threats, and tactical and technological advances. The installation, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. In addition, tenant organizations may occupy

portions of the installation, conduct aircraft operations, and maintain facilities. All of these actions (i.e., mission changes, facility improvements, and tenant use) would continue regardless of which alternative is selected.

The proposed aircraft beddowns for the 104 FW have the potential to interact in a cumulative manner with other projects within the ROI; these other projects are listed in Table MA4.1-1.

Table MA4.1-1 Current and Reasonably Foreseeable Actions at 104 FW Installation, Westfield-Barnes Regional Airport (BAF) and the Surrounding Area

Action	*Ground disturbance /new impervious surface*
Past Actions	
No identified recent past actions	
Present and Reasonably Foreseeable Future Actions	
Construction of a new AGE/NDI/Engine Shop at the 104 FW installation. This project includes the demolition of Buildings 20, 21, 70, and 71.	34,500 SF
Construction of an Entry Control Facility at the 104 FW installation. This project includes a single-story main gatehouse with canopy; a new main access road with associated pavements; curbs/gutters, exterior lighting, and drainage on newly acquired land.	79,200 SF/79,200 SF
Relocation and construction of Taxiway B South.	11.77 acres/11.77 acres
Construction of a new taxiway to the airport's southwest quadrant and new apron.	Runway 38,500 SF/38,500 SF Apron 78,00 SF/78,000 SF
Obstruction clearing on Runway 15.	3.38 acres/no new impervious surface
2023 Reconstruct Taxiway E. This is a normal phased reconstruction of the taxiway.	Unknown disturbance
2023 Expand South De-Arm Pad (this is a DoD funded project). This project involves doubling the size of the de-arm area that will make room for additional aircraft.	Unknown disturbance
2023 Expand SRE Building. This project doubles the size of the existing SRE building.	830 SY/830 SY
2023 Construct Taxiway J. This is a DoD funded project that would provide a second access point between the ANG ramp and Taxiway B North. The purpose is to permit short-term itinerant parking along the north de-arm area without impeding ramp and runway access.	2,979 SY/2,979 SY
2023 Relocate ILS Glideslope Antenna. Moving the glideslope antenna from the Runway 2/20 west to east side is necessary because traffic along Taxiway B South and the aircraft hold area lies in antenna's critical area. The relocation will also allow Taxiway J to be extended easterly to Runway 2/20.	Unknown disturbance
2024 Expand B1 Apron Area. This project is designed to improve aircraft movement around the taxiway.	Unknown disturbance
2024 Develop Hangar Areas 36, 40, and 41. These are demand driven projects designed to increase the airport's hangar capacity.	Unknown disturbance
Westfield Target Distribution Center Warehouse. Construction of a new 648,500 SF distribution center along Route 202 (New Apremont Way) to Falcon Drive. Expected to create 175 temporary construction jobs, employ 520 permanent workers, and 1,200 vehicle trips a day generated by operations at the warehouse.	126 acres to be developed
Southampton Road Improvements (Route 10/US 202) – Massachusetts DOT Project	Unknown disturbance

Legend: 104 FW = 104th Fighter Wing; AGE = Aerospace Ground Equipment; ANG = Air National Guard; DoD = Department of Defense; DOT = Department of Transportation; ILS = Instrument Landing System; NDI = Non-Destructive Inspection; SF = square foot/feet; SRE = Snow Removal Equipment.

MA4.2 ANALYSIS OF CUMULATIVE EFFECTS

The following analysis considers how the impacts of these other actions might affect or be affected by those resulting from the alternative actions at the 104 FW installation and whether such a relationship would result in potentially additive impacts. Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources, quantifiable data are not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made based on an understanding of the nature of the project regarding cumulative impacts related to this EIS.

MA4.2.1 Noise

Based upon DoD impact analysis, under the F-15EX beddown alternatives, 845 more acres off the airport property and 6 additional POIs would be exposed to 65 dB DNL when compared to existing conditions/No Action Alternative. Thirty-five POIs would experience increases between 1 and 5 dB DNL. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would be significant. Under FAA Order 1050.1F, the F-15EX Alternative at BAF would result in 10 POIs experiencing significant increases while 304 households and 852 people would be significantly affected. Five POIs, 621 households, and 1,811 people would experience a reportable increase in noise according to FAA criteria.

Based upon DoD impact analysis, under the F-35A aircraft beddown alternatives, 1,288 more acres off the airport property and 4 additional POIs would be exposed to 65 dB DNL. Thirty-one POIs would experience an increase of 1 to 7 dB DNL. The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL, it is estimated that the changes would be significant. Under FAA standards in FAA Order 1050.1F, the F-35A Alternative at BAF would result in 6 POIs experiencing significant increases while 429 households and 1,212 people would be significantly affected. Three POIs, 885 households, and 2,406 people would experience a reportable increase in noise according to FAA criteria.

Under the F-15C legacy aircraft alternative, impacts from noise would not change from the existing conditions/No Action Alternative and would not be significant under DoD or FAA Order 1050.1F. The addition of those projects listed in Table MA4.1-1 would not be expected to substantially add to the noise impacts; however, given that impacts from the F-15EX or F-35A Alternatives would be significant, cumulative impacts would similarly be significant should either of those alternatives be selected. All of the projects described in

Table MA4.1-1 are short-term construction projects that would occur in the airport environs or in areas identified as industrial or commercial. Noise associated with the construction projects would not affect sensitive receptors, disturb sleep, interrupt speech, or cause classroom disruptions in the long term. Noise from implementation of these actions would be short term and localized, and would not be expected to increase the overall DNL noise contours.

Fighter jet-generated noise would continue to dominate sound levels in the training airspace. Given that the projects listed in Table MA4.1-1 are all local to the BAF area, cumulative impacts in the airspace that would be anticipated when considered with the F-15EX or F-35A aircraft beddown alternatives for the 104 FW installation would not be significant.

MA4.2.2 Airspace

The replacement of the F-15C with the F-15EX or F-35A would not require changes in local airspace. Over time, the replacement of the F-15C aircraft at the installation could result in a 6.7 percent increase in total airfield operations at BAF. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the National Airspace System and SUA. Many of those projects described in Table MA4.1-1 would enhance airfield safety and flow; others would have little impact to the airfield or the airspace. Cumulative impacts would not be expected to be significant.

MA4.2.3 Air Quality/Climate Change

The ROI for criteria pollutants comprises Hampden County in MA, which is a maintenance area for the 8-hour O_3 NAAQS. All the present and reasonably foreseeable future actions have the potential to interact with the proposed aircraft beddowns and affect air quality. The construction of the additional projects described in Table MA4.1-1 would produce short-term air emissions from fuel burning equipment and particulate matter from ground disturbance.

The construction projects that would occur at the 104 FW installation or BAF may overlap the construction associated with the alternative aircraft beddowns, but as the emissions shown in Tables MA3.3-5, MA3.3-7, and MA3.3-8 are below the *de minimis* or comparative threshold, the short-term emissions from these projects considered cumulatively with the aircraft beddown alternatives for the 104 FW would not result in significant short- or long-term degradation of regional air quality. Thus, based on the project descriptions, the impacts of these projects in conjunction with the implementation of the Proposed Action alternatives would not have a significant impact on air quality in the ROI.

MA4.2.3.1 Greenhouse Gases

As described in Chapter 3.0, the CEQ published interim guidance on January 9, 2023, entitled *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (CEQ 2023). For GHGs, the ROI is global and impacts are cumulative by nature. The cumulative analysis evaluates emissions considering existing conditions and the Proposed Action alternatives. Implementation of the Proposed Action alternatives would contribute directly to emissions of GHGs from the combustion of fossil fuels. Emissions for these alternatives and the No Action Alternative were estimated based on the airfield emissions and the annual training hours anticipated. These estimates were prepared to provide a measure of the difference between the alternatives. Emissions were estimated using assumed flight patterns for fuel consumption averages for climb out and approach power settings and the results are presented in Tables MA4.2-1 and MA4.2-2. Detailed calculations and assumptions are included in Appendix D.

Table MA4.2-1 GHG Emissions Estimates for F-15EX Basing (tons per year)

Activity	*CO_2e*	*metric tons*
F-15C Existing Sorties	48,701	
Airfield Totals	15163	
Annual GHG total	63864	
50-year lifecycle emissions of F-15C/D	**3,193,178**	
F-15EX Sorties	99,919	
Airfield Totals	14,111	
Annual GHG total	**114,030**	
Total 50-year emissions F-15EX	**5,701,519**	
Annual GHG net change	50,167	45,511
50-year net change lifecycle emissions	**2,508,341**	

Note: [1]Current F-15C flight operations would continue unchanged under the Legacy aircraft alternative.
[2]Legacy F-15C and the No Action Alternative are identical except that the Legacy Alternative includes construction.
Legend: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas.

Table MA4.2-2 GHG Emissions Estimates For F-35A Basing (tons per year)

Activity	*CO_2e*	*metric tons*
F-15C Existing Sorties	48,701	
Airfield Totals	15,163	
Annual GHG total	63,864	
50-year lifecycle emissions of F-15C/D	**3,193,178**	
F-35A Sorties	99,919	
Airfield Totals	22,106	
Annual GHG total	**122,025**	
Total 50-year emissions F-35A	**6,101,254**	
Annual GHG net change	58,162	52,763
50-year net change lifecycle emissions	**2,908,076**	

Legend: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas.

The social costs of carbon (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) allow agencies to understand the benefits of reducing each of these GHGs or the social costs of increasing such emissions, in the policy-making process. Collectively, these are referenced as the social cost of greenhouse gases (SC-GHG) and is defined as the monetary value of the net harm to society associated with adding a small amount of carbon to the atmosphere in a given year. In principle, net harm cost includes the value of all climate change impacts, including but not limited to changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services (Interagency Working Group [IWG] 2021). For this analysis, only SC-CO_2 is evaluated as the vast majority of emissions are generated by aircraft flying with turbofan engines. These engines generate no methane emissions and very little nitrous oxide (N_2O) emissions. Quantifying the small quantity of N_2O emissions is a current subject of research.

Because the current lifetime expectancy of the aircraft associated with the Proposed Action, which represent the bulk of emissions, is at least 50 years, the SC-CO_2 analysis covers a 50-year period from 2027 to 2077 for the F-15EX, and 2026 to 2076 for the F-35A. Table CA4.2-3 identifies the projected cost, in 2020 dollars, of implementing the Proposed Action with F-15EX or F-35A basing using an average discount rate of 3 percent and what would be anticipated to represent the worst-case scenario, which is defined as the 95th percentile of the 3 percent average (IWG 2021). These costs are totaled in Table MA4.2-3 for the presumed first year of steady state operations (2027) for the F-15EX, and the year 2050 to provide an indication of the increasing monetary value of net harm on an annual basis. While the entire 50-year projected lifecycle would extend to 2077, the data on costs that far into the future are not currently available but can be calculated when the costs are computed and published by the White House Office of Management and Budget.

Table MA4.2-3 SC-CO_2 Select Yearly Estimates for Annual F-15EX Operations Emissions Increase Over 50 Years

Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount*
CO_2			
2027	$59	45,511	$2,665,100
2050	$85		$3,852,927
Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% 95th Percentile average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount, 95th Percentile average damages*
CO_2			
2027	$176	47,728	$8,018,056
2050	$260		$11,830,478

Note: [1]Values from Office of Management and Budget 2021; represented here rounded to closest whole number.
Legend: % = percent; CO_2 = carbon dioxide; SC-CO_2 = social cost of carbon.

Table MA4.2-4 identifies the projected cost, in 2020 dollars of implementing the Proposed Action with F-35A basing. The same value percentiles are used to assess costs, but the analysis begins with the year 2026, the presumed first steady state year for the F-35A beddown. All other assumptions are the same as presented for the F-15EX cost analysis.

Table MA4.2-4 SC-CO_2 Select Yearly Estimates for Annual F-35A Operations Emissions Increase Over 50 Years

Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ - 3% average discount*
CO_2			
2026	$57	52,763	$3,033,360
2050	$85		$4,466,938
Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% 95th Percentile average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount, 95th Percentile average damages*
CO_2			
2026	$173	52,763	$9,110,633
2050	$260		$13,715,810

Note: [1]Values from Office of Management and Budget 2021; represented here rounded to closest whole number.
Legend: % = percent; CO_2 = carbon dioxide; SC-CO_2 = social cost of carbon.

There are a number of limitations associated with the modeling used to derive the monetary values presented in Tables MA4.2-3 and MA4.2-4, due to the broad scope of scientific and economic issues across the complex global landscape, and the estimates likely underestimate the damages from GHG emissions (IWG 2021). Nonetheless, providing a monetary characterization of GHG impacts is a useful tool for generally assessing impacts from the

emissions as well as impacts from implementing mitigation measures to reduce those emissions.

Operational energy (aviation fuel and energy to power aircraft) comprises over 80 percent of the DAF's energy use. Lifecycle emissions for the Proposed Action assume no changes in operations from 2030 to 2080. However, likely reductions would include reductions in ground mobile source emissions as vehicles and equipment continue to be electrified, and as the DAF implements its Climate Action Plan.

Reduction of fuel use offers the most significant opportunity to optimize operational capability while simultaneously reducing GHG emissions. Technological enhancements to achieve this reduction include but are not limited to aerodynamic advancements, streamlined flight planning, incorporation of drag reduction technologies onto current platforms, enhanced engine sustainment practices, introduction of electric AGE, and increases in the use of simulation and augmented reality systems. Additionally, the DAF has instituted an installations portfolio goal of net-zero emissions by FY 2046 (DAF 2022). During the estimated 50-year lifecycle of the Proposed Action, many activities would be incorporated into the DAF functions to reduce GHG emissions across the DAF assets.

MA4.2.4 Socioeconomics/Environmental Justice/Children's Health and Safety

The past, present, and reasonably foreseeable future actions identified in Table MA4.1-1 include several construction actions within and near the ROI. Construction actions would also be required for the beddown of the F-15EX or F-35A or to maintain the existing F-15C flying mission. This would add to demand on the local construction industry, potentially requiring some construction workers to be hired from outside the ROI. The increased demand for housing and services would be temporary during construction. Construction spending would be a minor beneficial impact on economic activity, employment, and wages. Under both the F-15EX and F-35A Alternatives, impacts on minority or low-income populations would not be disproportionate. However, there is a higher percentage of children and elderly within the projected noise contours than the reference counties; and therefore, children under 18 years of age would be disproportionately impacted; and applying DoD criteria, the elderly would also be disproportionately impacted. Should the F-15C or the No Action Alternative be selected, impacts on socioeconomics and environmental justice communities would not change from existing conditions. Additionally, the past, present, and reasonably foreseeable future actions identified in Table MA4.1-1 would not alter the acoustic environment, which would continue to be attributed to aircraft noise. Increases in population in the ROI would occur due to the relocation of personnel under the beddown alternatives; however, the increased population would be a minor percentage of the total

population of the ROI. Therefore, cumulative impacts on socioeconomics during construction would be a minor beneficial impact from increased construction spending and employment and cumulative impacts during operation would not be significant.

MA4.2.5 Land Use/Noise Compatible Land Use

Under the aircraft beddown alternatives at the 104 FW installation, an additional 845 to 1,288 acres would fall within the projected noise contours for the F-15EX and F-35A, respectively. Under the F-15EX, an additional 287 acres of residential land use would fall within the 65 to 70 dB DNL and 23 acres within the 70 to 75 dB DNL. Impacts on residential land uses would not be considered significant with implementation of appropriate noise level reduction measures. Under the F-35A, there would be an additional 449 acres of residential land use within the 65 to 70 dB DNL, 109 acres within the 70 to 75 dB DNL, and 2 acres within the 75 to 80 dB DNL. Impacts on residential land uses would be considered significant. Under the F-35A, significant impacts would also occur to recreational land uses associated with the North Road Recreational Area where 6 additional acres would be exposed to 75 to 80 dB DNL noise contours.

Should the F-15C legacy aircraft alternative be selected, there would be no new impacts on land use. Planned projects in the ROI listed in Table MA4.1-1 would be on the 104 FW installation, BAF airfield and/or commensurate with the surrounding land uses in the area. Construction projects would introduce short-term noise increases that would not generate noise levels to cumulatively affect or change land use compatibilities. However, given that impacts on land use from the F-15EX or F-35A Alternatives aircraft beddown would be significant, cumulative impacts would similarly be considered significant.

MA4.2.6 Department of Transportation, Section 4(f)

Construction and operations associated with the F-15EX or F-35A beddown or construction associated with retaining the F-15C legacy aircraft would not have appreciable effects to proposed Section 4(f) resources, including historic sites. No permanent incorporation of land, direct use, or temporary occupancy of 4(f) resources under the basing of the F-15EX or F-35A aircraft would occur as no construction would occur near or within the boundaries of the 4(f) resources. Impacts would not be significant.

There are three Section 4(f) recreational resources that fall within the proposed 65 dB DNL noise contours: North Road Recreational Area (Woronoco Soccer Fields), Hampton Ponds Playground, and Apremont Park under the F-15EX. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB DNL. There are no incompatible land uses under this alternative. A proposed *constructive use* of this area would not be of such

magnitude as to effectively act as a permanent incorporation or to substantially impair usability and indirect impacts on Section 4(f) resources would not be considered significant. For the F-35A, Hampton Ponds Playground, Hampton Ponds State Park, and Apremont Park would have additional land located within the 65 to 70 dB DNL. Hampton Ponds Playground would also have 3 acres within the 70 to 75 dB DNL. North Road Recreational Area (Woronoco Soccer Fields) would have 6 acres within the 75 to 80 dB DNL noise contours, which is considered an incompatible land use. Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and no cumulative effects to consider. Cumulative impacts related to the Proposed Action would not be considered significant. There are no known Section 4(f) resources associated with the planned projects in the ROI listed in Table MA4.1-1; therefore, cumulative impacts on Section 4(f) resources would not be significant.

MA4.2.7 Water Resources/Floodplains/Wild and Scenic Rivers

Under the Proposed Action alternatives at the 104 FW installation, proposed construction and modification activities would result in up to 187,400 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. None of the proposed construction or modification projects are located within the 100-year floodplain. Impacts on water resources as a result of the proposed beddown of the F-15EX, F-35A, or retention of the F-15C aircraft at the 104 FW installation would not be significant. Similarly, those projects identified in Table MA4.1-1 would implement similar BMPs to manage impacts on both surface water and groundwater. As such, cumulative impacts would not be significant.

MA4.2.8 Geological Resources/Soils/Farmlands

Under the Proposed Action alternatives at the 104 FW installation, proposed construction and modification activities would result in up to 218,100 SF of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Construction and modification activities would only occur on soils designated by the NRCS as farmland of statewide importance. However, there would be no conversion of farmland to non-agricultural uses as the land within the BAF boundary has been previously disturbed and is not currently being used as

farmland. Impacts on geological resources as a result of the proposed beddown of the F-15EX, F-35A, or retention of the F-15C aircraft at the 104 FW installation on BAF, would not be significant. Similarly, those projects identified in Table MA4.1-1 would implement similar BMPs to manage impacts on ensure that runoff would be contained on-site. As such, cumulative impacts would not be significant.

MA4.2.9 Cultural Resources

There are no known archaeological sites within any of the proposed construction footprints at the 104 FW installation. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. No buildings associated with the proposed construction have been determined to be eligible for listing in the NRHP. No traditional cultural resources have been identified at the 104 FW installation. A desktop review was conducted utilizing the Massachusetts Historic Commission and the NRHP in order to identify historic properties present within the 65 dB DNL. There are no historic properties within one-half mile of BAF (Massachusetts Historic Commission 2022; National Park Service 2022b), which is beyond the 65 dB DNL; therefore, there would be no noise impacts as there are no historic properties affected per 36 CFR Section 800.4(d)(1). Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Use of the SUA under the Proposed Action would be similar to ongoing operations. Known historic properties are present within the APE under the airspace; therefore, there would be no adverse effect per 36 CFR Section 800.5(b). Similarly, many of those projects identified in Table MA4.1-1 are located at BAF, which has been previously disturbed. The commercial development projects listed in Table MA4.1-1 would follow similar procedures for inadvertent discoveries, so it is unlikely that any cultural resources would be impacted by such construction. As such, cumulative impacts would not be significant.

MA4.2.10 Safety

Fire and crash response would continue to be conducted by the 104 FW fire department under all aircraft beddown alternatives. Construction activities would not be expected to pose any unusual concerns, and standard construction safety procedures would be implemented for the 104 FW construction projects as well as those projects listed in Table MA4.1-1. Many of the projects listed would actually enhance airfield and flight safety. No construction of incompatible structures would occur within RPZs and there would be no new airfield obstructions created by construction or modification projects. QD arcs would not be expected to change from existing conditions/No Action Alternative. While there are some planned construction projects that would take place within QD arcs, all DAF regulations

would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements as mandated by the DoD and would increase overall AT/FP compliance.

The F-15EX would utilize the same airframe as the current and familiar F-15C model. The avionics are more advanced for the F-15EX, thus the increase in automation and technology would aid the pilots in reducing total workload therefore improving situational awareness. Additionally, the F-35A platform fly-by-wire and advanced systems also aid in cockpit management and improved situational awareness. Reduced workload, improved situational awareness, training and familiarity would only continue to reduce the chances of mishaps. The lifetime Class A mishap rates for the F-15 and F-35 are 2.29 and 2.22 per 100,000 hours flown, respectively. The 104 FW BASH plan is used to mitigate and reduce the chances of a BASH event from occurring.

No significant cumulative impacts on safety would be expected with implementation of any of the alternatives.

MA4.2.11 Hazardous Materials/Waste

The types of hazardous materials needed for maintenance and operation of the F-15EX and F-35A would be similar to those currently used for maintenance and operation of the F-15C fleet. Under the F-15EX and F-35A Alternatives, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action and the present/reasonably foreseeable projects listed in Table MA4.1-1 would occur. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP and would include any construction-related materials or waste associated with aircraft operations. Additionally, no changes to the installation's Large Quantity Generator status would be expected to occur due to the increase in hazardous waste generation from aircraft operations. In addition, any projects proposed for modifications would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation or potential construction dewatering for installation of building footers) for proposed construction

activities, work would cease until 104 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. The present and future projects listed in Table 4.1-1 could involve the use of some hazardous materials and the generation of some hazardous waste during construction; however, the same regulations that would apply to the Proposed Action would be required for these actions. As such, cumulative impacts from hazardous materials, hazardous waste, toxic substances, or contaminated sites are expected to be less than significant.

MA4.2.12 Biological Resources/Coastal Resources/Wetlands

Noise levels would be expected to increase from the affected environment with the conversion to either the F-15EX or the F-35A aircraft. However, these noise levels from operations and construction would not be expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with current aircraft and military operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds, would increase commensurate with the increase in potential airfield operations, though would be managed and minimized with implementation of procedures identified in the BASH plan. No threatened and endangered or special status species are currently known to reside on the 104 FW installation or within the land area within the projected noise contours. Construction-related impacts on the vegetation at the installation and in the vicinity of projects identified in Table MA4.1-1 would be minor due to the lack of sensitive vegetation in the project areas. In general, construction activities at the 104 FW installation and at BAF would primarily occur on sites that are already highly altered. These impacts would include the removal of some vegetation and associated wildlife habitat. However, wildlife that use these areas are typical of urban and suburban areas. There would be no impacts on wetlands as there are no proposed construction projects within wetlands; and there would be no impacts on coastal resources as the 104 FW installation is not located within a coastal zone and the Proposed Action would not affect the coastal zone. Though there could be an increase in operations within the SUA, impacts on wildlife would be minimal given that the F-15C aircraft (as well as other aircraft) already use the SUA, vertical distribution of operations would change minimally, and 93 percent of operations would occur above 10,000 feet AGL. No impacts on any federally or state threatened, endangered, or

special status species would be expected as a result of any of the alternative aircraft beddowns at the 104 FW installation or those projects listed in Table MA4.1-1; therefore, cumulative impacts on biological resources would not be significant.

MA4.2.13 Visual Impacts

Construction and operations associated with the F-15EX or F-35A beddown or construction associated with retaining the F-15C legacy aircraft in addition to those projects listed in Table MA4.1-1 would not have appreciable effects to visual resources at the 104 FW installation, BAF, or the immediate surrounding community. The proposed facilities and associated infrastructure associated with all three aircraft beddown alternatives and development identified in the table would remain consistent with the existing visual character of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through BAF would not be markedly different from existing conditions/No Action Alternative. Basing of the 21 F-15EX or F-35A to replace the existing 18 F-15C at the 104 FW installation and associated construction and operations would not substantially increase off-airport light emissions or create visual effects.

MA4.2.14 Infrastructure/Utilities/Natural Resources and Energy Supply/ Transportation/Public Transportation

Considering the alternative aircraft beddowns at the 104 FW installation as well as those projects identified in Table MA4.1-1, short- and long-term demand for all services would increase by a minor degree when considered regionally. The beddown alternatives and other projects would increase demand for potable water, increase production of wastewater, and create more impervious surfaces to increase stormwater runoff. However, cumulative effects would be anticipated to be minimal because there is current and long-term capacity to meet increased demand for drinking water and disposal of wastewater. For stormwater, BMPs such as silt fencing, vegetation management, and ditching would minimize erosion and sedimentation during the short-term construction phases; retention and detention pond systems would avoid excessive runoff due to increases in impervious surfaces in the long term.

Demand for electricity and natural gas would be expected to increase in the short term due to construction activities and in the long term due to minor increases in personnel. In the short term, existing energy systems have the ability to meet increased demand. In the long term, there is capacity to meet the demands of the minor increase in personnel. Further, any new facilities and additions associated with these projects would incorporate Leadership in

Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation when compared to facilities currently in place.

Under any of the three aircraft beddown alternatives at the 104 FW installation in addition to reasonably foreseeable future projects, it is anticipated that there would be both short- and long-term increases in solid waste generation. During demolition and construction phases, all materials would be disposed in permitted facilities, which have the capacity to accept these materials. In the long term, solid waste generated by the regionally minor increase in personnel could be handled by existing solid waste management systems.

In terms of transportation, the local traffic network has the ability to meet the short-term increases in traffic during construction activities from the construction activities and reasonably foreseeable future projects. In the long term, the transportation network would be able to meet the needs of the minor increase in personnel. In summary, cumulative impacts on infrastructure due to the aircraft beddown alternatives at the 104 FW installation and reasonably foreseeable future projects would not be significant.

MA4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA CEQ regulations require environmental analyses under an EIS to identify "...any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Building construction material such as gravel and gasoline usage for construction equipment would constitute the consumption of nonrenewable resources. Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

Training operations would involve consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in aircraft. Use of training ordnance would involve commitment of chemicals and other materials. None of these activities would be expected to substantially affect environmental resources because the relative consumption of these materials is expected to change negligibly.

The primary irretrievable impacts of implementation of any of the alternatives at the 104 FW installation or for any of the alternatives would involve the use of energy, labor, materials and funds, and the conversion of some lands from an undeveloped condition through the

construction of buildings and facilities on the installation. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

This page intentionally left blank.

144 FW at Fresno-Yosemite International Airport (FAT)

This page intentionally left blank.

CA1.0 144TH FIGHTER WING AT FRESNO YOSEMITE INTERNATIONAL AIRPORT (FAT) OVERVIEW

This section presents an overview of the 144 FW, currently a tenant located at FAT in Fresno, CA; the specifics of the Proposed Action as they relate to both the airfield and the associated airspace; construction and facility modifications required at the installation; and changes in personnel that would result if the 144 FW was selected to receive the F-15EX aircraft. Additionally, construction and facility modifications necessary to continue the 144 FW's mission with the currently based F-15C aircraft at FAT are evaluated in the event that the 144 FW is not selected for the F-15EX.

CA1.1 144TH FIGHTER WING ALTERNATIVE

The 144 FW of the California Air National Guard (CAANG) is a tenant at FAT. The installation is 5 miles east of downtown Fresno, in Fresno County, CA (Figure CA1.1-1). The federal government leases the property from the City of Fresno, and in turn licenses 102.5 acres to the CAANG. The main portion of the 144 FW installation is situated along the southeastern portion of the airfield. A 25.5-acre detached parcel serves as the unit's weapons storage area and is located along the northwest portion of the airfield.

The 144 FW is tasked to carry out both federal and state missions. The federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and provide assistance during national emergencies (e.g., natural disasters or civil disturbances). The state mission is to provide protection of life, property, and preserve peace and order, and public safety as directed by the Governor of California. The 144 FW currently flies and maintains 18 PAA F-15C fighter aircraft.

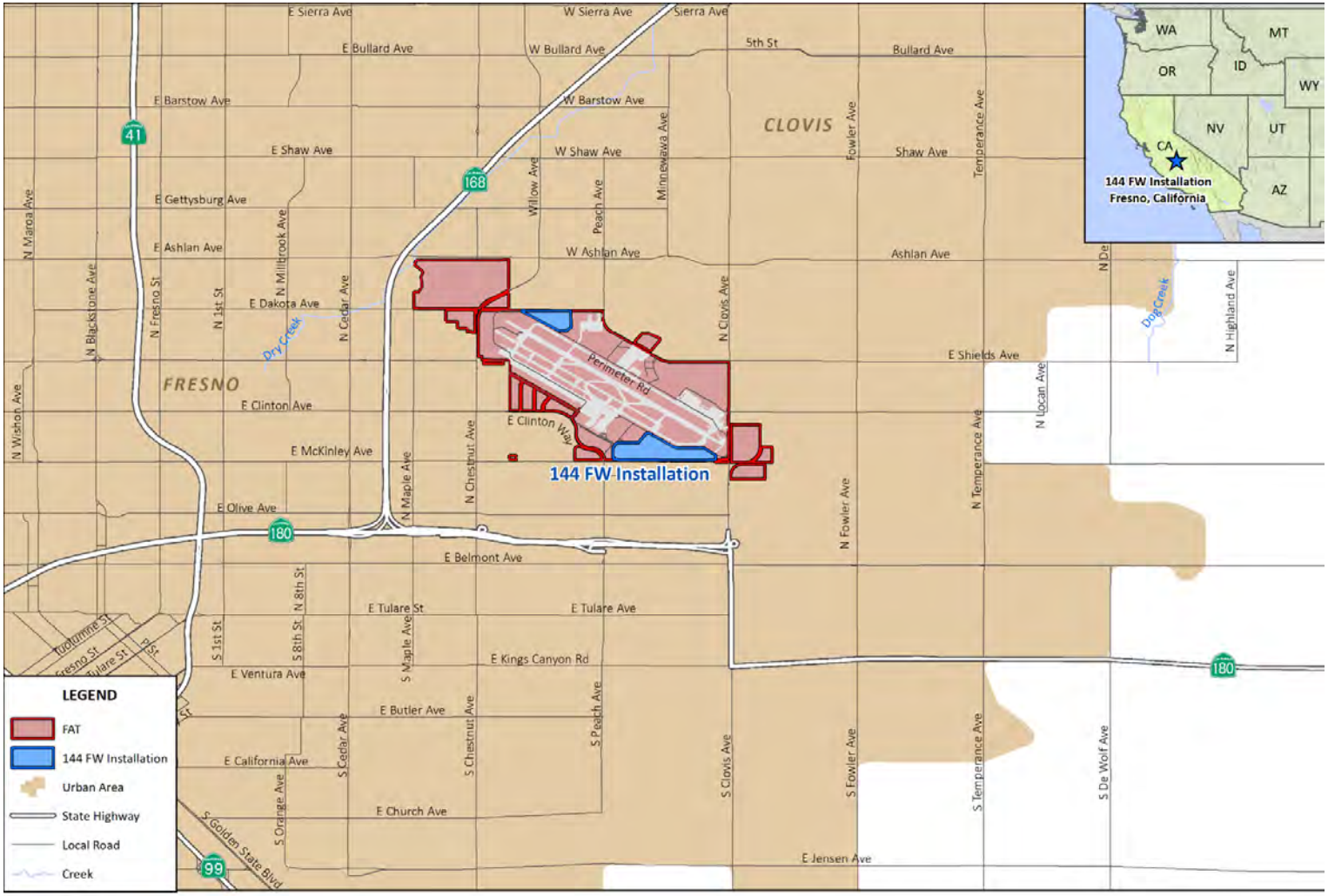


Figure CA1.1-1 Location of the 144 FW at Fresno Yosemite International Airport (FAT)

CA2.0 144TH FIGHTER WING AT FRESNO YOSEMITE INTERNATIONAL AIRPORT (FAT)

Alternatives evaluated in this EIS for the 144 FW at FAT include:

- Conversion from 18 PAA F-15C to 21 PAA F-15EX aircraft
- Retention of the 18 PAA F-15C aircraft and construction related to this continuing mission
- No Action

If the 144 FW is selected to receive one squadron of F-15EX aircraft at FAT, there are four components of this action: (1) conversion from F-15C to F-15EXs, (2) operations conducted at the airfield and within the SUA by either aircraft, (3) construction and facility modification projects to support the beddown of the F-15EX aircraft, and (4) personnel changes to meet the requirements for the F-15EX aircraft. Each component is explained in more detail below. If the 144 FW is not selected to receive the F-15EX aircraft, then the 144 FW could still implement construction and modifications to support and extend their legacy aircraft and mission at FAT.

CA2.1 144TH FIGHTER WING AT FRESNO YOSEMITE INTERNATIONAL AIRPORT (FAT)

CA2.1.1 Aircraft Conversion

Currently, the 144 FW has 18 F-15C PAA aircraft. If the 144 FW is selected to receive the F-15EX at FAT, the aircraft would be based at the installation by FY 2027–2028 for the F-15EX. Drawdown of the 144 FW's F-15C aircraft would be complete approximately 6 months prior to the initial arrival of the new aircraft. Table CA2.1-1 identifies the current type and number of aircraft at the 144 FW installation, the number of proposed F-15EX aircraft, and the net change in aircraft.

Table CA2.1-1 Current and Proposed Aircraft Beddown Inventory

Aircraft Type	*Currently Assigned PAA/BAA/AR*	*Proposed PAA/BAA/AR*	*Net Change in Aircraft PAA/BAA/AR*
Based F-15C	18/2/1	0	0
F-15EX	0	21/2/1	3/0/0

Legend: AR = Attrition Reserve; BAA = Backup Aerospace Vehicle Authorized; PAA = Primary Aerospace Vehicle Authorized.

CA2.1.2 Airfield Operations

The 144 FW has a fighter mission that is assigned to the DAF ACC MAJCOM for their federal mission, and as such they implement a training syllabus associated with ACC. As an integral component of ACC, ANG units defend the homeland of the U.S., as well as deploy forces worldwide to meet threats to ensure the security of the U.S. To fulfill this role, the 144 FW pilots

must train as they would fight, which means they must simulate battle conditions in a training environment.

Should the 144 FW be selected for either of these aircraft, the NGB anticipates that by FY 2027–2028, the 144 FW would be flying 21 F-15EX with up to 6,888 operations annually at the airfield. These operations are compared to 3,802 annual operations currently with the F-15C (Table CA2.1-2). This would represent an 81 percent increase in 144 FW operations with the F-15EX at the airfield, and a 3.6 percent increase in total operations at the airfield.

Table CA2.1-2 Current and Proposed Annual Airfield Operations

Aircraft	***Total Current Operations[1] (Legacy Aircraft)***	***Proposed F-15EX Operations***
Based F-15C	3,802	0
Proposed Aircraft	0	6,888
Other Aircraft	82,372	82,372
Total Airfield Operations	86,174	89,260
Percent Change at Airfield	N/A	+3.6%

Note: 144 FW F-15C and C-26 operations based upon FY 2021.
[1]Military transient and civil operations scaled to pre-COVID 3-year average for 2017–2019. Existing aircraft operations assumed to continue relatively unchanged for the No Action Alternative estimated for 2026 and 2027.
Legend: % = percent; N/A = Not Applicable.

If the 144 FW is not selected to receive the F-15EX aircraft, then ANG operations at the airfield would not change from current operations for the foreseeable future.

The FAT existing condition represents 86,174 operations annually (including the military operations), with approximately 95 percent consisting of commercial and civilian flights operating 365 days per year (as shown in Table CA2.1-2). Based on proposed requirements and deployment patterns, the F-15EX operational aircraft would fly some operations for exercises at other locations during deployments or in preparation for deployments. During such periods, home station flying operations would be reduced accordingly. Some of the home station missions could involve inert ordnance delivery training at approved ranges.

The F-15EXs would employ the same departure and landing flight tracks as currently used by the F-15C aircraft. F-15EX operations would adhere to existing restrictions, and noise abatement procedures currently in place at FAT, which includes actions such as following current "course rules" at the airfield; minimizing training during CNEL nighttime hours; and minimizing use of afterburner take-offs. The 144 FW operates the F-15C about 2 percent of the time between the hours of 10 p.m. and 7 a.m. (CNEL night) and 6 percent of the time during CNEL evening hours (7 p.m. to 10 p.m.). At this percentage, the F-15C annually fly about 71 operations during CNEL nighttime hours, with the majority of the operations after 10 p.m. being associated with arrivals

back to the installation; and they fly 229 operations during "evening" hours. In addition, overseas deployment departures may occur during environmental night, but would be infrequent. In contrast, the civilian and commercial aircraft perform approximately 14 percent of their operations after 10 p.m., or 12,188 operations per year; and 22 percent of their operations during "evening" hours, or 19,344 operations per year. The 144 FW would plan to fly a schedule similar to what they currently do with regard to environmental night flights, although contingencies such as weather or special combat mission training may result in rare unplanned operations during this period. Typically, all required "after dark" operations could be achieved prior to 10 p.m.

CA2.1.3 Construction and Modification of Facilities

To support the proposed operations, additional infrastructure and facilities would be required at the 144 FW installation. These construction and modification projects would vary depending on the proposed aircraft selected as shown in Table CA2.1-3. For a more detailed description of the individual construction projects, see Appendix C, *Construction Tables*. Figures CA2.1-1 through CA2.1-3 identify the construction locations for F-15EX, as well as the legacy construction projects, respectively. In addition, there are two proposed construction locations (hereafter called "Locational Scenarios") for the F-15EX aircraft beddown alternative: (1) construction would be located at the current 144 FW cantonment area south of the runway, and (2) the majority of the construction would be located at the current 144 FW cantonment area, with some projects related to the ACA mission occurring north of the runway at the existing ramp/developed area (i.e., Marine Corps Reserve Center ramp area). If the F-15EX does not beddown at the current 144 FW installation, then construction would still occur to support the legacy F-15C aircraft and mission. Table CA2.1-4 provides a summary of anticipated construction footprint.

Table CA2.1-3 Summary of Construction and Modification Projects

Project ID	*Project Name*	*F-15EX*		*Legacy F-15C*
		South	*Alert Only North*	
1	Construct Munitions Administration	X	X	X
2	Construct Three Phase ECP – Munitions Dakota Gate	X	X	X
3	Construct Three Phase ECP – Main Gate	X	X	X
4	Construct Vehicle Maintenance Complex	X	X	X
5	Construct Med Training and SFS EMEDS Facility	X	X	X
6	Repair Airfield Pavements (south side)	X	X	X
7	Repair Munitions M&I (Building 2600)	X	X	
8	ADAL Building 2606 for ATG Munitions & MAC Pad	X	X	
9.1 (Option 1)	Construct Fire Station (Option 1) (South side)	X	X	
9.2 (Option 2)	Construct Fire Station (Option 2) (North side – northwest of the Marine Corps ramp)		X	
10	ADAL Squadron Operations (Building 194)	X	X	
11	Repair Small Maintenance Hangar (Building 159)	X	X	
12	Repair Fuel Cell HVAC (Building 157)	X	X	

Project ID	*Project Name*	*F-15EX*		*Legacy F-15C*
		South	*Alert Only North*	
13	ADAL Alert Crew Readiness (South side)	X		
14	Construct F-15EX Four Bay FMS Facility	X	X	
15	Construct WLT Facility (F-15EX)	X	X	
16	Construct CFT Maintenance	X	X	
17	Construct Alert Spots 5 & 6 (North side)		X	
18	Construct Alert Complex (North side)		X	
19	Construct North Utilities Infrastructure (North side)		X	
20	Construct ECP – E. Airway Boulevard		X	
21	Building 130 Renovation			X
22	Building 135 Dining Facility Remodel			X

Legend: ADAL = Addition and Alteration; ATG = air-to-ground; CFT = Conforming Fuel Tank; ECP = Entry Control Point; EMEDS = Expeditionary Medical Support; FMS = Full Mission Simulator; HVAC = Heating, Ventilation, and Air Conditioning; M&I = Maintenance and Inspection; MAC = Munitions Assembly Conveyor; SFS = Security Forces Squadron; WLT = Weapons Load Crew Training.

Sources: ACC and NGB 2021; NGB 2021; 144 FW n.d.

Figure CA2.1-1 Proposed Construction and Modifications for F-15EX Beddown at the Current 144 FW Main Cantonment Area

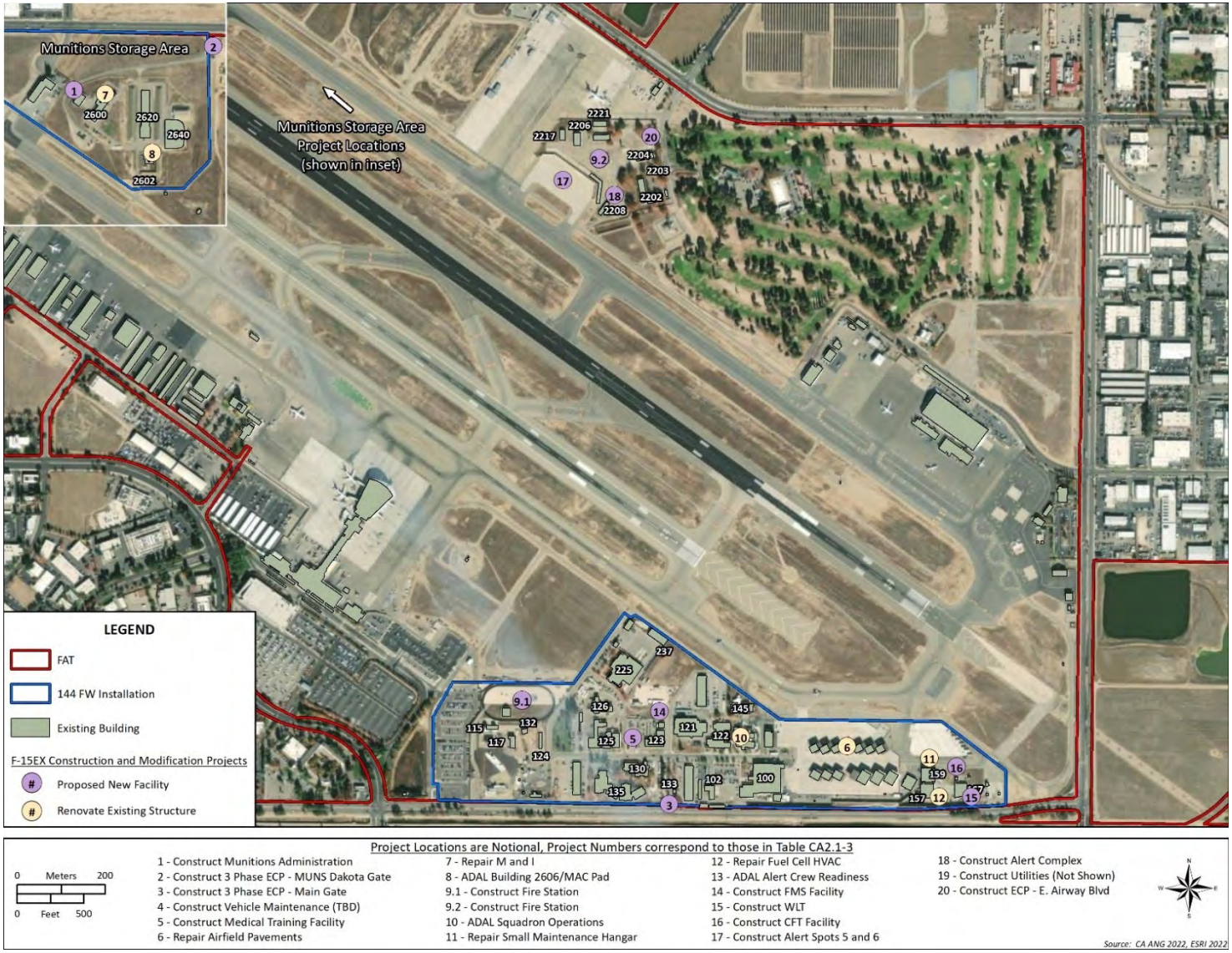


Figure CA2.1-2 Proposed Construction and Modifications for F-15EX Beddown at the Current 144 FW Main Cantonment Area with the ACA Mission to the North

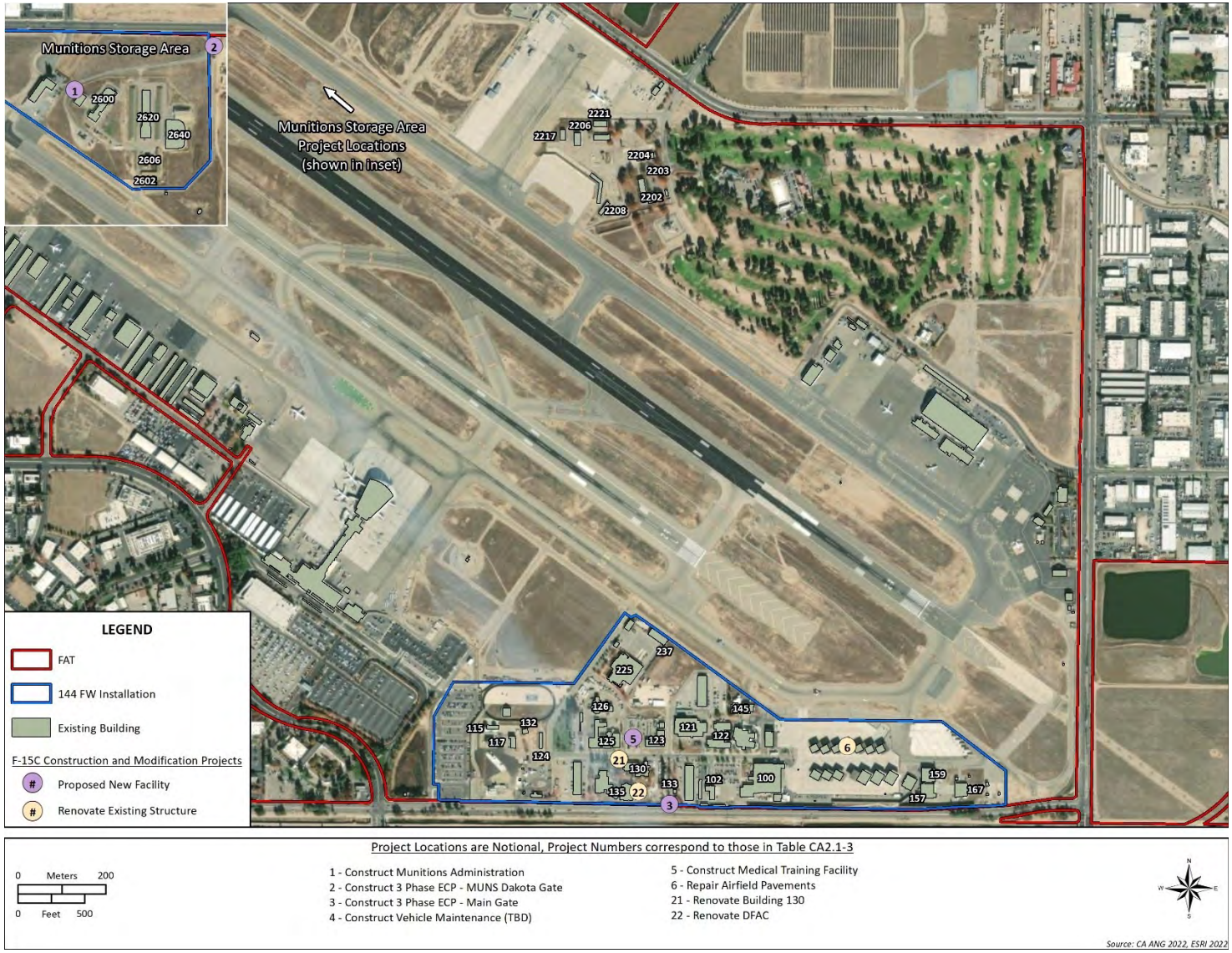


Figure CA2.1-3 Proposed Construction and Modifications for the 144 FW Legacy Aircraft Mission

Table CA2.1-4 Summary of Construction Footprints

Aircraft Type	*Total SF Disturbance*		*Total SF New Impervious*		*Years of Construction*	
	South	*Alert Only North*	*South*	*Alert Only North*	*South*	*Alert Only North*
Based F-15C	1,062,000	N/A	104,700	N/A	FY 2024[1]–2026	N/A
F-15EX	1,148,600	1,588,200	231,300	670,900	FY 2024–2028	FY 2024–2028

Note: [1]2024 but no sooner than ROD signature.
Legend: FY = Fiscal Year; N/A = Not Applicable; SF = square foot/feet.

It is anticipated that construction and modifications would begin shortly following the signature of the ROD for either of the proposed alternatives at FAT to support mission requirements.

CA2.1.4 Personnel

The 144 FW currently supports 36 civilian employees, 381 AGR, and 689 traditional guardsmen (144 FW 2022a). The overall number of ANG personnel at the 144 FW installation would increase with an addition of approximately 100 personnel under the F-15EX beddown. Table CA2.1-5 shows the changes in personnel.

Table CA2.1-5 Proposed Personnel at the 144 FW Installation

Personnel Category	*F-15EX Proposed Increase in Personnel*	*Legacy F-15C Change in Personnel*
Officers (including CSOs)	36	0
Enlisted	65	0
Change in Personnel	101	0

Legend: 144 FW = 144th Fighter Wing; CSO = Combat Systems Officer.

CA2.1.5 144th Fighter Wing: Training Airspace and Ranges

The 144 FW uses several airspace units (Table CA2.1-6 and Figure CA2.1-4), including overland MOAs, overlying ATCAAs, Restricted Areas, and Warning Areas. Section 2.2.2.1, *Training Airspace and Operations*, provides definitions of these airspace units. The beddown of the F-15EX would not require changes in SUA attributes, though there could be an increase in the use of SUA by the 144 FW.

Table CA2.1-6 144 FW Military Training Airspace

Complex	*Airspace*	*Floor*[1]	*Ceiling*[1]
Bakersfield MOA	Bakersfield MOA	2,000 ft AGL	18,000 ft MSL
Barstow MOA	Barstow MOA	200 ft AGL	18,000 ft MSL
Bishop MOA	Bishop MOA	200 ft AGL	18,000 ft MSL
Buckhorn MOA	Buckhorn MOA	200 ft AGL	18,000 ft MSL
Foothill MOA Complex	Foothill 1 MOA	2,000 ft AGL	18,000 ft MSL
	Foothill 2 MOA	2,000 ft AGL	18,000 ft MSL
Hunter MOA Complex	Hunter Low A	200 ft AGL	11,000 ft MSL
	Hunter Low B	2,000 ft AGL	11,000 ft MSL
	Hunter Low C	3,000 ft AGL	11,000 ft MSL
	Hunter Low D	1,500 ft AGL	6,000 ft MSL
	Hunter Low E	1,500 ft AGL	3,000 ft MSL
	Hunter High	11,000 ft MSL	18,000 ft MSL
Isabella MOA	Isabella MOA	200 ft AGL	18,000 ft MSL
Lemoore MOA	Lemoore A	5,000 ft MSL	18,000 ft MSL
	Lemoore B	13,000 ft MSL	18,000 ft MSL
	Lemoore C	16,000 ft MSL	18,000 ft MSL
	Lemoore D	5,000 ft MSL	18,000 ft MSL
	Lemoore F	5,000 ft MSL	18,000 ft MSL
Owens MOA	Owens MOA	200 ft AGL	18,000 ft MSL
Panamint MOA	Panamint MOA	200 ft AGL	18,000 ft MSL
Porterville MOA	Porterville MOA	2,000 ft AGL	18,000 ft MSL
Roberts MOA	Roberts MOA	500 ft AGL	15,000 ft MSL
Saline MOA	Saline MOA	200 ft AGL	18,000 ft MSL
Shoshone MOA	Shoshone MOA	200 ft AGL	18,000 ft MSL
Silver North MOA	Silver North MOA	200 ft AGL	9,000 ft MSL
R-2502	R-2502A	0	16,000 ft MSL
	R-2502E	0	UNLIMITED
	R-2502N	0	UNLIMITED
R-2504	R-2504A	0	6,000 ft MSL
	R-2504B	6,000 ft MSL	15,000 ft MSL
R-2505	R-2505	0	UNLIMITED
R-2506	R-2506	0	6,000 ft MSL
R-2508	R-2508	20,000 ft MSL	UNLIMITED
R-2513	R-2513	0	24,000 ft MSL
R-2515	R-2515	0	UNLIMITED
R-2524	R-2524	0	UNLIMITED
W-260	W-260	0	60,000 ft MSL
W-283	W-283	0	60,000 ft MSL
W-285	W-285A	0	45,000 ft MSL
	W-285B	0	19,000 ft MSL
	W-285C	19,000 ft MSL	45,000 ft MSL
	W-285D	0	19,000 ft MSL

Complex	*Airspace*	*Floor*[1]	*Ceiling*[1]
W-532	W-532E	0	UNLIMITED
	W-532N	0	UNLIMITED
	W-532S	0	UNLIMITED

Notes: [1]MSL is the elevation (on the ground) or altitude (in the air) of an object, relative to the average sea level. The elevation of a mountain, for example, is marked by its highest point and is typically illustrated as a small circle on a topographic map with the MSL height shown in either feet, meters, or both. Because aircraft fly across vast landscapes, where points above the ground can and do vary, MSL is used to denote the "plane" on which the floors and ceilings of SUA are established and the altitude at which aircraft must operate within that SUA.

Legend: 144 FW = 144th Fighter Wing; AGL = above ground level; ft = feet; MOA = Military Operations Area; MSL = mean sea level; SUA = Special Use Airspace; R = Restricted Area; W = Warning Area.

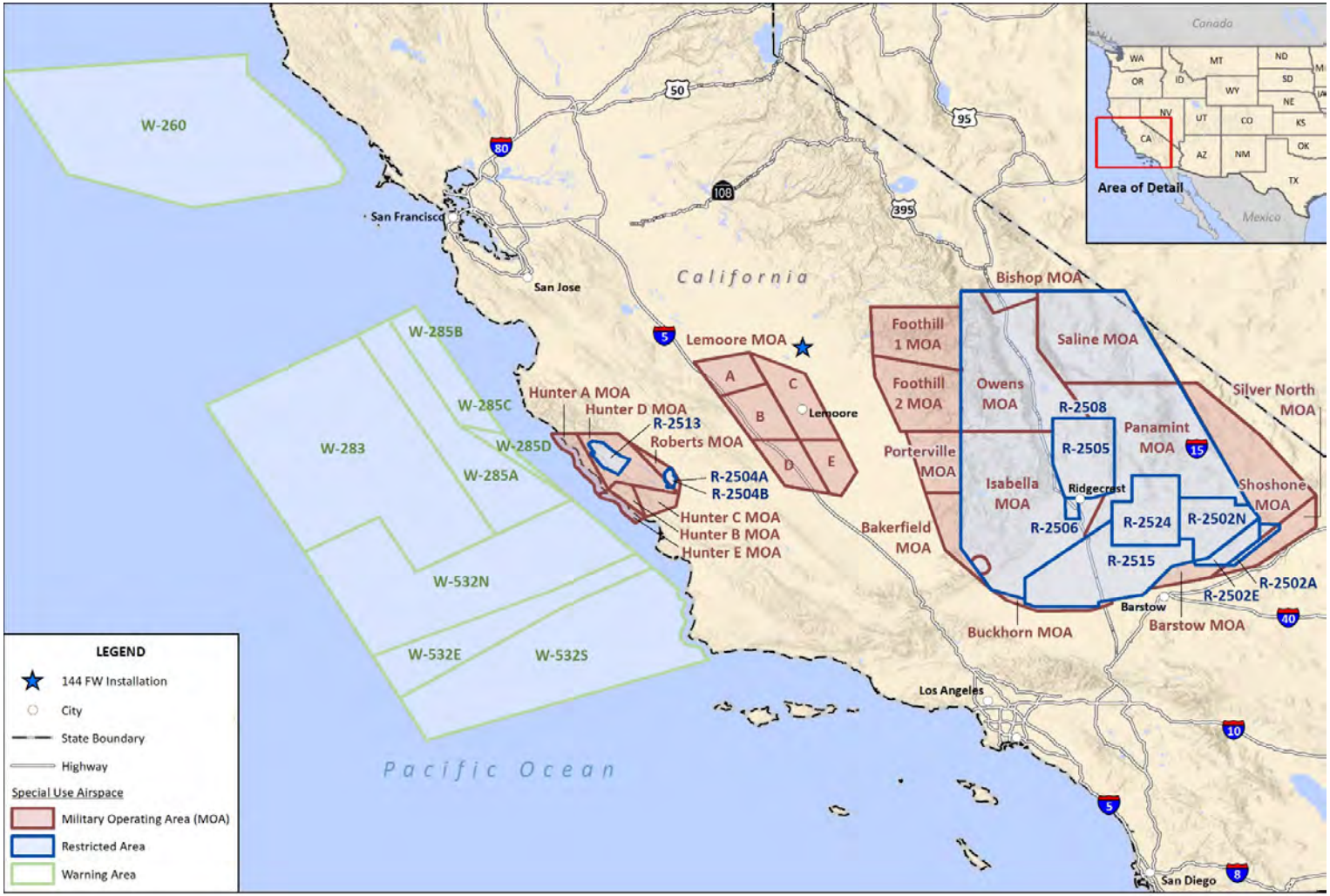


Figure CA2.1-4 Airspace Associated with the 144 FW

CA2.1.6 Airspace Use

All flight operations would take place in existing training airspace. No additions or alterations of training airspace are associated with the Proposed Action. The NGB expects that the F-15EX would operate in the airspace currently used by the 144 FW. Although the F-15EX aircraft would use the same airspace units as the current F-15C aircraft at the installation, the percentage of use by altitude and number of operations per airspace unit may vary. Table CA2.1-7 provides a breakdown of the percentage of use of each aircraft by altitude for current and proposed operations. Both aircraft fly only approximately 7 percent of the time below 10,000 feet MSL, and 93 percent of the time above 10,000 feet MSL. More details on different altitudes relative to different missions can be found in Chapter 2.0, Section 2.2.2.1, *Training Airspace and Operations*. Regardless of the altitude structure and percent use indicated in Table CA2.1-7, F-15EX aircraft (as with the F-15C) would adhere to all established floors and ceilings of airspace units.

Table CA2.1-7 Approximate 144 FW Current and Proposed Altitude Distribution

Altitude (feet)	*Percentage Use F-15C*	*Percentage Use F-15EX*
500–3,000 AGL	1	1
3,000–5,000 AGL	1	1
5,000–10,000 MSL	5	5
10,000 MSL–18,000 MSL	36	38
18,000 MSL–30,000 MSL	17	30
Above 30,000	40	25

Legend: 144 FW = 144th Fighter Wing; AGL = above ground level; MSL = mean sea level.

CA2.1.7 Ordnance Use and Defensive Countermeasures

CA2.1.7.1 F-15C

The F-15C does not carry any air-to-ground ordnance since it does not support an air-to-ground mission. In support of air-to-air training missions, it can carry training missiles and instrument pods (which help record the aircraft's position for training purposes). These training aids do not release from the airplane. Ordnance currently used by the F-15C include AIM-120 and AIM-9 missiles as well as a 20mm gun system.

Legacy F-15C aircraft are also used to stand ACA missions in support of U.S. National Security. For these missions, the aircraft are loaded with actual air-to-air missiles, and the cannon is loaded with 20mm gun rounds. For ANG locations where the fighter squadron is located on a civilian airport, there are strict regulations about the storage, loading, flying, and unloading of these items.

The F-15C aircraft also carries expendable defensive countermeasures for both training and for the ACA missions. These provide self-protection against radar-guided weapons, and IR-guided weapons (also called "heat-seeking"). These countermeasures are also subject to strict rules on the storage, loading, flying, and unloading of the countermeasures. Their use in SUA (for training) is also subject to restrictions in terms of types, minimum release altitude, and other conditions.

CA2.1.7.2 F-15EX

Most air-to-ground training for the F-15EX would be simulated, where nothing is released from the aircraft, and target scoring is done electronically. As was discussed in Chapter 2.0, Section 2.2.2.5, *Ordnance Use*, however, the F-15EX (like the F-15C) is capable of carrying and employing several types of air-to-air and air-to-ground ordnance (including strafing) and pilots would need training in their use. F-15EX pilots would only use ranges and airspace authorized for the type of ordnance being employed and within the number already approved at a range and/or target. Ordnance to be used by the F-15EX aircraft include AIM-120, AIM-9 missiles, AIM-9X missiles, GBU-31, and GBU-39 JDAM as well as a 20mm cannon system. If in the future the NGB identifies weapons systems that are either new or could exceed currently approved levels, appropriate NEPA documentation would need to occur prior to their employment.

China Lake Range (R-2508) contains varied target sets for supporting laser and practice/inert air-to-ground weapons training. It is expected that any live-fire training would be conducted during formal training exercises conducted remotely from the 144 FW installation.

The F-15EX would eventually be capable of conducting the ACA mission. The aircraft would continue to have the potential requirement to load live air-to-air missiles and live rounds in the gun, just like the legacy F-15C. It would continue to have the same restrictions on storage and use that exist now.

For air-to-ground ordnance, in locations where the ANG is collocated on civilian airfields (such as FAT), the ANG squadrons would deploy to other locations to train with live air-to-ground ordnance. Local regulations on safety for storage, handling, and use of ordnance would all remain as they are now.

Like the F-15C, the F-15EX would employ chaff and flares as defensive countermeasures in training. Chaff and flares are the principal defensive mechanisms dispensed by military aircraft to avoid attack by enemy air defense systems. Use of chaff and flares are permitted in all airspace units identified in Table CA2.1-6 and proposed for use by the F-15EX. Flares are not permitted to be released below 2,000 feet AGL over non-government-owned or -controlled property. Based on the emphasis on flight at higher altitudes for the F-15EX, roughly 90 percent of flare releases would occur above 15,000 feet MSL. At this altitude, most flares would be released more than

seven times higher than the minimum release altitude permitted (2,000 feet AGL) over non-government-owned or -controlled property and ensure complete burnout before reaching the ground.

The use of defensive countermeasures would not be expected to change. They would be used for ACA missions, and would also be used in training, and would be used at the same rates in the same places, subject to the same restrictions that exist now.

CA3.0 144TH FIGHTER WING AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CA3.1 NOISE

CA3.1.1 Affected Environment

CA3.1.1.1 Installation

The predominant sources of noise at FAT consist of aircraft operations from an active airfield. Additionally, construction, ground support equipment, and vehicular traffic all contribute to the noise environment, though these are transitory and provide a negligible contribution to the overall average noise level at FAT.

Based on historical data, the 144 FW flew approximately 1,811 sorties annually, with an ASD of 1.6 hours. Each sortie generates one departure and one arrival operation and approximately 5 percent of sorties also generate a closed pattern event, which generates an operation for both the approach and takeoff portion of that closed pattern event. In total, the 144 FW completed 3,802 annual operations in FY 2021 with the F-15C, as listed in Table CA3.1-1. The 144 FW avoids operating during the CNEL nighttime (10 p.m. to 7 a.m.) as much as practical resulting in an average of 71 total CNEL nighttime operations per year. Other based military operations include the 144 FW C-26 and Army Guard UH-60 and CH-47 aircraft accounting for a total of 1,960 operations among the three aircraft types.

Although military operations at FAT experienced minimal impacts due to COVID-19, the civil operations during the COVID-19 years 2020 and 2021 decreased dramatically. Therefore, a pre-COVID-19 3-year average of historical civil aircraft operations between 2017–2019 represents a more realistic existing condition for civil operations at FAT, which amounts to 80,412 operations (93 percent of all FAT operations). Within the civil operations category, jet airliners account for the largest share of civil activity followed by business jets, piston propeller aircraft, and helicopter operations. Specific details on operation type by aircraft and runway are provided in the 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

As a conservative estimate, this EIS assumed the air traffic at civilian airfields like FAT would return to pre-COVID-19 conditions by the time any new aircraft would arrive (FY 2026–2027) while military operational training requirements and resulting military operations would remain the same as existing conditions. Thus, the No Action Alternative for this EIS is equivalent to the existing conditions in terms of aircraft operations.

Table CA3.1-1 Fresno Yosemite International Airport (FAT) Existing Conditions – Average Annual Operations

Group	*Aircraft*	*Departures*			*Arrivals*			*Closed Patterns*[1]			*Total*			
		Day	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Total*
144 FW	F-15C	1,668	141	2	1,668	74	69	166	14	0	3,502	229	71	3,802
144 FW	C-26	150	8	2	145	10	5	0	0	0	295	18	7	320
Army Guard	UH-60	423	30	12	419	33	13	270	20	10	1,112	83	35	1,230
Army Guard	CH-47	142	10	3	140	11	4	90	7	3	372	28	10	410
Military	*Military Total*	*2,383*	*189*	*19*	*2,372*	*128*	*91*	*526*	*41*	*13*	*5,281*	*358*	*123*	*5,762*
Civil	Jet Airliner	21,112	7,121	2,989	17,025	7,328	6,925	0	0	0	38,137	14,449	9,914	62,500
Civil	Business jet	223	60	8	191	69	27	0	0	0	414	129	35	578
Civil	Piston Propeller (single or double)	3,649	768	135	3,267	999	283	0	0	0	6,916	1,767	418	9,101
Civil	Helicopter	2,347	1,193	576	1,359	1,648	1,110	0	0	0	3,706	2,841	1,686	8,233
Civil	*Civil Total*	*27,331*	*9,142*	*3,708*	*21,842*	*10,044*	*8,345*	*0*	*0*	*0*	*49,173*	*19,186*	*12,053*	*80,412*
Grand Total		**29,714**	**9,331**	**3,727**	**24,214**	**10,172**	**8,436**	**526**	**41**	**13**	**54,454**	**19,544**	**12,176**	**86,174**

Note: [1]Closed Patterns counted as two operations.
Legend: 144 FW = 144th Fighter Wing.

Figure CA3.1-1 shows the CNEL noise contours from 65 to 85 dB in 5-dB increments for the existing conditions at FAT. Noise generated from aircraft operations at FAT occurs within and outside of the airfield. Portions of the 65 dB CNEL contour extend beyond FAT to the northwest by 0.2 mile, to the northeast up to 0.3 mile, southeast 0.1 mile, and southwest approximately 0.1 mile.

Table CA3.1-2 shows the acreage (excluding water bodies) by noise contour band resulting in a total of 176 off-airport acres at FAT exposed to 65 dB CNEL or greater for existing conditions. That off-airport acreage is comprised of 161 acres exposed to 65 to 70 dB CNEL, 15 acres to 70 to 75 dB CNEL, and no acres exposed to 75 dB CNEL or greater.

Table CA3.1-2 Fresno Yosemite International Airport (FAT)
Existing Conditions – Noise Exposure Acreage

CNEL (dB)	*Existing Conditions Acreage*		
	On Airport	*Off Airport*	*Total*
65–70	510	161	671
70–75	320	15	335
75–80	185	0	185
80–85	160	0	160
85+	50	0	50
Total >65 dB	**1,226**	**176**	**1,402**

Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

An analysis of households and populations was conducted by reviewing census block groups. The analysis included all households and populations for each block group that fell completely within each CNEL contour band (Table CA3.1-3). For block groups that were partially within a CNEL contour band, the number of households and population were scaled based upon the proportion of block group within each CNEL contour band for levels from 65 to 80 dB (households in these areas are generally equally distributed throughout each block group). Households are counted manually for CNEL bands of 80 dB and above because populations in these high noise areas are often not evenly distributed and 80 dB CNEL is the threshold to screen for the potential for hearing loss analysis. Table CA 3.1-3 lists estimated households and population off airport that are currently exposed to each CNEL contour band under existing conditions. Currently, 139 households and 406 people are within the 65 to 70 dB CNEL contour band. A total of 10 households and 28 people reside within the 70 to 75 dB CNEL contour band and no households or people occur within the 75 dB CNEL or greater contour bands.

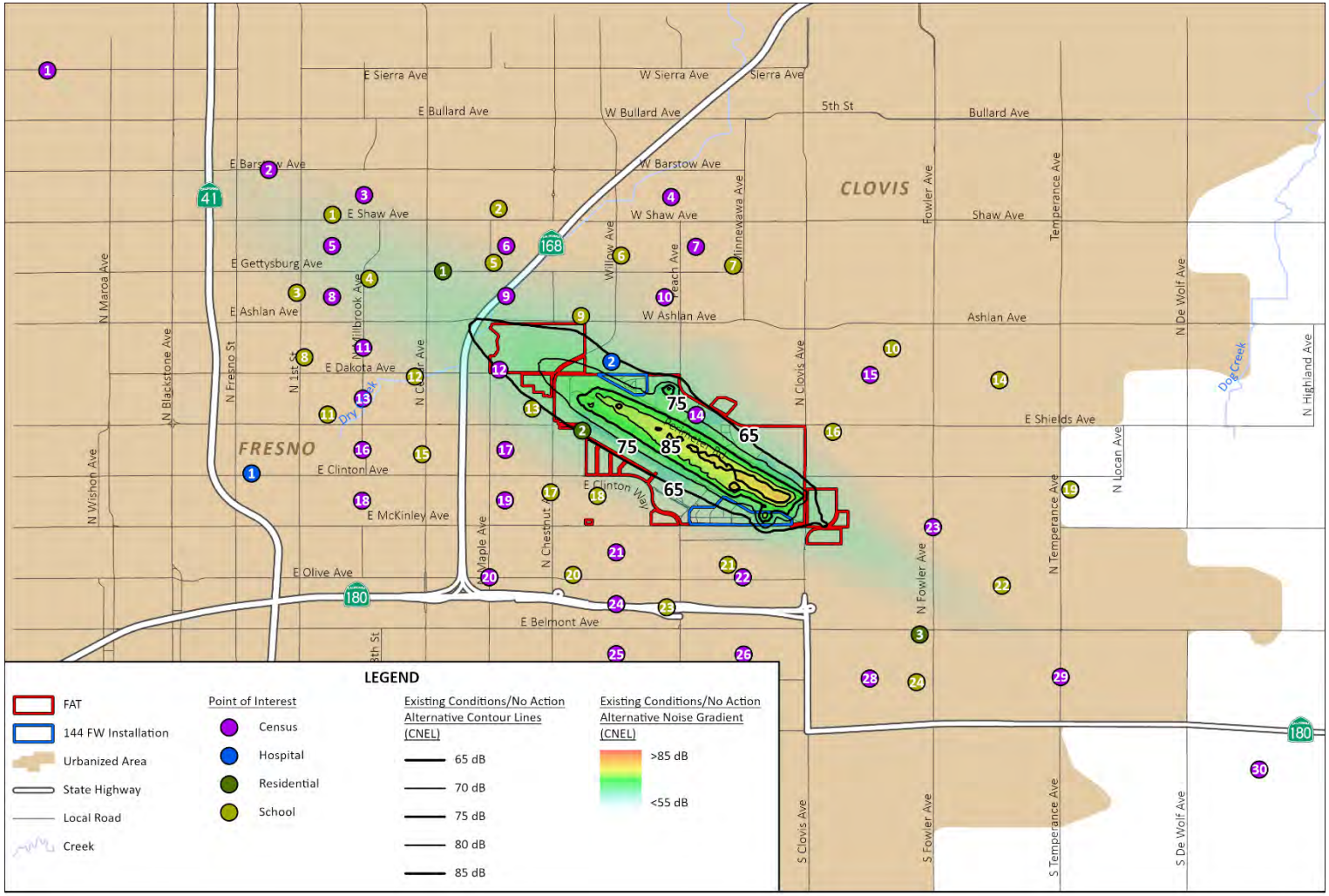


Figure CA3.1-1 Existing Condition Fresno Yosemite International Airport (FAT) – CNEL Contours and Gradient

Table CA3.1-3 Fresno Yosemite International Airport (FAT) Existing Conditions – Estimated Households and Population

CNEL Band (dB)	*Existing Conditions*	
	Households	*Population*
65–70	139	406
70–75	10	28
75–80	0	0
80–85	0	0
85+	0	0
Totals	**149**	**434**

Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

Table CA3.1-4 shows the CNEL values at each of the POIs under the existing conditions. Values range from 43 to 69 dB CNEL. Under existing conditions, a total of 4 POIs experience CNEL of 65 or greater, the threshold where land use restrictions are recommended for noise sensitive uses. None of those POIs experience 70 dB CNEL or greater noise levels. Additional details describing the POI selection and categories are provided in Chapter 3.0, Section 3.2.5, *Analysis Methodology*.

Table CA3.1-4 Existing Conditions POI Noise Exposure in the Vicinity of Fresno Yosemite International Airport (FAT)

Map ID	*Point Type*	*Named POI[1]*	*Existing Conditions CNEL[2] (dB)*
CAFr-C-01	Census Tract Centroid	Census Tract 45.03	52
CAFr-C-02	Census Tract Centroid	Census Tract 54.10	56
CAFr-C-03	Census Tract Centroid	Census Tract 54.03	56
CAFr-C-04	Census Tract Centroid	Census Tract 56.08	48
CAFr-C-05	Census Tract Centroid	Census Tract 53.02	60
CAFr-C-06	Census Tract Centroid	Census Tract 53.04	56
CAFr-C-07	Census Tract Centroid	Census Tract 31.02	52
CAFr-C-08	Census Tract Centroid	Census Tract 53.01	58
CAFr-C-09	Census Tract Centroid	Census Tract 53.05	62
CAFr-C-10	Census Tract Centroid	Census Tract 31.03	56
CAFr-C-11	Census Tract Centroid	Census Tract 52.04	56
CAFr-C-12	Census Tract Centroid	Census Tract 52.02	**65**
CAFr-C-13	Census Tract Centroid	Census Tract 52.03	53
CAFr-C-14	Census Tract Centroid	Census Tract 31.04	**69**
CAFr-C-15	Census Tract Centroid	Census Tract 58.04	50
CAFr-C-16	Census Tract Centroid	Census Tract 33.01	50
CAFr-C-17	Census Tract Centroid	Census Tract 32.01	56
CAFr-C-18	Census Tract Centroid	Census Tract 33.02	48
CAFr-C-19	Census Tract Centroid	Census Tract 32.02	52
CAFr-C-20	Census Tract Centroid	Census Tract 28	46
CAFr-C-21	Census Tract Centroid	Census Tract 29.06	51
CAFr-C-22	Census Tract Centroid	Census Tract 30.01	53
CAFr-C-23	Census Tract Centroid	Census Tract 58.05	54
CAFr-C-24	Census Tract Centroid	Census Tract 29.05	47
CAFr-C-25	Census Tract Centroid	Census Tract 29.04	44

Map ID	*Point Type*	*Named POI[1]*	*Existing Conditions CNEL[2] (dB)*
CAFr-C-26	Census Tract Centroid	Census Tract 30.04	47
CAFr-C-27	Census Tract Centroid	Census Tract 30.03	43
CAFr-C-28	Census Tract Centroid	Census Tract 14.11	47
CAFr-C-29	Census Tract Centroid	Census Tract 14.12	54
CAFr-C-30	Census Tract Centroid	Census Tract 59.04	51
CAFr-H-01	Healthcare Facility	Fresno VA Medical Center	46
CAFr-H-02	Healthcare Facility	Care Facilities Network	**66**
CAFr-R-01	Residential Area	E. Gettysburg Avenue and N. Rowell Avenue	61
CAFr-R-02	Residential Area	E. Simpson Avenue and N. Winery Avenue	**66**
CAFr-R-03	Residential Area	E. Madison Avenue and N. Renn Avenue	53
CAFr-S-01	School	Fresno Regional Occupational Program, Tioga Middle, and Wolter	59
CAFr-S-02	School	University High and California State	53
CAFr-S-03	School	Truth Tabernacle Christian School	57
CAFr-S-04	School	Thomas Elementary	61
CAFr-S-05	School	Vinland Elementary	58
CAFr-S-06	School	College Community (Economic Opportunities Commission) Head Start Community College	55
CAFr-S-07	School	Tarpey Elementary	52
CAFr-S-08	School	Maverick Prep Private School for Gifted Dyslexic Students	53
CAFr-S-09	School	Viking Elementary and Fresno Unified School District-Viking Childcare	62
CAFr-S-10	School	Miramonte Elementary	46
CAFr-S-11	School	Carter G. Woodson Public Charter and Learn Academy	50
CAFr-S-12	School	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	57
CAFr-S-13	School	Irwin O. Addicott Elementary Scandinavian Middle	63
CAFr-S-14	School	Roger S. Oraze Elementary	43
CAFr-S-15	School	McLane High	51
CAFr-S-16	School	Cup Large Day Care Center	54
CAFr-S-17	School	Ericson Elementary	54
CAFr-S-18	School	Sierra Charter and Violet Heintz Education Academy	57
CAFr-S-19	School	Virginia R. Boris Elementary	46
CAFr-S-20	School	Ewing Elementary and Remnant Christian School	48
CAFr-S-21	School	Fresno Adventist Academy	54
CAFr-S-22	School	Temperance-Kutner Elementary	54

Map ID	*Point Type*	*Named POI*[1]	*Existing Conditions CNEL*[2] *(dB)*
CAFr-S-23	School	Molly S. Bakman Elementary and Turner Elementary	47
CAFr-S-24	School	Fancher Creek Elementary	49

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding FAT where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section CA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to CNEL of 65 dB or greater.
Legend: dB = decibel; CNEL = Community Noise Equivalent Level; ID = Identification; POI = Point of Interest.

Although FAA Order 1050.1F specifies DNL (or CNEL within California) as the primary metric for impact analysis while allowing supplemental metrics if pre-approved by the FAA, the supplemental metric analysis included in this EIS and presented below are included to conform with DoD policy described by DNWG (DNWG 2009a).

Table CA3.1-5 presents the classroom learning interference for schools S-01 through S-24 experienced under existing conditions. The 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), provides the same school metrics computed for all other POIs to cover any daycare facilities that could occur near other POIs, such as a daycare operated out of a personal residence. As described in the noise study, the school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found classroom learning impacts (DNWG 2009b, 2013a). Given current operations at FAT, 6 of the 24 school POIs are exposed to exterior $L_{eq(8hr)}$ greater than or equal to 60 dB for windows open condition. Additional school impact analysis involves determining the number of noise-generated speech-interfering events per school day hour that exceed an interior L_{max} of 50 dB (equivalent to an exterior L_{max} of 65 dB for windows open). The number of classroom-interfering events ranges from 1 to 5 per school day hour, as presented in Table CA3.1-5. The time above an interior level of 50 dB (equivalent to an exterior of 65 dB for windows open) varies from less than a minute to a maximum of 9 minutes per school day. Note that the results presented in Table CA3.1-5 provide a conservative estimate assuming windows open. If classroom windows are closed, then $L_{eq(8hr)}$ would be approximately 10 dB less and the number of speech interfering events and time above results would likely decrease.

Table CA3.1-5 Fresno Yosemite International Airport (FAT) Existing Conditions – Classroom Learning Interference

ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*[2]	*Number of Speech Interfering Events per School Day Hour*[3]	*Time above 50 dB per 8-hour school day (minutes)*[3]
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter Elementary	**61**	3	6
CAFr-S-02	University High and California State	55	1	2
CAFr-S-03	Truth Tabernacle Christian School	59	2	5
CAFr-S-04	Thomas Elementary	**63**	4	8
CAFr-S-05	Vinland Elementary	**61**	2	3
CAFr-S-06	College Community (Economic Opportunities Commission)	58	1	2
CAFr-S-07	Tarpey Elementary	55	1	3
CAFr-S-08	Maverick Prep Private School for Gif	55	1	3
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	**65**	2	5
CAFr-S-10	Miramonte Elementary	48	1	2
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	52	1	2
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	**60**	2	4
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	**66**	5	9
CAFr-S-14	Roger S. Oraze Elementary	45	1	-
CAFr-S-15	McLane High	54	1	2
CAFr-S-16	Cup Large Day Care Center	56	1	2
CAFr-S-17	Ericson Elementary	57	1	3
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	59	1	3
CAFr-S-19	Virginia R. Boris Elementary	48	1	1
CAFr-S-20	Ewing Elementary and Remnant Christian School	50	1	3
CAFr-S-21	Fresno Adventist Academy	56	2	3
CAFr-S-22	Temperance-Kutner Elementary	56	2	2
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	49	1	2
CAFr-S-24	Fancher Creek Elementary	51	1	1

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
[3]Assumes 90% of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
Legend: dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level.

Table CA3.1-6 presents the existing conditions for speech interference based upon the number of events per average hour during the CNEL daytime period for both a windows open and windows closed condition. The number of speech-interfering events with windows open is none at 7 POIs

and ranges from 1 to 5 events per hour at the remaining 52 POIs, with the greatest occurring at CAFr-C-08 Census Tract 31.04 centroid point. With windows closed, the number of POIs experiencing at least one speech-interfering event per hour decreases to 12 POIs with a range of 1 to 2 events per hour.

Table CA3.1-6 Fresno Yosemite International Airport (FAT) Existing Conditions – Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
CAFr-C-01	Census Tract 45.03	1	0
CAFr-C-02	Census Tract 54.10	2	0
CAFr-C-03	Census Tract 54.03	2	1
CAFr-C-04	Census Tract 56.08	1	0
CAFr-C-05	Census Tract 53.02	1	0
CAFr-C-06	Census Tract 53.04	4	1
CAFr-C-07	Census Tract 31.02	1	0
CAFr-C-08	Census Tract 53.01	5	2
CAFr-C-09	Census Tract 53.05	1	0
CAFr-C-10	Census Tract 31.03	1	0
CAFr-C-11	Census Tract 52.04	1	0
CAFr-C-12	Census Tract 52.02	1	0
CAFr-C-13	Census Tract 52.03	1	0
CAFr-C-14	Census Tract 31.04	0	0
CAFr-C-15	Census Tract 58.04	0	0
CAFr-C-16	Census Tract 33.01	1	0
CAFr-C-17	Census Tract 32.01	1	0
CAFr-C-18	Census Tract 33.02	1	0
CAFr-C-19	Census Tract 32.02	0	0
CAFr-C-20	Census Tract 28	1	0
CAFr-C-21	Census Tract 29.06	0	0
CAFr-C-22	Census Tract 30.01	1	0
CAFr-C-23	Census Tract 58.05	2	0
CAFr-C-24	Census Tract 29.05	1	0
CAFr-C-25	Census Tract 29.04	0	0
CAFr-C-26	Census Tract 30.04	4	1
CAFr-C-27	Census Tract 30.03	3	1
CAFr-C-28	Census Tract 14.11	4	1
CAFr-C-29	Census Tract 14.12	1	0
CAFr-C-30	Census Tract 59.04	2	1
CAFr-H-01	Fresno VA Medical Center	1	0
CAFr-H-02	Care Facilities Network	1	0
CAFr-R-01	E. Gettysburg Avenue and N. Rowell Avenue	3	1
CAFr-R-02	E. Simpson Avenue and N. Winery Avenue	1	0
CAFr-R-03	E. Madison Avenue and N. Renn Avenue	1	0
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	1	0
CAFr-S-02	University High and California State	1	0
CAFr-S-03	Truth Tabernacle Christian School	2	1
CAFr-S-04	Thomas Elementary	1	0
CAFr-S-05	Vinland Elementary	1	0

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	1	0
CAFr-S-07	Tarpey Elementary	3	1
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	0	0
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	1	0
CAFr-S-10	Miramonte Elementary	1	0
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	1	0
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	1	0
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	1	0
CAFr-S-14	Roger S. Oraze Elementary	1	0
CAFr-S-15	McLane High	1	0
CAFr-S-16	Cup Large Day Care Center	1	0
CAFr-S-17	Ericson Elementary	0	0
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	1	0
CAFr-S-19	Virginia R. Boris Elementary	1	0
CAFr-S-20	Ewing Elementary and Remnant Christian School	2	0
CAFr-S-21	Fresno Adventist Academy	2	1
CAFr-S-22	Temperance-Kutner Elementary	1	0
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	1	0
CAFr-S-24	Fancher Creek Elementary	4	1

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; POI = Point of Interest.

Analysis of the potential for sleep disturbance involves determining the number and SEL of CNEL nighttime aircraft events to estimate the PA metric. As detailed in the 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) and Table CA3.1-7, PA with windows open ranges from less than 1 percent at 36 POIs and between 1 and 30 percent at the remaining 23 POIs. PA with windows closed ranges from less than 1 percent at 44 POIs, and between 1 and 20 percent at the remaining 15 POIs.

Table CA3.1-7 Fresno Yosemite International Airport (FAT)
Existing Conditions – Estimated PA

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-C-01	Census Tract 45.03	<1%	<1%
CAFr-C-02	Census Tract 54.10	1%	1%
CAFr-C-03	Census Tract 54.03	1%	1%
CAFr-C-04	Census Tract 56.08	<1%	<1%
CAFr-C-05	Census Tract 53.02	5%	4%
CAFr-C-06	Census Tract 53.04	<1%	<1%
CAFr-C-07	Census Tract 31.02	<1%	<1%
CAFr-C-08	Census Tract 53.01	3%	2%
CAFr-C-09	Census Tract 53.05	4%	3%
CAFr-C-10	Census Tract 31.03	<1%	<1%

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-C-11	Census Tract 52.04	1%	<1%
CAFr-C-12	Census Tract 52.02	14%	9%
CAFr-C-13	Census Tract 52.03	1%	<1%
CAFr-C-14	Census Tract 31.04	30%	20%
CAFr-C-15	Census Tract 58.04	<1%	<1%
CAFr-C-16	Census Tract 33.01	1%	<1%
CAFr-C-17	Census Tract 32.01	<1%	<1%
CAFr-C-18	Census Tract 33.02	1%	<1%
CAFr-C-19	Census Tract 32.02	<1%	<1%
CAFr-C-20	Census Tract 28	<1%	<1%
CAFr-C-21	Census Tract 29.06	<1%	<1%
CAFr-C-22	Census Tract 30.01	<1%	<1%
CAFr-C-23	Census Tract 58.05	<1%	<1%
CAFr-C-24	Census Tract 29.05	<1%	<1%
CAFr-C-25	Census Tract 29.04	<1%	<1%
CAFr-C-26	Census Tract 30.04	<1%	<1%
CAFr-C-27	Census Tract 30.03	<1%	<1%
CAFr-C-28	Census Tract 14.11	<1%	<1%
CAFr-C-29	Census Tract 14.12	1%	<1%
CAFr-C-30	Census Tract 59.04	<1%	<1%
CAFr-H-01	Fresno VA Medical Center	<1%	<1%
CAFr-H-02	Care Facilities Network	11%	7%
CAFr-R-01	E. Gettysburg Avenue and N. Rowell Avenue	6%	4%
CAFr-R-02	E. Simpson Avenue and N. Winery Avenue	20%	13%
CAFr-R-03	E. Madison Avenue and N. Renn Avenue	1%	1%
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	3%	2%
CAFr-S-02	University High and California State	<1%	<1%
CAFr-S-03	Truth Tabernacle Christian School	2%	1%
CAFr-S-04	Thomas Elementary	7%	5%
CAFr-S-05	Vinland Elementary	<1%	<1%
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	<1%	<1%
CAFr-S-07	Tarpey Elementary	<1%	<1%
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	<1%	<1%
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	<1%	<1%
CAFr-S-10	Miramonte Elementary	<1%	<1%
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	1%	<1%
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	1%	<1%
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	9%	6%
CAFr-S-14	Roger S. Oraze Elementary	<1%	<1%
CAFr-S-15	McLane High	<1%	<1%
CAFr-S-16	Cup Large Day Care Center	<1%	<1%
CAFr-S-17	Ericson Elementary	<1%	<1%
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	<1%	<1%
CAFr-S-19	Virginia R. Boris Elementary	<1%	<1%
CAFr-S-20	Ewing Elementary and Remnant Christian School	<1%	<1%

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-S-21	Fresno Adventist Academy	<1%	<1%
CAFr-S-22	Temperance-Kutner Elementary	1%	<1%
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	<1%	<1%
CAFr-S-24	Fancher Creek Elementary	<1%	<1%

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: % = percent; < = less than; ID = Identification; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the potential for hearing loss resulting from elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to CNEL of 80 dB or greater (DNWG 2013b)[1]. Figure CA3.1-2 presents the areas currently exposed to CNEL of 80 dB or greater overlaid with the 75 dB $L_{eq(24hr)}$ contour line, which represents the lowest $L_{eq(24hr)}$ that is considered for the potential for hearing loss analysis if also exposed to 80 dB CNEL. As previously summarized in Table CA3.1-2 and depicted in Figure CA3.1-2, no land outside of FAT is exposed to 80 dB CNEL or greater, so no residents experience the potential for hearing loss for the existing condition.

CA3.1.1.2 Airspace

The 144 FW trains in SUA listed in Table CA2.1-6, with the primary emphasis in use being the W-283/285 and the Hunter MOA Complex. This airspace is shared with other units including other services. The 144 FW currently flies 1,811 annual sorties divided across the SUA, with 93 percent of time spent above 10,000 feet MSL. In most of the locations, the 144 FW sorties contribute $CNEL_{mr}$ less than 35 dB on the ground below the SUA, with 35 dB being the lower noise level limit of the noise modeling software. For reference, a 35 dB $CNEL_{mr}$ is consistent with ambient noise levels typically found in rural or remote areas with minimal or no human sources of noise (vehicle traffic, regular or low altitude aircraft flights, etc.).

[1]DNWG 2013b. Noise-Induced Hearing Impairment Technical Bulletin. As part of the noise analysis in all future EISs, DoD components will use the 80 Day-Night A-Weighted (CNEL) noise contour to identify populations at the most risk of potential hearing loss (PHL). DoD components will use as part of the analysis, as appropriate, a calculation of the PHL of the at-risk population.

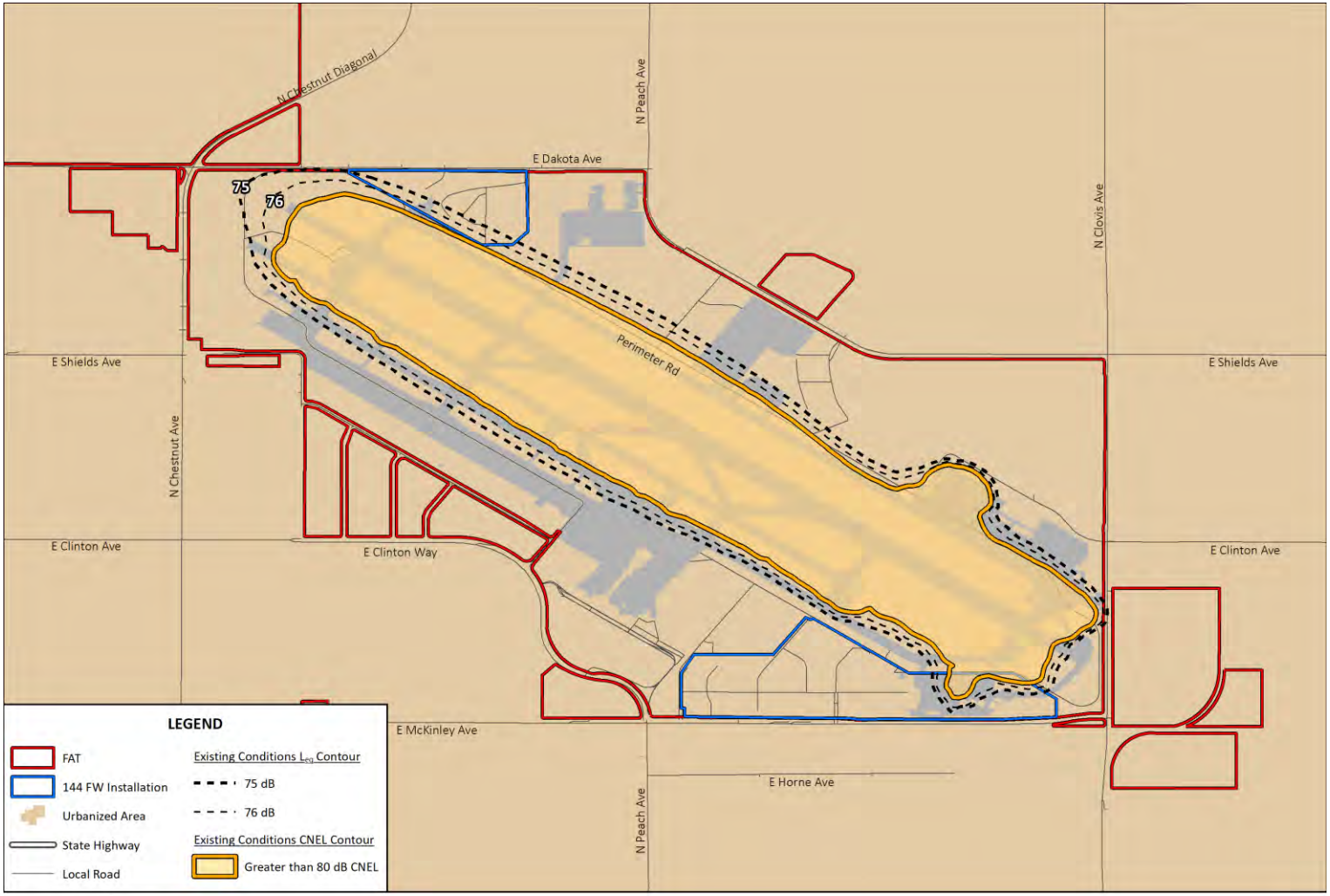


Figure CA3.1-2 Existing Conditions Fresno Yosemite International Airport (FAT) – PHL Analysis

Current flying activity occurs in overland airspace. Because the overwater training area, W-283/285, is far from land, no amount of training there generates significant noise impacts on land. Given these assumptions, noise levels generated by existing operations in overland SUA are 41 dB $CNEL_{mr}$ for subsonic operations. The actual distribution across multiple training areas makes the resulting noise much lower than this. However, those levels are too low to accurately assess given the lower noise limit of the modeling software and are below the threshold at which noise impacts on people occurs.

To train with the full capabilities, F-15C aircraft employ supersonic flight (flights that exceed the speed of sound) during a small portion of their sorties that occur at the 144 FW overwater ranges at a minimum altitude of 10,000 feet MSL. The fuel demand when flying supersonic limits the amount of time the aircraft could travel supersonic before having to return to the installation to refuel. In general, an aircraft would only travel supersonic for approximately 30 seconds. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the overpressures of booms that reach the ground due to supersonic activity at these altitudes are well below those that would begin to cause physical injury to humans or animals (National Aeronautics and Space Administration 2015). Given the 15-mile distance between the shore and 144 FW overwater supersonic activity, the existing F-15C supersonic operations do not impact or generate annoyance to people on land.

CA3.1.2 Environmental Consequences

CA3.1.2.1 F-15EX

Installation

Under this alternative, the 144 FW would replace their 18 F-15C aircraft with 21 F-15EX aircraft. The following subsection describes the resulting noise impacts due to construction, installation operations, and airspace operations associated with the F-15EX Alternative at FAT.

The F-15EX Alternative includes construction projects that would occur within the FAT property, which would generate temporary construction noise. The proposed construction sites would be in areas close to the runways currently exposed to 65 dB CNEL or greater and most of the land adjacent outside of the airport property is primarily commercial. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

As summarized in Table CA3.1-8, F-15EX operations would amount to 3,281 departures, 3,281 arrivals, and 326 closed patterns resulting in a total of 6,888 annual operations at FAT. The proportion of CNEL evening (7 p.m. to 10 p.m.) and CNEL nighttime operations (10 p.m. to 7 a.m.) would remain consistent with current F-15C operations at approximately 6 and 2 percent, respectively. F-15EX would use the same flight tracks and runway use as the current F-15C operations. The other current military and civil operations would continue under the F-15EX Alternative unchanged. Additional noise modeling details are provided in the 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Figure CA3.1-3 shows the CNEL noise contours from 65 to 85 dB in 5-dB increments for the F-15EX Alternative at FAT. As with the existing conditions, noise generated from aircraft operations at FAT occurs within and outside of the airfield. Under this alternative, the 65 dB CNEL contour would extend an additional 1,600 feet to the north, 1,300 feet to the south, 3,500 feet to the southeast, and 2,200 feet to the northwest. Figure CA3.1-4 depicts a comparison of the F-15EX Alternative to the existing conditions/No Action Alternative. The newly exposed areas to the north and south would be due to a combination of the increase in operations and the F-15EX engine generating greater noise. The shape of the contour to the northwest would be due to the louder noise generated by the F-15EX during departures and increase in operations when compared with the F-15C, but would be partially offset due to the steeper climb rates of the F-15EX. Section CA3.5, *Land Use*, addresses residential areas exposed to 65 dB CNEL or greater in more detail.

Table CA3.1-9 shows the acreage breakdown (excluding water bodies) within each noise contour at FAT with a total of 1,262 off-airport acres that would be exposed to 65 dB CNEL or greater noise levels for the F-15EX Alternative. That off-airport acreage would be comprised of 1,069 acres exposed to 65 to 70 dB CNEL (an increase of 908 acres), 169 acres to 70 to 75 dB CNEL (an increase of 154 acres), 18 acres to 75 to 80 dB CNEL (an increase of 18 acres), and 6 acres to 80 to 85 dB CNEL (an increase of 6 acres). No areas off airport would be exposed to CNEL greater than 85 dB for the F-15EX Alternative.

Table CA3.1-8 F-15EX Alternative at Fresno Yosemite International Airport (FAT) – Average Annual Operation

Group	*Aircraft*	*Departures*			*Arrivals*			*Closed Patterns*[1]			*Totals*			
		Day	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Day*	*Eve*	*Night*	*Total*
144 FW	F-15EX	3,022	255	4	3,022	134	125	300	26	-	6,344	415	129	6,888
Other Military	C-26, UH60, CH47	715	48	17	704	54	22	360	27	13	1,779	129	52	1,960
Civil	Civil Total	27,331	9,142	3,708	21,842	10,044	8,345	-	-	-	49,173	19,186	12,053	80,412
Grand Total		**31,068**	**9,445**	**3,729**	**25,568**	**10,232**	**8,492**	**660**	**53**	**13**	**57,296**	**19,730**	**12,234**	**89,260**

Note: [1]Closed patterns counted as two operations.
Legend: 144 FW = 144th Fighter Wing.

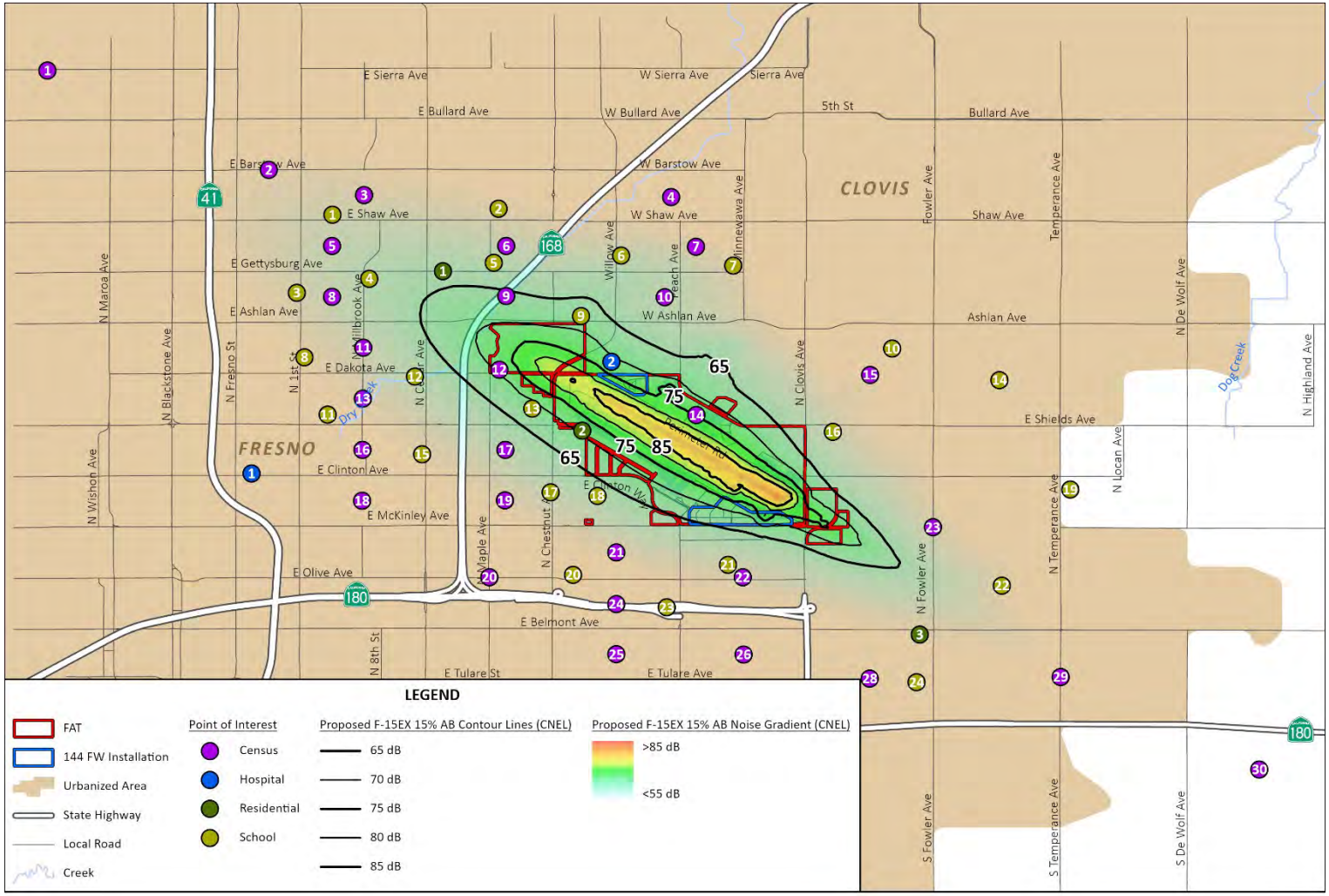


Figure CA3.1-3 F-15EX Alternative at Fresno Yosemite International Airport (FAT) – CNEL Contours and Gradient

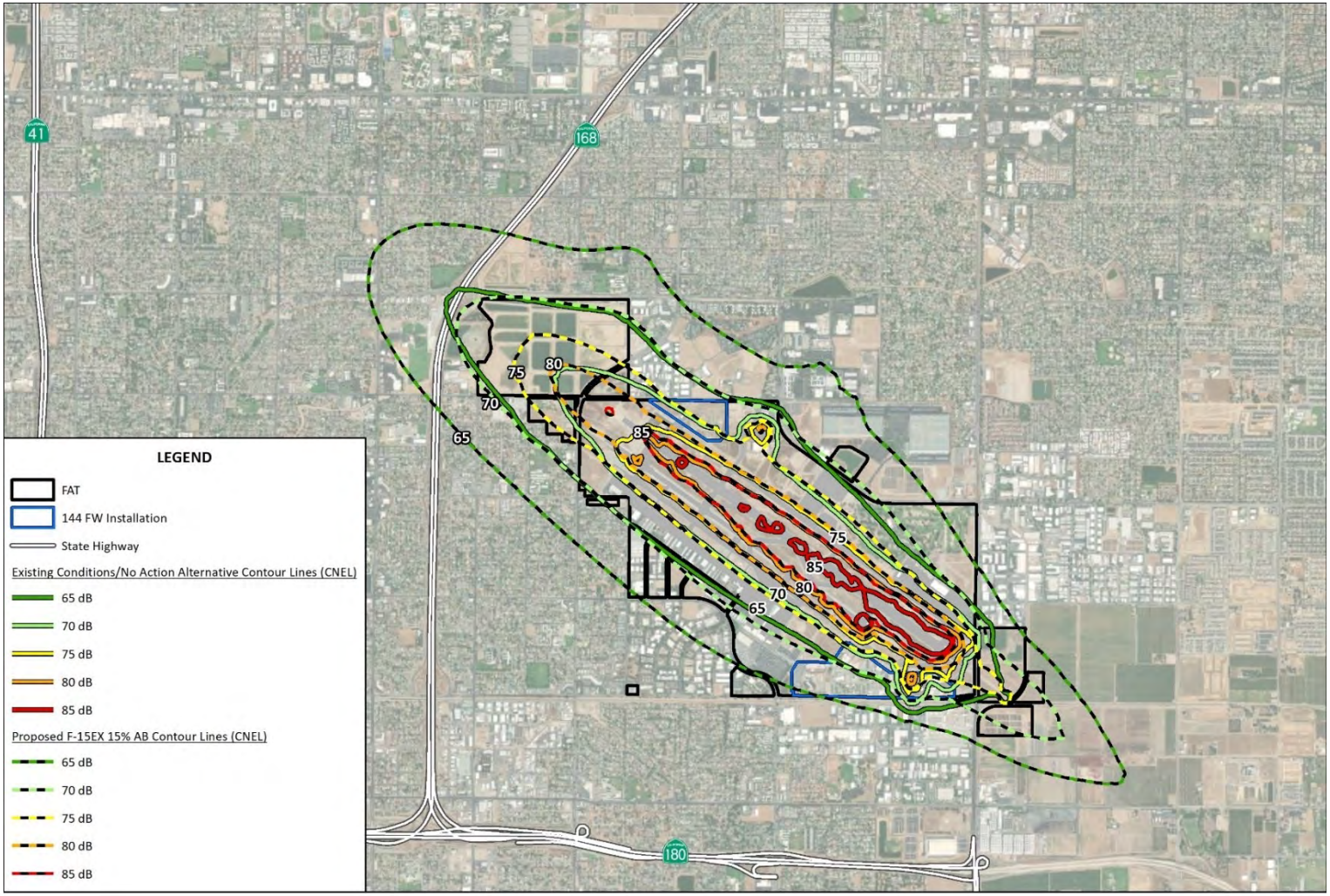


Figure CA3.1-4 F-15EX Alternative Comparison to Existing Conditions/ No Action Alternative at Fresno Yosemite International Airport (FAT) – CNEL Contours

Table CA3.1-9 F-15EX Alternative at Fresno Yosemite International Airport (FAT) Noise Exposure Acreage

CNEL (dB)	*F-15EX Alternative Acreage*			*Change Relative to Existing Conditions/ No Action Alternative*		
	On Airport	*Off Airport*	*Total*	*On Airport*	*Off Airport*	*Total*[1]
65–70	265	1,069	1,334	-245	+908	+663
70–75	503	169	672	+183	+154	+337
75–80	358	18	376	+173	+18	+191
80–85	242	6	248	+82	+6	+88
85+	204	0	204	+153	0	+153
Total >65 dB	**1,572**	**1,262**	**2,834**	**+346**	**+1,086**	**+1,431**

Notes: [1]Numbers may not add up due to rounding.
Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

Table CA3.1-10 details the households and estimated population that would be exposed to each CNEL contour band under the F-15EX Alternative at FAT. A total of 1,774 households and 5,577 people would be exposed to 65 to 70 dB CNEL, an increase of 1,635 households and 5,171 people. This increase would be due to the general increase in width of the 65 dB CNEL contour caused by the increase in operations and the greater noise generated by the F-15EX engine. Table CA3.1-10 reflects an increase of 129 additional households and 376 people that would be exposed to 70 to 75 dB CNEL and 4 additional households and 12 additional people that would be exposed to 75 to 80 dB CNEL. Much of the newly exposed areas, particularly those above 75 dB CNEL would occur over industrial or undeveloped land so the actual impacts may be less than estimated for these greater noise levels in Table CA3.1-10.

Table CA3.1-10 Fresno Yosemite International Airport (FAT) F-15EX Alternative Estimated Households and Population

CNEL Band (dB)	*F-15EX Alternative*		*Change Relative to Existing Conditions/No Action Alternative*	
	Households	*Population*	*Households*	*Population*
65–70	1,774	5,577	+1,635	+5,171
70–75	139	404	+129	+376
75–80	12	30	+12	+30
80–85	4	12	+4	+12
85+	0	0	0	0
Totals[1]	**1,929**	**6,023**	**+1,780**	**+5,589**

Notes: Households and population estimated using proportion area of census block groups exposed to each contour band which may overestimate impacts in greater CNEL bands.
[1]Numbers may not add up due to rounding.
Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

Table CA3.1-11 describes the estimated CNEL values at POIs for the F-15EX Alternative at FAT and the net change compared to existing conditions/No Action Alternative. The values would range from 46 to 75 dB CNEL with the change ranging from up to a reduction of 2 dB to an increase of 6 dB. The number of POIs exposed to 65 dB CNEL or greater would increase from 4 to 7 POIs with 3 newly exposed (CAFr-C-09 Census Tract 53.05, CAFr-S-09 Viking Elementary and Fresno Unified School District-Viking Childcare, and CAFr-S-13 Irwin O. Addicott

Elementary and Scandinavian Middle School) under the F-15EX Alternative. The subset of POIs that would be exposed to greater than 70 dB CNEL would increase by 4 (CAFr-C-12 Census Tract 52.02, CAFr-C-14 Census Tract 31.04, CAFr-H-02 Care Facilities Network, CAFr-R-02 E. Simpson Ave and N. Winery Ave). The number of POIs exposed to 75 dB CNEL or greater would increase from none to 1 (CAFr-C-14 Census Tract 31.04).

Table CA3.1-11 CNEL at POIs for F-15EX Alternative at Fresno Yosemite International Airport (FAT)

Map ID	*Point Type*[1]	*Existing Conditions/No Action Alternative*	*F-15EX Alternative CNEL (dB)*[2]	*Change From Existing Conditions/No Action Alternative CNEL (dB)*
CAFr-C-01	Census Tract 45.03	52	50	-2
CAFr-C-02	Census Tract 54.10	56	56	0
CAFr-C-03	Census Tract 54.03	56	57	+1
CAFr-C-04	Census Tract 56.08	48	52	+4
CAFr-C-05	Census Tract 53.02	60	60	0
CAFr-C-06	Census Tract 53.04	56	60	+4
CAFr-C-07	Census Tract 31.02	52	57	+5
CAFr-C-08	Census Tract 53.01	58	60	+2
CAFr-C-09	Census Tract 53.05	62	**66**	+4
CAFr-C-10	Census Tract 31.03	56	61	+5
CAFr-C-11	Census Tract 52.04	56	59	+3
CAFr-C-12	Census Tract 52.02	**65**	**71**	+6
CAFr-C-13	Census Tract 52.03	53	56	+3
CAFr-C-14	Census Tract 31.04	**69**	**75**	+6
CAFr-C-15	Census Tract 58.04	50	55	+5
CAFr-C-16	Census Tract 33.01	50	53	+3
CAFr-C-17	Census Tract 32.01	56	61	+5
CAFr-C-18	Census Tract 33.02	48	51	+3
CAFr-C-19	Census Tract 32.02	52	56	+4
CAFr-C-20	Census Tract 28	46	50	+4
CAFr-C-21	Census Tract 29.06	51	57	+6
CAFr-C-22	Census Tract 30.01	53	57	+4
CAFr-C-23	Census Tract 58.05	54	58	+4
CAFr-C-24	Census Tract 29.05	47	51	+4
CAFr-C-25	Census Tract 29.04	44	47	+3
CAFr-C-26	Census Tract 30.04	47	50	+3
CAFr-C-27	Census Tract 30.03	43	46	+3
CAFr-C-28	Census Tract 14.11	47	50	+3
CAFr-C-29	Census Tract 14.12	54	54	0
CAFr-C-30	Census Tract 59.04	51	50	-1
CAFr-H-01	Fresno VA Medical Center	46	48	+2
CAFr-H-02	Care Facilities Network	**66**	**71**	+5
CAFr-R-01	E. Gettysburg Avenue and N. Rowell Avenue	61	63	+2
CAFr-R-02	E. Simpson Avenue and N. Winery Avenue	**66**	**71**	+5
CAFr-R-03	E. Madison Avenue and N. Renn Avenue	53	56	+3
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	59	59	0

Map ID	*Point Type*[1]	*Existing Conditions/No Action Alternative*	*F-15EX Alternative CNEL (dB)*[2]	*Change From Existing Conditions/No Action Alternative CNEL (dB)*
CAFr-S-02	University High and California State	53	57	+4
CAFr-S-03	Truth Tabernacle Christian School	57	58	+1
CAFr-S-04	Thomas Elementary	61	62	+1
CAFr-S-05	Vinland Elementary	58	62	+4
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	55	60	+5
CAFr-S-07	Tarpey Elementary	52	56	+4
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	53	55	+2
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	62	**67**	+5
CAFr-S-10	Miramonte Elementary	46	50	+4
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	50	54	+4
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	57	61	+4
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	63	**68**	+5
CAFr-S-14	Roger S. Oraze Elementary	43	46	+3
CAFr-S-15	McLane High	51	56	+5
CAFr-S-16	Cup Large Day Care Center	54	59	+5
CAFr-S-17	Ericson Elementary	54	60	+6
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	57	63	+6
CAFr-S-19	Virginia R. Boris Elementary	46	48	+2
CAFr-S-20	Ewing Elementary and Remnant Christian School	48	53	+5
CAFr-S-21	Fresno Adventist Academy	54	59	+5
CAFr-S-22	Temperance-Kutner Elementary	54	56	+2
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	47	50	+3
CAFr-S-24	Fancher Creek Elementary	49	51	+2

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding FAT where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section CA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to CNEL of 65 dB or greater.
Legend: dB = decibel; CNEL = Community Noise Equivalent Level; POI = Point of Interest.

Because the FAA, a cooperating agency, applies different significance criteria for noise impact analysis, Figure CA3.1-5 depicts CNEL differences at key thresholds according to FAA guidance described in FAA 1050.1F. These results, along with Table 3.1-12, are included in this EIS to aid in significance determination under FAA criteria.

As shown in Figure CA3.1-5, areas primarily to the north and south of FAT would experience increases in CNEL greater than 1.5 dB that would be exposed to 65 dB CNEL. This would affect seven POIs (CAFr-R-02, CAFr-C-09, CAFr-C-12, CAFr-C-14, CAFr-S-09, CAFr-S-13, and CAFr-H-02) that would be considered under FAA 1050.1F guidelines to experience a significant noise impact. The FAA also requires reporting increases of 3 dB or greater in CNEL that would occur at noise sensitive locations that would experience CNEL between 60 and 65 dB. This reporting threshold would apply to six POI (CAFr-S-04, CAFr-S-05, CAFr-S-12, CAFr-S-18, CAFr-C-10, CAFr-C-17).

Because the residential POIs, denoted with '-R-,' represent a neighborhood of multiple residential properties, Table 3.1-12 quantifies the acreage, households, and population that would be affected. A total of 1,258 acres, 1,924 households, and an estimated 6,010 people would be exposed to greater than 65 dB CNEL under the F-15EX Alternative while experiencing an increase of 1.5 dB or greater change to CNEL relative to existing conditions/No Action Alternative, which the FAA criteria would classify as a significant impact. A total of 2,035 acres, 5,063 households, and an estimated 14,977 people would be exposed to CNEL between 60 and 65 dB under the F-15EX Alternative while experiencing an increase of 3 dB or greater in CNEL relative to existing conditions/No Action Alternative, which the FAA criteria would classify as a reportable change in noise exposure.

Table CA3.1-12 FAA CNEL Exposure Thresholds Affecting Acreage, Population, and Households Under F-15EX Alternative

FAA Classification[1]	*Description*	*Acreage*	*Households*	*Population*
Significant	+1.5 dB (or higher) Change within 65+ dB CNEL	1,258	1,924	6,010
Reportable	+3 dB (or higher) Change within 60–65 dB CNEL	2,035	5,063	14,977

Note: [1]FAA 2023.
Legend: dB = decibel; CNEL = C-weighted Day-Night Average Sound Level; FAA = Federal Aviation Administration.

Table CA3.1-13 displays results for three metrics used to examine noise effects on classroom learning: exterior school day $L_{eq(8hr)}$ with screening threshold of 60 dB (equivalent to interior of 45 dB $L_{eq(8hr)}$ with windows open), number of classroom speech interfering events above 50 dB per school day hour (equivalent to 65 dB outside with windows open), and time above interior 50 dB per 8-hour school day (equivalent to exterior 65 dB). Under the F-15EX Alternative at FAT, the number of schools above the $L_{eq(8hr)}$ 60 dB screen criteria would increase by 6 schools, to a total of 12 schools. Change to $L_{eq(8hr)}$ at school POIs would range from no change at 1 school POI to an increase of 1 to 7 dB at the remaining 23 school POIs. Four of the 24 school POIs would experience 1 additional speech interfering event per average hour while the others would not change. The duration of time above 50 dB during a typical school day would not change at 5 school POIs and increase 1 to 3 minutes at the remaining 19 POIs.

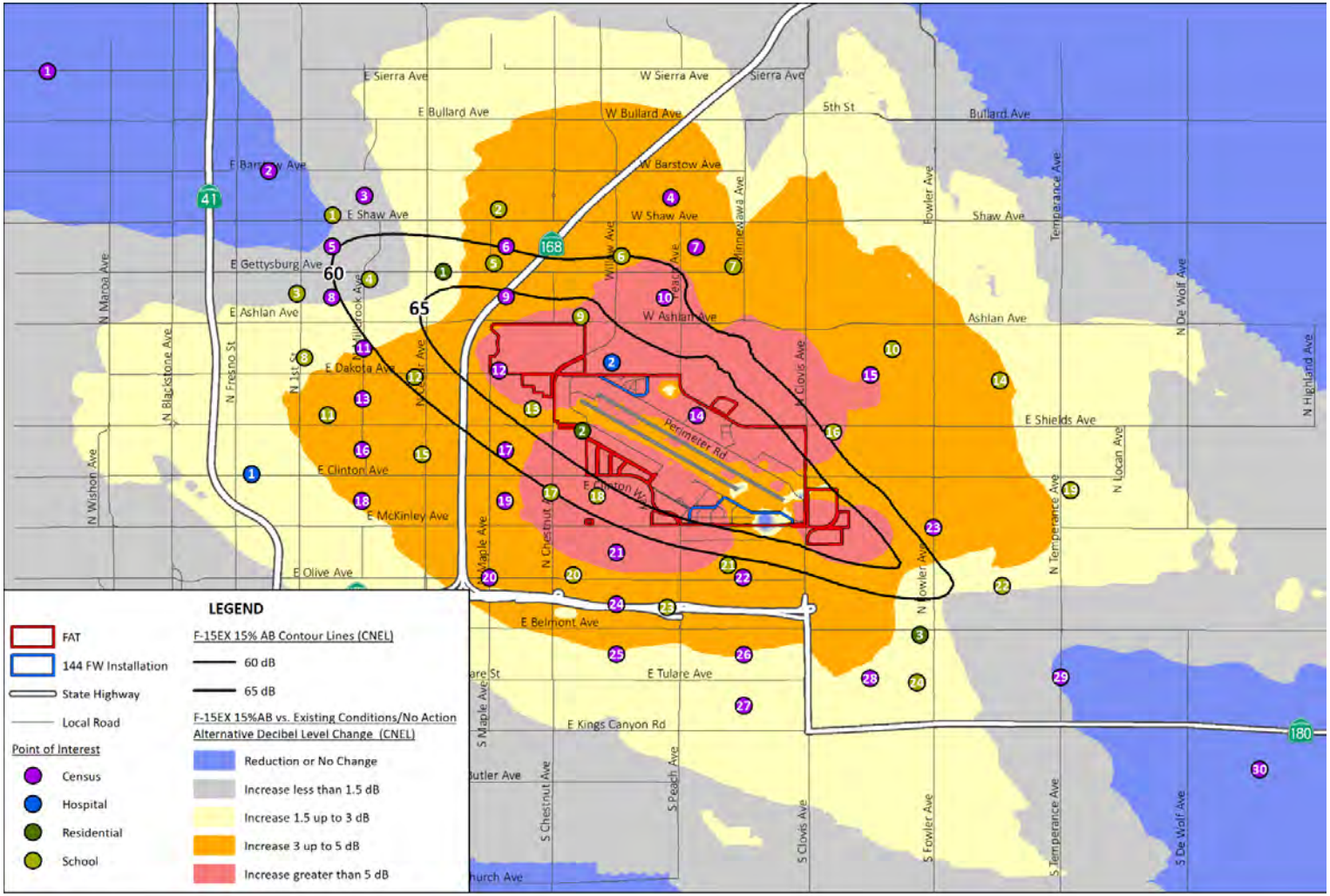


Figure CA3.1-5 F-15EX Difference Contours Relative to Existing Conditions/ No Action Alternative at Fresno Yosemite International Airport (FAT) for FAA Analysis

Table CA3.1-13 F-15EX Alternative at Fresno Yosemite International Airport (FAT) Classroom Learning Interference

Map ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*		*Number of Speech Interfering Events per School Day Hour*[2]		*Time above 50 dB per 8-hour school day (minutes)*	
		F-15EX Alternative[3]	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	**61**	0	3	0	7	+1
CAFr-S-02	University High and California State	59	+4	1	0	3	+1
CAFr-S-03	Truth Tabernacle Christian School	**60**	+1	2	0	6	+1
CAFr-S-04	Thomas Elementary	**64**	+1	5	+1	8	0
CAFr-S-05	Vinland Elementary	**65**	+4	2	0	4	+1
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	**63**	+5	1	0	3	+1
CAFr-S-07	Tarpey Elementary	59	+4	1	0	4	+1
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	58	+3	1	0	3	0
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	**70**	+5	3	+1	7	+2
CAFr-S-10	Miramonte Elementary	53	+5	1	0	4	+2
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	56	+4	1	0	3	+1
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	**64**	+4	2	0	4	0
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	**71**	+5	5	0	12	+3
CAFr-S-14	Roger S. Oraze Elementary	49	+4	1	0	1	+1
CAFr-S-15	McLane High	59	+5	1	0	3	+1
CAFr-S-16	Cup Large Day Care Center	**62**	+6	2	+1	5	+3
CAFr-S-17	Ericson Elementary	**63**	+6	1	0	4	+1
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	**66**	+7	1	0	4	+1

Map ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*		*Number of Speech Interfering Events per School Day Hour*[2]		*Time above 50 dB per 8-hour school day (minutes)*	
		F-15EX Alternative[3]	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*	*F-15EX Alternative*	*Change From Existing Conditions/ No Action Alternative*
CAFr-S-19	Virginia R. Boris Elementary	51	+3	1	0	1	0
CAFr-S-20	Ewing Elementary and Remnant Christian School	55	+5	1	0	4	+1
CAFr-S-21	Fresno Adventist Academy	**61**	+5	3	+1	6	+3
CAFr-S-22	Temperance-Kutner Elementary	58	+2	2	0	3	+1
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	53	+4	1	0	3	+1
CAFr-S-24	Fancher Creek Elementary	54	+3	1	0	1	0

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 144 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Assumes 90% of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.\
[3]Bold text represents schools exposed to exterior Leq(8hr) of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
Legend: dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour equivalent sound level.

Table CA3.1-14 presents the speech interference based on the number of events per average hour during the CNEL daytime period for both a windows open and windows closed condition for the F-15EX Alternative. The number of events would increase by 1 per average hour at 21 of the POIs and not change at the remaining locations for windows open. Consistent with existing conditions/No Action Alternative, the number of speech interfering events would remain in the range of 1 to 5 per average hour across all POIs for windows open. For windows closed, 22 POIs would experience no change and 37 POIs would increase by 1 event when compared to existing conditions/No Action Alternative.

Table CA3.1-14 F-15EX Alternative at Fresno Yosemite International Airport (FAT) Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*F-15EX Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-C-01	Census Tract 45.03	1	1	0	+1
CAFr-C-02	Census Tract 54.10	2	1	0	+1
CAFr-C-03	Census Tract 54.03	2	1	+1	+1
CAFr-C-04	Census Tract 56.08	1	1	0	+1
CAFr-C-05	Census Tract 53.02	3	1	0	0
CAFr-C-06	Census Tract 53.04	1	1	0	+1
CAFr-C-07	Census Tract 31.02	1	1	0	+1
CAFr-C-08	Census Tract 53.01	2	1	0	+1
CAFr-C-09	Census Tract 53.05	3	1	+1	0
CAFr-C-10	Census Tract 31.03	1	1	0	+1
CAFr-C-11	Census Tract 52.04	1	1	0	+1
CAFr-C-12	Census Tract 52.02	4	2	0	+1
CAFr-C-13	Census Tract 52.03	1	1	0	+1
CAFr-C-14	Census Tract 31.04	5	2	0	0
CAFr-C-15	Census Tract 58.04	1	1	0	+1
CAFr-C-16	Census Tract 33.01	1	1	0	+1
CAFr-C-17	Census Tract 32.01	1	1	0	+1
CAFr-C-18	Census Tract 33.02	1	1	0	+1
CAFr-C-19	Census Tract 32.02	1	1	0	+1
CAFr-C-20	Census Tract 28	1	1	+1	+1
CAFr-C-21	Census Tract 29.06	1	1	+1	+1
CAFr-C-22	Census Tract 30.01	2	1	+1	+1
CAFr-C-23	Census Tract 58.05	1	0	0	0
CAFr-C-24	Census Tract 29.05	1	1	0	+1
CAFr-C-25	Census Tract 29.04	1	0	+1	0
CAFr-C-26	Census Tract 30.04	1	0	0	0
CAFr-C-27	Census Tract 30.03	1	0	+1	0
CAFr-C-28	Census Tract 14.11	1	0	0	0
CAFr-C-29	Census Tract 14.12	2	0	0	0
CAFr-C-30	Census Tract 59.04	1	0	0	0
CAFr-H-01	Fresno VA Medical Center	1	1	+1	+1

Map ID[1]	*Named POI*	*F-15EX Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-H-02	Care Facilities Network	4	1	0	0
CAFr-R-01	E. Gettysburg Avenue and N. Rowell Avenue	3	1	0	0
CAFr-R-02	E. Simpson Avenue and N. Winery Avenue	5	2	+1	+1
CAFr-R-03	E. Madison Avenue and N. Renn Avenue	2	0	+1	0
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	3	1	+1	0
CAFr-S-02	University High and California State	1	1	0	+1
CAFr-S-03	Truth Tabernacle Christian School	2	1	+1	+1
CAFr-S-04	Thomas Elementary	4	1	+1	0
CAFr-S-05	Vinland Elementary	2	1	+1	+1
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	1	1	0	+1
CAFr-S-07	Tarpey Elementary	1	1	0	+1
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	1	1	0	+1
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	2	1	0	0
CAFr-S-10	Miramonte Elementary	1	0	0	0
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	1	1	0	+1
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	2	1	+1	+1
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	4	1	+1	0
CAFr-S-14	Roger S. Oraze Elementary	1	0	+1	0
CAFr-S-15	McLane High	1	1	0	+1
CAFr-S-16	Cup Large Day Care Center	2	1	+1	+1
CAFr-S-17	Ericson Elementary	1	1	0	+1
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	1	1	0	+1
CAFr-S-19	Virginia R. Boris Elementary	1	0	0	0
CAFr-S-20	Ewing Elementary and Remnant Christian School	1	1	0	+1
CAFr-S-21	Fresno Adventist Academy	2	1	+1	+1
CAFr-S-22	Temperance-Kutner Elementary	2	1	+1	+1
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	1	0	+1	0
CAFr-S-24	Fancher Creek Elementary	1	0	0	0

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; POI = Point of Interest.

The PA was calculated to estimate sleep disturbance resulting from CNEL nighttime aircraft noise (Table CA3.1-15). Compared to the PA for existing conditions/No Action Alternative for

windows open, the PA at 6 POIs would increase by 1 percent and not change at the remaining locations. PA with windows closed would increase by 1 percent at 4 POIs and would not change at the remaining 55 POIs. The changes to PA would be relatively small because the 144 FW CNEL nighttime operations (10 p.m. to 7 a.m.) would only represent 2 percent of 144 FW operations, which is the same proportion as existing conditions/No Action Alternative. Civil CNEL nighttime operations would remain the top contributor to PA.

Table CA3.1-15 F-15EX Alternative at Fresno Yosemite International Airport (FAT) Estimated PA

Map ID	*Named POI*[1]	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
CAFr-C-01	Census Tract 45.03	<1%	<1%	0%	0%
CAFr-C-02	Census Tract 54.10	1%	1%	0%	0%
CAFr-C-03	Census Tract 54.03	1%	1%	0%	0%
CAFr-C-04	Census Tract 56.08	<1%	<1%	0%	0%
CAFr-C-05	Census Tract 53.02	5%	4%	0%	0%
CAFr-C-06	Census Tract 53.04	<1%	<1%	0%	0%
CAFr-C-07	Census Tract 31.02	<1%	<1%	0%	0%
CAFr-C-08	Census Tract 53.01	3%	2%	0%	0%
CAFr-C-09	Census Tract 53.05	5%	3%	1%	0%
CAFr-C-10	Census Tract 31.03	<1%	<1%	0%	0%
CAFr-C-11	Census Tract 52.04	1%	1%	0%	1%
CAFr-C-12	Census Tract 52.02	14%	9%	0%	0%
CAFr-C-13	Census Tract 52.03	1%	<1%	0%	0%
CAFr-C-14	Census Tract 31.04	30%	20%	0%	0%
CAFr-C-15	Census Tract 58.04	1%	<1%	1%	0%
CAFr-C-16	Census Tract 33.01	1%	<1%	0%	0%
CAFr-C-17	Census Tract 32.01	<1%	<1%	0%	0%
CAFr-C-18	Census Tract 33.02	1%	<1%	0%	0%
CAFr-C-19	Census Tract 32.02	<1%	<1%	0%	0%
CAFr-C-20	Census Tract 28	<1%	<1%	0%	0%
CAFr-C-21	Census Tract 29.06	<1%	<1%	0%	0%
CAFr-C-22	Census Tract 30.01	<1%	<1%	0%	0%
CAFr-C-23	Census Tract 58.05	1%	<1%	1%	0%
CAFr-C-24	Census Tract 29.05	<1%	<1%	0%	0%
CAFr-C-25	Census Tract 29.04	<1%	<1%	0%	0%
CAFr-C-26	Census Tract 30.04	<1%	<1%	0%	0%
CAFr-C-27	Census Tract 30.03	<1%	<1%	0%	0%
CAFr-C-28	Census Tract 14.11	<1%	<1%	0%	0%
CAFr-C-29	Census Tract 14.12	1%	1%	0%	1%
CAFr-C-30	Census Tract 59.04	<1%	<1%	0%	0%
CAFr-H-01	Fresno VA Medical Center	<1%	<1%	0%	0%
CAFr-H-02	Care Facilities Network	11%	7%	0%	0%
CAFr-R-01	E. Gettysburg Avenue and N. Rowell Avenue	6%	4%	0%	0%
CAFr-R-02	E. Simpson Avenue and N. Winery Avenue	20%	13%	0%	0%
CAFr-R-03	E. Madison Avenue and N. Renn Avenue	1%	1%	0%	0%

Map ID	*Named POI[1]*	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed[3]*	*Windows Open[2]*	*Windows Closed[3]*
CAFr-S-01	Fresno Regional Occupational Program, Tioga Middle, and Wolter	3%	2%	0%	0%
CAFr-S-02	University High and California State	<1%	<1%	0%	0%
CAFr-S-03	Truth Tabernacle Christian School	2%	1%	0%	0%
CAFr-S-04	Thomas Elementary	7%	5%	0%	0%
CAFr-S-05	Vinland Elementary	<1%	<1%	0%	0%
CAFr-S-06	College Community (Economic Opportunities Commission) Head Start Community College	<1%	<1%	0%	0%
CAFr-S-07	Tarpey Elementary	<1%	<1%	0%	0%
CAFr-S-08	Maverick Prep Private School for Gifted Dyslexic Students	<1%	<1%	0%	0%
CAFr-S-09	Viking Elementary and Fresno Unified School District-Viking Childcare	1%	<1%	1%	0%
CAFr-S-10	Miramonte Elementary	<1%	<1%	0%	0%
CAFr-S-11	Carter G. Woodson Public Charter and Learn Academy	1%	<1%	0%	0%
CAFr-S-12	Centennial Elementary, Dakota Circle (Economic Opportunities Commission), and Erma Duncan Polytechnical High	1%	1%	0%	1%
CAFr-S-13	Irwin O. Addicott Elementary Scandinavian Middle	9%	6%	0%	0%
CAFr-S-14	Roger S. Oraze Elementary	<1%	<1%	0%	0%
CAFr-S-15	McLane High	<1%	<1%	0%	0%
CAFr-S-16	Cup Large Day Care Center	1%	<1%	1%	0%
CAFr-S-17	Ericson Elementary	<1%	<1%	0%	0%
CAFr-S-18	Sierra Charter and Violet Heintz Education Academy	<1%	<1%	0%	0%
CAFr-S-19	Virginia R. Boris Elementary	<1%	<1%	0%	0%
CAFr-S-20	Ewing Elementary and Remnant Christian School	<1%	<1%	0%	0%
CAFr-S-21	Fresno Adventist Academy	<1%	<1%	0%	0%
CAFr-S-22	Temperance-Kutner Elementary	1%	1%	0%	1%
CAFr-S-23	Molly S. Bakman Elementary and Turner Elementary	<1%	<1%	0%	0%
CAFr-S-24	Fancher Creek Elementary	1%	<1%	1%	0%

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: % = percent; < = less than; ID = Identification; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the potential for hearing loss due to elevated aircraft noise levels beginning at residential areas exposed to 80 dB CNEL or greater (DNWG 2013b). As previously summarized in Table CA3.1-9, 6 acres outside of FAT would be exposed to 80 dB CNEL or greater, which would occur on land that runs in between FAT's main property that includes the runways and FAT's property that is located northwest of the main property. This land

is used primarily as roads without residences or schools so detailed PHL analysis would not be applicable.

Under FAA Order 1050.1F significance criteria standards, noise impacts under the F-15EX Alternative at FAT would be significant because noise sensitive areas that would be exposed to 65 dB CNEL or greater would experience more than a 1.5 dB increase in CNEL, relative to the existing conditions/No Action Alternative. The DAF does not have specific standards for noise impact significance, but due to the changes noted in CNEL, it is estimated that the changes would also be significant.

Airspace

As tabulated in Section 3.2.5.2, *Special Use Airspace Noise Modeling*, while operating in airspace the F-15EX would be 2 to 3 dB greater in SEL and 4 to 5 dB greater in L_{max} than the existing F-15C for a typical airspace flight profile example at 400 knots and at military power when comparing single-event noise levels. Individual airspace flights would differ from noise levels because aircraft speeds and power settings would vary depending upon specific training exercises performed at that time.

Under this alternative, the 144 FW would be assigned 21 PAA F-15EX aircraft with a higher annual flying hour program, resulting in up to 3,281 sorties per year, an 81 percent increase above existing conditions/No Action Alternative. The F-15EX would continue to train in the airspace currently used by the F-15C. The mix of types of training events under the F-15EX Alternative would result in a similar altitude mix as the F-15C (shown in Table CA2.1-7). Since air-to-ground ordnance delivery would be impractical when operating from FAT, it is likely that some portion of the training syllabus would have to be flown from other bases. In a 'worst-case' for noise impacts, an entire year of training would occur at the 144 FW home training airspace with no training deployments elsewhere, the number of airspace sorties would increase 81 percent and that change would apply equally to all of the SUA currently used by the 144 FW, resulting in up to a 6 dB increase above current levels within the SUA in both $CNEL_{mr}$ and CNEL for subsonic activity (see the 144 FW Noise Study, which can be found on the project website [URL address: www.angf15ex-f35a-eis.com/documents/]). This increase would result in $CNEL_{mr}$ and CNEL that would range from 41 to below the software's lower limit of prediction of 35 dB $CNEL_{mr}$ or CNEL (see Section CA3.1.1.1, *Installation*). Because the 144 FW airspace training would remain primarily at higher altitudes (93 percent above 10,000 feet MSL), most subsonic aircraft sorties would not likely be noticed by a casual observer.

Under the F-15EX scenarios, the F-15EX would replace the F-15C for supersonic activity in the W-283/285 overwater airspace located 15 miles from land and the 10,000 feet MSL minimum

altitude would not change. The frequency of supersonic activity in these areas would increase by 81 percent from the existing conditions/No Action Alternative, which would equate to an increase in CDNL of 2 to 3 dB. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the magnitude of noise generated by each sonic boom depends primarily by altitudes, which would not change. The shape and size of the aircraft plays a smaller role in the magnitude of sonic boom generated. Because the F-15EX and F-15C aircraft both share the same airframe and would operate similarly during supersonic operations, each supersonic generated noise event for the F-15EX would be the same as the existing F-15C. Therefore, the overall change to CDNL in W-283/285 would be up to 3 dB greater than existing conditions/No Action Alternative due to the increase in supersonic sorties.

CA3.1.2.2 F-15C Legacy Aircraft

Under this alternative, the 144 FW would continue to operate their F-15C aircraft at FAT. The following sections describe the impacts resulting from construction, installation operations, and airspace operations associated with maintaining the existing F-15C aircraft at FAT.

Installation

Under this alternative, the F-15C would be retained and include construction projects that would occur within the FAT property generating temporary construction noise. The proposed construction sites would be in areas close to the runways currently exposed to 65 dB CNEL or greater and most of the land adjacent outside of FAT is primarily commercial. Therefore, the proposed construction activity under this alternative would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

Under this alternative, flight operations at FAT would continue as described under the affected environment section (CA3.1.1.1, *Installation*) and noise impacts associated with 144 FW operations would be the same as the existing conditions/No Action Alternative.

Airspace

Under this alternative, airspace operations in 144 FW training areas would continue as described under the affected environment section (CA3.1.1.1, *Installation*), so impacts associated with airspace operations would be the same as the existing conditions/No Action Alternative.

CA3.1.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or

SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The 144 FW would remain in their current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on the acoustic environment would not be significant.

CA3.1.3 Summary of Impacts

When compared with the existing conditions/No Action Alternative, the F-15EX basing at FAT would result in an increase of 1,086 additional acres outside of airport property that would be exposed to 65 dB or greater. The number of households exposed to 65 dB CNEL would increase by 1,635 and estimated population exposed would increase by 5,171 people because the size of CNEL contours would increase over residential areas. The number of noise sensitive POIs exposed to 65 dB CNEL or greater would increase by 3. The number of speech interfering events during the school day would increase by 1 event per hour at 4 schools. Existing F-15C and civil jet operations at FAT already create interfering events at many of these schools, so replacing the F-15C with the F-15EX that generates greater noise levels would not significantly change the amount of time of disruption during the school day, but instead would cause each military jet interfering event to be louder by several decibels. The number of speech-interfering events would increase by 1 per average hour at 21 of the POIs for windows open, increase by 1 event per hour with windows closed at 37 POIs and not change at the remaining POIs. The PA at 6 POIs would increase by 1 percent with windows open, and 4 POIs would increase by 1 percent with windows closed while PA at the remaining would not change. $CNEL_{mr}$ and CNEL within the SUA would increase by up to 6 dB but remain in the 35 to 41 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and consistent with noise levels in many rural areas. The DAF does not have specific standards for noise impact significance, but due to the changes noted in CNEL, it is estimated that the changes in the vicinity of FAT would be significant while airspace noise would be less than significant.

Under FAA Order 1050.1F significance criteria standards, the F-15EX Alternative at FAT would result in 7 POIs experiencing significant increases while 1,924 households and 6,010 people would be significantly affected. One POI, 5,063 households, and 14,977 people would experience a reportable increase in noise according to FAA criteria.

Under the F-15C Legacy Alternative, 144 FW F-15C flight operations at FAT would continue and noise impacts associated with installation operations would be the same as the existing conditions/No Action Alternative. Therefore, impacts on noise at the airfield would not be significant. Impacts under the No Action Alternative would be similar to the Legacy Alternative.

CA3.2 AIRSPACE

CA3.2.1 Affected Environment

To ensure 144 FW personnel and squadron from FAT are combat mission ready, training is conducted at the airfield and in the airspace surrounding it, as well as utilizing the overland and overwater SUA, which consist of MOAs, Restricted Areas, and Warning Areas (see Table 2.2-5 and Figure CA2.1-4).

CA3.2.1.1 Installation

The 144 FW operates and is based at FAT, which has two parallel operational runways. The airfield diagram in Figure CA3.2-1 depicts the runway and taxiway designations, field elevation, and depiction of critical areas on the airfield. All runways at FAT are precision instrument runways. General runway details are provided below.

- **Runway 11L** is 9,539 feet x 150 feet. The primary surface is grooved asphalt and concrete. There is a 1,000-foot blast pad area.
- **Runway 29R** is 9,539 feet x 150 feet. The primary surface is as described for Runway 11L above with an 850-foot blast pad area.
- **Runway 11R** is 8,008 feet x 150 feet. The primary surface is grooved asphalt. There is a 1,000-foot blast pad area.
- **Runway 29L** is 8,008 x 150 feet. The surface and blast pad locations are as described for Runway 11R.

The airport provides and maintains the following lighting systems for air carrier operations during the hours of darkness or during conditions below VFR minimums. Runway 11R/29L is served by Medium Intensity Runway Edge Lights, Runway End Identifier Lights, and Precision Approach Path Indicator for glide path indication. Runway 11L/29R is served by Medium Intensity Runway Edge Lights, Runway End Identifier Lights, and Precision Approach Path Indicator. Runway 29R is a category two runway with an approach lighting system with sequenced flashing lights installed. An airport rotating light beacon is located adjacent to the on-field fire station.

Aircraft Arresting Systems are equipped at FAT, which provides a means of rapidly stopping aircraft on a runway. FAT has the BAK 14 extended length tape aircraft arresting system located on Runway 11L/29R. Runway 11L arresting system is 1,500 feet from the threshold and Runway 29R is 1,310 feet from the threshold. The cable can be raised by ATC with prior coordination.

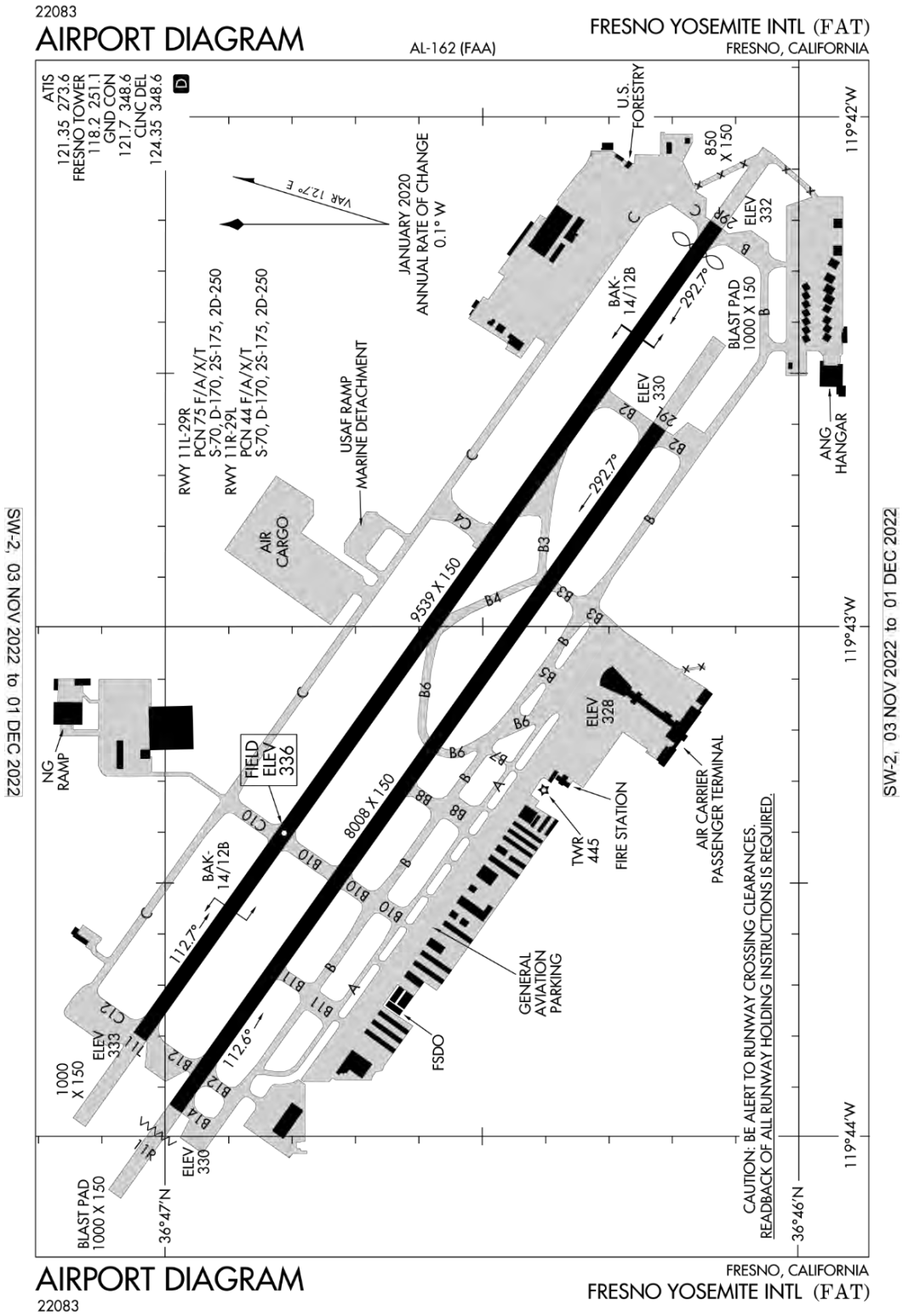


Figure CA3.2-1 Fresno Yosemite International Airport (FAT) Airfield Diagram

Airspace Designation

FAT is an ATC-controlled airfield surrounded by Class C airspace. In order to have Class C airspace, the primary airport must be serviced by both an ATC approach control and tower. Class C airspace is reserved for more crowded airspace where a high number of IFR operations and passenger enplanements take place. The Fresno Class C comprises the airspace within a 5-nautical mile radius of the geographical center of the airport up to and including 4,400 feet MSL and within a 10 nautical mile radius from 1,600 feet MSL (2,500 feet MSL south of the railroad) to 4,400 feet MSL. Two-way radio communications with ATC must be established before entering Class C airspace. Additionally, there are specific aircraft equipment requirements for entry into Class C airspace.

Air Traffic Control Facilities

FAT is a civilian airport controlled by the FAA. Fresno control tower and Fresno Terminal Radar Approach Control operate 24 hours a day, 7 days a week.

Navigation Aids

FAT offers several types of instrument approach and departure procedures to each runway. In total, there are 14 instrument approach procedures, 1 standard terminal arrival, and 3 standard instrument departures. The Clovis VOR TACAN System (VORTAC) is 7 nautical miles northwest of FAT, which is a navigation aid used by both military and civilian aircraft and vital to certain approach and departure procedures. Noise abatement procedures are in affect at FAT, which include "terminating afterburner at 300 KIAS or NLT the field boundary." Afterburner use in the traffic pattern is prohibited unless required for safety of flight; however, this restriction is not applicable to ACA aircraft (144 FW 2019a).

Federal Airways

"Tango" or T-route 331 transitions through the Fresno Class C airspace with a minimum enroute altitude of 2,000 feet MSL. T-routes give pilots the ability to file and fly direct IFR routings around or through the busy Fresno Class C terminal airspace, and in remote areas where the fixed locations of VORs and other ground-based NAVAIDS make direct routings unlikely or impossible.

The VOR or "Victor" airway system consists of airway designated from 1,200 feet AGL up to, but not including 18,000 feet MSL. Victor airways are utilized by both VFR and IFR aircraft as "highways" in the sky to navigate between NAVAIDs. Within 25 nautical miles of FAT, there are three airways V-230, V-459, and V-23. These airways do not impact Fresno Class C airspace.

CA3.2.1.2 Airspace

Warning Areas

The 144 FW uses W-283 to conduct overwater training 3–5 days per week which generate 6–10 sorties per day. W-260 is used as back-up airspace when W-283 is unavailable. W-532 and W-291 are used 2–3 times per year. The DON (Fleet Area Control and Surveillance Facility-San Diego) provides command and control in W-283/285 and W-260. Supersonic flight is approved above 10,000 feet MSL when greater than 15 nautical miles from land. Additionally, chaff and flares and electronic attack are authorized within the confines of the Warning Area.

Military Operations Areas

The 144 FW utilizes the Lemoore MOA, Foothill MOA, and Hunter MOA (see Figure CA2.1-4) to conduct training sorties. Lemoore MOA is only utilized by the 144 FW one time per month. The Foothill MOA (see Figure CA2.1-4) is located 22 nautical miles east of FAT within control jurisdiction of Oakland ARTCC. The Foothill MOA is utilized monthly by the 144 FW and is activated intermittently by Notice to Airmen. The Foothill MOA is divided into two subsections, Foothill 1 and Foothill 2 MOAs. The mid to eastern sections within both Foothills 1 MOA and Foothills 2 MOA contain noise sensitive wilderness areas that preclude operations below 3,000 feet AGL. The Hunter MOA is subdivided into five sections and a high-altitude block over the entire MOA complex.

Restricted Areas

The 144 FW utilizes R-2508 (China Lake Range) daily. The Range contains varied target sets for supporting laser and practice/inert air-to-ground weapons training. It is expected that any live-fire training would be conducted during formal training exercises conducted remotely from the 144 FW installation. The 144 FW generates 4–6 sorties daily tasked to R-2508 airspace. Located 54 nautical miles southeast of FAT, the airspace is controlled by Edwards Air Force Base Joshua Control Facility. R-2508 has a standard ceiling of FL290, unless a higher altitude is pre-approved. Chaff use is authorized with prior coordination with base spectrum managers and documented within flight plans. Flare use is not authorized within R-2508. Charted altitude is FL200 to unlimited and active continuously to include weekends and holidays.

The 144 FW also uses the Nevada Test and Training Range monthly for testing and certification purposes.

Noise Sensitive Areas

The 144 FW aircraft observe a 3,000 feet AGL minimum altitude over the following sensitive areas: Yosemite National Park, Sequoia and Kings Canyon National Parks, Death Valley, Kern River, Lone Pine, Independence, Trona and Inyo-Kern (AFMAN 11-2F-15 Vol 3).

CA3.2.2 Environmental Consequences

CA3.2.2.1 F-15EX

Installation

The F-15EX would continue to conduct the same departure and arrival procedures as the current F-15C. With an increase in operations, there are various methods used by ATC to prevent impacts on airspace. These methods include de-combining control positions (reducing workload), adding an assist controller, or other aircraft-specific methods like holding or vectoring. Generally, vectoring and holding is the choice for controllers to separate aircraft and establish a sequence for departing and arriving aircraft. Additionally, the 144 FW would continue to follow their guidance in limiting the option to conduct more than one practice approach. By limiting multiple approaches, staggered drawdown of aircraft, and utilizing the various methods of separating and sequencing aircraft as mentioned in the FAA Order 7110.65AA, there would be no significant impact to controlled airspace by implementation of this alternative at FAT.

Airspace

There are no specific guidelines as to what quantifies SUA saturation point. For example, 4–6 bomber aircraft within a specific MOA could make the MOA be considered saturated, while 8 fighter type aircraft may not. Additionally, with the vast amount of SUA in the region, aircraft can be dispersed throughout the region instead of all being tasked to one SUA.

The proposed F-15EX beddown would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change, the impacts on the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the SUA activation times remain the same. ATC would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Selection of the 144 FW for beddown of the 21 operational F-15EX aircraft would result in minimal impacts on SUA use throughout this region. Under this alternative, the F-15EX aircraft would conduct up to 3,281 annual sorties, an increase of 81 percent above the 1,811 currently

flown by the F-15C. Based on the average sortie duration of 1.6 hours, beddown of the F-15EX would result in an increase in airspace use of approximately 2,350 hours annually.

Table CA3.2-1 illustrates the projected change in airspace use by altitude associated with the beddown of the F-15EX. The F-15EX would utilize altitudes below 10,000 feet MSL at the same rate as the current F-15C operations. Training at altitudes between 10,000 feet MSL to 30,000 feet MSL would increase, while those above 30,000 feet MSL would decrease as shown in Table CA 3.2-1.

Table CA3.2-1 Existing Conditions/No Action Alternative and Proposed Use by F-15EX by Altitude

Altitude (feet)	***Existing Conditions/ No Action Alternative Percentage Use F-15C***	***Proposed Percentage Use F-15EX***	***Change***
500–3,000 AGL	1	1	0
3,000–5,000 AGL	1	1	0
5,000–10,000 MSL	5	5	0
10,000 MSL–18,000 MSL	36	38	+2
18,000 MSL–30,000 MSL	17	30	+13
Above 30,000	40	25	-15

Legend: AGL = above ground level; MSL = mean sea level.

Implementation of this alternative represents the continuation of current SUA activities with increases only to the number of potential operations, which fall within previously analyzed parameters. Impacts would not be significant.

CA3.2.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW not be selected for a new aircraft, they would retain the current fleet of 18 F-15C aircraft and would continue to operate at FAT. Aircraft operations would not change from existing conditions/No Action Alternative. The 144 FW would continue to support the F-15C mission currently being conducted. There would be no change to the use of the controlled airspace and therefore, no significant impacts associated with implementation of this alternative.

Airspace

Should the 144 FW not be selected for a new aircraft, they would retain the current fleet of 18 F-15C aircraft at FAT. The current fleet of F-15C aircraft would continue to be based at FAT and would continue to utilize the existing SUA. No changes to the number of operations or frequency

of use would occur. Operations would continue to remain as described in Table CA2.1-2. No significant impact to airspace would occur under this alternative.

CA3.2.2.3 No Action Alternative

Should the 144 FW not be selected for a new aircraft, they would retain the current fleet of 18 F-15C aircraft at FAT. The current fleet of F-15C aircraft would continue to be based at FAT and would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur. Operations would continue to remain as described in Table CA2.1-2. No significant impacts on airspace would occur under this alternative.

CA3.2.3 Summary of Impacts

The replacement of the F-15C with the F-15EX at FAT would not require changes in the local airspace. Over time the replacement of the F-15C aircraft at the installation could result in an 81 percent increase in 144 FW operations (and a 3.6 percent increase in total operations) at the airfield at FAT and in the SUA.

This increase in airfield operations and time within airspace would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the National Airspace System and SUA. In summary, impacts on controlled airspace and SUA associated with the beddown of the F-15EX would not be significant.

Under the F-15C Legacy Alternative, 144 FW F-15C flight operations at FAT would continue and installation operations would be the same as the existing conditions/No Action Alternative. Therefore, impacts on airspace would not be significant. Impacts under the No Action Alternative would be similar to the Legacy Alternative.

CA3.3 AIR QUALITY/CLIMATE CHANGE

The following section describes the affected environment associated with the current operations of a 144 FW ANG squadron and examines the extent to which the beddown of an ANG squadron of F-15EXs at the 144 FW installation at FAT would be consistent with federal, state, and local air quality regulations. The Climate Change analysis is discussed in the context of Cumulative Impacts as presented in Section CA4.2.3.

CA3.3.1 Affected Environment

The affected environment for the air quality analysis includes portions of Fresno County, where the 144 FW installation is located. Fresno County falls within the San Joaquin Valley Intrastate Air Quality Control Region that also includes Madera County, Merced County, San Joaquin

County, Stanislaus County, Tulare County, Kings County, and the San Joaquin Valley Air Basin portion of Kern County (that portion of the county that straddles the Sierra Nevada and Tehachapi mountains) (40 CFR 81.165). This eight-county area is also known as the San Joaquin Valley Air Pollution Control District (APCD). The San Joaquin Valley APCD is a public health agency that develops air quality management plans and implements control measures to protect and improve the health and quality of life for those under its jurisdiction (San Joaquin Valley APCD 2022).

The San Joaquin Valley APCD is currently designated as nonattainment for the following NAAQS: 8-hour O_3 (extreme), 24-hour $PM_{2.5}$ (serious), and annual $PM_{2.5}$ (serious) (40 CFR 81.305; EPA 2022a). In June 2021, the EPA announced it will reconsider the 2020 decision to retain the particulate matter NAAQS, which were last strengthened in 2012, because available scientific evidence and technical information indicate that the current standards may not be adequate to protect public health and welfare, as required by the Clean Air Act (EPA 2022b).

The San Joaquin Valley APCD reached levels of attainment status for PM_{10} in December 2008 and was reclassified from "non-attainment" to "maintenance," and is designated as unclassifiable, attainment, or better than national standards for the federal SO_2, CO, NO_2, and lead NAAQS. The applicable General Conformity Rule *de minimis* levels for the San Joaquin Valley APCD are listed in Table CA3.3-1.

Table CA3.3-1 Applicable General Conformity *De Minimis* Thresholds (tons per year)

***VOCs*[1]**	***NO_x*[1]**	***CO***	***SO_2***	***PM_{10}*[2]**	***$PM_{2.5}$*[3]**
10	10	NA[4]	70[5]	100	70

Notes: [1]San Joaquin Valley APCD is an extreme nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.
[2]San Joaquin Valley APCD is a maintenance area for the federal PM_{10} standard.
[3]San Joaquin Valley APCD is a serious nonattainment area for the federal $PM_{2.5}$ standards.
[4]*De minimis* thresholds are not applicable because the San Joaquin Valley APCD is in attainment of the federal CO standard. For attainment area criteria pollutants, this analysis uses the EPA's Prevention of Significant Deterioration permitting threshold of 250 tons per year as an initial indicator of the local significance of potential impacts on air quality.
[5]SO_2 is a precursor to the formation of $PM_{2.5}$.
Legend: CO = carbon monoxide; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; TPY = tons per year; VOC = volatile organic compound.
Source: 40 CFR 93.153.

Table CA3.3-2 presents the 2017 emission inventories for Fresno, which is the most recent data available.

Table CA3.3-2 2017 Criteria Pollutant Emissions for Fresno, California (tons)

Location	***VOCs***	***NO_x***	***CO***	***SO_2***	***PM_{10}***	***$PM_{2.5}$***
Fresno County, California	20,205	15,978	38,942	485	16,849	4,072

Notes: Totals do not include estimated emissions from wildfires or prescribed burns but do include estimated emissions from agricultural field burning.
Legend: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
Source: EPA 2022c.

In the Fresno area, summers are hot and dry, with temperatures ranging from 60°F to 98°F with less than 0.2 inch of precipitation per month. In the winters, temperatures range from 57°F to 63°F and between 1.4 and 2.1 inches of precipitation per month (National Weather Service 2022). Wind conditions vary throughout the year, and instantaneous wind speed and direction vary more widely than hourly averages. Wind experienced at any given location is highly dependent on local topography and other factors. In Fresno, it is generally windier during the months of April to July, with average wind speeds of 5.6 miles per hour and wind coming from the west most often between the months of March to October, from the north between October and March. June is the windiest month for Fresno, with an average hourly wind speed of 6.7 miles per hour with winds coming from the west (Weather Spark 2022).

CA3.3.1.1 Installation

The 144 FW installation holds a Permit to Operate (Facility C-216) issued by the San Joaquin Valley APCD, with an expiration date of March 31, 2024 (ANG 2023). The Permit to Operate provides the regulatory requirements for a variety of stationary sources located at the installation, including a jet engine test cell, gasoline dispensing operation, emergency generators, solvent degreaser, and a paint spray booth. Stationary source emissions data from the 144 FW installation reported to the California Air Resources Board in 2020 are presented in Table CA3.3-3.

Table CA3.3-3 144 FW Installation – Reported Stationary Source Emissions for 2020 (tons per year)

Emission Source	*Total Organic Gases/Reactive Organic Gases*[1]	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
144 FW Installation–2020	0.4	1.4	1.6	0	0.1	0.1

Note: [1]Total Organic Gases/Reactive Organic Gases are different forms of hydrocarbons that are similar to VOCs.
Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide.
Source: California Air Resources Board 2022.

The installation also has a Statewide Portable Equipment Registration (186490) with the California Air Resources Board for 75 units of AGE, which are regulated as mobile sources. The registration contains limitations on how long the equipment can run if emissions are visible.

The 144 FW installation has developed an Air Quality Management Plan that provides the regulatory requirements applicable to stationary and mobile air emission sources that are operated within the installation boundary and fall under the operational control of the Installation Commander (144 FW 2020a).

As described in Section CA2.1.2, current airfield operations are performed by the 144 FW, which currently flies F-15C aircraft that are proposed to be replaced by the F-15EX. For the air quality

analysis, only the aircraft to be replaced have been analyzed, as all other aircraft and their activities would remain the same. The current emissions (FY 2021) from the annual F-15C operations at FAT in Fresno County are presented in Table CA3.3-4. Other sources of air emissions associated with aircraft operations include AGE such as generators, lifts, and service carts; and emissions generated from engine testing in a hush house. Emission estimates were developed for the F-15C aircraft, using the Pratt and Whitney F100-PW-220 engine. Aircraft operation emission estimates were derived from the DAF's ACAM version 5.0.18b, using installation-specific data including landings and takeoffs, closed patterns, and annual jet engine testing in the jet engine test cell. AGE operations emissions were estimated using data provided by the installation, ACAM, and EPA's NONROAD. A full description of the methods of analysis for air quality are provided in Appendix D.

Table CA3.3-4 Current Annual F-15C Emissions Estimates for the 144 FW at Fresno Yosemite International Airport (FAT), Fresno County (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C Airfield Operations (mobile sources)	26.10	30.44	107.27	4.15	2.72	2.45	11,838
Jet Engine Test Cell (stationary source)	0.15	0.38	0.61	0.03	0.02	0.02	104
Total	26.25	30.81	107.87	4.18	2.74	2.47	11,942

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

CA3.3.1.2 Airspace

The affected environment for air quality comprises the SUA associated with 144 FW flight operations that occur below the mixing height of 3,000 feet AGL, as shown in Table CA2.1-6. The F-15Cs currently fly approximately 1 percent of the time below 3,000 feet AGL, which is below the mixing height and where emissions from the flying aircraft can influence ground-level air quality. For the 144 FW SUA, this includes portions of the Foothill MOA Complex portions that are not located above a wilderness area (floor of 2,000 feet AGL) in Fresno County and the low-altitude portions of the Hunter MOA Complex in Monterey and San Luis Obispo counties in California. The NAAQS attainment status for these airspace units is presented in Table CA3.3-5.

Table CA3.3-5 NAAQS Attainment Status for Low-Level Airspace

Airspace	*County(ies)*	*Attainment Status*
Portions of the Foothill MOA Complex (portions not located above a wilderness area with a floor of 2,000 feet AGL)	Fresno, Kings	Same as described above in Section CA3.3.1
Portions of Hunter MOA Complex • Hunter Low A MOA (floor of 200 feet AGL) • Hunter Low B MOA is 2,000 feet AGL • Hunter Low D MOA is 1,500 feet AGL • Hunter Low E MOA is 1,500 feet AGL to 3,000 feet MSL • VR-249 runs through Hunter Low D and E MOA 3,000 feet MSL (approximately 2,786 feet AGL[1])	Monterey (North Central Coast); San Luis Obispo (South Central Coast)	Monterey: None (all attainment/unclassifiable) San Luis Obispo: 8-hour O_3 (marginal)

Note: [1]Elevation at NAS Lemoore is 214 feet above MSL.
Legend: AGL = Above Ground Level; MOA = Military Operations Area; NAAQS = National Ambient Air Quality Standards; O_3 = ozone.

CA3.3.2 Environmental Consequences

Air quality impacts within the affected environment were reviewed relative to federal, state, and local air pollution standards and regulations. Refer to Chapter 3.0, Section 3.4 for a detailed discussion of air quality resource definitions and the analytical methodology for evaluating impacts. As described above, the San Joaquin Valley APCD is currently designated as nonattainment for the NAAQS: the 8-hour O_3 (extreme), 24-hour $PM_{2.5}$ (serious), and annual $PM_{2.5}$ (serious); a maintenance area for PM_{10}, and is designated as unclassifiable, attainment, or better than national standards for the federal SO_2, CO, NO_2, and lead. To assess the applicability of General Conformity to the Proposed Action, the General Conformity Rule *de minimis* threshold of 70 tons per year was used for $PM_{2.5}$ and its precursor SO_2, and the O_3 *de minimis* threshold of 10 tons per year was used for its precursors, VOCs and NO_x.

Proposed construction varies based on the aircraft and location (two proposed construction locations for the F-15EX aircraft beddown alternative at FAT as well as the construction that would occur to support the legacy aircraft if either location is not selected for the F-15EX). All proposed construction would occur within the footprint of the installation. To ensure the maximum annual emissions from construction are captured, the calculations have been performed to account for each construction project being completed within 12 months of the year that it is programmed (e.g., if a project is planned for implementation in FY 2024, the construction is assumed to occur between January and December 2025), even though some projects would last longer than 12 months. The following assumptions were used for construction projects:

- New building foundations require excavation of at least 1 foot of grade soil.
- Airfield pavements require excavation of at least 3.5 feet of grade soil.

- For the purposes of calculating emissions based on building volume (cubic feet), buildings are assumed to have an average height of 14 feet to account for some variation in the heights across all the proposed projects.
- Parking areas for new buildings are assumed to be 50 percent and sidewalks assumed to be 10 percent of the new building square footage.
- New impervious surfaces are assumed to be concrete or asphalt.
- Where two options are under consideration, the option that would generate the greatest emissions was selected for analysis.

Construction emission estimates were prepared using the California Emissions Estimator Model (CalEEMod) version 2020.4.0 (California Air Pollution Control Officers Association 2023). Emissions would primarily be generated by:

- diesel-powered construction equipment operating on site
- trucks removing or delivering materials from the construction areas
- construction worker vehicles
- application of architectural coatings
- dust created by grading and other bare earth construction activities

Default values in CalEEMod were used for the length of construction phases within each calendar year and construction equipment used during each phase, which correspond to the total acres proposed for construction. Assumptions for on-road vehicle trips related to construction worker commutes and material deliveries were developed based on the total square footage of construction planned for each year as well as the number of pieces of construction equipment per phase.

Construction would follow all applicable San Joaquin Valley APCD rules, such as submitting a Dust Control Plan prior to the start of any construction activity on any site that would include 5 acres or more of disturbed surface area for non-residential development (Rule 8021); controlling visible emissions (Rule 4101); and limiting the emission of air contaminants from fuel burning Equipment (Rule 4301).

ACAM (version 5.0.18b) was used to provide emissions estimates for current F-15C operations, the proposed F-15EX or F-35A operations, and additional employee commutes. ACAM provides estimated air emissions from proposed actions for specific criteria and precursor pollutants as defined in the NAAQS. For aircraft, operational modes (including taxi/idle [in and out], takeoff, climb out, and approach) are used as the basis of the emission estimates. Emission estimates were developed for the F-15C using two Pratt and Whitney F100-PW-220 engines, for the F-15EX aircraft using two General Electric F110-GE-129 engines, and for the F-35A using one Pratt and

Whitney F135-PW-100 engine. Detailed information on the emissions estimates and assumptions can be found in Appendix D.

As described in Section CA2.1.3, there are two locational scenarios for construction projects considered for the F-15EX conversion:

- Locational Scenario 1: construction would occur at the current 144 FW cantonment area south of the runway
- Locational Scenario 2: the majority of the construction would occur at the current 144 FW cantonment area, with some projects related to the ACA mission occurring north of the runway

The airfield and airspace operations under the Proposed Action would stay the same regardless of where the construction projects would occur.

CA3.3.2.1 F-15EX

Installation

Locational Scenario 1

The annual emissions estimates from each year of construction are shown in Table CA3.3-6. The year with the highest level of emissions from construction would be 2026, when construction at two entry control points (Main Gate and Munitions Dakota Gate), and an addition to Building 194 would occur, along with airfield pavement repairs. Construction of a concrete batch plant that would be used to produce the concrete required for the pavement repairs at all locations, and a permit to operate would be required from the San Joaquin Valley APCD. Fugitive PM was assumed to be controlled through twice daily watering of materials. No construction projects would be planned to begin after 2029 for this location.

Table CA3.3-6 Annual Emissions Estimates for Construction with the F-15EX Conversion at Locational Scenario 1 at the 144 FW (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Construction Emissions	0.86	3.85	4.83	0.01	0.30	0.19	822
2026 Construction Emissions	1.87	7.25	8.64	0.02	7.55	1.28	1,738
2027 Construction Emissions	0.05	0.31	0.40	0.00	0.02	0.01	59
2028 Construction Emissions	0.58	2.37	2.82	0.01	0.13	0.10	446
2029 Construction Emissions	0.10	0.58	0.75	0.00	0.03	0.02	111

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new

or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

Locational Scenario 2

The annual emissions estimates from each year of construction are shown in Table CA3.3-7. The year with the highest level of emissions from construction would be 2025, when the Alert Complex, the north utilities infrastructure project, and the entry point at East Airway Boulevard would be constructed. The next highest year of emissions is 2026 with construction at two entry control points at the Main Gate and Munitions Dakota Gate, an addition to Building 194, and repairs to Building 159 would occur, along with airfield pavement repairs. Similar to Locational Scenario 1, construction of a concrete batch plant that would be used to produce the concrete required for the pavement repairs at all locations, and a permit to operate would be required from the San Joaquin Valley APCD. Fugitive PM was assumed to be controlled through twice daily watering of materials. No construction projects would be planned to begin after 2029 for this location.

Table CA3.3-7 Annual Emissions Estimates for Construction with the F-15EX Conversion at Locational Scenario 2 at the 144 FW Installation (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Construction Emissions	2.10	8.23	10.21	0.02	0.77	0.44	1,895
2026 Construction Emissions	1.87	7.25	8.64	0.02	7.55	1.28	1,738
2027 Construction Emissions	--	--	--	--	--	--	--
2028 Construction Emissions	0.58	2.37	2.82	0.01	0.13	0.10	446
2029 Construction Emissions	0.34	2.35	2.77	0.01	0.14	0.10	448

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

Airfield operations for the F-15EX at both locational scenarios would be similar to those currently occurring with the F-15C at the 144 FW. The primary difference would be that the annual number of airfield operations is projected to increase. The net change in operational emissions at the 144 FW installation are presented in Table CA3.3-8 and assume that 100 percent of the F-15EX aircraft would be on-site and operational in 2027. The F-15EX operations would represent the new emission profile moving forward. The emissions account for the difference in the engine operations between the F-15C and the F-15EX, the increase in annual operations, and an increase in commuting personnel who would be assigned to the 144 FW installation as a result of beddown of the F-15EX.

Table CA3.3-8 Annual Airfield Steady State Emissions Estimates for the 144 FW Beginning in 2027 (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C Current Airfield Operations removed	-26.10	-30.44	-107.27	-4.15	-0.72	-2.45	-11,838
F-15EX Airfield Operations added	15.68	34.56	113.64	4.39	7.89	7.13	12,227
Net Change in Airfield Emissions – F-15EX[1]	-10.42	4.13	6.37	0.24	5.17	4.68	389
F-15EX – Additional Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
Total	-10.28	4.19	7.20	0.24	5.18	4.68	557

Note: [1]Numbers may not add up due to rounding.
Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The total emissions per year for each locational scenario to support the F-15EX beddown at the 144 FW installation are presented in Tables CA3.3-9 and CA3.3-10. The total emissions that would occur in each year from both construction and operational activities are evaluated against the applicable *de minimis* or comparative threshold for the criteria pollutant.

Based on the emissions presented above, the criteria pollutant emissions associated with the basing of the F-15EX during concurrent construction and operations would not exceed the *de minimis* thresholds for any applicable criteria pollutant. CO emissions would not exceed the comparative threshold. Beginning in 2030 for both Locational Scenario 1 and Locational Scenario 2, construction associated with this alternative would be complete. The long-term operational emissions associated with the F-15EX aircraft activity and additional personnel commutes would not exceed the *de minimis* thresholds for any applicable criteria pollutant. Long-term operational emissions of CO would increase over existing conditions/No Action Alternative but would remain below the comparative indicator threshold. Because no emissions would exceed the *de minimis* thresholds, the Proposed Action is presumed to conform under 40 CFR 93.153(g) and no further action under the General Conformity Rule is required.

Airspace

As described in Section CA3.2.2, *Airspace*, with the conversion to the F-15EX aircraft, operations in the SUA would increase compared to the current F-15C operations, resulting in airspace use of approximately 2,350 hours annually. The percentage of time flown below 3,000 feet AGL during F-15EX operations would remain at 1 percent (refer to Table CA3.2-1), and thus the net change in time flown below 3,000 feet AGL would increase by approximately 23.5 hours annually. The operations within the SUA would be infrequent and sporadic. Thus, even though there would be a slight increase in time spent flying below 3,000 feet AGL, the emissions from the F-15EX operations would not have a significant effect on regional air quality in the SUA.

Table CA3.3-9 Total Annual Emissions Estimates for Construction and Operations with the F-15EX Conversion at Locational Scenario 1 at the 144 FW Installation (tons per year)

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.86	3.85	4.83	0.01	0.30	0.19	822
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	1.87	7.25	8.64	0.02	7.55	1.28	1,738
Net Change – F-15EX Operations Emissions (50% transition)	-5.21	2.06	3.19	0.12	2.59	2.34	195
Commuter Emissions (50% transition)	0.07	0.03	0.42	0.00	0.01	0.00	84
Total 2026 Estimated Emissions[1]	**-3.27**	**9.35**	**12.24**	**0.14**	**10.14**	**3.62**	**2,016**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.05	0.31	0.40	0.00	0.02	0.01	59
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
Total 2027 Estimated Emissions[1]	**-10.22**	**4.49**	**7.60**	**0.24**	**5.20**	**4.69**	**616**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.58	2.37	2.82	0.01	0.13	0.10	446
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2028 Total Net Change Emissions[1]	**-9.69**	**6.55**	**10.02**	**0.25**	**5.32**	**4.77**	**1,003**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.10	0.58	0.75	0.00	0.03	0.02	111
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2029 Total Net Change Emissions[1]	**-10.17**	**4.77**	**7.95**	**0.24**	**5.21**	**4.70**	**668**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2030 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2030 Total Net Change Emissions[1]	**-10.28**	**4.19**	**7.20**	**0.24**	**5.18**	**4.68**	**557**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

Table CA3.3-10 Total Annual Emissions Estimates for Construction and Operations with the F-15EX Conversion at Locational Scenario 2 at the 144 FW Installation (tons per year)

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	2.10	8.23	10.21	0.02	0.77	0.44	1,895
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	1.87	7.25	8.64	0.02	7.55	1.28	1,738
Net Change – F-15EX Operations Emissions (50% Transition)	-5.21	2.06	3.19	0.12	2.59	2.34	195
Commuter Emissions (50% Transition)	0.07	0.03	0.42	0.00	0.01	0.00	84
2026 Total Net Change Emissions[1]	**-3.27**	**9.35**	**12.24**	**0.14**	**10.14**	**3.62**	**2,016**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	--	--	--	--	--	--	--
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2027 Total Net Change Emissions[1]	**-10.28**	**4.19**	**7.20**	**0.24**	**5.18**	**4.68**	**557**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.58	2.37	2.82	0.01	0.13	0.10	446
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2028 Total Net Change Emissions[1]	**-9.69**	**6.55**	**10.02**	**0.25**	**5.32**	**4.77**	**1,003**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.34	2.35	2.77	0.01	0.14	0.10	448
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2029 Total Net Change Emissions[1]	**-9.94**	**6.54**	**9.98**	**0.25**	**5.32**	**4.78**	**1,005**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2030 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change – F-15EX Operations Emissions	-10.42	4.13	6.37	0.24	5.17	4.68	389
Commuter Emissions	0.14	0.06	0.83	0.00	0.01	0.00	168
2030 Total Net Change Emissions[1]	**-10.28**	**4.19**	**7.20**	**0.24**	**5.18**	**4.68**	**557**
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

CA3.3.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW retain the F-15C legacy aircraft at FAT, impacts would be less intensive in magnitude than the basing of the F-15EX, as fewer construction projects with less square footage would be implemented. No additional personnel would be added to the 144 FW installation and the F-15C airfield operations would remain the same as existing conditions/No Action Alternative.

Construction projects required to sustain the current mission would be implemented, and the emissions from the construction activities are shown in Table CA3.3-11. The year with the highest level of emissions from construction would be 2026, when construction at two entry control points at the Main Gate and Munitions Dakota Gate, along with airfield pavement repairs would occur. Construction of a concrete batch plant that would be used to produce the concrete required for the pavement repairs, and a permit to operate would be required from the San Joaquin Valley APCD. No construction projects are proposed to begin after 2026.

Table CA3.3-11 Annual Emissions Estimates for Construction with the Legacy F-15C at the 144 FW Installation (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Construction Emissions	0.73	3.09	3.61	0.01	0.18	0.13	587
2026 Construction Emissions	1.40	3.57	4.61	0.01	7.43	1.23	776
de minimis or Comparative Threshold	10	10	250	70	100	70	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**NA**

Legend: 144 FW = 144th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

Based on the emissions presented above, the applicable criteria pollutant emissions associated with construction would be below the *de minimis* thresholds and the comparative thresholds for CO. As the F-15C aircraft would continue to operate, long-term operational emissions would remain the same as existing conditions/No Action Alternative. Because no emissions would exceed the *de minimis* thresholds, the Proposed Action is presumed to conform under 40 CFR 93.153(g) and no further action under the General Conformity Rule is required.

Airspace

No changes to operations in the SUA would occur, and existing conditions would continue.

CA3.3.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or

SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in their current location on FAT. Impacts on air quality would remain unchanged.

CA3.3.3 Summary of Impacts

If the F-15EX is selected for beddown at the 144 FW installation at FAT, the net change in emissions resulting from implementation of alternatives at either of the two locational scenarios would not exceed the *de minimis* thresholds for any of the applicable criteria pollutants, nor would CO emissions exceed the comparative threshold.

If the F-15EX aircraft is not selected, the F-15C would continue to operate at the 144 FW installation at FAT. Once construction is complete, there would be no change in long-term operational emissions.

Because the emissions results do not exceed the *de minimis* thresholds under all the locational scenarios for the beddown of the F-15EX, the General Conformity Regulations do not apply to this action.

CA3.4 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE/CHILDREN'S HEALTH AND SAFETY

CA3.4.1 Affected Environment

CA3.4.1.1 Installation

Fresno County is considered the ROI for socioeconomic effects of the Proposed Action at the 144 FW installation. Socioeconomic data provided in this section are presented for Fresno County, the State of California, and the U.S. to characterize existing socioeconomic conditions, which are used to gauge the level of impacts that are associated with project activities. Additional data are presented for the city of Fresno in some locations for reference. Data have been collected from documents published by federal, state, and local agencies and from state and national databases (e.g., USCB and U.S. Bureau of Labor Statistics).

The ROI for socioeconomic effects is in part driven by access points and built infrastructure that determines where people who work at the installation live, spend money, and pay taxes. However, the analysis of impacts on Environmental Justice, Children's Health and Safety, and the Elderly includes a review of all potential adverse impacts on these communities as discussed in other resource sections of this EIS and the ROI is determined by the extent of the adverse impacts identified. For the Proposed Action, the ROI for Environmental Justice, Children's Health and

Safety, and the Elderly includes areas surrounding 144 FW installation at FAT that may experience noise increases as identified in Section CA3.1.2, *Environmental Consequences*.

Population

In 2020, Fresno County had a total population of 1,008,654 which was an 8.4 percent increase over the previous 10 years (Table CA3.4-1). This is a faster growth rate than both California (6.1 percent) and the U.S. (7.4 percent).

Table CA3.4-1 Population in the ROI over Time

Area	*2010*	*2020*	*Percent Change*
United States	308,745,538	331,449,281	7.4
California	37,253,956	39,538,223	6.1
Fresno County	930,450	1,008,654	8.4
City of Fresno	494,665	542,107	9.6

Legend: ROI = Region of Influence.
Sources: USCB 2010, 2020a.

Housing

As shown in Table CA3.4-2, in 2020 Fresno County had a total of 333,357 housing units, 23,260 of which were vacant. The rental vacancy rate (3.2 percent) is lower than California (3.7 percent) and the U.S. (5.8 percent). The median value of owner-occupied housing units was $271,000 and the median gross rent was $1,029 per month.

Table CA3.4-2 Housing in the ROI (2020)

Area	*Total Housing Units*	*Vacant Housing Units*	*Rental Vacancy Rate*	*Median Value of Owner-Occupied Housing Units*	*Median Gross Rent*	*Persons per Household*
United States	138,432,751	16,078,532	5.8%	$229,800	$1,096	2.6
California	14,210,945	1,107,831	3.7%	$538,500	$1,586	2.9
Fresno County	333,357	23,260	3.2%	$271,000	$1,029	3.1
City of Fresno	180,020	9,883	3.4%	$256,000	$1,041	3.0

Legend: % = percent; ROI = Region of Influence.
Source: USCB 2020b.

Schools

There are a total of 351 public schools in Fresno County and 17 private schools (see Table CA3.4-3). The public schools have a student-teacher ratio of 25.2 and the private schools have a student-teacher ratio of 16.9. In total, Fresno County has 207,368 students in kindergarten through 12th grade.

Table CA3.4-3 Public and Private Schools in Fresno County

School Type	*Number of Schools*	*Number of Students*	*Number of Teachers*	*Student Teacher Ratio*
Public	351	203,780	8,089.0	25.2
Private	17	3,588	212.6	16.9
Total	368	207,368	8,301.6	25.0

Note: Public School data is from 2020–2021 and Private School data is from 2019–2020.
Source: National Center for Education Statistics 2020, 2021.

Employment and Income

Table CA3.4-4 shows the Bureau of Labor Statistics' employment data for Fresno County in August of 2022 as compared to employment information from California and the U.S. Fresno County's unemployment rate (5.9 percent) is higher than both the state (4.1 percent) and national levels (3.8 percent).

Table CA3.4-4 Employment in the ROI (August 2022)

Area	*Civilian Labor Force*	*Employed*	*Unemployed*	*Unemployment Rate*
United States	164,971,000	158,714,000	6,256,000	3.8%
California	19,288,261	18,505,554	782,707	4.1%
Fresno County	457,849	431,061	26,788	5.9%

Legend: % = percent; ROI = Region of Influence.
Sources: Bureau of Labor Statistics 2022a, 2022b, 2022c.

Median and mean household incomes as well as median earnings for workers and per-capita income in Fresno County are lower than the state and national levels (see Table CA3.4-5).

Table CA3.4-5 Incomes in the ROI

Area	*Median Household Income*	*Mean Household Income*	*Median Earnings for Workers*	*Per Capita Income*
United States	$64,994	$91,547	$36,280	$35,384
California	$78,672	$111,622	$38,176	$38,576
Fresno County	$57,109	$79,175	$30,630	$25,757

Legend: ROI = Region of Influence.
Source: USCB 2020b.

Environmental Justice

Table CA3.4-6 displays the total population, total and percentage of minority, low-income, children under 18 years of age, and elderly populations in the ROI. Table CA3.4-7 displays the same information for those populations affected by the existing noise contours associated with the F-15C aircraft.

Table CA3.4-6 Total Population, Minority, Low-income, Children, and Elderly Populations in the ROI

Geographic Area	*Total Population*	*Low-Income Population*	*Percent Low-Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
United States	326,569,308	40,821,164	13%	130,317,933	40%	73,296,738	22%	52,362,817	16%
California	39,346,023	4,721,523	12%	39,346,023	64%	9,049,585	23%	5,508,443	14%
Fresno County	990,204	188,139	19%	703,045	71%	277,257	28%	118,824	12%

Legend: % = percent; ROI = Region of Influence.
Source: USCB 2020b, 2021.

Table CA3.4-7 Total Current Population, Minority Low-income, Children, and Elderly Populations Affected by Noise Greater than 65 dB DNL

Noise Contour	*Affected Population*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	406	105	26%	325	80%	125	31%	27	7%
70–75	28	7	25%	22	79%	9	32%	2	7%
75–80	0	0	0%	0	0%	0	0%	0	0%
80–85	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0
Total	434	112	26%	347	80%	134	31%	29	7%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Areas that have a higher percentage of their population that are low-income than their reference county are considered to be a low-income area. Areas where 50 percent of the population or more are from a minority group, or are higher than the reference county, are considered a minority area.

In 2020, an estimated 19 percent of the population in Fresno County had incomes below the poverty level. An estimated 71 percent of the residents of Fresno County were a member of a minority group in 2020. Comparing this reference group to those persons affected by the existing noise contours shown in Table CA3.4-7, 26 percent of those individuals are considered to be low-income, which is slightly higher than the reference group of 19 percent; and 80 percent are recognized as a member of a minority group, which is above the reference group of 71 percent.

Children's Health and Safety and the Elderly

Table CA3.4-7 shows the population in Fresno County that are under 18 years of age, and those that are 65 years of age or older. Fresno County has a population of 28 percent children under the age of 18 and 12 percent elderly. Comparing the reference group to those persons affected by the existing noise contours shown in Table CA3.4-7, 31 percent of those individuals are considered to be children under 18, which is just above the reference group of 28 percent; and 7 percent are elderly, which is lower than the reference group of 12 percent.

CA3.4.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.4.2 Environmental Consequences

CA3.4.2.1 F-15EX

Installation

Construction and modification projects required for the beddown of the F-15EX would include between 16 and 20 projects between FY 2024 and FY 2029 and would include a total of between 1,148,600 SF and 1,588,200 SF of disturbance (see Tables CA2.1-3 and CA2.1-4).

Under operations of the F-15EX beddown, 101 new personnel would be supported at the 144 FW installation and airfield operations would increase by approximately 3.6 percent (see Tables CA2.1-5 and CA2.1-2).

Population

The population base and established construction industry in the city of Fresno and Fresno County in California would be able to support most of the required construction workforce. Any required relocation of workers to the area would be temporary during the construction period. Therefore, any impacts on population during construction of the F-15EX beddown would be minor and temporary and not significant.

During operation of the F-15EX beddown, 101 new personnel would be based at the 144 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of less than 0.1 percent in Fresno County (see Table CA3.4-1). Therefore, any impacts on population as a result of the F-15EX beddown would be minor and not significant.

Housing

During construction, most workers would come from the local area or from within commuting distance of FAT. Specialized workers coming from outside the ROI or workers drawn to the area for employment opportunities may utilize temporary housing options such as hotels, motels, recreational vehicle parks, or housing rentals. This would create a minor increase in demand for

housing in the ROI; however, as most workers would be expected to live within commuting distance, this would be a minor temporary impact and not significant.

The increase of 101 new personnel along with their families could create a demand for an additional 101 housing units in the ROI. This would be less than 0.1 percent of the total housing units in Fresno County and 0.4 percent of the vacant housing units (see Table CA3.4-2). Therefore, any impacts on housing as a result of the F-15EX beddown would be minor and not significant.

Schools

As described above, most construction workers would come from the local area or from within commuting distance, so they would not be bringing new dependent school-aged children to the ROI. The limited number of workers that would come from outside the area would likely not bring families because of the temporary nature of the construction work. Therefore, the number of workers that would relocate to the area during construction and enroll their children in the school system would be small and would be a minor temporary impact and not significant.

According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), 64.7 percent of ANG family members are children, so there would be an expected 104.6 children relocating to the ROI during operation of the F-15EX beddown. Although not all of the children would be school-aged, for a conservative estimate if all of the children entered the local school system in Fresno County, this would be a 0.1 percent increase in the total number of students (see Table CA3.4-3). This would be a minor permanent impact and not significant.

Employment and Income

Preliminary estimates of the construction required under this F-15EX Alternative place the cost of construction between $60 and $72 million or $130 and $156 million, depending on which location course of action (COA) (Locational Scenario 1 or 2) is chosen. Hiring local construction workers would be beneficial for local employment and income. Local construction spending on materials and equipment would also further stimulate the local economy providing jobs and income to suppliers in the ROI. This would be a temporary beneficial impact and not significant.

The increase of 101 new positions during operation of the F-15EX beddown would be a permanent increase in employment in the ROI. The incomes from the new positions would contribute to the local tax base and spending on local goods and services which would further stimulate the local economy. The 101 positions would represent less than 0.1 percent of the total employment in Fresno County (see Table CA3.4-4). Increases in employment and income would be a minor permanent beneficial impact and not significant.

Environmental Justice

During construction, adverse impacts from construction noise and traffic would predominantly occur at the installation or on airport property. As shown in Table CA3.4-8, 77 percent of the population within the projected noise contours associated with the F-15EX are a member of a minority group and 23 percent of the population have incomes below the poverty level. These levels are higher than the Fresno County reference group of 71 percent and 19 percent, respectively. Therefore, these populations would be disproportionately impacted.

Table CA3.4-8 Total Current and Proposed Population, Minority, Low-income, Children, and Elderly Populations Affected by Noise Greater than 65 dB DNL Under the F-15EX Alternative

Noise Contour	*Affected Population w/ F15C/D*	*Affected Population w/ F-15EX*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	406	5,577	1,246	22%	4,299	77%	1,599	29%	553	10%
70–75	28	404	101	25%	320	79%	124	31%	27	7%
75–80	0	30	7	23%	23	77%	8	27%	2	7%
80–85	0	12	4	33	9	75%	4	33%	0	0
85+	0	0	0	0	0	0	0	0	0	0
Total	434	6,023	1,358	23%	4,651	77%	1,735	29%	582	10%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Children's Health and Safety and the Elderly

Table CA3.4-8 shows the percentage of the population that is under 18 years of age. Under the F-15EX beddown, 6,023 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 29 percent are under the age of 18, which is slightly higher than the Fresno County reference of 28 percent. Therefore, children under the age of 18 would be disproportionately impacted by the F-15EX Alternative.

Older adults have been identified as sensitive receptors to potential adverse impacts due to physiological and behavioral changes that come with age (AFCEC 2020). Table CA3.4-8 shows the percentage of the population that would be affected that are elderly. Of the total population exposed to these noise levels, approximately 10 percent are considered elderly, which is just lower than the Fresno County reference of 12 percent. Therefore, applying DoD criteria, the F-15EX Alternative would not disproportionately impact the elderly population.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.4.2.2 F-15C Legacy Aircraft

Installation

If the F-15EX beddown alternative is not selected, the existing F-15C flying mission would remain in place at the 144 FW installation until the projected end of the airframe mission or future required mission change proposals are presented. Under this alternative, some construction would be required to sustain the mission and construction impacts would be similar to those described for the F-15EX beddown; however, impacts would be lower due to less construction. Preliminary estimates of the construction required under this legacy aircraft alternative place the cost of construction between $100 and $120 million, or $110 and $132 million, depending on which location COA (Locational Scenario 1 or 2) is taken. During operations, existing conditions described in Section CA3.4.1 would remain unchanged, and no significant impacts would occur. Therefore, as with the F-15EX beddown alternative, construction spending would be a minor beneficial impact on economic activity, employment, and wages. There would be no disproportionately high and adverse health or environmental effects on minority and low-income populations during construction or operation; there would be no environmental health and safety risks that would disproportionately affect children; and there would be no disproportionate impacts on the elderly during construction or operation and impacts would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.4.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The 144 FW would remain in their current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.

CA3.4.3 Summary of Impacts

Construction projects under the alternatives (with the exception of the No Action Alternative) would lead to minor beneficial impacts on the local economy and employment. A significant portion of the workforce could be supplied by the local construction industry or from within

commuting distance, so impacts from non-local construction workers moving into the area would be minimal. Under the F-15EX Alternative, the percentage of both minority and low-income populations within the projected noise contours would be higher than the reference community, thus, these populations would be disproportionately impacted. The population of children under the age of 18 would be higher than the reference community, thus, children under the age of 18 would be disproportionately impacted. The percentage of elderly impacted would be lower than the reference community and thus, applying DoD criteria, the elderly would not be disproportionately impacted. Under the Legacy Alternative, impacts on minority and low-income populations would not be disproportionate. Similarly, impacts on children under the age of 18 or the elderly population would not be disproportionate. Under the No Action Alternative, impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.

CA3.5 LAND USE/NOISE COMPATIBLE LAND USE

CA3.5.1 Affected Environment

In order to provide a comparable data set between proposed siting alternatives across all fighter wing locations considered for the Proposed Action, local zoning categories were consolidated and/or renamed. Table CA3.5-1 provides a cross-reference between the Fresno County zoning classifications and those used in this analysis.

Table CA3.5-1 Zoning Classification Used in EIS Analysis

Zoning Classification	*EIS Zoning Classification*
Fresno County, CA	
Exclusive, general, limited agriculture	Agriculture
Neighborhood, community, regional shopping center, Commercial and light manufacturing, central trading, general commercial, commercial center, commercial-main street, administrative and professional office, downtown core, general, neighborhood	Commercial
Mixed-Use; regional mixed-use; residential and professional office	Mixed-Use
Light, medium, heavy, general industrial; light manufacturing; industrial park	Industrial
Open space, open conservation, commercial recreation, park	Open Space/Recreation/Forest
Single family residential, low-, medium-, high-density residential; mobile home park; Single family residential agricultural; rural settlement	Residential
Mixed-Use	Mixed-Use
Parking, off-street parking,	Public
Unknown[1]	Unknown[1]

Note: [1]The 'unknown' land use designation includes areas of land within the study area that Fresno County has not designated as a specific land use category.
Legend: CA = California; EIS = Environmental Impact Statement.
Sources: Fresno County 2022.

CA3.5.1.1 Installation

The 2018 *Fresno Yosemite International Airport Master Plan* (FAT 2019) characterizes the region's land uses, existing urban growth, and community boundaries, as well as the goals and objectives of the plan. FAT has established noise exposure maps (FAT 2017a) in accordance with 14 CFR Part 150, *Airport Noise Compatibility Planning*, to help identify and plan for compatible land use and development near FAT. In addition, the City of Fresno supports an airport noise compatibility zone to manage urban encroachment and focus on minimizing incompatible uses away from active airfields in addition to managing noise mitigation measures (such as sound insulation and land acquisition of residential properties) under its Sound Mitigation Acoustic Remedy Treatment Program.

As shown on Figure CA3.5-1, FAT is primarily surrounded by urban development including industrial, commercial, residential, public, open space, agricultural, unknown, and mixed-use land uses. Airport property encompasses approximately 1,614 acres of land within the city of Fresno bounded by Clovis Avenue to the east, Chestnut Avenue to the west, Dakota Avenue to the north, and McKinley Avenue to the south. There are approximately 230 acres of airport property immediately northwest of the Chestnut Avenue/Dakota Avenue intersection that includes a system of groundwater recharge ponds. Similarly, there are approximately 88 acres of property immediately east of Clovis Avenue, containing recharge ponds and the airport-owned solar farm. The Airways Golf Course, located south of Airways Boulevard and west of Clovis Avenue, is also on airport property. The golf course, while having been a community asset since the early 1950s and providing a source of revenue for the airport, is considered a temporary use of airport property until that area may be needed for airport-related uses.

As shown on Figure CA3.5-1, land use surrounding the 144 FW main cantonment area is surrounded by the west, north, and east by FAT. The southern part of the installation is immediately adjacent to industrial land uses, with some commercial uses to the west and open space to the east. The unit's munitions storage area is located within the northern portion of FAT and is also surrounded to the west, south, and east by the airport. The land uses immediately adjacent to the munitions storage area along the north are industrial.

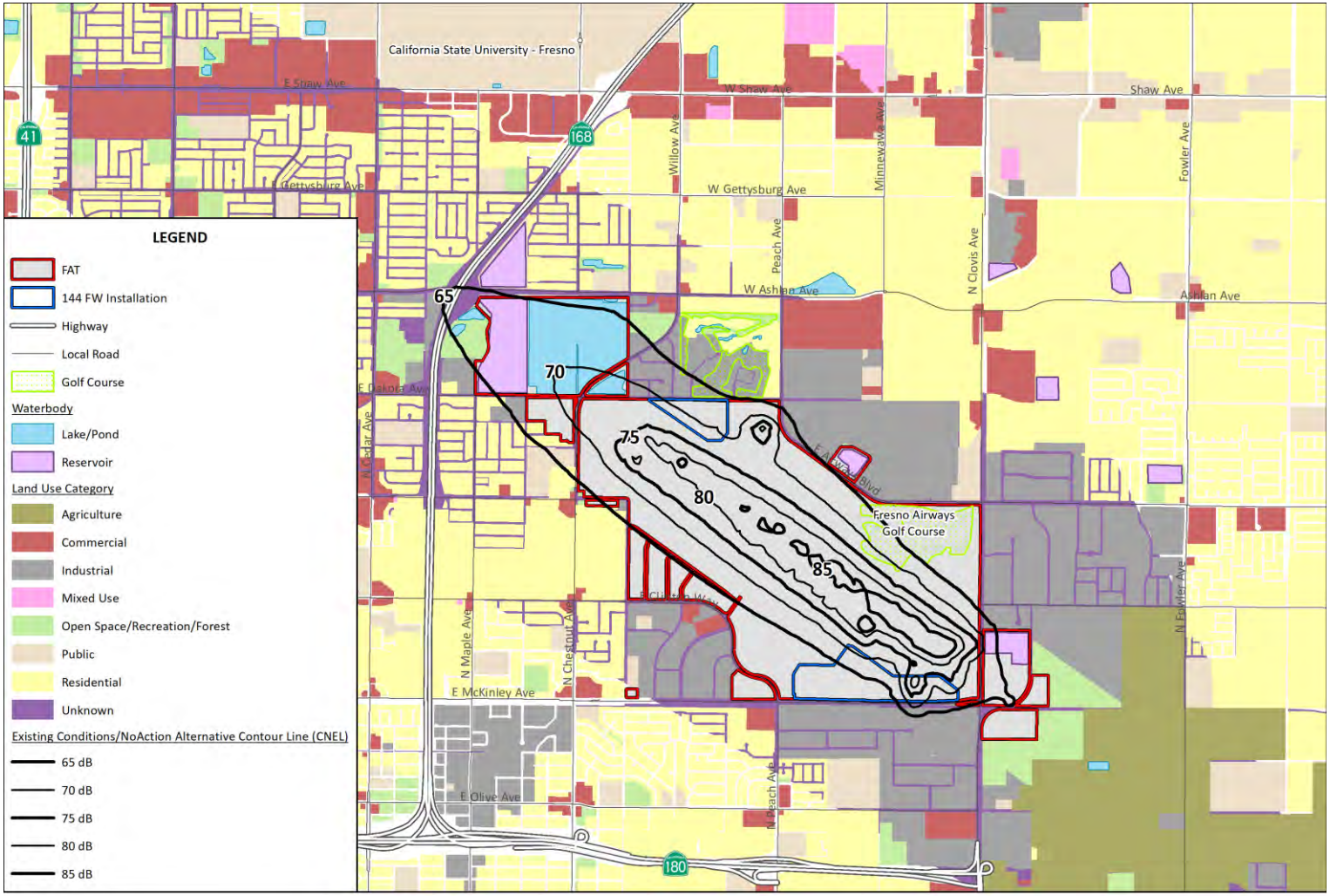


Figure CA3.5-1 Land Uses and Existing Noise Contours within the Vicinity of Fresno Yosemite International Airport (FAT)

Land use activities most sensitive to noise typically include residential and commercial use, public services, and areas associated with cultural and recreational uses, such as parks/open space. Land uses surrounding FAT are typical of airport environs and include airport uses and the airport itself, roadways, industrial, commercial, military, and residential activities. The FAA provides compatible land use guidelines for a variety of land uses in 14 CFR Part 150, *Airport Noise Compatibility Planning*. According to these criteria, sound levels up to 65 dB CNEL are compatible with land uses such as residences, transient lodging, and medical facilities. Currently, aircraft noise from FAT exposes approximately 1,835 acres of off-airport areas of industrial, commercial, agricultural, open space/recreation/forest, unknown, public, and residential land uses to noise levels between 65 and 80 dB CNEL.

Section 3.1.1, *Noise*, discusses existing noise levels at POIs such as schools and churches located within the greater than 65 dB CNEL off-airport noise contour areas. Figure CA3.5-1 shows existing noise contours extend off-airport primarily to the northwest and to the southeast. Northwest of the airport, contours 65 dB CNEL and above overlap with residential, industrial, commercial, open space/recreation/forest, unknown, and public land uses. To the southeast, contours 65 dB CNEL and above extend over industrial, agricultural, unknown, and open space/recreation/forest land uses. The 'unknown' land use designation includes areas of land within the study area that Fresno County has not designated as a specific land use category.

As shown on Figure CA3.10-1 (see Section 3.10.1, *Safety*), RPZs associated with the runway at both ends are located within FAT and except for very small portions, do not extend off airport property.

CA3.5.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.5.2 Environmental Consequences

CA3.5.2.1 F-15EX

Installation

Locational Scenario 1

As shown on Figure CA3.5-2, land use immediately surrounding the installation is comprised of airport and industrial uses. No land use changes would be proposed, and existing land use would not be affected by the proposed construction footprint (1,148,600 SF) as all construction and modification activities would occur within the existing installation boundaries. Additionally, there

would be no change to the existing airfield-related RPZs which are located within airport property and free of development that would be incompatible with airport operations. Proposed construction activities would be short-term and intermittent but may cause minor traffic and/or noise disruptions to local businesses as well as employees at the 144 FW installation. However, construction activities would be temporary (between FY 2024 and 2028) and would occur during normal business hours (i.e., between 7 a.m. and 5 p.m., Monday through Friday). The proposed construction activities would improve efficiency in daily operations by providing more efficient and secure operations for the 144 FW. Land uses would be consistent with current functions on the installation and the airport. All facilities would be designed and sited to be compatible with existing land uses and safety guidelines. There would be no significant impacts on land use related to construction as a result of basing the F-15EX aircraft at the 144 FW installation.

At noise levels greater than or equal to 65 dB CNEL, different land uses are either considered compatible, compatible with recommended sound attenuation materials incorporated into the construction, or not recommended. Based on Table 1, Appendix A in 14 CFR Part 150, all land uses are considered to be compatible with noise levels less than 65 dB DNL. Therefore, mitigation measures considered for aviation noise typically address land uses in the 65 dB DNL noise contour or greater.

Annual airfield operations for the 144 FW would increase by 81 percent with the new F-15EX aircraft, while total annual airfield operations would increase by 3.6 percent at FAT. The land use analysis compares the proposed noise contours to current noise contours, which show the existing noise environment. The comparison of the proposed contours to the current contours shows potential change in noise conditions and land use compatibility (Table CA3.5-2 and Figure CA3.5-2). Basing of the F-15EX at the 144 FW installation would result in an overall increase in the off-airport area affected by noise levels greater than 65 dB CNEL by approximately 1,086 acres.

Table CA3.5-2 Off-Airport Land Use Acreage Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of Fresno Yosemite International Airport (FAT)

Land Use Category	*Current 65–70 dB CNEL*	*Proposed 65–70 dB CNEL*	*Change in Acres*	*Current 70–75 dB CNEL*	*Proposed 70–75 dB CNEL*	*Change in Acres*	*Current 75–80 dB CNEL*	*Proposed 75–80 dB CNEL*	*Change in Acres*	*Current 80–85 dB CNEL*	*Proposed 80–85 dB CNEL*	*Change in Acres*
Residential	12	275	**262**	0	15	**15**	0	0	**0**	0	0	**0**
Commercial	0	26	**26**	0	0	**0**	0	0	**0**	0	0	**0**
Industrial	56	316	**260**	3	54	**51**	0	7	**7**	0	0	**0**
Open Space/ Recreation/Forest[1]	23	122	**99**	0	38	**38**	0	0	**0**	0	0.2	**0.2**
Unknown[1,2]	61	208	**148**	11	51	**39**	0	11	**11**	0	5	**5**
Agriculture	0	53	**53**	0	0	**0**	0	0	**0**	0	0	**0**
Public	9	68	**59**	0	12	**12**	0	0	**0**	0	0.3	**0.3**
Total[3]	161	1,069	**908**	15	169	**154**	0	18	**18**	0	6	**6**

Notes: [1]Unclassified land (e.g., unknown/other, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use is not considered under Part 150 guidance.
[2]The 'unknown' land use designation includes areas of land within the study area that the Fresno County has not designated as a specific land use category.
[3]Numbers may not add up due to rounding.

Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

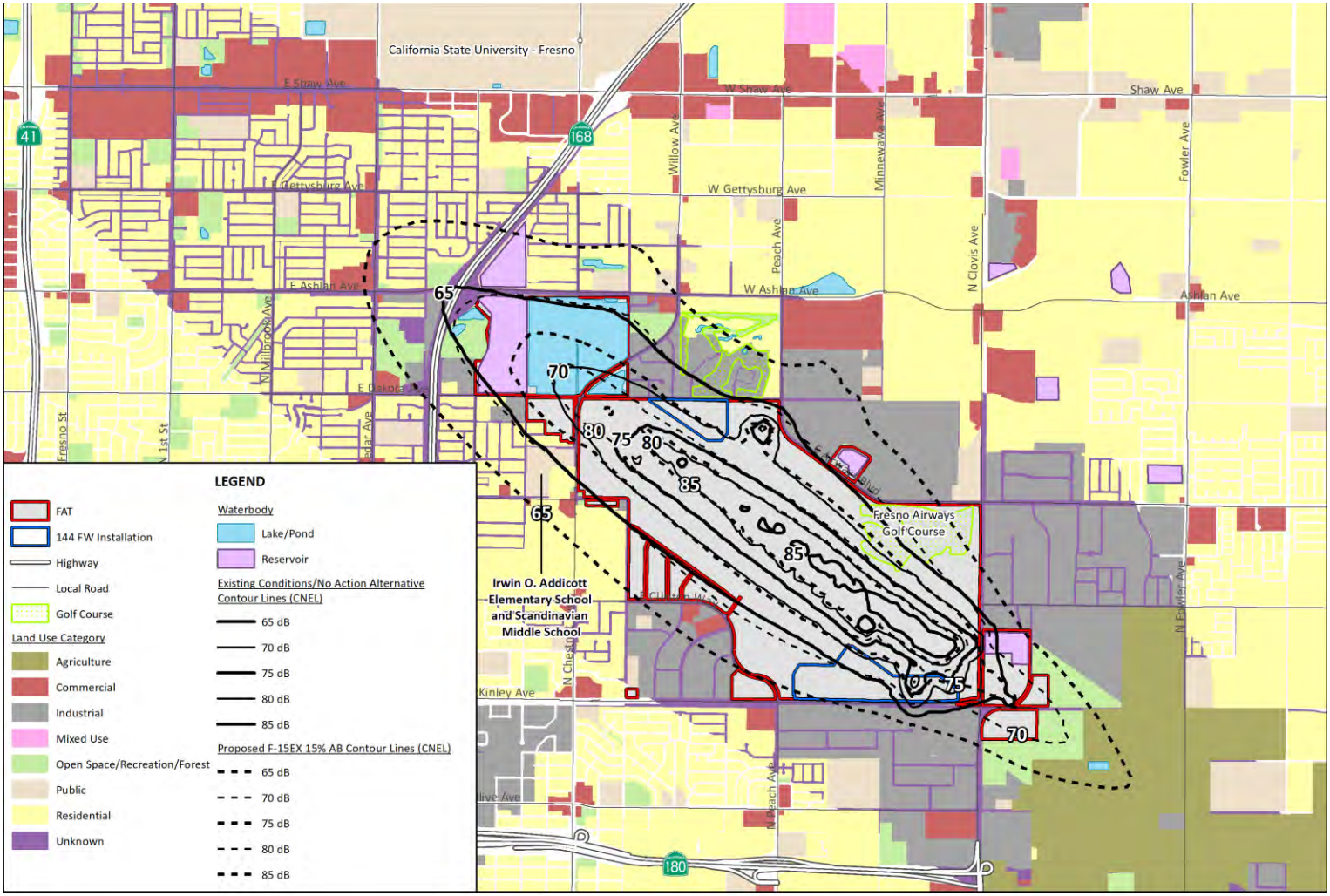


Figure CA3.5-2 Land Use, Existing Noise Contours, and Proposed F-15EX Noise Contours within the Vicinity of Fresno Yosemite International Airport (FAT)

Source: CAANG 2022, Fresno City 2022, Fresno County 2022

As shown in Table CA3.5-2, an additional 262 acres of residential land use would be within the 65 to 70 dB CNEL noise contours and 15 acres within the 70 to 75 dB CNEL noise contours. Residential uses within the 65 to 75 dB CNEL are generally discouraged but could be mitigated with noise level reduction measures achieved through the incorporation of noise attenuation. The use of noise level reduction criteria would not eliminate outdoor noise increases. Residential uses are an incompatible and unmitigable land use over 75 dB CNEL; however, no residential land uses are exposed to noise over the 75 dB CNEL under this locational scenario. Incompatibility does not constitute a federal determination that any land use is acceptable or unacceptable under federal, state, or local law, nor are they used to determine if a structure is habitable or uninhabitable. Impacts on residential land uses would be considered a significant impact. See Section CA3.1, *Noise*, for a detailed discussion of potential noise impacts related to sensitive uses (e.g., residential homes, schools, churches, nursing homes).

The public land use category typically includes various types of public facilities and amenities that can include government services (including schools and medical facilities), transportation, parking, public parks, and water features (including reservoirs and wetlands). An additional 59 acres of public land uses would be within the 65 to 70 dB CNEL noise contours and 11 acres within the 70 to 75 dB CNEL noise contours. A majority of the public land uses within the proposed noise contours are associated with school facilities/campuses and reservoir/lake ponds.

One school facility would have area that would be newly exposed to the 70 to 75 dB CNEL noise contour (Irwin O. Addicott Elementary School/Scandinavian Middle School); this facility currently has 2 acres of land within the 65 to 70 dB CNEL noise contours. Under this locational scenario, the school facility would have an additional 6 acres exposed to 65 to 70 dB CNEL and 3 acres exposed to 70 to 75 dB CNEL. School facilities are compatible with land uses up to 65 dB CNEL. School facilities are discouraged within the 65 to 75 dB CNEL noise contour; however, where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor noise level reduction of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. School uses are an incompatible and unmitigable land use over 75 dB CNEL; however, no school facilities are exposed to noise over 75 dB CNEL under this locational scenario. Impacts on public land uses as they relate to school facilities would be considered a significant impact without implementation of appropriate noise level reduction measures. See Section CA3.1, *Noise*, for a detailed discussion of potential noise impacts related to sensitive uses (e.g., households, schools, churches, nursing homes).

There would be an additional 260 acres of industrial land uses within the 65 to 70 dB CNEL noise contours, 51 acres within the 70 to 75 dB CNEL noise contours, and 7 acres within the 75 to 80 dB CNEL. Most transportation (highway and street right-of-way) and industrial uses are

compatible up to 85 dB CNEL with appropriate noise level reduction measures. There are no industrial uses within noise contours above 85 dB CNEL; therefore, impacts on industrial land uses would not be considered a significant impact under this locational scenario.

Part 150 guidance states that most commercial uses up to 80 dB are compatible with noise level reduction measures that would be achieved through the incorporation of noise attenuation. Similarly, most agricultural uses are compatible up to 85 dB CNEL with appropriate noise level reduction measures. Unclassified land (e.g., unknown/other, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not considered under Part 150 guidance. There are no commercial or agricultural uses within noise contours above 75 dB CNEL; therefore, impacts on these land uses would not be considered significant under this locational scenario.

Golf courses are compatible up to 80 dB CNEL with implementation of noise level reduction measures for structures associated with these facilities. Fresno Airways Golf Course (located on FAT but open to the general public) would have 8 additional acres of land newly exposed to 75 to 80 dB CNEL. Therefore, impacts on land use as they relate to recreational uses at the Fresno Airways Golf Course would be considered a significant impact without implementation of appropriate noise level reduction measures.

Locational Scenario 2

Land use impacts as a result of construction for F-15EX Locational Scenario 2 would be similar to those described for Locational Scenario 1. Locational Scenario 2 would have a 37 percent larger construction footprint (1,588,200 SF) than Locational Scenario 1. There would be no significant impacts on land use related to construction as a result of basing of the F-15EX aircraft as all construction would occur within the installation.

Effects related to the proposed noise contours, operations, and land use would be similar to those described under the basing of the F-15EX Locational Scenario 1 as they both increase overall airport operations by 3.6 percent compared to existing conditions/No Action Alternative, and changes to proposed noise contours would be the same as described for Locational Scenario 1.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.5.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW retain the 18 F-15C legacy aircraft, impacts would be less intensive in magnitude than the basing of the F-15EX. Construction for the F-15C legacy aircraft would include a construction footprint of 1,062,000 SF. Impacts related to construction would remain similar to the basing of the F-15EX and impacts related to operation would remain the same as existing conditions/No Action Alternative; impacts on land use would not be significant. No land use changes are proposed as a result of the proposed construction.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.5.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The 144 FW would remain in their current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on land use would not be significant.

CA3.5.3 Summary of Impacts

Under the F-15EX Alternative, there would be an increase by approximately 1,086 acres of off-airport property experiencing noise levels greater than 65 dB CNEL. Under the F-15EX, there would be an additional 262 acres of residential land use within the 65 to 70 dB CNEL noise contours and 15 acres within the 70 to 75 dB CNEL noise contours. Impacts on residential land uses would be considered significant without implementation of appropriate noise level reduction measures under the F-15EX Alternative.

Under the F-15EX Alternative, Irwin O. Addicott Elementary School/Scandinavian Middle School would have an additional 3 acres exposed within the 70 to 75 dB CNEL noise contour. Impacts on public land uses as they relate to school facilities would be considered a significant impact without implementation of appropriate noise level reduction measures.

There are no commercial, industrial, or agricultural uses above 80 dB CNEL for the F-15EX Alternative; therefore, impacts on commercial, industrial, and agricultural land uses would not be considered significant.

There are no recreational uses above 80 dB CNEL associated with the Fresno Airways Golf Course. Golf courses are compatible up to 80 dB CNEL with implementation of noise level reduction measures for structures associated with these facilities. Therefore, impacts on land use as they relate to recreational uses at the Fresno Airways Golf Course would be considered significant without implementation of appropriate noise level reduction measures.

Should the F-15C legacy aircraft alternative be selected, there would be no new impacts on land use. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities. Therefore, impacts on land use at the airfield under the Legacy Alternative would not be significant. Impacts under the No Action Alternative would be similar to the Legacy Alternative.

CA3.6 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) properties were identified within the vicinity of FAT by reviewing the following data sources:

- Park location data from USFWS, National Park Service, State of California, Fresno County, and City of Fresno Parks and Recreation Department.
- GIS and Google Earth mapping depicting publicly owned properties such as National Parks, state forests, wildlife management areas, trails, cemeteries, zoos, tribal lands, and local preserves and conservation areas managed by federal agencies, agencies of the State of California, Fresno County, City of Fresno, and the Fresno Unified Public School System.
- Information obtained from the NRHP and the California State Historic Resources Commission.
- The cultural resources assessment that was prepared for this project (see Section CA3.9).

CA3.6.1 Affected Environment

CA3.6.1.1 Installation

Section 4(f) Parks, Recreation Areas, and Refuges

To adequately capture all publicly owned parks, recreation areas, or wildlife/waterfowl refuges potentially eligible for protection under Section 4(f), the ROI includes: (1) areas where *permanent incorporation* (a qualifying 4(f) property is partially or completely acquired and permanently

incorporated into a transportation facility) could occur; (2) areas of *temporary occupancy* (short-term construction impacts related to temporary construction roads and material staging); and (3) areas of *constructive use* (indirect impacts related to construction, noise, vibration impacts, or impairment of property access), including areas where noise impacts from construction activities and/or operations as a result of implementation of the Proposed Action alternatives are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired.

Each potential 4(f) property was evaluated to determine if it is publicly owned; is open and accessible to the public; has a major or primary purpose, and is considered "significant" for park, recreation, or refuge activities. As shown on Table CA3.6-1 and Figure CA3.6-1, six potential Section 4(f) resources were identified in the vicinity of FAT. The Palm Lakes Municipal Golf Course facility was shut down by the City of Fresno in 2006. The primary purpose of the Irwin O. Addicott Elementary School and Scandinavian Middle School Recreational Facility is to serve as a facility for students at the school and/or other primary and elementary schools and is not open to the general public. The primary purpose of the Basin C. Park is to serve as a stormwater retention basin; therefore, these resources were not carried forward for further analysis.

Section 4(f) Historic Sites

As listed in Table CA3.6-2 and shown on Figure CA3.6-1, there is one historic site of national, state, and/or local significance considered Section 4(f) resource located within the APE at the 144 FW. This historic site is an off-airport resource, the Gould Canal. Gould Canal has been recorded and is listed in the California Office of Historic Preservation's (OHP) Built Environment Resources Directory (Southern San Joaquin Valley Information Center 2023). Per the California Historical Resource Status Code, 6Y, the Gould Canal was determined not eligible for listing in the NRHP by consensus through the Section 106 process; however, it is unevaluated for the California Register or any other local listing (California OHP 2020). There are no archaeological sites, traditional cultural resources, historic or archaeological districts, historic transportation sites, or historic trails located with the APE (National Park Service 2022a; Southern San Joaquin Valley Information Center 2023).

Table CA3.6-1 Section 4(f) Properties within the Vicinity of Fresno Yosemite International Airport (FAT)

Section 4(f) Resource	*Description*	*Owned by*	*Open to the Public?*
Fresno Airways Municipal Golf Course	Airways Golf Course, established in 1952, is located within FAT property boundary. The facility offers 18 holes, 5,286 yards, a driving range, practice putting green, coffee shop, and a Pro Shop.	FAT/City of Fresno	Full Public Access
Palm Lakes Municipal Golf Course	Public, 18-hole golf course. Facility was closed in 2006 by the City of Fresno.	City of Fresno	Closed N.A.
Large Park	6.9-acre neighborhood park, which includes a football/soccer field. Primary purpose is recreation.	City of Fresno, Parks and Recreation	Full Public Access
Rotary West Sports Center	Approximately 12-acre park that includes soccer and baseball/softball fields. Primary purpose is recreation.	City of Fresno, Parks and Recreation	Full Public Access
Vinland Park	7.5-acre neighborhood park, adjacent to Vinland Elementary School. Amenities include barbecues, baseball/softball fields, basketball, children's play area, football/soccer field, parking lot, picnic tables, restrooms, and tennis courts. Primary purpose is recreation.	City of Fresno, Parks and Recreation	Full Public Access
Basin C. Park	The primary use of this facility is to serve as a stormwater basin to capture and control stormwater. The secondary purpose is to function as a park and open space when not retaining stormwater.	Fresno Metropolitan Flood Control District	Full public access during dry season, closed to the public during rainy season
Irwin O. Addicott Elementary School and Scandinavian Middle School Recreational Facility	Irwin O. Addicott Elementary School is a public middle school and Scandinavian Middle School is a public middle school in Fresno. A chain-link fence surrounds the recreational facilities and schools. The primary purpose of the recreational facility is to serve the students at the school. Facility includes track, soccer field, and basketball courts.	Fresno Unified School District	Not Open to the Public

Legend: FAT = Fresno Yosemite International Airport.
Sources: City of Fresno 2022a; Fresno Unified Public School District 2022.

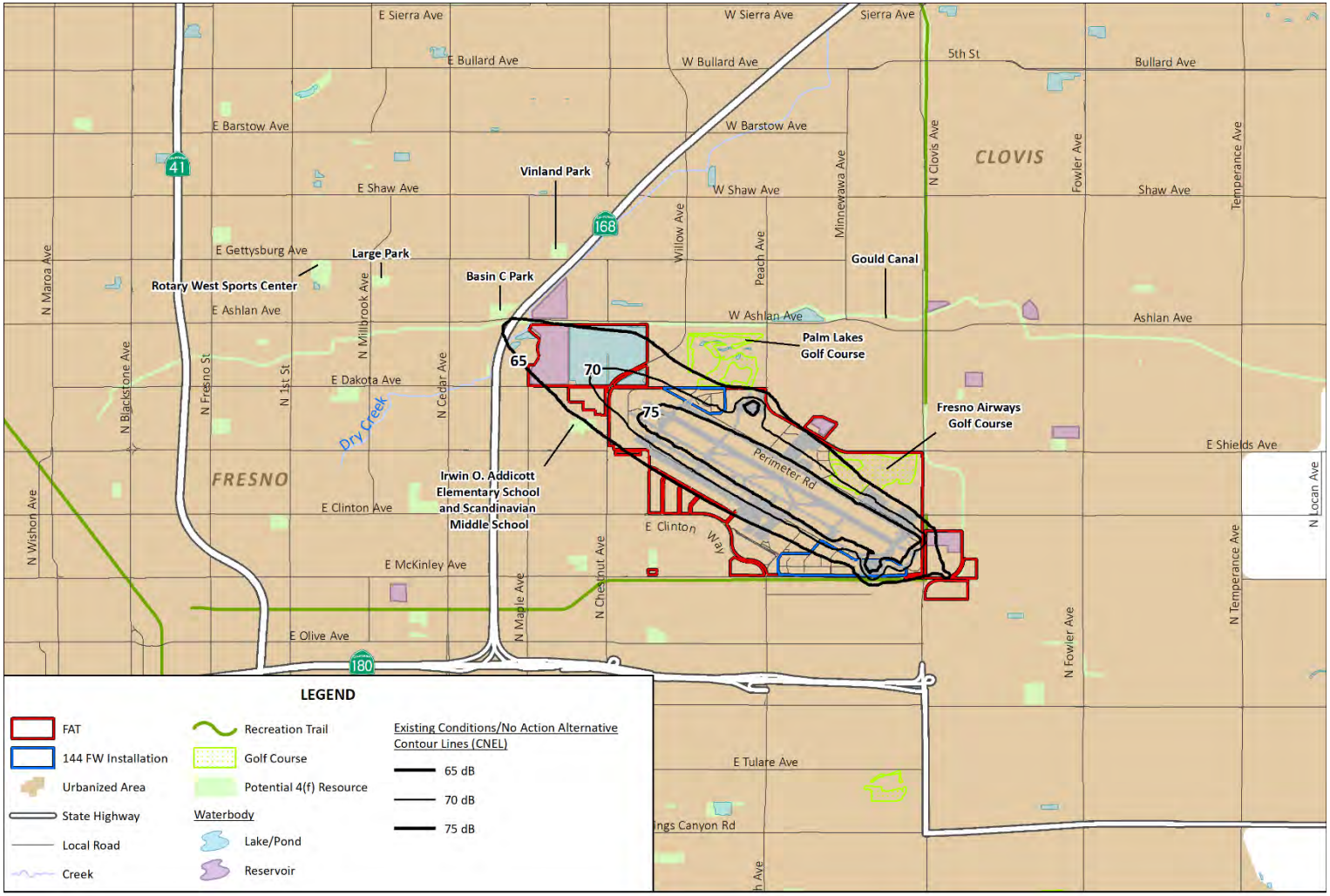


Figure CA3.6-1 Section 4(f) Properties with Existing Noise Contours within the Vicinity of Fresno Yosemite International Airport (FAT)

Source: CAANG 2022, Fresno City 2022, Fresno County 2022

Table CA3.6-2 Section 4(f) Historic Sites within the Vicinity of Fresno Yosemite International Airport (FAT)

CHRIS Number	*Building Number*	*Location/Common Name*
CA-FRE-003825	Gould Canal	Gould Canal

Legend: CHRIS = California Historic Resources Information System.
Source: Southern San Joaquin Valley Information Center 2023.

CA3.6.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.6.2 Environmental Consequences

Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant. See Section CA3.1, *Noise*, for a detailed discussion on noise impacts.

CA3.6.2.1 F-15EX

Installation

Locational Scenario 1

No permanent incorporation of land, direct use, or temporary occupancy of 4(f) resources under the basing of the F-15EX aircraft would occur as no construction would occur near or within the boundaries of 4(f) resources under Locational Scenario 1. There would be no significant impacts on Section 4(f) related to construction as a result of basing of the F-15EX aircraft.

Under this alternative, 16 additional Section 4(f) historic sites would fall within the 65 dB DNL noise contours (Table CA3.6-3 and Figure CA3.6-2). None of these historic sites have been evaluated for eligibility to the NRHP or California State Register; therefore, they are managed as if they are eligible (Southern San Joaquin Valley Information Center 2023). The Southern Pacific Railroad also falls within the 70 to 75 dB DNL.

Table CA3.6-3 Section 4(f) Historic Sites Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of Fresno Yosemite International Airport (FAT)

CHRIS Number	*Name*	*Address*
P-10-003930/ CA-FRE-003109H	Southern Pacific Railroad	N/A
P-10-005049	Building 110	144 FW Installation
P-10-005050	Building 112	144 FW Installation
P-10-005051	Building 114	144 FW Installation
P-10-005052	Building 120	144 FW Installation
P-10-005053	Building 116	144 FW Installation
P-10-005054	Building 124	144 FW Installation
P-10-005055	Building 102	144 FW Installation
P-10-005056	Building 105	144 FW Installation
P-10-005057	Building 101	144 FW Installation
P-10-005058	Building 107	144 FW Installation
P-10-005060	Building 109	144 FW Installation
P-10-006647	Harpain Dairy Palms	3949 North Barton Avenue
P-10-006856	Robert Whitaker Home	4545 East Garland Avenue
P-10-006857	Max Neunzig Home	4546 East Robinson Avenue
P-10-006859	Charles E. Sickler Home	4544 East Dakota Avenue

Legend: 144 FW = 144th Fighter Wing; CHRIS = California Historic Resources Information System; dB = decibel; N/A = Not Applicable.
Source: Southern San Joaquin Valley Information Center 2023.

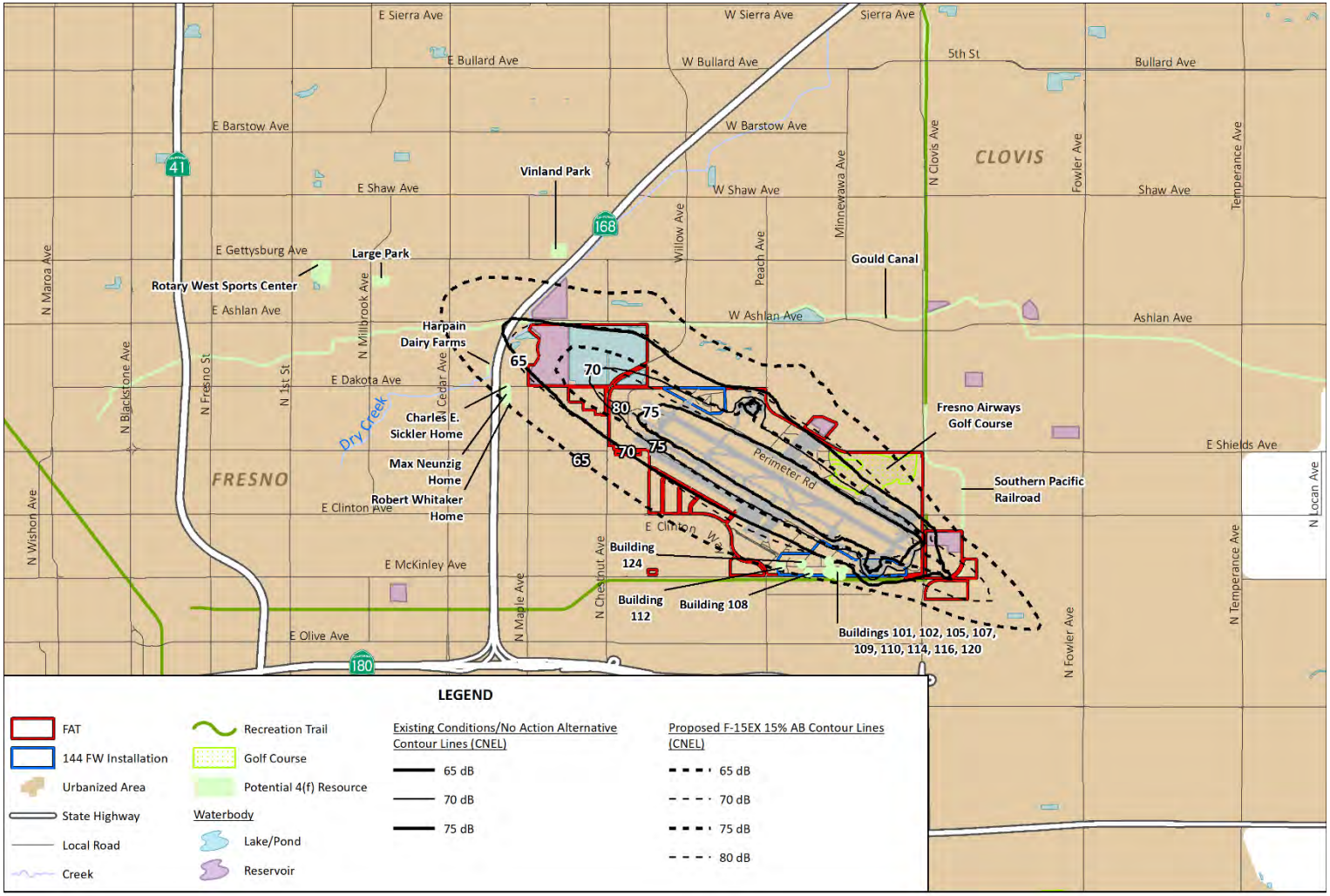


Figure CA3.6-2 Section 4(f) Properties with Existing and Proposed F-15EX Noise Contours in the Vicinity of Fresno Yosemite International Airport (FAT)

Since all construction would occur within the part of the airport already subject to airport use, there would be no constructive use based on visual impacts. The 144 FW uses the FAA Part 150 guidance for land use compatibility. At levels greater than or equal to 65 dB CNEL, different land uses are either considered compatible, compatible with recommended sound attenuation materials incorporated into the construction, or not compatible. Based on Part 150 guidelines, noise sensitive land uses (e.g., residential dwellings, churches, schools, and nursing homes) are considered compatible with aircraft noise at levels below 65 dB CNEL. Hence, noise mitigation measures at airports have generally been restricted to areas exposed to noise of 65 dB CNEL or greater where noise level reduction through incorporation of sound attenuation into the design and construction of a structure may be necessary to achieve compatibility. In regard to recreational uses, Part 150 guidelines state that parks are compatible up to 75 dB CNEL. Golf courses are compatible up to 80 dB CNEL with noise level reduction measures implemented for structures associated with these facilities.

Annual 144 FW operations at FAT would increase by 81 percent; overall airport operations would increase by 3.6 percent should the 144 FW acquire the new F-15EX airframe. The Section 4(f) analysis compares the proposed noise contours to current noise contours, which shows potential change in noise conditions and land use compatibility that could result in *constructive use* of Section 4(f) resources. As shown on Table CA3.6-4 and Figure CA3.6-2, there is one Section 4(f) resource that falls within the proposed noise contours above 65 dB CNEL, the Fresno Airways Municipal Golf Course. However, golf courses are compatible up to 80 dB CNEL with implementation of noise level reduction measures for structures associated with these facilities. In addition, per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and 4(f) impacts related to the Proposed Action would not be considered significant. See Section CA3.1, *Noise*, for a detailed discussion on noise impacts.

For historic sites, a finding of "no adverse effect" in the Section 106 process automatically means that there is no constructive use, according to the Section 4(f) regulations; no further analysis is required. Therefore, impacts on Section 4(f) resources would not be considered significant. DAF is currently seeking concurrence from the SHPO regarding its finding of no adverse effect for the Proposed Action (see Section CA3.9, *Cultural Resources*, for detailed analysis on historic properties).

Table CA3.6-4 Acreage of Section 4(f) Resource Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft in the Vicinity of Fresno Yosemite International Airport (FAT)

Section 4(f) Resource	*Current 65–70 dB CNEL*	*Proposed 65–70 dB CNEL*	*Change in Acres*	*Current 70–75 dB CNEL*	*Proposed 70–75 dB CNEL*	*Change in Acres*	*Current 75–80 dB CNEL*	*Proposed 75–80 dB CNEL*	*Change in Acres*	*Current 80–85 dB CNEL*	*Proposed 80–85 dB CNEL*	*Change in Acres*
Fresno Airways Municipal Golf Course	39	35	**-4**	4	24	**20**	0	8	**8**	0	0	**0**

Legend: dB = decibel; CNEL = Community Noise Equivalent Level.

Locational Scenario 2

Section 4(f) impacts as a result of construction for F-15EX Locational Scenario 2 would be similar to those described for Locational Scenario 1. Locational Scenario 2 would have a 38 percent larger construction footprint (1,588,200 SF) than Locational Scenario 1. There would be no construction associated with the Fresno Airways Golf Course or any other Section 4(f) resource. There would be no significant impacts on 4(f) related to construction as a result of basing of the F-15EX aircraft.

Effects related to operations would be the same as those described under the basing of the F-15EX Locational Scenario 1 as they would both increase overall operations at FAT by 3.6 percent compared to existing conditions/No Action Alternative, and noise contours would be the same as under Locational Scenario 1.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.6.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW retain the F-15C legacy aircraft, impacts would be less intensive in magnitude than the basing of the F-15EX. Construction for the F-15C legacy aircraft would include a construction footprint of 1,062,000 SF 12 percent and 8 percent less, respectively, than the F-15EX and there would be no increase in flying operations. Impacts related to construction would remain similar to the basing of the F-15EX and impacts related to aircraft operations would remain the same as existing conditions/No Action Alternative. There would be no construction associated with the Fresno Airways Golf Course or any other Section 4(f) resource or secondary impacts related to noise. No impacts on Section 4(f) resources would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.6.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft.

Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on Section 4(f) resources would not be significant.

CA3.6.3 Summary of Impacts

Construction and operations associated with the F-15EX beddown or construction associated with retaining the legacy F-15C aircraft would not have appreciable effects to proposed Section 4(f).

Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and any 4(f) impacts related to the Proposed Action would not be considered significant.

CA3.7 WATER RESOURCES/FLOODPLAINS/WILD AND SCENIC RIVERS

CA3.7.1 Affected Environment

CA3.7.1.1 Installation

Groundwater

FAT, including the 144 FW installation, is located within the San Joaquin Valley Groundwater Basin in the Kings Subbasin spanning Fresno, Kings, and Tulare counties. Groundwater flow is generally to the southwest. The City of Fresno delivers water to the city and county primarily through the groundwater supply, which is supplemented by treated surface water (NGB 2013a; FAT 2019). The 144 FW installation relies entirely on groundwater supplied by the City of Fresno for potable water supply. The City of Fresno has implemented a Groundwater Recharge Program that uses surface water to replace lost groundwater at an artificial recharge zone called Leaky Acres, which is located north of the FAT runways, and smaller facilities in Southeast Fresno (Figure CA3.7-1). Problems associated with the groundwater supply include degradation of quality, moderate overdraft, high consumption, and stringent water quality standards leading to a reduction in potable water supply in the vicinity of the 144 FW installation (NGB 2013a; FAT 2019). There is one groundwater well on the installation classified as an emergency potable water source by the San Joaquin Valley Regional Water Control Board. The installation is able to draw water from the well for use under emergency conditions for up to 15 days annually (NGB 2013a; FAT 2019).

Surface Water

The San Joaquin and Kings Rivers are the two major drainages within or bordering the Kings Subbasin. Surface water within the vicinity of the 144 FW installation consists primarily of controlled discharges from Kings River to local irrigation canals. The closest irrigation canal to the installation is Mill Ditch, located along the southern property boundary of FAT and the 144 FW installation, parallel to McKinley Avenue (Figure CA3.7-1) (FAT 2019).

There are no jurisdictional waters of the U.S. within the 144 FW installation (FAT 2019), therefore they are not discussed further in this analysis (see Section CA3.12.1.1 for discussion of wetlands).

There are a total of four stormwater infiltration ponds within FAT, two managed by the airport and two managed by the Fresno Metropolitan Flood Control District. Stormwater is typically contained within the infiltration ponds and overflow does not typically occur. However, during periods of high rainfall, overflow stormwater is directed to Mill Ditch (NGB 2013a; FAT 2019). Stormwater flow within the main cantonment of the installation is generally at a southwesterly gradient and stormwater discharges into a stormwater infiltration basin bordering the installation to the west. The stormwater basin is maintained by the Fresno Metropolitan Flood Control District and also receives discharges from the municipal storm sewer system and FAT. Stormwater overflow from the northern 144 FW installation discharges to Mill Ditch by way of an existing storm drainage pump station located west of Clovis Avenue on the south side of McKinley Avenue (NGB 2013a; FAT 2019).

Floodplains

Most of FAT is not within any 100-year flood hazard areas (i.e., 1 percent annual chance of flooding) or 500-year hazard areas (i.e., 0.2 percent annual chance of flooding). There are, however, portions of airport property categorized as being within the 100-year and 500-year floodplains (Figure CA3.7-1). These include the groundwater recharge area known locally as Leaky Acres northwest of the runways and the stormwater management pond near the airport entrance road north of McKinley Avenue. Mill Ditch, the manmade canal along the south side of McKinley Avenue is also considered within the 100-year and 500-year floodplains. Areas to the south and northwest of the airport are considered the 500-year floodplain. A majority of the 144 FW installation is located outside the 100-year and 500-year floodplains; however, the westernmost portion of the southern ANG parcel next to the Peach/McKinley Basin is located within the 100-year and 500-year floodplains (FEMA 2009; FAT 2019).

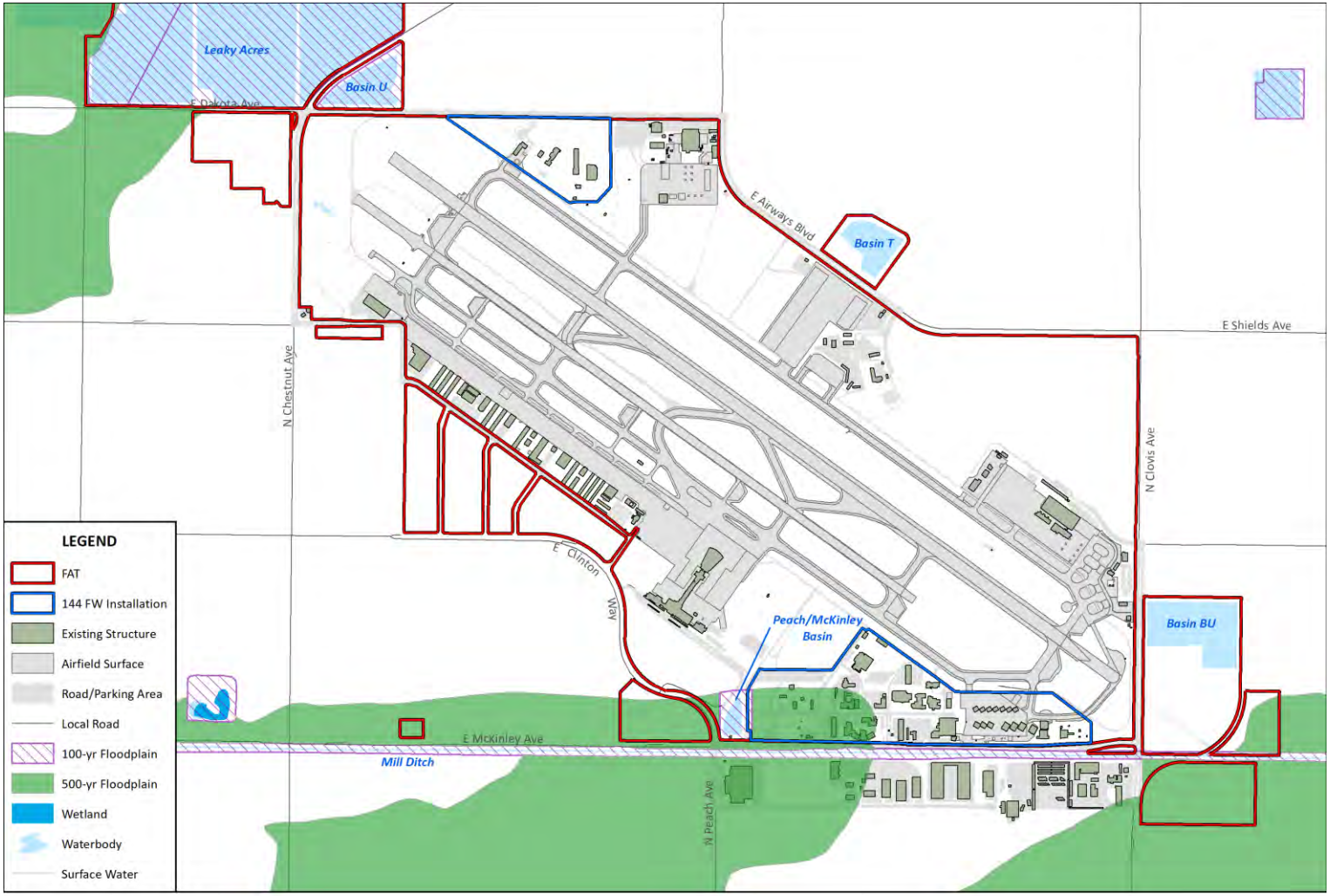


Figure CA3.7-1 Water Resources at Fresno Yosemite International Airport (FAT)

Wild and Scenic Rivers

There are no wild and scenic rivers in close proximity to the 144 FW installation (National Park Service 2022b). The closest wild and scenic river is the Kings River located approximately 42 miles to the east. Therefore, no further discussion of wild and scenic rivers will be included in this analysis.

CA3.7.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.7.2 Environmental Consequences

CA3.7.2.1 F-15EX

Installation

Locational Scenario 1

Groundwater

Construction activities, as shown in Figure CA3.7-2, and operations under the F-15EX beddown for Locational Scenario 1 at FAT would include stormwater runoff protection measures that would also serve to protect groundwater quality. By implementing BMPs identified in a site-specific SWPPP, to be prepared in adherence with the Construction General Permit (see below under Surface Water), stormwater pollutant loading would be minimized and thus pollution loading potential to the underlying groundwater basins during construction would be minimized. Impacts on groundwater recharge would be minimized through implementation of LID technologies that would ensure predevelopment hydrology is maintained. Site grading and construction activities would also not reach depths at which groundwater would be affected. Personnel numbers would increase by approximately 101 at the 144 FW installation under this locational scenario. Therefore, there would be a minor increase in demand on potable water supplies. After construction, adhering to the FAT Industrial Stormwater General Permit and associated SWPPP (FAT 2015), which also covers the 144 FW installation, would help prevent stormwater pollutant loading potential to the underlying groundwater basins. Implementation of stormwater runoff protection measures, as necessary and appropriate, would ensure that impacts on groundwater under this locational scenario at the 144 FW installation would not be significant.

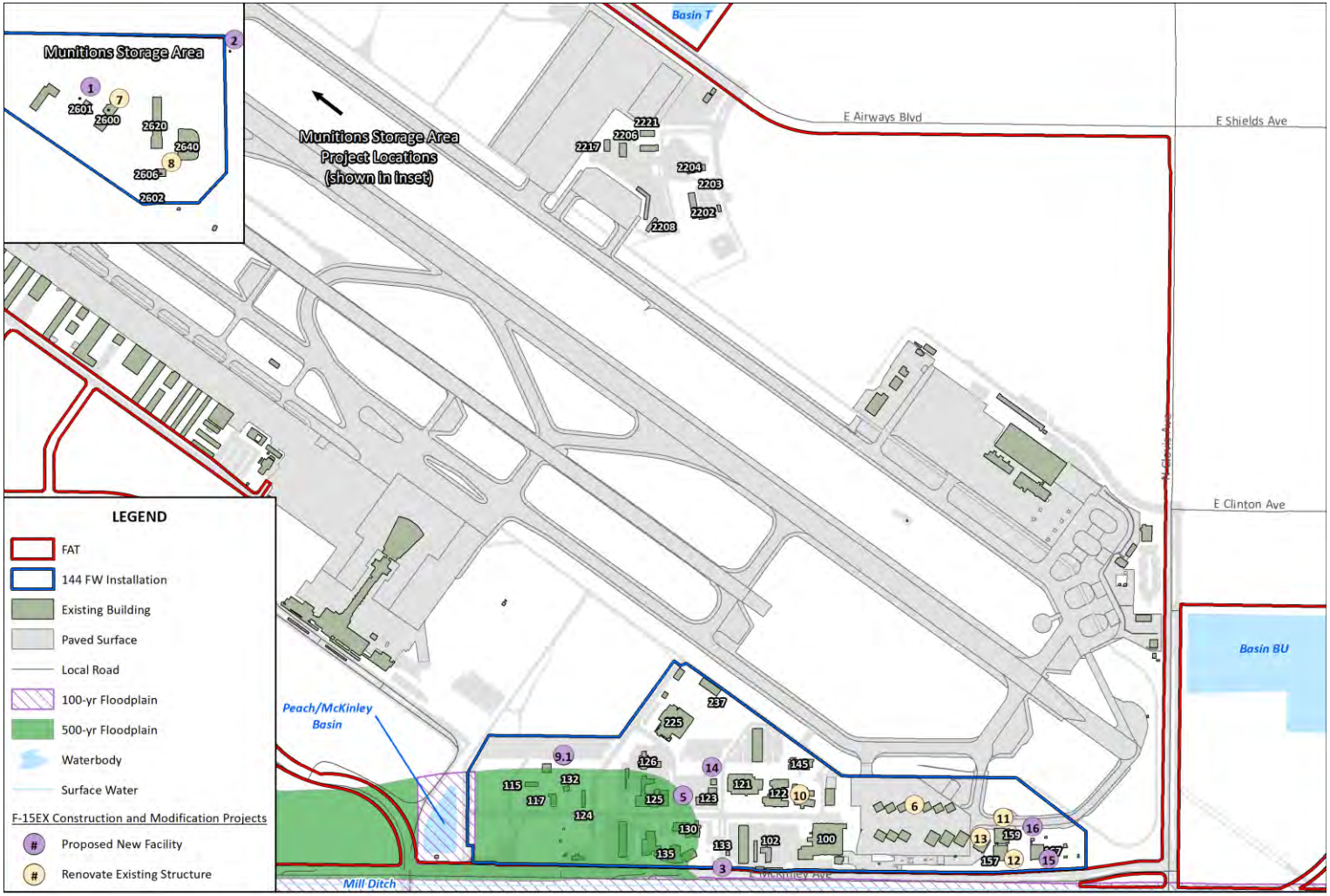


Figure CA3.7-2 Water Resources within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 1 at the 144 FW Installation

Surface Water

The 144 FW installation must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (General Permit Order 2009-0009-DWQ) prior to implementation of individual projects. To obtain coverage, the 144 FW would need to submit a Notice of Intent, SWPPP and other required documents, and permit fee to the California State Water Board. Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation.

To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs identified in a site-specific SWPPP, to be prepared in compliance with the Construction General Permit, would be implemented during and following the construction period. These measures could include straw bales, sandbags, silt fencing, earthen berms, tarps or water spraying, soil stabilization, temporary sedimentation basins, and re-vegetation with native plant species, where possible, to decrease erosion and sedimentation. Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential.

As a result of the F-15EX beddown alternative for Locational Scenario 1 at FAT, there would be approximately 231,300 SF of net new impervious surfaces from the proposed facility construction and modification activities. While an increase of 231,300 SF of impervious surface is relatively minor, any increase in impervious surface could result in an associated increase in stormwater runoff volume and intensity, total suspended particulates to nearby surface waters. However, the integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area. In addition, implementing LID into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. All new facilities would be in compliance with the FAT Industrial General Permit and associated SWPPP.

Implementation of surface runoff measures, as necessary and appropriate, would ensure that impacts on surface water as a result of implementation at this locational scenario would be minimal and not significant.

Floodplains

Consistent with EO 13690, the 0.2-percent-annual-chance flood approach was used to establish the floodplain area that could be impacted. Proposed construction activities for Project 5 and

Project 9.1 would occur within or immediately adjacent to the 500-year floodplain zone, as shown in Figure CA3.7-3. Consistent with AFI 32-1023, design of these new facilities would address flood risk condition protection requirement minimums outlined in UFC 1-200-01. As such, the project would be consistent with EO 13690 and impacts on floodplains under this locational scenario would not be significant.

Locational Scenario 2

Impacts on groundwater for Locational Scenario 2 would be similar to those described for Locational Scenario 1. As a result of the F-15EX beddown alternative at Locational Scenario 2, there would be approximately 670,900 SF of net new impervious surfaces from the proposed facility construction and modification activities, shown in Figure CA3.7-3. Increased surface water runoff would be managed by implementing LID strategies, implementation of BMPs, adherence to the SWPPP, and implementing surface runoff measures, as necessary and appropriate, and would ensure that impacts on surface water would be minimal and not significant. Consistent with AFI 32-1023, design of new facilities for Project 9.1 and Project 5 would address flood risk condition protection requirement minimums outlined in UFC 1-200-01. As such, the project would be consistent with EO 13690 and impacts on floodplains under this alternative would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.7.2.2 F-15C Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would create 104,700 SF of new impervious surfaces. There would be less impervious surfaces as compared to the F-15EX Alternative at any locational scenario on FAT. Impacts on groundwater resources would be minimal. Increased surface water runoff would be managed by implementing LID strategies, implementation of BMPs, adherence to the SWPPP, and implementing surface runoff measures, as necessary and appropriate, and would ensure that impacts on surface water would be minimal and not significant. Proposed construction activities for Project 5 and Project 24 would occur within or immediately adjacent to the 500-year floodplain zone, as shown in Figure CA3.7-4. Consistent with AFI 32-1023, design of these facilities would address flood risk condition protection requirement minimums outlined in UFC 1-200-01. As such, the project would be consistent with EO 13690 and impacts on floodplains under this alternative would not be significant.

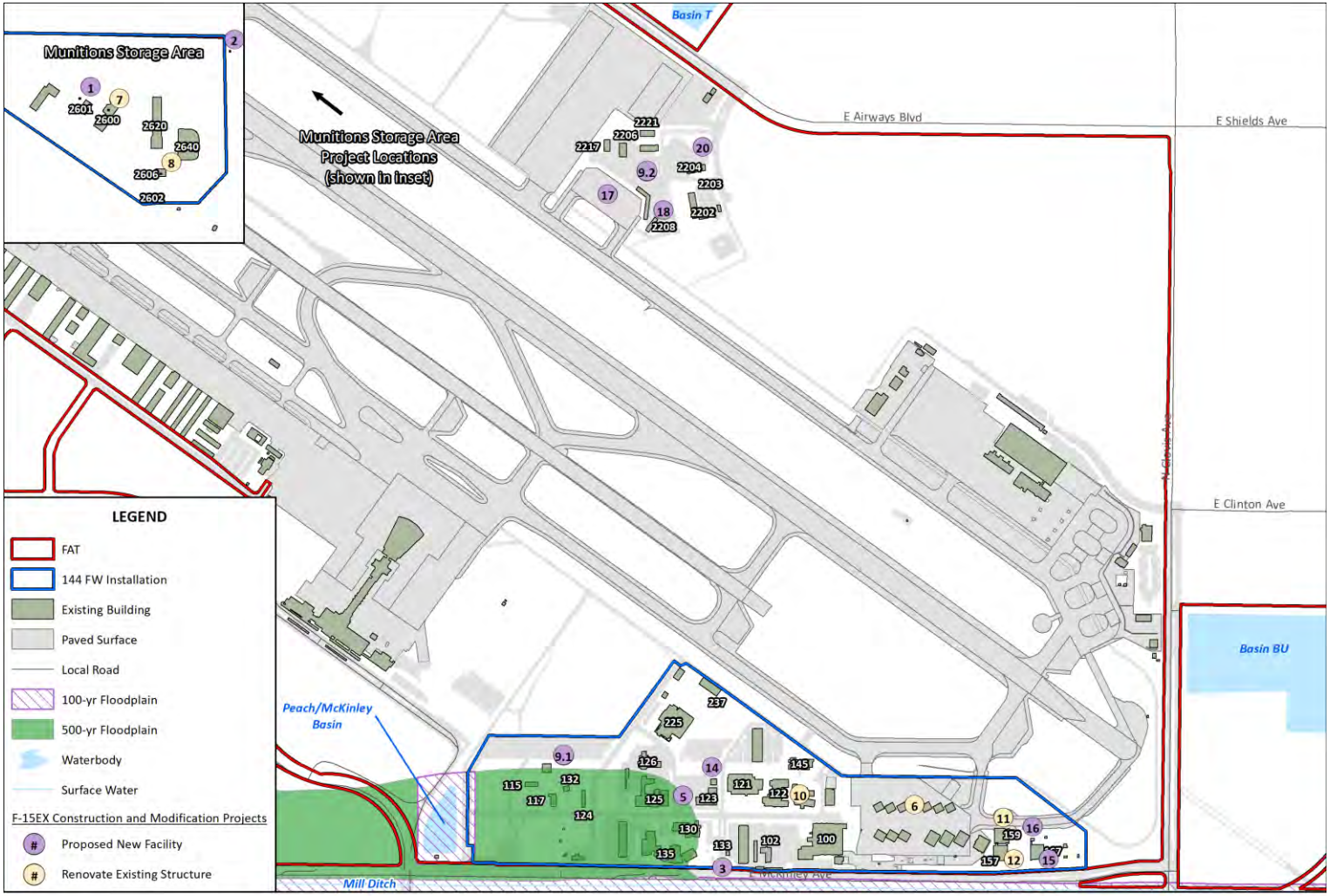


Figure CA3.7-3 Water Resources within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 2 at the 144 FW Installation

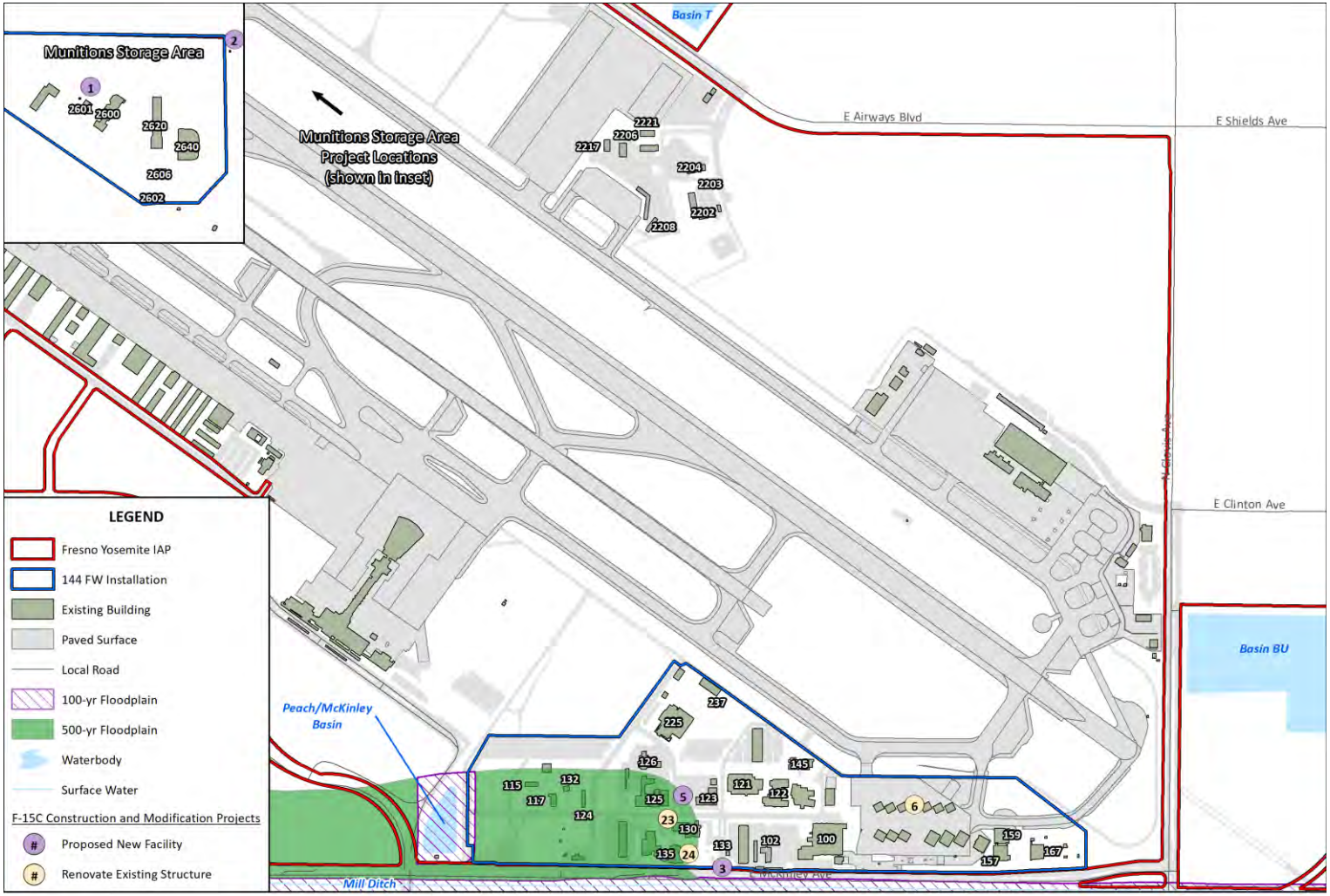


Figure CA3.7-4 Water Resources within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 144 FW Installation

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.7.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in their current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on water resources would not be significant.

CA3.7.3 Summary of Impacts

Under the Proposed Action alternatives at the 144 FW at FAT, proposed construction activities would result in up to 231,300 SF for Locational Scenario 1, and 670,900 SF for Locational Scenario 2 of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. None of the proposed construction or modification projects are located within the 100-year floodplain. Impacts on water resources as a result of the proposed beddown of the F-15EX or retention of the F-15C aircraft at the 144 FW installation at FAT would not be significant. In addition, under the No Action Alternative, impacts on water resources would not be significant.

CA3.8 GEOLOGICAL RESOURCES/SOILS/FARMLANDS

CA3.8.1 Affected Environment

CA3.8.1.1 Installation

Topography and Geology

Regional topography is characterized by a nearly level alluvial plain of the San Joaquin River enclosed by the Sierra Nevada foothills to the east, the Tehachapi Mountains to the south, and the Coast Mountain Ranges. Elevation at FAT, which includes the 144 FW installation, is approximately 326 feet above MSL. The majority of the airport property is essentially flat, with the total relief not more than 10 feet (144 FW 2007). The unconsolidated alluvial fan deposits at

the installation are characterized by fine-grained silt and sand extending to depths of 1,000 feet or more below ground surface (144 FW 2007).

Fresno is in one of the more geologically stable areas of California and does not lie within a known active earthquake fault zone. Many faults are located within the Sierra Nevada Mountain Range, with the nearest active fault located approximately 100 miles to the east near Independence, CA. Overall, seismic-related concerns (including liquefaction and subsidence) are considered minor for FAT and surrounding areas (144 FW 2018). The principal potential earthquake hazard for Fresno is ground shaking, which could cause damage to buildings and infrastructure elements such as bridges and pipes.

Soils

Native soils beneath the proposed construction and modifications areas for both locational scenarios are described in detail in Table CA3.8-1. However, during development of existing installation facilities and associated infrastructure, most native soils were highly disturbed, removed, or covered by fill materials designed to support development (144 FW 2007).

Table CA3.8-1 Soil Types and Characteristics at Fresno Yosemite International Airport (FAT)

Soil Name	*Description*
Atwater sandy loam	This soil is derived from the Atwater series which consists of deep, well-drained coarse textured and moderately coarse-textured soil that formed in stabilized old dunes of wind-sorted material.
Atwater sandy loam, moderately deep	This soil is similar to the Atwater sandy loam except that it has a thick, hard, unrelated substratum of compacted, weekly cemented, sandy material that underlies this soil at a moderate depth.
Atwater loamy sand	This soil is described as typical for the Atwater series. Runoff from this soil is very slow because of the gentle slopes and moderately rapid permeability.
Hanford sandy loam	This soil is from the Hanford series which consists of very deep, well drained soils that formed in moderately coarse textured alluvium dominantly from granite.

Sources: NRCS 2022; 144 FW 2007.

Farmlands

There are two designated types of farmlands that exist within the boundaries of FAT which include Prime Farmland if irrigated and Farmland of Statewide Importance (Figure CA3.8-1, NRCS 2022). Proposed construction and modification projects for both locational scenarios are located within land classified as Prime Farmland if irrigated. However, there are no current agricultural activities within FAT or the 144 FW installation and these soils were removed, altered, or covered by fill materials, as previously described under *Soils*.

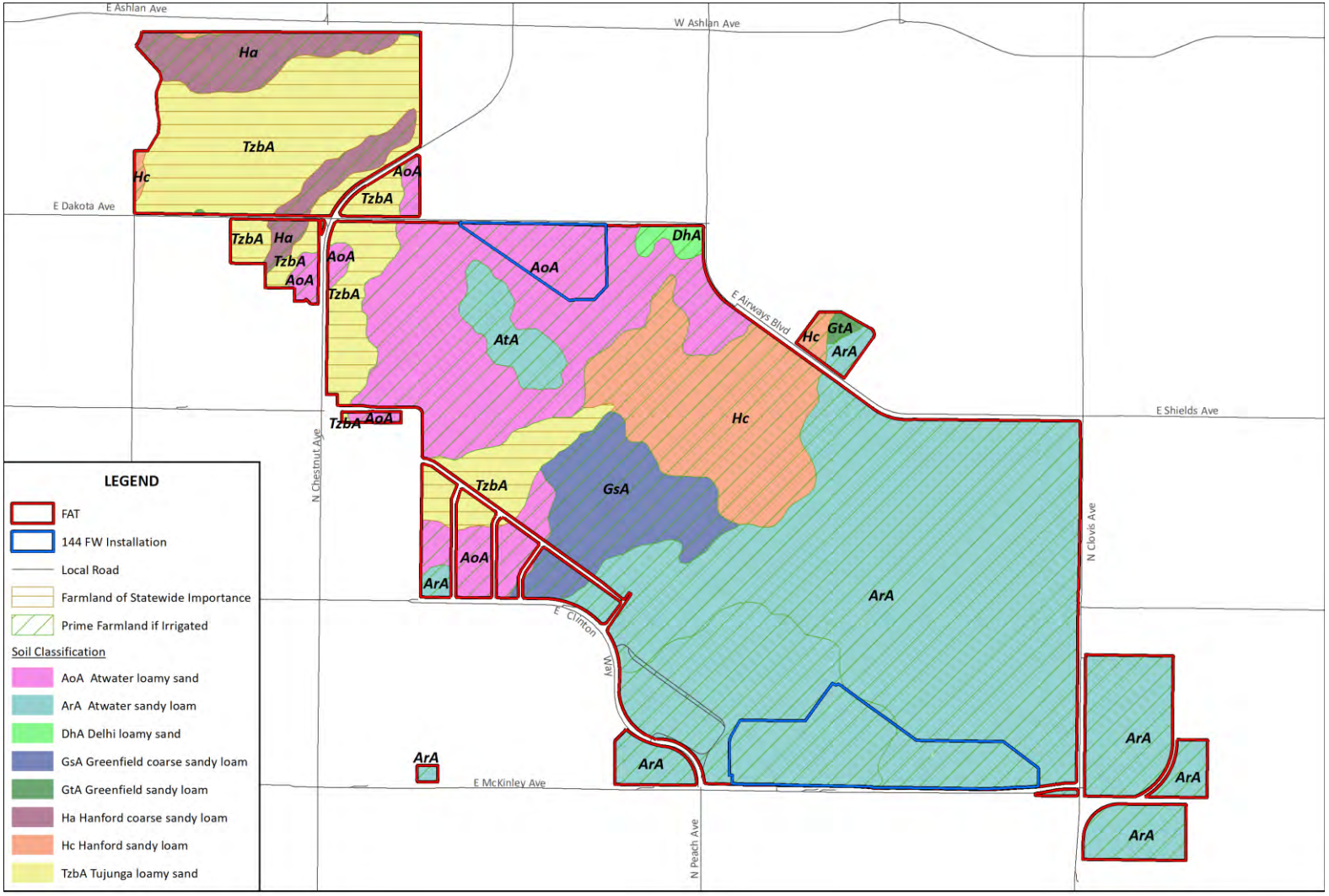


Figure CA3.8-1 Geological Resources at Fresno Yosemite International Airport (FAT)

CA3.8.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.8.2 Environmental Consequences

CA3.8.2.1 F-15EX

Installation

Locational Scenario 1

Topography and Geology

Proposed construction and modifications activities would result in approximately 1,148,600 SF of ground disturbance and would require some modification of terrain by cut and fill techniques and other minor grading. However, the project areas would remain relatively level following construction and modification activities. Implementation of proposed new construction would not affect the geologic units underlying the installation, as no unique geologic features are present. Although ground disturbance would occur during construction and modification activities, the majority of construction and modifications would occur over previously disturbed surfaces.

The 144 FW installation at FAT is not underlain by any active faults, but is in an area that could be impacted by seismic activity on the San Andreas Fault. The construction and modification projects proposed under this scenario would be consistent with UFC 3-310-04, *Seismic Design for Buildings*, which provides DoD requirements for earthquake-resistant design for new buildings, requirements for evaluating and rehabilitating existing buildings for earthquake resistance, and guidance on applying seismic design principles to specialized structural and non-structural elements. UFC 3-310-04 adopts the seismic design provisions of the 2003 International Building Code for use in DoD building design. Therefore, implementation of this locational scenario would result in negligible impacts associated with seismicity or geologic hazards and would not be significant.

Soils

Proposed construction and modification activities would occur primarily on Atwater sandy loam, with a small amount of the new construction footprint on Atwater loamy sand. For these soil types, there is a low risk of erosion. It is likely that grading of existing soils and placement of structural fill for new facilities would not substantially alter existing soil conditions at the installation and adjacent property because much of the property has been previously disturbed or altered as a result

of prior development, where most native soils were removed, altered, or covered by fill materials to support development.

As discussed in Section CA3.7.2, construction activities would be in compliance with the Construction General Permit. This would include a site-specific and detailed SWPPP that coordinates the timing of soil disturbing activities with the installation of soil erosion and runoff controls is an effective way of controlling erosion while soil is exposed and subject to construction activity. Such BMPs could include the use of effective wind erosion controls, stabilization for all disturbed soils prior to storm events, maintaining effective perimeter controls and stabilizing site entrances and exits. Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. Additionally, post construction BMPs, as outlined in the FAT SWPPP (FAT 2015) would minimize erosion during operations. Implementation of these measures, as necessary and appropriate, would ensure that impacts on soils under this locational scenario at the 144 FW installation would not be significant.

Farmlands

Construction and modification activities under this scenario would only occur on soils designated by the NRCS as Prime Farmland if irrigated (NRCS 2022). However, there would be no conversion of farmland to non-agricultural uses as the land within the FAT property has been previously disturbed and is not currently being used as farmland. Therefore, no impacts on farmland are expected under this locational scenario.

Locational Scenario 2

Under this F-15EX beddown locational scenario, new construction and modifications projects, identified in Table 2.1-3, would result in approximately 1,588,200 SF of ground disturbance. There would be less ground disturbance for this construction location than the Locational Scenario 1. Impacts on geological, soils, and farmland resources would also be similar in nature to Locational Scenario 1; therefore, there would be no significant impacts on geological, soils, and farmland resources.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.8.2.2 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on geological resources would not be significant.

CA3.8.3 Summary of Impacts

Under the F-15EX Alternative at the 144 FW installation at FAT, proposed construction activities would result in up to 1,148,600 SF for Locational Scenario 1, and 1,588,200 SF for Locational Scenario 2 of ground disturbance, as described in Table CA2.1-4. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on site. Construction and modification activities would only occur on soils designated by the NRCS as Prime Farmland if irrigated (NRCS 2022). However, there would be no conversion of farmland to non-agricultural uses as the land within FAT boundaries has been previously disturbed and is not currently being used as farmland. Impacts on geological, soils, and farmland resources as a result of the proposed beddown of the F-15EX or retention of the F-15C aircraft at the 144 FW installation would not be significant. In addition, under the No Action Alternative, impacts on geological resources would not be significant.

CA3.9 CULTURAL RESOURCES

CA3.9.1 Affected Environment

CA3.9.1.1 Installation

Archaeological Resources

In 2017, the 144 FW was awarded an ICRMP Waiver by the NGB Cultural Resources Program Manager for a period of 5 years, valid from 1 April 2018 to 31 March 2023 (NGB 2017). An application for a new ICRMP Waiver has been submitted by NGB and the current ICRMP Waiver has been extended until the new waiver is issued. This ICRMP Waiver states that the 144 FW is not exempt from assessing impacts on cultural resources through the EIAP and/or the review processes. The 144 FW must ensure that no cultural resources have been discovered, and if such resources are discovered, then contact the NGB/A4AM Cultural Resources Program to assist in

consultations in accordance with Section 106 of the NHPA. The installation must record all infrastructure development activities, including demolition of and/or renovation to all buildings during the 5-year period during which the Waiver is valid and coordinate with the NGB/A4AM to develop and implement systematic plans that assess the potential eligibility of all buildings that approach 45 years of age, in accordance with the criteria set forth in NRHP (NGB 2017).

A comprehensive cultural resources survey of the entire 144 FW installation (approximately 102 acres) was conducted in 2006. The 2006 survey did not identify any archaeological sites; therefore, there are no NRHP-listed archaeological sites at the 144 FW installation at FAT (ANG 2010).

Per the 2018 *FAT Master Plan*, there are no NRHP-listed archaeological resources located within or near the property (FAT 2019). Additional research conducted in 2004 and 2006 found that no archaeological or cultural resources are present on FAT property (FAT 2019). However, the ramp/developed area (i.e., Marine Corps Reserve Center ramp area) has not been surveyed.

Architectural Resources

The 144 FW installation has been used by the military since World War II. The majority of its buildings were constructed between 1955 and 1977. The 2006 cultural resources survey inventoried and evaluated the NRHP eligibility of 19 buildings, including those less than 50 years of age for exceptional significance related to the Cold War, none of which were recommended as being eligible for listing in the NRHP (ANG 2010). The Marine Corps Reserve Center ramp area has not been surveyed for architectural resources. There are no known NRHP-eligible or listed architectural properties, historic districts, or historic landscapes at the 144 FW installation (ANG 2010).

A 2006 historic architectural reconnaissance identified six buildings on FAT property that were older than 45 years. However, per a 2013 Environmental Assessment (EA), none of these buildings are listed in or are eligible for listing in the NRHP (FAT 2019). Because no comprehensive and current data are available about existing or potential historical sites at FAT, the Airports Department may need to conduct additional research, prior to development, to confirm that no state-regulated sites are located on the property (FAT 2019). An increase in noise from aircraft operations would not be expected to affect the potential eligibility of the buildings, as noise from aircraft operations at FAT have been part of the environment of the property since they were built.

Traditional Cultural Resources

Government-to-government consultation between the 144 FW and each federally recognized and state recognized Tribal Nation associated with the 144 FW installation and FAT is being conducted

for this action to afford the Tribal Nations the opportunity to provide input in the decision-making process in recognition of their status as sovereign nations, to provide information regarding Tribal concerns per Section 106 of the NHPA, and to provide information on traditional cultural resources that may be present on lands present at the 144 FW installation and FAT.

To date, no traditional cultural resources or Native American sacred places have been identified at the 144 FW installation nor FAT (ANG 2010; FAT 2019). There are 21 Tribal Nations that claim tribal affiliation with the 144 FW installation and/or the geography in which the installation occurs (ANG 2010; FAT 2019; HUD 2022). Government-to-government consultation letters have been sent to the 21 Tribal Nations. See Appendix A for all Section 106 and government-to-government correspondence.

Off-Installation

There are no NRHP-listed historic properties located within the 65 dB DNL or greater noise contours surrounding the airfield (National Park Service 2022a). The only site within the 65 dB noise contour that has been recorded and is listed in the California OHP's Built Environment Resources Directory is a linear site, the Gould Canal (Southern San Joaquin Valley Information Center 2023). This linear site is located within the 65 to 70 dB DNL noise contour. Per the California Historical Resource Status Code, 6Y, the Gould Canal was determined not eligible for listing in the NRHP by consensus through the Section 106 process; however, it is unevaluated for the California Register or any other local listing (California OHP 2020).

CA3.9.1.2 Airspace

Table CA3.9-1 presents the NRHP-listed sites underlying the airspace on lands beneath the SUA used by 144 FW (Table CA3.9-1) (National Park Service 2022a). These historic properties include historic districts, a rock formation, a shelter, ranger stations, cabins, courthouses, an aerial tramway, a stone bridge, a cultural landscape, rock stairway, a ski hut, a railroad depot, a lighthouse, library, religious temple, a church and associated cemetery, a courthouse, refineries, a desert salt pan in the Mojave Desert, Walker Pass, the Manzanar War Relocation Center, the Pioneer Deep Space Station, and the Death Valley National Monument.

Table CA3.9-1 NRHP Historic Properties Associated with 144 FW SUA

SUA	*Number of NRHP Properties Under Airspace*[1]
Bakersfield MOA	3
Foothill 1 MOA	6
Foothill 2 MOA	13
Hunter A MOA	5
Hunter B MOA	1
Hunter C MOA	3
Hunter E MOA	1
Isabella MOA	4
Lemoore MOA	4
Owens MOA	8
Porterville MOA	1
Panamint MOA	2
R-2502N	1
R-2508	18
R-2513	2
R-2515	1
Saline MOA	2

Note: [1]Many of these historic properties underly multiple SUA and may be listed more than once.
Legend: 144 FW = 144th Fighter Wing; NRHP = National Register of Historic Places; MOA = Military Operations Area; R- = Restricted Area; SUA = Special Use Airspace.
Source: National Park Service 2022a.

Two National Historic Landmarks are located beneath the 144 FW SUA and include Walker Pass and Pioneer Deep Space Station. Walker Pass was used during the Gold Rush from 1848–1855 which led emigrants down the Owens River Valley through western Inyo County, passing by Owens Lake, and through Walker's Pass to the South Fork of the Kern River. It then split into several different directions at the junction of the South and the North Forks at Lake Isabella (Historical Marker Database 2022).

The Pioneer Deep Space Station antenna was the first antenna to support the National Aeronautics and Space Administration's unmanned exploration of deep space. This was the prototype antenna for the entire Deep Space Network. During its operational life, the Pioneer Deep Space Station antenna tracked a variety of National Aeronautics and Space Administration missions including the following projects: Pioneer, Echo, Ranger, Lunar Orbiter, Surveyor, Apollo, Helios, Mariner, Viking, and Voyager (National Park Service 2022c).

The Old Spanish Trail, a National Historic Trail, is located on lands underlying the Shoshone MOA and the Silver North MOA (National Park Service 2022d). The Old Spanish Trail was the first commercial caravan from New Mexico to Los Angeles in 1829. The route was made from a combination of the early Native American trails, early trade and exploration routes, and horse and mule routes (National Park Service 2022e).

Death Valley National Monument, also a National Park, was created in 1933 by a Presidential Proclamation and is located on lands underlying R-2508 (National Park Service 2022f).

César E. Chávez National Monument, also referred to as Nuestra Señora Reina de la Paz, is located on lands underlying R-2508 (National Park Service 2022a). César E. Chávez was a leader during the 1970s to improve the working and living conditions and wages for farm workers. His legacy and the farm worker movement led to the passage of California's Agricultural Labor Relations Act of 1975 which was the first law in the U.S. that recognized farm workers' collective bargaining rights (National Park Service 2002g).

There are no national historic battlefields located under the existing SUA (National Park Service 2022h).

To date, no traditional cultural resources or Native American sacred places have been identified under the existing SUA. There are 32 Tribal Nations that claim tribal affiliation with lands under the existing SUA (HUD 2022). As part of the Proposed Action, government-to-government consultation letters asking for issues of concern have been sent to these 32 Tribal Nations. See Appendix A for all Section 106 and government-to-government correspondence.

CA3.9.2 Environmental Consequences

CA3.9.2.1 F-15EX

Installation

Implementation of this alternative at the 144 FW installation located at FAT would include new construction, building demolitions, and site and utility improvements resulting in approximately 1,148,600 SF of ground disturbance in Locational Scenario 1 and 1,588,200 SF in Locational Scenario 2. The entirety of the 144 FW installation has been surveyed for archaeological resources. The ramp/developed area (i.e., Marine Corps Reserve Center ramp area) has not been surveyed for archaeological resources. However, this parcel consists of the built environment, and therefore, encountering unidentified archaeological resources in an undisturbed location is not likely. There are no NRHP-listed archaeological sites at 144 FW installation or FAT (FAT 2019; ANG 2010).

It is not expected that undiscovered archaeological resources would be found during implementation of the F-15EX beddown at the 144 FW installation. 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 144 FW Environmental Manager. The Environmental Manager would secure the location

and ensure that all cultural items are left in place and that no further disturbance is permitted to occur. The Environmental Manager would then contact the installation commander and continue to follow Standard Operating Procedure No. 6, *Inadvertent Discovery of Cultural Materials*, as outlined in the 144 FW installation ICRMP (ANG 2010).

No traditional cultural resources have been identified at the 144 FW installation or FAT; therefore, no traditional cultural resources would be expected to be impacted by implementation of the F-15EX Alternative. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of this alternative at FAT would involve the interior modification of six buildings in Locational Scenario 1 and five buildings in Locational Scenario 2. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. Building 194 (Locational Scenario 1 only) would also undergo an exterior addition. Building 2606, built in 1966, has not been evaluated for NRHP eligibility. However, modifications for Building 2606 would be confined to the interior of the building, which would not affect the building's potential significance or integrity (ANG 2010).

Therefore, there would likely be no adverse effect to historic properties per 36 CFR Section 800.5(b).

Off-Installation

Based on the projected noise contours for the aircraft operations under the F-15EX Alternative, seven historic buildings or structures would be exposed to higher noise levels than under the affected environment (Southern San Joaquin Valley Information Center 2023; Table CA 3.9-2). Six buildings are located within the modeled 65 to 70 dB DNL contour and one within the modeled 70 to 75 dB DNL contour; this site is also located within the 65 to 70 dB noise contour. Only one structure has been evaluated for the NRHP, the Gould Canal, while the other structures have not been evaluated; therefore, they are managed as if they are eligible for listing in the NRHP. Per the California Historical Resource Status Code, 6Y, the Gould Canal was determined not eligible for listing in the NRHP by consensus through Section 106 process; however, it is unevaluated for the California Register or any other local listing (California OHP 2020).

Table CA 3.9-2 Historic Properties and California State Register Sites Present Around the Airfield under the F-15EX Alternative

Site Trinomial Number	*Other Identifier*	*Name**	*NRHP Evaluation*	*California Register Evaluation*
65–70 dB DNL				
CA-FRE-003109	P-10-003930	Southern Pacific Railroad - Fresno Co	Unevaluated	Unevaluated
CA-FRE-003825	P-10-007030	Gould Canal	Not Eligible	Unevaluated
N/A	P-10-006856	4545 E. Garland Avenue	Unevaluated	Unevaluated
N/A	P-10-006857	4546 E. Robinson Avenue	Unevaluated	Unevaluated
N/A	P-10-006859	4544 E. Dakota Avenue	Unevaluated	Unevaluated
N/A	P-10-006647	Harpain Dairy Palms; 3949 North Barton Avenue	Unevaluated	Unevaluated
70–75 dB DNL				
CA-FRE-003109	P-10-003930	Southern Pacific Railroad - Fresno Co	Unevaluated	Unevaluated

Note: *Name per the records search results.
Legend: dB = decibel; DNL = Day-Night Average Sound Level; NRHP = National Register of Historic Places.
Source: Southern San Joaquin Valley Information Center 2023.

Despite an increase in noise from aircraft operations under the F-15EX Alternative, it would not be expected to affect the potential eligibility of the buildings or structures, as noise from aircraft operations at FAT have been part of the environment surrounding the airfield for many years. Therefore, known unevaluated sites (managed like historic properties) are present within the APE surrounding the airfield; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Airspace

Under the F-15EX Alternative, the F-15EX aircraft would conduct up to 3,281 annual sorties. Based on this, the time spent in the airspace by the 144 FW would increase by approximately 81 percent. With the vast amount of SUA in the region, aircraft can be dispersed throughout instead of all tasked to one SUA. The F-15EX would conduct 76 percent more training in the altitudes 18,000 feet MSL through 30,000 feet MSL than the F-15C, which would be above standard MOA altitudes. Noise modeling results suggest an increase of 81 percent of events would result in up to a 6 dB increase in the noise produced in any given area. This increase would be on top of the existing CNEL levels, which vary from 41 dB $CNEL_{mr}$ on the high end down to below the software's lower limit of prediction of 35 dB $CNEL_{mr}$.

Visual intrusions under this alternative would be minimal and would not represent an increase sufficient to cause significant impacts on the settings of cultural resources or adverse effects to historic properties. Due to the high altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft would not be readily visible to observers on the ground.

No additional ground disturbance would occur under the airspace due to the basing of the F-15EX. Use of ordnance and defensive countermeasures would occur in areas already used for these activities. Flares deployed from the aircraft would not pose a visual intrusion either, as flares are small in size and burn only for a few seconds and the high relative altitude of the flights would make them virtually undetectable to people on the ground. Use of chaff and flare results in residual materials that fall to the ground in a dispersed fashion. However, these residual materials do not collect in quantities great enough to adversely affect the NRHP status of historic properties (DAF 2023).

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-15EX beddown would not result in significant impacts on cultural resources and no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties located at the installation and within 65 dB DNL and greater, and historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

CA3.9.2.2 F-15C Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would result in approximately 1,062,000 SF of ground disturbance. The entirety of the 144 FW installation has been surveyed for archaeological resources. There are no NRHP-listed archaeological sites at the 144 FW installation or FAT (FAT 2019; ANG 2010). It is not expected that undiscovered archaeological resources would be found during implementation of the F-15C legacy aircraft beddown at the 144 FW installation. However, in the event of an inadvertent discovery, the installation would follow the steps as described above under the F-15EX proposed beddown.

No traditional cultural resources have been identified at 144 FW or FAT; therefore, no traditional cultural resources would be expected to be impacted by implementation of the F-15C Legacy Alternative. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of this alternative would involve the interior modification of two buildings—Buildings 130 and 135. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. Neither building is eligible for nor is listed in the NRHP (ANG 2010).

Under the F-15C legacy aircraft alternative, flight operations at FAT would continue and noise impacts associated with installation operations would be the same as the existing condition.

No known historic properties are present within the APE at the installation; therefore, there would be no historic properties affected per 36 CFR Section 800.4(d)(1).

Off-Installation

There are no NRHP-listed historic properties located within the 65 dB DNL or greater noise contours surrounding the airfield (National Park Service 2022a). One linear site, the Gould Canal, has been recorded and is listed in the California OHP's Built Environment Resources Directory (Southern San Joaquin Valley Information Center 2023). This linear site is located within the 65 to 70 dB DNL noise contour. Per the California Historical Resource Status Code, 6Y, the Gould Canal was determined not eligible for listing in the NRHP by consensus through the Section 106 process; however, it is unevaluated for the California Register or any other local listing (California OHP 2020).

Under the F-15C Legacy Alternative, the noise would not be expected to affect the potential eligibility of the Gould Canal for the California Register, as noise from aircraft operations at FAT has been part of the environment surrounding the airfield for many years. Therefore, known historic properties are present within the APE; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Airspace

There would be no change to the current use of the airspace under this alternative.

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-15C Legacy Alternative would likely result in no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties located at the installation and within 65 dB DNL and greater and historic properties beneath the SUA.

The DAF is seeking concurrence with the SHPO on its finding of no adverse effect for the Proposed Action.

CA3.9.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or

SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on cultural resources would not be significant and there would be no adverse effects to historic properties.

CA3.9.3 Summary of Impacts

There are no known historic properties within any of the proposed construction footprints at the 144 FW installation at FAT. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. Building 2606, built in 1966, has not been evaluated for NRHP eligibility. However, modifications for Building 2606 would be confined to the interior of the building, which would not affect the building's potential significance or integrity (ANG 2010). Therefore, there would likely be no adverse effect to historic properties per 36 CFR Section 800.5(b). No traditional cultural resources have been identified at the 144 FW installation at FAT. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Use of the SUA under the F-15EX Alternative would increase but would be similar to ongoing operations. Overall, implementation of F-15EX, Legacy F-15C, or No Action Alternatives at the 144 FW installation at FAT or the SUA would not result in significant impacts on cultural resources. In addition, overall implementation of the F-15EX, Legacy F-15C, or No Action Alternatives would likely result in no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties located at the installation and within 65 dB DNL and greater and to historic properties beneath the SUA.

CA3.10 SAFETY

CA3.10.1 Affected Environment

CA3.10.1.1 Installation

Fire/Crash Response

Aircraft emergencies at FAT are responded to by the Airport Crash/Fire/Rescue Division (Fresno Aircraft Rescue and Firefighting [ARFF]) stationed at FAT; all other emergency services are provided by the municipal fire department. A mutual aid agreement for providing fire protection also exists between the Fresno ARFF and the 144 FW fire department. Crash-Fire-Rescue vehicles are operated by the 144 FW and respond to both military and civil emergencies under this mutual aid agreement (FAT 2017b). ARFF, structure firefighting, and technical rescue for the 144 FW

installation is provided by the 144 FW. The 144 FW fire department also has a mutual aid agreement with the Fresno Fire Department Station 10 for providing fire protection, first responder lifesaving services, and hazardous materials incident response at the airfield (City of Fresno n.d.).

Accident Potential Zone/Runway Protection Zone

RPZs at FAT occur almost entirely over areas within the airport property and are free of development that would be incompatible with airport operations (Figure CA3.10-1). Runways 11L and 11R RPZs at the northwest corner of the airport extend off airport and overlay small portions of East Dakota and North Chestnut Avenues. Runway 29R RPZ at the southeast corner of the airport extends off airport over North Clovis and East McKinley Avenues. Runway 29L RPZ occurs entirely over airport property, including over nine Aircraft Sun Shades located at the 144 FW installation. Runways 11L, 11R, and 29R RPZs extend into approximately 18 acres of off-airport areas, which are primarily roads adjacent to the airport property.

Additionally, there are approximately six trees within Fresno Airways Golf Course, located within airport property, which penetrate the airfield transitional surface by approximately 19 feet. These trees represent potential runway obstructions and have been recommended for removal (FAT 2019).

Explosive Safety

The 144 FW stores, maintains, and uses munitions required for performance of their mission (see Section CA2.1.7). The MSA at the 144 FW installation currently has 12 facilities, including an Inspection facility, five earth-covered magazines, and six aboveground arm/de-arm and holding areas. In addition, there is an EOD team assigned to the 144 FW which provides direct support to the 144 FW installation. The southeast QD arc extends slightly off airport property and overlays a small portion of McKinley Avenue that runs along the southern airport boundary (Figure CA3.10-2). Currently, the 144 FW has 50 constraints that are associated with established QD arcs (Askins 2023).

Anti-terrorism/Force Protection

Many of the military facilities at the 144 FW were constructed before AT/FP considerations became a critical concern. There are 15 facilities and 2 gates that do not meet current AT/FP standards at the 144 FW installation (Askins 2023). However, as new construction occurs and as facilities are modified, the 144 FW incorporates these standards to the maximum extent practical during project planning and design phases.

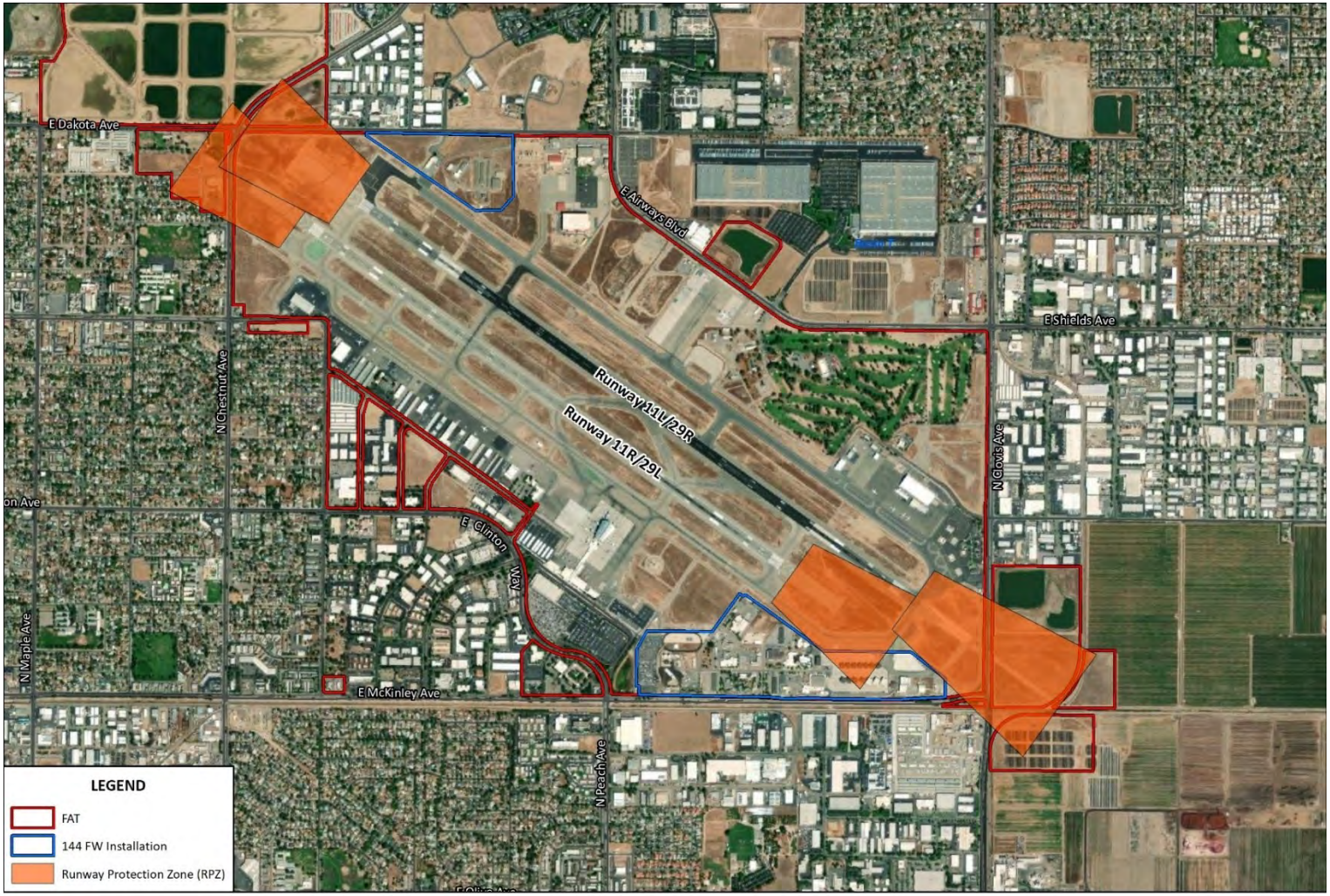


Figure CA3.10-1 FAA-controlled RPZs at Fresno Yosemite International Airport (FAT)

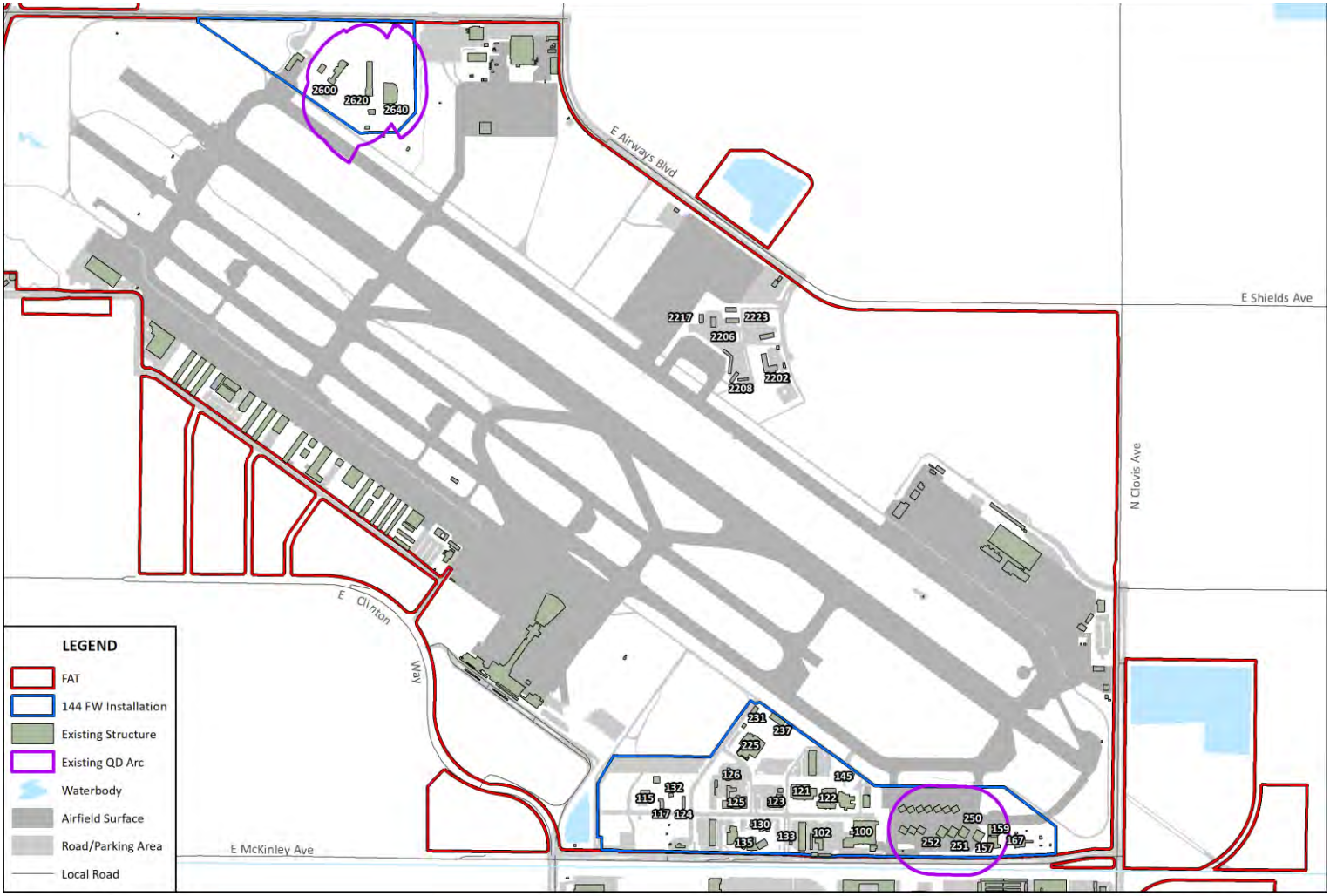


Figure CA3.10-2 Existing QD Arcs at Fresno Yosemite International Airport (FAT)

Air Surveillance Radar (ASR-11)

Airport Surveillance Radar (ASR-11) is an integrated primary and secondary radar system that has been deployed at FAT. Facilities proposed within the 1,500-foot radius of the ASR at FAT will be analyzed by the FAA Air Traffic Organization to determine compatibility with the ASR, and identify any specific design features (e.g., roof materials/coatings, orientation/layout, and heights of the buildings) required to ensure safe and effective operation of the ASR.

CA3.10.1.2 Airspace

Flight Safety Procedures

Aircraft flight operations at FAT are governed by standard flight rules set forth under AFI 11-2F-15 Volume 3 and Airfield Operations Instruction 13-1. Specific safety requirements are contained in standard operating procedures that must be followed by all aircrews operating from the airfield (144 FW 2019a; DAF 2021).

Aircraft Mishaps

The 144 FW currently has 18 PAA F-15C aircraft. The F-15 aircraft (all models) have flown 6,982,447 hours since the aircraft entered the DAF inventory in 1972. Over that period, 160 Class A mishaps have occurred, and 127 aircraft have been destroyed. This results in a lifetime Class A mishap rate of 3.20 annual mishaps per 100,000 flight hours and a lifetime destroyed aircraft rate of 1.82 annual aircraft destroyed per 100,000 flight hours (AFSEC 2021). The 144 FW has not experienced a Class A mishap in the past 5 years (144 FW 2022b).

Bird/Wildlife Aircraft Strike Hazards

FAT maintains a WHMP that was approved by the FAA in November 2013. The FAT WHMP defines site-specific roles, responsibilities, and authorities, as well as wildlife hazard management strategies and procedures, training, evaluation, and monitoring. Several areas in and adjacent to FAT are identified as potential wildlife and/or bird attractants including agricultural areas, Fresno Airways Golf Course, and open waters such as groundwater recharge basins. Several management techniques were identified to discourage wildlife from utilizing these habitats ranging from grounds maintenance and habitat modification to lethal management (FAT 2013).

The 144 FW actively implements the *144 FW Bird-Aircraft Strike Hazard Plan 91-212* (144 FW 2020b) in accordance with 14 CFR Part 139.337 FAA guidelines, in addition to the wildlife management activities conducted by FAT personnel under the approved WHMP. Key elements

of the plan include monitoring the airfield for bird and other wildlife activity, issuing bird hazard warnings, initiating bird/wildlife avoidance procedures when potentially hazardous bird/wildlife activities are reported, and submitting BASH reports for all incidents. Additionally, bird watch conditions, which are addressed in the 144 FW BASH Plan are broken down into three categories (severe, moderate, and low) based on concentration of birds and if the birds are on or immediately above the active runway. When conditions are in the moderate or severe range, it represents an increased potential for a bird strike.

The 144 FW currently flies and maintains 18 PAA F-15C aircraft. Between January 2017 and April 2021, there has been 1 Class B mishap and 11 unclassified mishaps that involved bird strikes documented by the 144 FW Safety Officer (144 FW 2021a). The Fresno Airways Golf Course is located within the boundaries of FAT and provides habitat that could attract wildlife and/or bird species and presents additional BASH potential (see Section 3.11.1.2, *Airspace*, for a description of aircraft mishaps).

The last documented BASH incident at FAT involved an F-15C and occurred on April 2, 2021, during which an F-15C hit a flock of rock pigeons (*Columba livia*) while landing. Bird watch condition at the time was low.

CA3.10.2 Environmental Consequences

CA3.10.2.1 F-15EX

Installation

Under the F-15EX Alternative, total flight operations at FAT would increase by 3,086, or 3.6 percent over existing operations. The fire department would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations under F-15EX Alternative. Additionally, under this alternative, a new fire station would be constructed under Locational Scenario 1 on the south side of the installation, or Locational Scenario 2 on either the south or north side of the installation northwest of the Marine Corps Reserve Center ramp area. With an increase of proposed airfield operations, there is a higher potential and need for fire support during ground emergencies. Providing a new fire station would support operational requirements of the F-15EX and when properly sited with adequate space and supporting infrastructure, would greatly enhance ground and flight safety during operations, training, security functions and other activities conducted by the 144 FW. In addition, construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. Any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the

current capacity of the 144 FW fire department; therefore, no impacts on fire/crash safety would be expected under the F-15EX Alternative.

Proposed renovation and infrastructure improvement projects related to this alternative would not impact aircraft takeoff and landings but would penetrate Runway 29L RPZ under Locational Scenarios 1 and 2 as illustrated in Figures CA3.10-3 and CA3.10-4, and Table CA2.1-3. Project 6, Repair Airfield Pavements, would occur within the Runway 29L RPZ footprint. This project involves ground level repairs that would not create additional airfield obstructions. No impacts on safety under the F-15EX Locational Scenarios 1 and 2 are expected.

The QD arcs would not change under the F-15EX Locational Scenario 1. Under Locational Scenario 2, the QD arc associated with the current alert facility would move to the northern portion of the airport with the new Alert Facility. This QD arc would be located entirely within airport boundaries and would result in a positive impact to existing conditions in which the current QD arc extends off airport property. While there are a few planned construction projects within the QD arcs, per AFI 91-201, *Explosive Safety Standards*, all public traffic route distances and inhabited building distances would meet specified net explosive weight QD criteria (see Figure CA3.10-1). No explosives would be handled during construction or demolition activities. Therefore, no additional risk would be expected as a result of implementing this alternative.

The proposed construction projects would incorporate AT/FP requirements and design standards as mandated by UFC 4-010-01, *DoD Minimum Anti-Terrorism Standards for Buildings*. Under the F-15EX Alternative to move the alert facilities to the northern portion of FAT (Locational Scenario 2), 50 current AT/FP constraints would be eliminated, thus increasing AT/FP compliance.

Overall, impacts on safety under the F-15EX Alternative would not be significant.

Airspace

F-15EX aircrew would follow the local and federal regulations which govern flight within controlled, uncontrolled, and SUA. The F-15EX would continue to follow all guidelines according to the F-15 Operations Procedures (DAF 2021). When flying at other locations, pilots would comply with the F-15 Operations Procedures to the maximum extent possible, or with local guidance, whichever one is more restrictive (DAF 2021).

The F-15EX utilizes the same airframe as the current and familiar F-15C model. Though the avionics are more advanced, the increase in automation and technology would aid the pilots in reducing total workload, therefore, improving situational awareness.

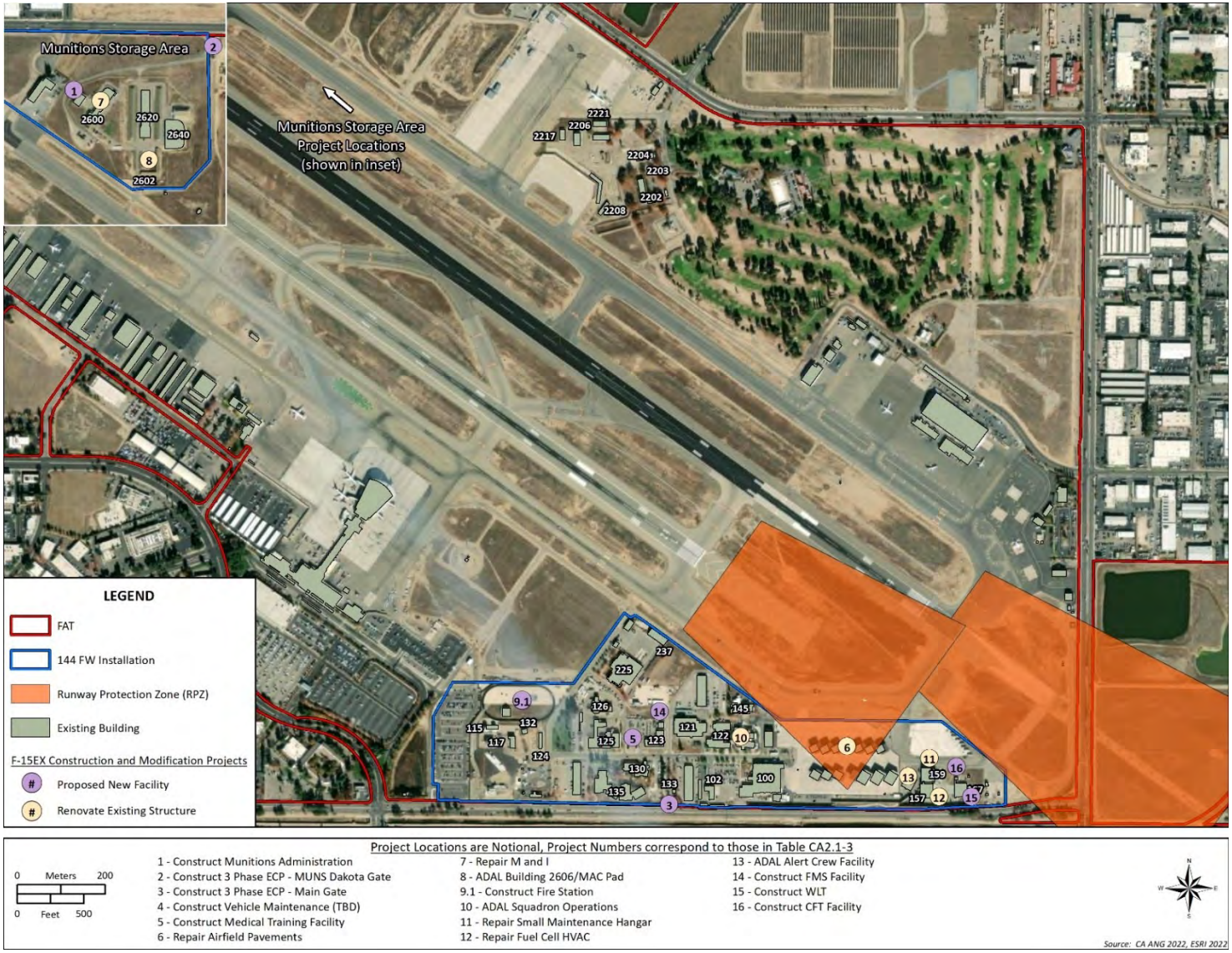


Figure CA3.10-3 Existing FAA-controlled RPZs and Proposed Construction and Modifications for F-15EX Beddown at the Current 144 FW Main Cantonment Area

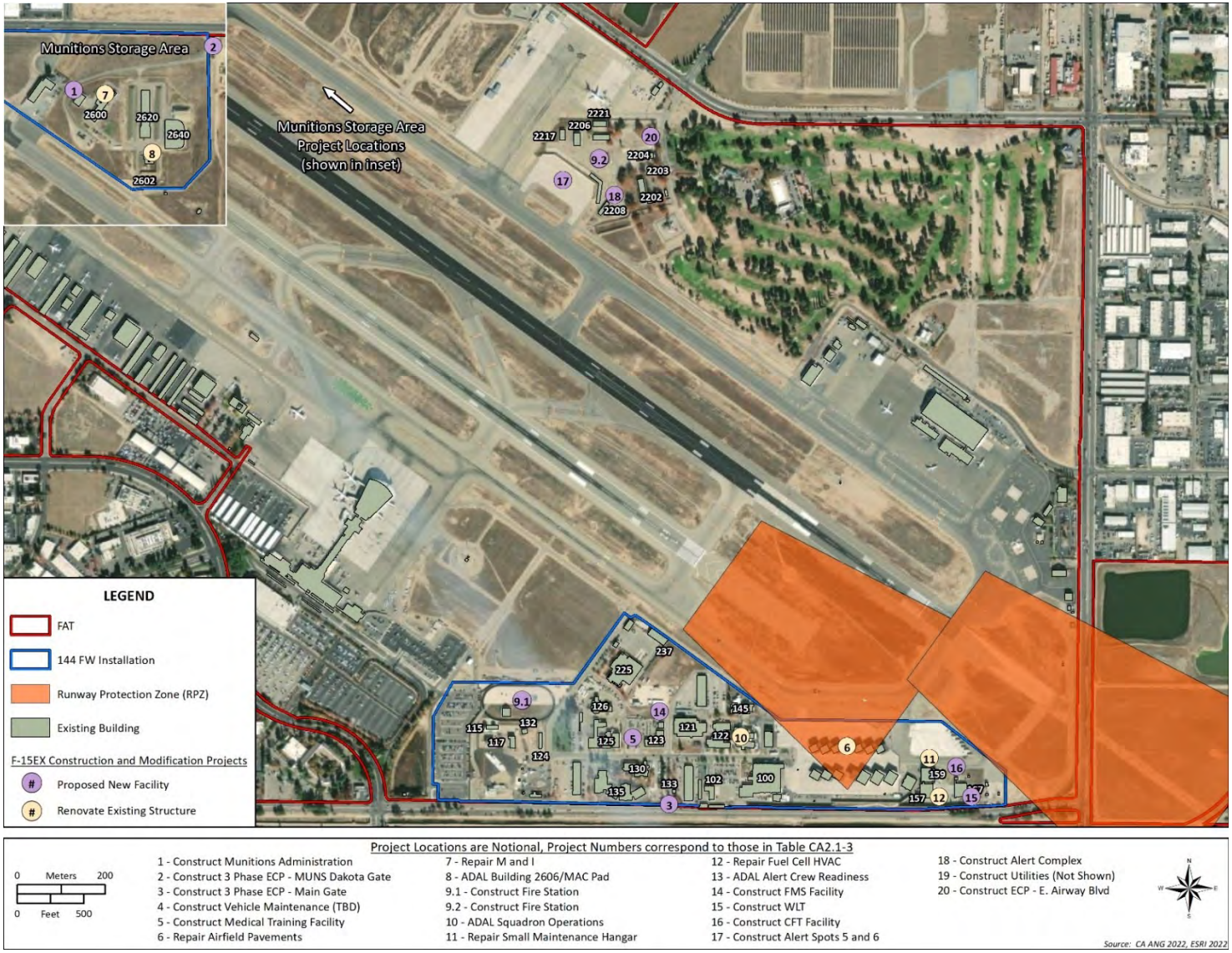


Figure CA3.10-4 Existing FAA-controlled RPZs and Proposed Construction and Modifications for F-15EX Beddown at the Current 144 FW Main Cantonment Area with the ACA Mission to the North

The F-15EX is similar in size to the legacy F-15C and would operate in the same airspace environment as the F-15C. The increase in aircraft operations under the Proposed Action could result in an increased BASH potential; however, F-15EX aircrews would be expected to follow applicable rules and procedures outlined in the 144 FW BASH Plan which when followed reduces the overall risk of a potential BASH event. Local bird watch conditions would still be briefed and adhered to in an effort to reduce the likelihood of a bird strike.

CA3.10.2.2 F-15C Legacy Aircraft

Installation

The CAANG fire department at FAT would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations to continue to support the current F-15C flying mission. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. Any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 144 FW fire department; therefore, no impacts on fire/crash safety would be expected under the legacy aircraft alternative.

Proposed renovation and infrastructure improvement projects related to this alternative would not impact aircraft takeoff and landings but will slightly penetrate the Runway 29L RPZ footprint. Repairs to the airfield pavement in Project 6 will occur within the Runway 29L RPZ as illustrated in Figure CA3.10-5 and Table CA2.1-3. The repair is short-term surface based; therefore, not considered a long-term hazard. ATC approval would be needed for any vehicle to cross into a controlled movement area, therefore, preventing any hazards to flight safety operating near the runway environment. No impact to safety would be expected.

Under the legacy aircraft alternative, the 144 FW would improve airfield and quality of life facilities to sustain the legacy aircraft mission and safety of the wing's servicemembers. The QD arcs would not change under this alternative. While there are a few planned construction projects within the QD arcs, per AFI 91-201, *Explosive Safety Standards*, all public traffic route distances and inhabited building distances meet specified net explosive weight QD criteria (see Figure CA3.10-2). No explosives would be handled during construction or demolition activities. Therefore, no additional risk would be expected as a result of implementing this alternative.

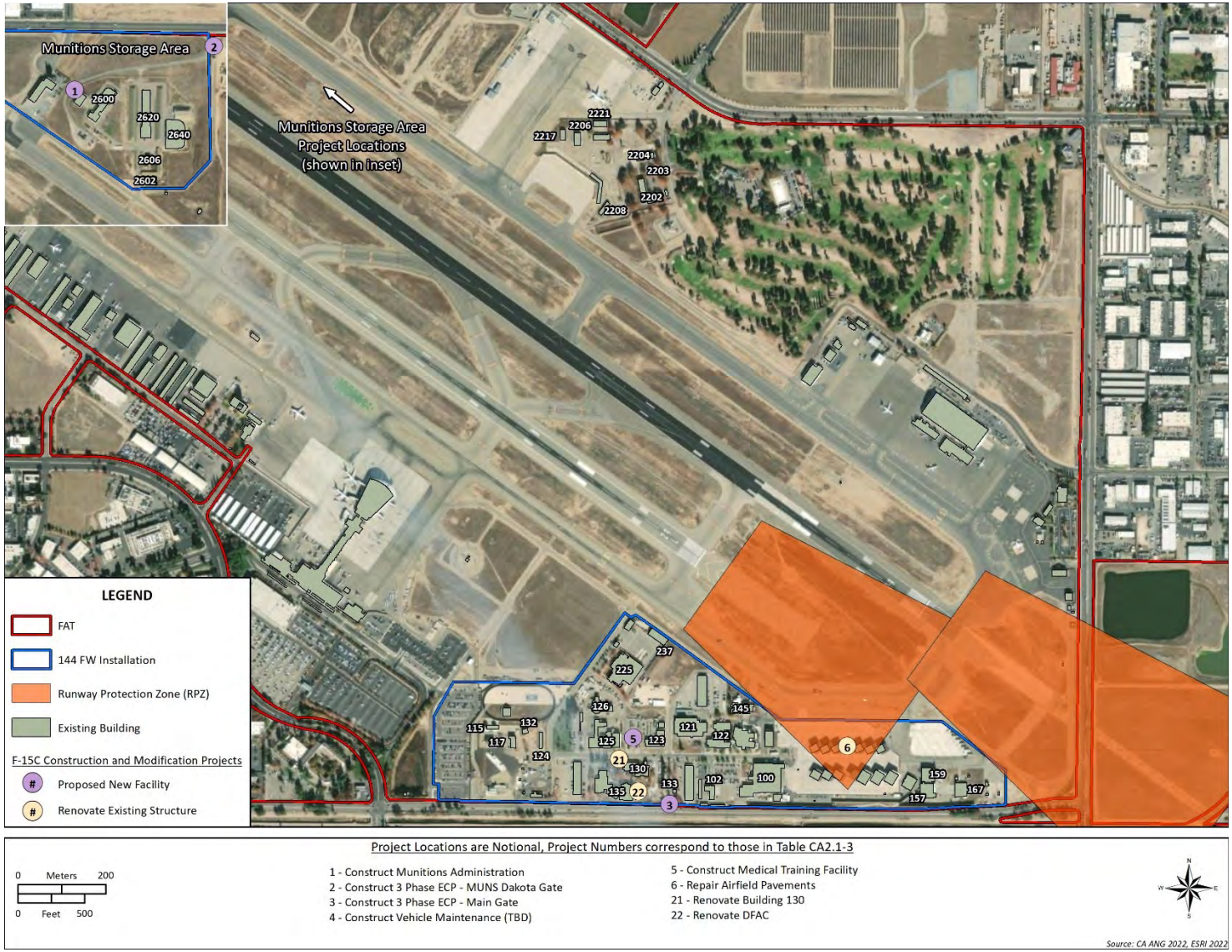


Figure CA3.10-5 Existing RPZs and Proposed Construction and Modifications for the 144 FW Legacy Aircraft Mission

The proposed construction projects will incorporate AT/FP requirements and design standards as mandated by UFC 4-010-01, *DoD Minimum Anti-Terrorism Standards for Buildings*.

Airspace

Under the legacy aircraft alternative, the 18 legacy F-15C would continue to operate in accordance with standard flight safety procedures set forth under AFI 11-2F-15 Volume 3 and Airfield Operations Instruction 13-1. Specific safety requirements are contained in standard operating procedures that must be followed by all aircrews operating from the airfield (144 FW 2019a; DAF 2021). Mishaps and BASH would continually be mitigated through the safety training, 144 FW BASH Plan, technology, and ATC services.

CA3.10.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on safety would not be significant.

CA3.10.3 Summary of Impacts

Fire and crash response would continue to be conducted by both installations' fire departments under all alternatives. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. While there are some planned constructions that would take place within QD arcs, all DAF and DON regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements as mandated by the DoD and would increase overall AT/FP compliance.

Each installation has published rules, regulations, and procedures in place to ensure flight safety. The lifetime Class A mishap rates for the F-15 are 2.29 per 100,000 hours flown. The F-15EX would utilize the same airframe as the current and familiar F-15C model. The avionics for the F-15EX are more advanced than the F-15C, thus the increase in automation and technology would aid the pilots in reducing total workload, therefore, improving situational awareness. Reduced workload, improved situational awareness, training, and familiarity would only continue to help reduce the chances of mishaps. Under the legacy aircraft alternative, the 18 legacy F-15C would continue to operate in accordance with standard flight safety procedures set forth under

AFI 11-2F-15 Volume 3 and Airfield Operations Instruction 13-1. The DoD's detailed BASH plan would continue to be followed to mitigate and reduce the chances of a BASH event from occurring for all the alternatives.

No significant impacts on safety would be expected with implementation of any of the alternatives.

CA3.11 HAZARDOUS MATERIALS/WASTE

CA3.11.1 Affected Environment

CA3.11.1.1 Installation

Hazardous Materials

Hazardous materials and petroleum products are used throughout the 144 FW installation at FAT to support aircraft maintenance; aerospace ground equipment maintenance; ground vehicle maintenance; and POL management and distribution. Types of hazardous substances found on the 144 FW installation include POLs, solvents, hydrazine, antifreeze and deicing fluids, batteries, aerosols, recovered fuels, hydraulic fluid, paints, and paint strippers (144 FW 2021b). Handling of hazardous materials is in accordance with DoD, federal, state, and local regulations.

Hazardous materials used by ANG and contractor personnel on the 144 FW installation are issued and controlled through the Hazardous Materials Management Process. This process centralizes procurement, handling, storage, and issuing of hazardous materials and their turn-in, recovery, reuse, or recycling. The Hazardous Materials Management Process includes review and approval by ANG personnel to ensure users are aware of exposure and safety risks. The Hazmat Tracking Activity is operated in accordance with AFMAN 32-7002, Chapter 3, *Hazardous Materials Management*. The Hazmat Tracking Activity is located in Building 228 (144 FW 2021b).

ASTs and other containers are used for bulk fluid storage on the installation including Jet A fuel, gasoline, diesel fuel, used oils, transformer mineral oil, hydraulic fluids, and solvents, as well as fire suppression agents. Currently, there are 80 ASTs and other bulk fluid storage containers on the installation with various contents and capacities. Individual storage tanks/containers and their location, contents, capacity, tank material, and installation date are described in detail in the *Final Spill Prevention, Control, and Countermeasure Plan* dated 20 December 2021 (144 FW 2021c).

Hazardous Waste

The 144 FW *Final Spill Prevention, Control, and Countermeasure Plan* contains the governing regulations for spill prevention and describes specific protocols for preventing and responding to releases, accidents, and spills involving oils and hazardous materials (144 FW 2021c).

Hazardous and petroleum wastes are generated throughout the installation during various operations, including aircraft maintenance and repair, painting and corrosion prevention operations, and vehicle maintenance and repair. These hazardous and petroleum wastes include paints, solvents, lubricants, oils, jet fuel, and fuel oil. The 144 FW HWMP outlines procedures for controlling and managing hazardous wastes from the point where they are generated until they are disposed. In addition, it includes guidance for compliance with all applicable federal, military, state, and local laws and regulations pertaining to hazardous waste. The HWMP also promotes pollution prevention at the installation with the goal of reducing or eliminating the use of toxic or hazardous substances and the generation of hazardous waste wherever possible through source reduction and environmentally sound recycling (144 FW 2021b).

The 144 FW is regulated as a Small Quantity Generator of hazardous waste and maintains EPA Identification Number CA0572825909. A hazardous waste generation point is where a waste is initially created or generated. A satellite accumulation point (SAP) is an area where hazardous waste is initially accumulated at the point of generation and is under the control of SAP Manager and alternate. The maximum volume of hazardous waste permitted at each SAP is 55 gallons or one quart of acutely hazardous waste at each SAP without a permit. Once either of the maximum volumes of hazardous waste is reached, excess waste must be moved to the designated hazardous waste central accumulation point (CAP). There are SAPs located in Buildings 102, 104, 117, 121, 123, 125, 157, 159, and 2600 and one CAP located in Building 231 on the 144 FW installation (144 FW 2014). Because the 144 FW is a small quantity generator, the hazardous wastes can be accumulated in containers at the CAP for up to 180 days or 270 days if the receiving hazardous waste transportation, storage, and disposal facility is located more than 200 miles away (144 FW 2021a).

OWSs are used to separate oils, fuels, sand, and grease from wastewater and to prevent contaminants from entering the sanitary sewer and stormwater drainage systems. The 144 FW has one 1,000-gallon fiberglass UST that collects skimmed Jet A from an OWS located in the Fuel Cell. The 144 FW also has 14 other OWSs located throughout the installation (144 FW 2021c).

Toxic Substances

Regulated toxic substances typically associated with buildings and facilities include asbestos, LBP, and PCBs. An asbestos survey was performed for the 144 FW installation in 1993 (144 FW 2007).

ACM was found to be present in 11 of the buildings (Buildings 100, 102, 104, 110, 117, 121, 122, 123, 157, 2602, and 2606) that were surveyed.

Asbestos surveys for the former Marine Corps Reserve Center subleased area were performed in 1999 and 2004 (144 FW 2007). ACM was found to be present or assumed to be present in Buildings 2202, 2203, 2204, 2205, 2206, 2207, 2208, and 2223.

A LBP survey has not been conducted on the 144 FW buildings. All buildings on the 144 FW installation constructed prior to 1978 are presumed to contain LBP and are tested for LBP prior to demolition or renovation (144 FW 2007). LBP surveys were conducted at the Marine Corps Reserve Center in 1999 and again in 2004. LBP was detected in Buildings 2202, 2204, 2205, 2206, 2208, 2217, 2221, 2223, and two parking structures (144 FW 2007).

None of the operations on the 144 FW installation maintain, operate, or own any PCB equipment or PCB-contaminated equipment and the installation is considered PCB-free. Environmental investigations conducted at the installation did not identify any releases with respect to historic PCB use or storage (144 FW 2007).

Contaminated Sites

Defense Environmental Restoration Program

Under the DERP, the IRP is designed to identify, evaluate, and remediate sites where activities may threaten public health, welfare, or the environment and is the basis for response actions at the 144 FW under the provisions of the CERCLA, as amended.

The 144 FW began conducting activities under the IRP in 1987 when a preliminary assessment of the installation was conducted. As a result of this preliminary assessment, three IRP Sites were identified; two additional IRP sites have since been identified at the installation. Following site investigations in 1992 at the five IRP sites, supplemental site investigations were conducted for Sites 1 through 4 and a remedial investigation was conducted at Site 5. In January 1996, decision documents were prepared recommending No Further Action for all five IRP sites at the 144 FW installation. The California Department of Toxic Substances Control and the Central Valley Regional Water Quality Control Board approved the No Further Action recommendations in March of 1997 (144 FW 2007).

In addition to the five IRP sites, there is a site outside of the installation that affects the regional groundwater quality beneath the 144 FW installation and is managed under the Formerly Used Defense Sites Program. The groundwater contamination is associated with the Old Hammer Field (OHF) Area 1 Remedial Investigation Site. A remedial investigation conducted

in the late 1990s found chlorinated VOCs, including trichloroethylene (TCE) as the dominant VOC. The plume currently covers 78 acres and is located north of the 144 FW installation, extending over approximately 75 percent of the installation. The site is currently undergoing remedial activities including soil vapor extraction, in-situ chemical oxidation, predesign investigation, and potential remediation of the southeast plume source area, long-term monitoring, and toe-of-plume groundwater extraction. With the selected remedy, the cleanup goal for groundwater is not expected to be achieved for several decades (144 FW 2007; Department of Toxic Substances Control 2022).

Figure CA3.11-1 shows the location of the five IRP sites and the OHF Area 1 Remedial Investigation Site TCE plume.

In response to PFAS (e.g., PFOS and PFOAs) and other emerging contaminants, AFCEC, the unit responsible for environmental management and response across the DAF, established a program to systematically identify potential releases, respond to drinking water contamination, and prevent future contamination. Nine potential AOCs or PRLs related to PFAS contamination from AFFF or other PFAS containing products were identified at the 144 FW installation during a preliminary assessment in January 2016 (144 FW 2019b). All nine were recommended for further investigation to characterize potential PFAS contamination. In 2018, a Phase III regional site inspection was conducted on the nine PRLs to (1) determine the presence or absence of PFAS in soil, surface water, or sediment (if present) at nine PRLs and in groundwater immediately downgradient of each PRL; (2) assess if PFAS from the installation are migrating off installation; and (3) determine if the concentrations of PFAS at each PRL are present in quantities or concentrations that warrant No Further Action or additional investigation as part of the Expanded Site Investigation or Remedial Investigation/Feasibility Study phase, and if so, what the appropriate data quality objectives should be (144 FW 2019b).

In addition, in 2020, a preliminary assessment for PFAS was conducted adjacent to the 144 FW for the Army National Guard, 1106th Theater Aviation Sustainment Maintenance Group also located at FAT to assess potential PFAS release areas and exposure pathways to receptors (Army National Guard and USACE 2020). The preliminary assessment included an inspection of the known fire training areas as well as additional locations where PFAS may have been released to the environment at Fresno Army National Guard, 1106th Theater Aviation Sustainment Maintenance Group and adjacent sites.

Table CA3.11-1 provides details for the PRLs at the 144 FW installation and the recommendations based upon the 2019 site investigation results, Table CA3.11-2 provides details for the potential sources adjacent to the installation and the recommendations (if any were provided) based upon the 2020 preliminary assessment results, and Figure CA3.11-2 shows the PRLs.

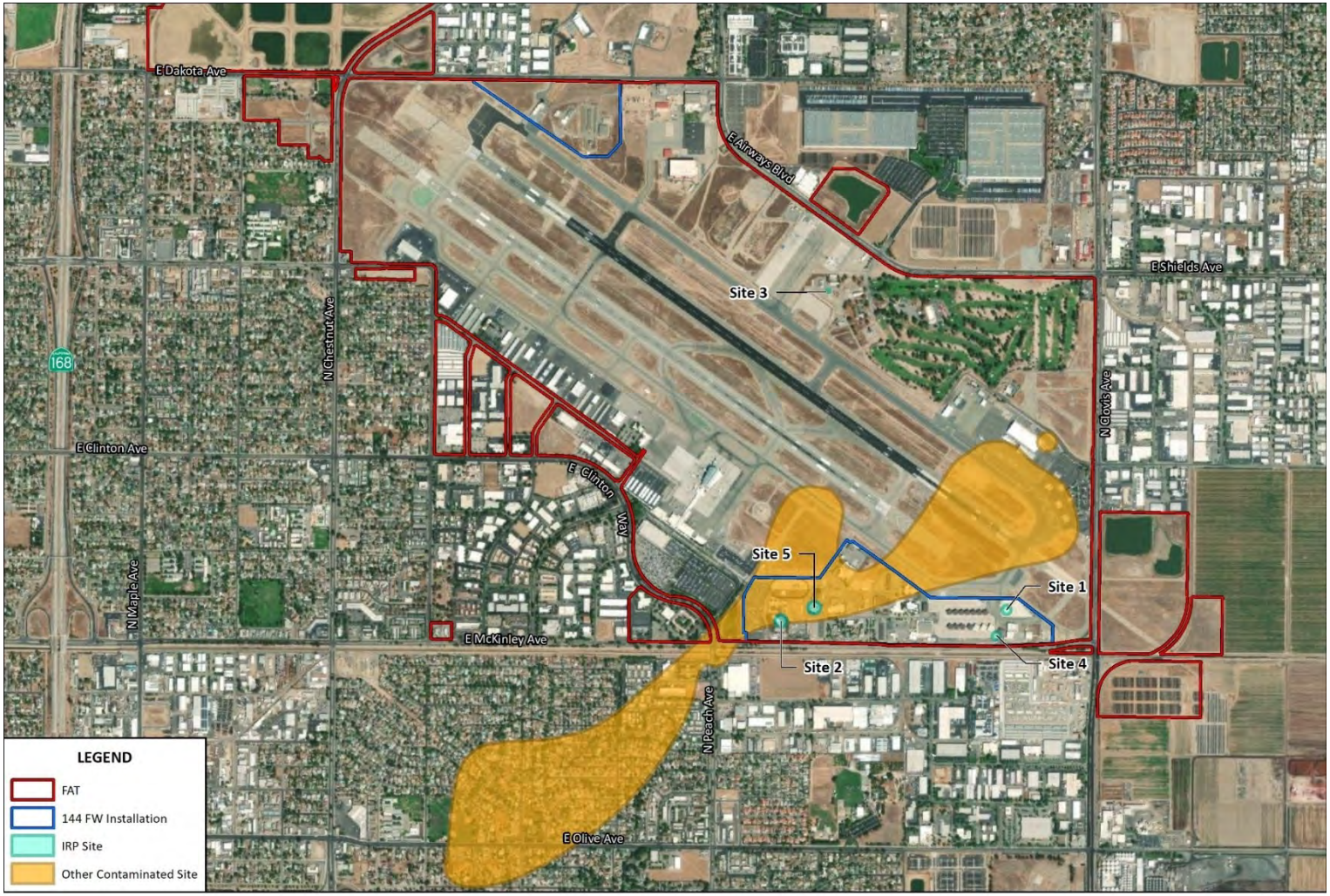


Figure CA3.11-1 Location of the IRP Sites and OHF Area 1 Remedial Investigation Site TCE Plume at Fresno Yosemite International Airport (FAT)

Table CA3.11-1 Potential Release Locations of PFAS at the 144 FW Installation

Site ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1,2]
1	Former Fire Training Area (FTA) (IRP Site 1)	Firefighting training activities were executed at this location between the late 1950s and early 1970s. Between 25,000 and 40,000 gallons of flammable material were used at the FTA over this time period. After igniting the flammable materials for firefighting training, the flames were allowed time to burn until they began to die down at which point the flames were extinguished with AFFF. The AFFF used in the training exercises was protein-based foam consisting of approximately 6% AFFF diluted with 94% water. Sodium bicarbonate, also referred to as Purple K, was used as a dry chemical extinguisher at the FTA as well.	**Soil:** Although Project Action Limits (PALs) were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
2	Aircraft Parking Ramp	The Aircraft Parking Ramp is a large concrete area where drainage is characterized by sheet flow into either grassy, vegetated areas to the north or storm drains lining the southern portion. Although there are not any documented releases of AFFF to the aircraft parking apron, this area was included as a PRL in the Preliminary Assessment Report due to the potential use and discharge of AFFF associated with this area.	**Soil:** Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
3	Building 145 (Fire Station)	Building 145 was built in 1992 and has operated as the Fire Station since. There have been no known releases of AFFF within or around the Fire Station. In the event of an accidental release of AFFF, the discharged material would flow into the floor drains within the Fire Station which are connected to an OWS which is connected to the storm sewer. ARFF vehicles were stored and washed within the Fire Station; any wash fluid would discharge to the floor drains.	**Soil:** Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells.

Site ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1,2]
4	Building 100 (Aircraft Hangar)	Building 100 was constructed in 1955 and is equipped with an FSS, which was supplied with AFFF between 1994 and 2007. The Preliminary Assessment Report stated that installation records indicated some of the valves on the FSS would leak AFFF to the floor when touched. During FSS system testing, installation personnel estimated that approximately 10 gallons of AFFF was discharged. Installation personnel believe there was an accidental release of AFFF from the FSS prior to 2004; however, installation records could not confirm the release. AFFF discharged from the FSS was washed into trench drains within the hangar. The trench drains discharge to a 5,000-gallon underground holding tank located southeast of the hangar which connects to the storm sewer. The holding tank also receives stormwater runoff from the Aircraft Parking Ramp. According to installation personnel, the holding tank has a valve that is normally kept in the closed position to contain water for inspection prior to release to the storm sewer. It is unknown if the AFFF discharged into this holding tank was removed and sent for off-site disposal or released to the storm sewer.	**Soil:** Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing FSS, documented AFFF leaks, and suspicion of an accidental release. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
5	Building 157 (Fuel Cell)	Building 157 was built in 1988 and a FSS supplied with AFFF was installed in 1994 and was in place through 2007. The FSS was tested every 2 to 3 years and it was noted by installation personnel that during FSS testing, approximately 10 gallons of AFFF would be discharged with each testing. Additionally, the valves of the FSS reportedly leaked. The discharged AFFF was washed into trench drains within the building which connected to a 1,000-gallon OWS that discharges to the sanitary sewer.	**Soil:** Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells.

Site ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1,2]
6	Building 104 (Former Fire Department)	Building 104, which was built in 1957, served as the original Fire Department until 1992 when the new Fire Department, Building 145, was constructed. The Preliminary Assessment Report noted that AFFF was stored on the parking apron to the east of the building. ARFF vehicles were washed and filled up with AFFF on the parking apron as well. There are no known releases of AFFF in or around the former fire station. If any releases did occur within the building or on the apron to the east, the AFFF would have been washed down or left to dissipate.	**Soil:** Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for a fire department to have soil impacts. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
7	Stormwater Discharge Point 01	Stormwater from the northern most drainage area (DA-01) flows into storm drains that are conveyed to a stormwater line that runs east to west along Air Guard Road. The current Fire Station, Building 145 (PRL 3) is located within DA-01. AFFF discharged into DA-01 will enter the storm sewer at this PRL through surface water flow or water washed into floor drains. The storm sewer eventually discharges into the collection basin located directly west of the base at the corner of McKinley and Peach Avenue.	**Surface Water and Sediment:** Conduct sampling of surface water to determine if there is a complete pathway from these PRLs to the installation outfalls. Conduct additional sediment sampling in associated surface water runoff drainage feature.
8	Stormwater Discharge Point 04	Drainage area 04 (DA-04) constitutes the eastern portion of the installation. Aircraft Parking Ramp (PRL 2), Building 157 Fuel Cell (PRL 5), and Former FTA (PRL 1) are located in this drainage area. Stormwater from this drainage area flows into a stormwater line that runs east west within the installation and eventually discharges into the collection basin located directly west of the installation at the corner of McKinley and Peach Avenue.	**Surface Water and Sediment:** Conduct sampling of surface water to determine if there is a complete pathway from these PRLs to the installation outfalls. Conduct additional sediment sampling in associated surface water runoff drainage feature.

Site ID	*Site Name and Description*	*Site Activities*	*Recommendation*[1,2]
9	Stormwater Discharge Point 06	Drainage Area 06 (DA-06) at the 144 FW installation includes Building Aircraft Parking Ramp (PRL 2), 100 Aircraft Hangar (PRL 4), and Building 104 Former Fire Department (PRL 6) and is located on the mid-east portion of the installation. Stormwater from this drainage area and the hangar trench drains discharge to an OWS/holding tank southeast of the hangar. According to installation personnel, a stormwater/spill control valve is kept in the closed position and is typically opened during storm events. The OWS/holding tank discharges to the stormwater line that runs east and west along 144 FW installation, which eventually discharges into the collection basin located directly west of the installation at the corner of McKinley and Peach Avenue.	**Surface Water and Sediment:** Conduct sampling of surface water to determine if there is a complete exposure pathway from this PRL to the installation outfalls. Conduct sediment sampling in associated surface water runoff drainage features.
General			**Groundwater:** (1) Collect additional groundwater samples in upgradient locations to quantify potential impacts from upgradient sources; and (2) collect additional groundwater samples off-installation from a limited number of new monitoring wells to determine if PFAS impacts beyond the installation boundary are increasing or decreasing.

Notes: [1]See 144 FW 2019b. Final Site Inspection Report Air National Guard Phase II Regional Site Inspections for Per- and Polyfluoroalkyl Substances, Fresno Air National Guard Base, Fresno, California for further details regarding the investigation of the PRLs.
Legend: 144 FW = 144th Fighter Wing; AFFF = aqueous film-forming foam; ARFF = Aircraft Rescue and Firefighting; FSS = fire suppression system; FTA = Fire Training Area; OWS = oil/water separator; PAL = Project Action Limit; PFAS = per- and polyfluoroalkyl substances; PRL = Potential release location.
Source: 144 FW 2019b.

Table CA3.11-2 Potential Sources of PFAS Adjacent to the 144 FW Installation

Site ID	*Site Name and Description*	*Material Disposed History*	*Recommendation*[1]
1	Hangar Training Area	AOI 1 is the Hangar Training Area, which borders the Army National Guard, 1106th Theater Aviation Sustainment Maintenance Group Hangar to the west. Controlled AFFF releases through fire training activities occurred annually during the approximate years 2008 to 2011 and 2014.	Proceed to a Site Investigation, focus on soil, groundwater, surface water, sediment.
2	Wash Rack and East Airfield Taxiway	AOI 2 is the Wash Rack and East Airfield Taxiway. The area includes the HAZMAT locker with AFFF storage, located at the southeast corner of the Wash Rack. Controlled AFFF releases to the Wash Rack have occurred periodically from 2007 to 2010, and AFFF releases in the two identified areas from the servicing of Tri-Max™ fire extinguishers in the East Airfield Taxiway have occurred in 2015.	Proceed to a Site Investigation, focus on soil, groundwater, surface water, sediment.
N/A	Fresno ANG Installation	A PFAS Site Investigation at the installation has reported PFAS exceedances of the RSL for soil and health advisory limits for groundwater (see Table CA3.11-2).	None.
N/A	Fresno ARFF (ARFF Test Foam Areas)	The Fresno ARFF stores AFFF at the fire station and uses AFFF in several areas of the FAT property for bi-annual FAA certification.	None.
N/A	Former Fire Training Area #1	A former FTA on FAT property was reportedly used by ARFF and ANG and may have involved AFFF in training exercises.	None.
N/A	Former Fire Training Area #2	A former FTA on FAT property was reportedly used by ARFF and ANG and may have involved AFFF in training exercises.	None.
N/A	Private Aviation Companies at FAT	Signature Flight Support Corporation, Inc. maintains two hangars with AFFF deluge systems, one of which had an accidental trip, and SkyWest Airlines also maintains a hangar with an AFFF deluge system.	None.
N/A	Former Marine Corps Facility	Reportedly had a fire unit with a P-19 fire truck and conducted fire training activities with the 144 FW, which may have involved AFFF usage.	None.
N/A	Aramark Uniform Services	An Aramark Uniform Services facility conducts industrial activities related to uniform manufacturing and fireproofing, which may involve PFAS-containing chemicals.	None.

Site ID	*Site Name and Description*	*Material Disposed History*	*Recommendation*[1]
N/A	1994 Learjet Crash	In 1994, a Learjet crashed onto Olive Avenue approximately 2 miles southwest of the airport; an unknown quantity and type of foam was used in the incident response.	None.

Notes: [1]See the USACE 2020 Final Preliminary Assessment Report Fresno TASMG, California, Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites ARNG Installations, Nationwide, February for further details regarding the investigation of the potential sources.

Legend: 144 FW = 144th Fighter Wing; AFFF = aqueous film-forming foam; ANG = Air National Guard; AOI = Area of Interest; ARFF = Aircraft Rescue and Fire Fighting; FAT = Fresno Yosemite International Airport; FTA = Fire Training Area; HAZMAT = hazardous materials; N/A = not applicable; PFAS = per- and poly-fluoroalkyl substances; RSL = regional screening level.

Source: Army National Guard and USACE 2020.

Figure CA3.11-2 PRLs at and Adjacent to the 144 FW Installation

CA3.11.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.11.2 Environmental Consequences

CA3.11.2.1 F-15EX

Installation

Locational Scenario 1 – Construction Occurs within Existing 144 FW Cantonment

Hazardous Materials

Under the F-15EX beddown at Locational Scenario 1, the quantities of hazardous materials and petroleum substances used throughout the installation could increase over the long term due to the potential increase in aircraft operations. Construction and modification activities under the proposed beddown of the F-15EX at Locational Scenario 1 at FAT would cause short-term increases in the quantities of hazardous materials (e.g., paint) and petroleum products (e.g., vehicle fuel) used and stored on the installation. Currently, the majority of the F-15C aircraft maintenance takes place at the 144 FW installation.

Under the beddown at Locational Scenario 1, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous material streams would be expected to increase. The 144 FW is responsible for managing these materials in accordance with all applicable federal, military, state, and local laws and regulations to protect their employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community. The operating location would be responsible for the safe storage and handling of hazardous materials used in conjunction with all construction activities. Additional aircraft, vehicles, and equipment would increase consumption of operating fluids and fuel; however, the long-term impacts are expected to be minor with the implementation of the aforementioned hazardous materials management procedures and practices and would not be significant. No direct work would be performed on the ASTs and no additional ASTs are proposed to be installed. Possible impacts associated with these projects include tank ruptures or leaks during construction. The 144 FW has in place a *Spill Prevention, Control, and Countermeasures Plan*, which would address these impacts should they occur (144 FW 2021b).

Hazardous Waste

Implementation of the F-15EX beddown at Locational Scenario 1 would have short-term minor impacts on hazardous waste accumulation. There would be an increase in temporary construction-related hazardous wastes. All construction hazardous waste would be managed by the contractors and would be applicable to all federal and state rules and regulations. Note that in August 2022, the EPA proposed to designate PFAS as hazardous substances under CERCLA. If this designation is finalized, it would impact the management requirements for excavated material (i.e., soil and groundwater) generated during construction. In addition, such designation as hazardous material or waste could impact generator status for installations (i.e., from a Small Quantity Generator to Large Quantity Generator, depending on the current status and amount of waste generated). These impacts would be short-term; however, the potential impacts of the generator status change (even temporarily) could be significant in regard to cost and additional management requirements. The volume of waste generated would be tracked and analyzed to determine whether each type of waste is hazardous. The DoD management of PFAS is evolving and a recent Office of the Secretary of Defense decision impacted management requirements. On July 7, 2023, the Assistant Secretary of Defense for Energy, Installations, and Environment, issued a memo "Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States" that directs DoD installations to dispose PFAS-containing materials in hazardous waste landfills, or specialized solid waste landfills with environmental permits, that have composite liners, and gas and leachate collection and treatment systems (Assistant Secretary of Defense for Energy, Installations, and Environment 2023). All waste would be properly disposed of in accordance with all applicable federal, military, state, and local laws and regulations. No trash or other solid waste would be buried, burned, or otherwise disposed of at the project site.

The F-15EX beddown at Locational Scenario 1 would not result in any adverse long-term environmental impacts that would affect the installation. Hazardous waste generation would continue to be managed in accordance with the installation's HWMP and all applicable federal, military, state, and local laws and regulations. Changes to the installation's Small Quantity Generator status could occur if pending legislation to make PFAS a hazardous material/waste takes effect and PFAS contamination continues to be an issue at the installation. Under the F-15EX beddown at Locational Scenario 1, the total number of airfield operations would increase; therefore, throughput of hazardous waste streams would be expected to increase.

Toxic Substances

Toxic substances typically associated with buildings and facilities include ACM, LBP, and/or PCBs. No new toxic substances would be used or stored due to the implementation of the F-15EX beddown at Locational Scenario 1. ACM is present in Building 2606 in the munitions area, which

is proposed to have repairs made to the existing building to accommodate air-to-ground munitions inspection and assembly and training functions (Project 8). There is also the potential for ACM in Building 157, which is proposed to have repairs made to the existing heating, ventilation, and air conditioning system in order to provide adequate make-up air for fuel cell operations (Project 12). If ACM is discovered within a building that is to be demolished or renovated, the proper federal and state rules and regulations would be followed, including but not limited to, 40 CFR 61.145, *Standard for Demolition and Renovation* and 29 CFR 1926.1101, *Asbestos Construction Standard*.

An LBP survey has not been conducted on the 144 FW buildings. All buildings on the 144 FW installation constructed prior to 1978 are presumed to contain LBP and are tested for LBP prior to demolition or renovation (144 FW 2007). LBP surveys were conducted at the Marine Corps Reserve Center in 1999 and again in 2004 and LBP was identified in some of the buildings; however, there are no proposed construction projects under the F-15EX beddown at Locational Scenario 1 that involve those buildings. As a BMP, contractors who renovate or demolish buildings testing positive for LBP should be certified by the EPA and follow lead-safe work practices. LBP would be managed and disposed of in accordance with Toxic Substances Control Act, OSHA regulation, California requirements, and established ANG procedures.

The state and federal rules and regulations mentioned above, as well as BMPs would be followed by the 144 FW during construction; therefore, there would be less than significant impacts with respect to toxic substances with the implementation of the F-15EX beddown at Locational Scenario 1.

Contaminated Sites

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

In accordance with AFI 32-7020, *The Environmental Restoration Program*, construction, modifications, and/or additions to existing buildings can occur on or in proximity to existing IRP sites. Accordingly, the appropriate organizations (e.g., installation planners, remedial project managers, design engineers) must consider a compatible land use based on current site conditions and the selected or projected remedial action alternatives. If the potential for uncharacterized IRP sites exists, the 144 FW would be responsible for identifying existing contamination at the proposed construction sites to avoid unknowingly locating construction projects in contaminated areas. There are no active IRP sites that could potentially impact the proposed construction projects under the F-15EX beddown at Locational Scenario 1. However, there is a TCE-contaminated groundwater plume associated with the OHF Area 1 (Formerly Used Defense Site) Remedial Investigation Site which overlaps with Project 5 (construction of a medical training facility), Project 9.1 (construction of a fire station), and Project 14 (construction of a four bay Full Mission Simulator facility) (Figure CA3.11-3).

Figure CA3.11-3 IRP Sites and OHF Area 1 TCE Plume within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 1 at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Projects 6, 11, and 16; would overlap with areas identified as being potential sources of PFAS (PRL 2 [Aircraft Parking Ramp]) (Figure CA3.11-4). Project 6, which involves repairs to the airfield pavement, Project 11, which involves repairing the Small Maintenance Hangar (Building 159), and Project 16, which involves construction of the Conforming Fuel Tank Maintenance facility, overlap with PRL 2 (Aircraft Parking Ramp).

If contaminated media (e.g., soil, groundwater) are encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation or potential construction dewatering for installation of building footers) for proposed construction activities, work would cease until 144 FW Program Managers establish an appropriate course of action for the project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation as necessary. Prior to construction and demolition activities, the construction and demolition contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety and to prevent the spread of contamination. The construction and demolition contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained if required.

Therefore, no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would occur with implementation of the F-15EX beddown at Locational Scenario 1.

Locational Scenario 2 – Construction Occurs Primarily at the 144 FW Cantonment Area, with Some Projects Related to the Aerospace Control Alert Mission Occurring North of the Runway

Construction and modification projects under the F-15EX beddown at Locational Scenario 2 would be similar to those described for Locational Scenario 1 (see Table CA2.1-3) and operations would be the same. Thus, the F-15EX beddown at Locational Scenario 2 would potentially involve similar hazardous material usage, generate similar quantities of hazardous waste, and would also involve Project 8 at Building 2606 which does include ACM and Project 12 at Building 157 where there is the potential for ACM. LBP removal would not be required as none of the potentially contaminated locations will be disturbed under this alternative.

Figure CA3.11-4 PFAS PRLs within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 1 at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Under the F-15EX beddown at Locational Scenario 2, there would be the same overlap with the OHF Area 1 TCE-contaminated groundwater plume and the proposed projects as with the Locational Scenario 1 (Figure CA3.11-5). Projects 6, 9.2, 11, 16, 17, 18, 19 (not shown in the figure), and 20, however, would overlap with areas identified as being potential sources of PFAS (PRL 2 [Aircraft Parking Ramp] and Former Marine Corps Facility) (Figure CA3.11-6). If contaminated media (e.g., soil, groundwater) are encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation or potential construction dewatering for installation of building footers) for proposed construction activities, the same practices and procedures described for the F-15EX beddown at Locational Scenario 1 would be implemented. Therefore, impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would be similar to those described for F-15EX beddown at Locational Scenario 1. As such, no significant impacts would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.11.2.2 F-15C Legacy Aircraft

Installation

Under the legacy F-15C aircraft alternative, the planned construction and repair projects required for the current mission would be implemented (Table CA2.1-3). Construction impacts would be much smaller in magnitude than the proposed F-15EX Alternative as overall there would be much less construction and modification projects executed. Thus, the Legacy F-15C Alternative would involve significantly less hazardous material usage, generate significantly less hazardous waste, and might require ACM and/or LBP removal if discovered during the renovation and/or demolition of a building. There are no overlaps between the IRP sites and PRLs and the proposed construction and modification projects with the exceptions of Project 5 (construction of a medical training facility) which overlaps the TCE-contaminated groundwater plume associated with the OHF Area 1 Remedial Investigation Site and Project 6 which involves the airfield pavement repairs and overlaps PRL 2 (Figures CA3.11-7 and CA3.11-8). There will be no additional aircraft, vehicles, and equipment and hence there would be no change in consumption of operating fluids and fuel. Impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would be less than those described for the F-15EX Alternative. Overall, no significant impacts would occur.

Figure CA3.11-5 OHF Area 1 TCE Plume within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 2 at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Figure CA3.11-6 PFAS PRLs within the Vicinity of the Proposed Construction for the F-15EX at Locational Scenario 2 at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Figure CA3.11-7 OHF Area 1 TCE Plume within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Figure CA3.11-8 PFAS PRLs within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 144 FW Installation at Fresno Yosemite International Airport (FAT)

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.11.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would not be significant.

CA3.11.3 Summary of Impacts

The types of hazardous materials needed for maintenance and operation of the F-15EX and the F-35A would be similar to those currently used for maintenance and operation of the F-15C fleet. Under the F-15EX Alternative, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action and the present/reasonably foreseeable project would occur. Under the Legacy Alternative, construction impacts would be much smaller in magnitude than the proposed F-15EX Alternative as overall there would be much less construction and modification projects executed. Thus, the Legacy F-15C Alternative would involve significantly less hazardous material usage and generate significantly less hazardous waste. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP at FAT and all applicable federal, military, state, and local laws and regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP and would include any construction-related materials or waste associated with aircraft operations. Additionally, changes to the 144 FW's Small Quantity Generator status at FAT could occur in the short-term if PFAS is designated as a hazardous substance and is detected in excavated material (i.e., soil and groundwater) generated during construction and/or in the long term with the increase in hazardous waste generation from aircraft operations. In addition, any projects proposed for construction or modification at FAT would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

If contaminated media (e.g., soil, groundwater) was encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities at FAT, work would cease until the designated Program Manager(s) establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing IRP or AOC sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained if required.

Under the No Action Alternative, impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would not be significant. Therefore, no significant impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would occur with implementation of any of the alternatives.

CA3.12 BIOLOGICAL RESOURCES/COASTAL RESOURCES/WETLANDS

CA3.12.1 Affected Environment

CA3.12.1.1 Installation

Vegetation

Most areas associated with the 144 FW installation have been actively altered through landscaping and paving, and therefore contain little native vegetation. Vegetation surrounding the runways/taxiways and adjacent to the aircraft aprons consists primarily of ruderal native and non-native grass such as softchess brome (*Bromus hordeaceus*) and Pacific fescue (*Vulpia microstachys* var. *pauciflora*) as well as non-native forbs such as toadflax (*Linaria pinifolia, L. maroccana*), filaree (*Erodium cicutarium*), wire lettuce (*Lactuca serriola*), and native miniature lupine (*Lupinus bicolor*) (NGB 2013b). The adjoining 97-acre golf course northeast of the airfield includes numerous trees, including a mix of native oaks (*Quercus* sp.), ornamental hardwoods (maples, pines, etc.), and short, manicured grass.

Wildlife

Due to the lack of native vegetation and the frequency of human activities, the majority of the wildlife present at the 144 FW installation consists of species that are highly adapted to developed

and disturbed areas including starlings (*Sturnus vulgaris*), house finches (*Carpodacus mexicanus*), western meadowlarks (*Sturnella neglecta*), and American crows (*Corvus brachyrhynchos*). Waterbirds such as the Canada goose (*Branta canadensis*), mallards (*Anas platyrhynchos*), killdeer (*Charadrius vociferus*), black-necked stilts (*Himantopus mexicanus*), and greater yellowlegs (*Tringa melanoleuca*) can be found within the stormwater detention basins. Amphibian and reptile species that have the potential to occur in the area include western toads (*Bufo boreas*) and gopher snakes (*Pituophis melanoleucus*). Mammals known to occur at FAT include California ground squirrels (*Otospermophilus beecheyi*), coyotes (*Canis latrans*), and red foxes (*Vulpes vulpes*).

The adjacent Fresno Airways Golf Course also provides habitat for these species, as well as vegetative cover for a variety of birds such as Canada geese, mallards, American avocets (*Recurvirostra americana*), red-tailed hawks (*Buteo jamaicensis*), Brewer's blackbirds (*Euphagus cyanocephalus*), and great blue herons (*Ardea Herodias*) (NGB 2013b; 144 FW 2020b). Three species of bats were acoustically detected during a 2022 survey of the Fresno Airways Golf Course: Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), and silver-haired bat (*Lasionycteris noctivagans*) (NGB 2022).

Threatened, Endangered, and Special Status Species

No federally or state listed threatened or endangered species or critical habitats are known to exist at the 144 FW installation. Table CA3.12-1 summarizes threatened, endangered and special status species with the potential to occur on or within the vicinity of the installation. Thirteen federally listed, candidate, or proposed for listing wildlife species have the potential to occur on or within the vicinity of the installation. Table CA3.12-2 also outlines the potential presence of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), which are both protected under the BGEPA, in addition to the MBTA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to disturb eagles. However, because the installation is located within the boundaries of FAT and consists almost entirely of impervious surfaces, artificial structures, and introduced or invasive vegetation, little or no quality habitat exists for any of these species. The potential for their occurrence is highly unlikely given this environment.

Table CA3.12-1 Federally and State Listed Species Potentially Occurring in the Vicinity of the 144 FW Installation at Fresno Yosemite International Airport (FAT) and Under the Airspace

Common Name	*Scientific Name*	*Status*	*Potential Occurrence on the Installation*	*Potential Occurrence Under the Airspace*
Birds				
California clapper rail	*Rallus longirostris obsoletus*	E		P
California condor	*Bymnogyps californianus*	E, SE	P	P
California least tern	*Sterna antillarum browni*	E, SE		P
Hawaiian petrel	*Pterodroma sandwichensis*	E		P
Inyo California towhee	*Pipilo crissalis eremophilus*	T, SE		P
Least Bell's vireo	*Vireo bellii pusillus*	E, SE		P
Marbled murrelet	*Brachyramphus marmoratus*	T, SE		P
Short-tailed albatross	*Phoebastria albatrus*	E		P
Southwestern willow flycatcher	*Empidonax traillii extimus*	E, SE		P
Western snowy plover	*Charadrius nivosus nivosus*	T		P
Yellow-billed cuckoo	*Coccyzus americanus*	T, SE	P	P
Mammals				
Amargosa vole	*Microtus californicus scirpensis*	E, SE		P
Buena Vista lake shrew	*Sorex ornatus relictus*	E		P
Fisher	*Pekania pennanti*	E, ST		P
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	E, SE	P	P
Giant kangaroo rat	*Dipodomys ingens*	E, SE		P
North American wolverine	*Gulo gulo luscus*	PT, ST		P
San Joaquin kangaroo rat	*Dipodomys nitratoides*	E		P
San Joaquin kit fox	*Vulpes macrotis mutica*	E, ST	P	P
Sierra Nevada bighorn sheep	*Ovis canadensis sierrae*	E, ST		P
Sierra Nevada red fox	*Vulpes vulpes necator*	E, ST		P
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	E, SE		P
Reptiles and Amphibians				
Arroyo toad	*Anaxyrus californicus*	E		P
Blunt-nosed leopard lizard	*Gambelia silus*	E, SE	P	P
California red-legged frog	*Rana draytonii*	T		P
California tiger Salamander	*Ambystoma californiense*	T, ST	P	P
Desert tortoise	*Gopherus agassizii*	T, ST		P

Common Name	*Scientific Name*	*Status*	*Potential Occurrence on the Installation*	*Potential Occurrence Under the Airspace*
Foothill yellow-legged frog	*Rana boylii*	PT, ST		P
Mountain yellow-legged frog	*Rana muscosa*	E, SE		P
Giant garter snake	*Thamnophis gigas*	T		P
Sierra Nevada yellow-legged frog	*Rana sierrae*	E, ST		P
Yosemite toad	*Anaxyrus canorus*	T		P
Fish				
Delta smelt	*Hypomesus transpacificus*	T, SE	P	N/A
Invertebrates				
Monarch butterfly	*Danaus plexippus*	C	P	N/A
Conservancy fairy shrimp	*Branchinecta conservatio*	E	P	N/A
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	P	N/A
Plants				
Fleshy owl's-clover	*Castilleja campestris* ssp. *succulenta*	T, SE	P	N/A
Greene's Tuctoria	*Tuctoria greenei*	E	P	N/A
San Joaquin Orcutt grass	*Orcuttia inaequalis*	T, SE	P	N/A

Legend: 144 FW = 144th Fighter Wing; C = Federal Candidate for Listing; E = Endangered; FAT = Fresno Yosemite International Airport; N/A = Not applicable as these groups are not being analyzed under the airspace; P = Potential to Occur; PT = Proposed for federally listing as Threatened; SE = State Endangered; ST = State Threatened; T = Federally Threatened.
Sources: California Department of Fish and Wildlife 2022a, 2022b; Nevada Department of Wildlife 2022; USFWS 2022.

In addition, seven migratory birds that occur on the USFWS Birds of Conservation Concern list have the potential to occur on the installation (Table CA3.12-2) (USFWS 2022).

Table CA3.12-2 Migratory Birds of Conservation Concern that Could Potentially Occur within the 144 FW Installation at Fresno Yosemite International Airport (FAT) and Under the Airspace

Common name	*Scientific Name*	*Season*	*Potential Occurrence on the 144 FW Installation*	*Potential Occurrence Under the Airspace*
Allen's hummingbird	*Selasphorus sasin*	Year-round		P
American White Pelican	*Pelecanus erythrorhynchos*	Year-round		P
Bald Eagle[1]	*Haliaeetus leucocephalus*	Year-round	P	P
Belding's Savannah Sparrow	*Passerculus sandwichensis beldingi*	Year-round	P	P
Bendire's thrasher	*Toxostoma bendirei*	Breeding		P
Black oystercatcher	*Haematopus bachmani*	Year-round		P
Black scoter	*Melanitta nigra*	Fall/Winter		P
Black skimmer	*Rynchops niger*	Breeding		P
Black swift	*Cypseloides niger*	Breeding		P
Black tern	*Chlidonias niger*	Breeding		P

Common name	***Scientific Name***	***Season***	***Potential Occurrence on the 144 FW Installation***	***Potential Occurrence Under the Airspace***
Black turnstone	*Arenaria melanocephala*	Year-round		P
Black-chinned sparrow	*Spizella atrogularis*	Breeding		P
Black-footed albatross	*Phoebastria nigripes*	Spring		P
Black-legged kittiwake	*Rissa tridactyla*	Winter		P
Black-throated gray warbler	*Dendroica nigrescens*	Breeding		P
Black-vented shearwater	*Puffinus opisthomelas*	Fall		P
Bobolink	*Dolichonyx oryzivorus*	Breeding		P
Brown pelican	*Pelecanus occidentalis*	Year-round		P
Bullock's Oriole	*Icterus bullockii*	Breeding	P	P
California spotted owl	*Strix occidentalis occidentalis*	Breeding		P
California thrasher	*Toxostoma redivivum*	Year-round		P
Cassin's finch	*Carpodacus cassinii*	Year-round		P
Clark's Grebe	*Aechmophorus clarki*	Year-round		P
Common Loon	*Gavia immer*	Year-round		P
Common murre	*Uria aalge*	Year-round		P
Common yellowthroat	*Geothlypis trichas sinuosa*	Year-round		P
Costa's hummingbird	*Calypte costae*	Year-round		P
Evening grosbeak	*Coccothraustes vespertinus*	Breeding		P
Franklin's gull	*Leucophaeus pipixcan*	Breeding		P
Golden Eagle[1]	*Aquila chrysaetos*	Year-round	P	P
Grace's warbler	*Dendroica graciae*	Breeding		P
Lawrence's goldfinch	*Carduelis lawrencei*	Breeding	P	P
Le Conte's thrasher	*Toxostoma lecontei*	Breeding		P
Lesser yellowlegs	*Tringa flavipes*	Spring/Summer		P
Lewis's woodpecker	*Melanerpes lewis*	Breeding		P
Long-eared owl	*Asio otus*	Breeding		P
Long-tailed duck	*Clangula hyemalis*	Fall/Winter		P
Marbled godwit	*Limosa fedoa*	Year-round		P
Mountain plover	*Charadrius montanus*	Fall/Winter		P
Nuttall's woodpecker	*Picoides nuttallii*	Year-round	P	P
Oak Titmouse	*Baeolophus inornatus*	Year-round	P	P
Olive-sided flycatcher	*Contopus cooperi*	Breeding		P
Pink-footed shearwater	*Puffinus creatopus*	Fall		P
Pinyon jay	*Gymnorhinus cyanocephalus*	Year-round		P
Red phalarope	*Phalaropus fulicarius*	Summer/Fall		P
Pomarine jaeger	*Stercorarius pomarinus*	Fall		P
Red-breasted merganser	*Mergus serrator*	Year-round		P
Red-necked phalarope	*Phalaropus lobatus*	Summer		P
Red-throated Loon	*Gavia stellata*	Year-round		P
Ring-billed Gull	*Larus delawarensis*	Year-round		P
Royal tern	*Thalasseus maximus*	Year-round		P
Rufous hummingbird	*Selasphorus rufus*	Spring/Summer		P

Common name	*Scientific Name*	*Season*	*Potential Occurrence on the 144 FW Installation*	*Potential Occurrence Under the Airspace*
Rugous-winged sparrow	*Aimophila carpalis*	Year-round		P
Sage thrasher	*Oreoscoptes montanus*	Year-round		P
Scripp's murrelet	*Synthliboramphus scrippsi*	Spring/Summer		P
Short-billed dowitcher	*Limnodromus griseus*	Year-round		P
Surf scoter	*Melanitta perspicillata*	Year-round		P
Tricolored Blackbird	*Agelaius tricolor*	Year-round		P
Virginia's warbler	*Vermivora virginiae*	Breeding		P
Western Grebe	*Aechmophorus occidentalis*	Year-round		P
White-winged scoter	*Melanitta fusca*	Fall/Winter		P
Willet	*Catoptrophorus semipalmatus*	Year-round		P
Wrentit	*Chamaea fasciata*	Year-round		P
Yellow-billed magpie	*Pica nuttalli*	Year-round		P

Note: [1]This is not a Bird of Conservation Concern in this area, but warrants attention because of the Eagle Act.
Legend: 144 FW = 144th Fighter Wing; P = Potential to Occur.
Source: USFWS 2022.

Wetlands

No wetlands are known to exist on the 144 FW installation (NGB 2023).

Coastal Resources

In California, the California Coastal Act of 1976 is administered by the California Coastal Commission. The primary authority for the Coastal Commission is the federal CZMA of 1972, as amended. The Coastal Commission regulates development activities and manages the resources of the Coastal Zone, especially those which have a direct and significant impact on coastal waters. It is the function of Coastal Commission, through its staff, to maintain, protect, develop, and restore or enhance the invaluable coastal region of the state of California. Section 306 of the CZMA contains the procedures for the allocation of grants and the adoption and approval of state coastal management programs.

The 144 FW installation is not located within any Coastal Zone boundary and therefore actions on the installation would not affect any coastal zone. Therefore, coastal resources are excluded from further review.

CA3.12.1.2 Airspace

Due to the nature of the actions proposed within the airspace, coastal resources, wetlands, and plant species were excluded from extensive review and analysis because the proposed activities

would not result in new ground disturbance, and ordnance delivery and chaff and flare use would not exceed current levels and would occur in locations already used and authorized for those purposes. In addition, marine species, invertebrates, and fish were excluded from review and analysis as they, too, would not likely be impacted by the Proposed Action.

Wildlife

The airspace associated with the 144 FW operations covers over 25,000 square miles of land within California and Nevada. Wildlife within these areas occur within the Central California Valley where ecologically, this falls under the EPA's Ecoregion Level IV (Griffith et al. 2016). The valley distinguishes itself from neighboring ecoregions because it consists of flat, intensively farmed plains with long, hot, dry summers and mild winters. The two major rivers flow from opposite ends of the Central California Valley, entering into the Sacramento-San Joaquin River Delta and San Pablo Bay.

A wide variety of wildlife species are found within this habitat, including black-tailed jackrabbits (*Lepus californicas*), barn owls (*Tyto alba*), California ground squirrels, killdeer, and coyotes (Griffith et al. 2016).

Threatened, Endangered, and Special Status Species

Table CA3.12-1 lists federally threatened, endangered, candidate, and state listed species observed or potentially occurring under the airspace. There are 32 federally listed and candidate species that have been observed or potentially occur under the airspace. There is critical habitat for the Amargosa vole (*Microtus californicus scirpensis*), California condor (*Bymnogyps californianus*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), desert tortoise (*Gopherus agassizii*), fisher (*Pekania pennanti*), Inyo California towhee (*Pipilo crissalis eremophilus*), mountain yellow-legged frog (*Rana muscosa*), Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), Sierra Nevada yellow-legged frog (*Rana sierrae*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), and the Yosemite toad (*Anaxyrus canorus*) under the airspace. In addition, 64 migratory birds that occur on the USFWS Birds of Conservation Concern list have the potential to occur under the airspace (see Table CA3.12-2).

CA3.12.2 Environmental Consequences

CA3.12.2.1 F-15EX

Installation

Vegetation

Construction of new facilities for the F-15EX at the 144 FW installation would occur primarily on poor habitat such as existing paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in an estimated maximum increase of 231,300 SF (5.3 acres), or 670,900 SF (15.4 acres) of impervious surfaces for Locational Scenarios 1 or 2, respectively. Vegetation with potential to be affected would consist of non-native species as described in CA3.12.1.2, *Airspace*. Most new construction would occur within currently landscaped, dirt or disturbed areas, and all land that would be permanently impacted is adjacent to disturbed and developed habitats. Therefore, impacts to vegetation would not be significant under this alternative.

Wildlife

Noise associated with construction at the 144 FW installation may cause wildlife to temporarily avoid the area, including those that are protected under the MBTA. Noise associated with construction activities, as well as an increase in general military industrial activity and human presence, could evoke reactions in birds. Disturbed nests in the immediate vicinity of construction activity would be susceptible to abandonment and depredation. Additional discussion of noise impacts on animals can be found in Appendix B.

The military is authorized to take birds covered under the MBTA during military readiness activities, provided the military implements necessary avoidance, minimization, and conservation measures if such readiness activities may significantly impact a population(s) of MBTA-covered species. These avoidance and conservation measures should be developed in coordination with USFWS. Regardless, migratory birds occurring on the installation would not be expected to be impacted by the noise from the F-15EX at the 144 FW installation since they would already be habituated to aircraft noise from existing operations.

Indirect impacts from construction noise are expected to be minimal because the ambient noise levels within the vicinity are already high under the affected environment and would be unlikely to substantially increase by the relatively minor and temporary nature of the proposed construction and modifications. Additionally, by conducting work activities outside of nesting season for migratory birds (generally between February 1 and August 31 for North American species), negative effects to populations of MBTA-protected species would be avoided. Under the F-15EX

Alternative at the 144 FW installation, impacts to wildlife due to construction would not be significant.

Operational noise levels at the 144 FW installation would be expected to increase from the affected environment with the conversion to the F-15EX aircraft. With the basing of the F-15EX, total annual airfield operations by the 144 FW are proposed to increase by 3,086 operations (81 percent). As a result of the aircraft conversion and the increase in operations, an additional 1,086 acres of land off the airport property would be exposed to noise levels greater than 65 dB. The majority of this area is residential, commercial, industrial, and agricultural lands. Changes in operational noise are not expected to impact wildlife species because not only do these changes in sound remain below the threshold known to disturb wildlife, species on and near the installation are likely already accustomed to elevated noise levels associated with aircraft and military operations (Bowles 1995).

An increase in airfield operations may result in a slight increased opportunity for bird/wildlife aircraft strikes to occur, including those with migratory birds. However, adherence to the existing BASH program would minimize the risk of bird/wildlife aircraft strikes (see Section CA3.10, *Safety*). The 144 FW has developed procedures designed to minimize the occurrence of bird/wildlife aircraft strikes and has documented detailed procedures to monitor and react to heightened risk of bird/wildlife aircraft strikes. When risk increases, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for increased bird/wildlife aircraft strikes within the airspace.

Overall, for reasons discussed above, impacts on wildlife from operations as a result of the implementation of the F-15EX Alternative would not be significant.

Threatened, Endangered, and Special Status Species

Impacts on potentially occurring federally or state listed species on this installation would be similar to those described under wildlife. That is, studies indicate that wildlife species (whether they are common or protected species) already occupying lands exposed to airfield noise are generally not affected by minor increases in ambient noise levels as they have already habituated to frequent loud overflight noise (Bowles 1995). However, special status species, including bald and golden eagles (which are MBTA-listed birds given extra federal protection by the BGEPA, not the ESA) are not known to occur at the 144 FW installation.

No federally listed species in Table CA3.12-1 have been observed at the 144 FW installation. Although the endangered California condor, threatened yellow-billed cuckoo, endangered Fresno kangaroo rat (*Dipodomys nitratoides exilis*), endangered San Joaquin kit fox (*Vulpes macrotis mutica*), endangered blunt-nosed leopard lizard (*Gambelia silus*), threatened California tiger salamander,

threatened Delta smelt (*Hypomesus transpacificus*), candidate monarch butterfly (*Danaus plexippus*), endangered conservancy fairy shrimp (*Branchinecta conservation*), threatened vernal pool fairy shrimp (*Branchinecta lynchi*), endangered fleshy owl's-clover (*Castilleja campestris* ssp. *succulenta*), threatened Greene's Tuctoria (*Tuctoria greenei*), and threatened San Joaquin Orcutt grass (*Orcuttia inaequalis*) have the potential to occur on the installation, habitat for these species within installation boundary is extremely limited due to the highly urbanized and disturbed nature of the cantonment area. Because the proposed developments would occur only in areas adjacent to the airfield within a highly disturbed and managed area where little to no native vegetation exists that could support any of these species, the proposed activities that would occur at this installation would have no effect on any of these species or their habitats.

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figures CA3.7-3 through CA3.7-5).

Airspace

No construction would occur beneath the training airspace; however, inert ordnance would be deployed in ranges authorized for their use. Existing range management procedures and vegetation removal guidelines would be adhered to and vegetation management measures currently in place would persist. Impacts on wildlife habitat would not be significant. Chaff and flare deployment would be expected to remain the same as current levels conducted by F-15C aircraft and would occur within the same training areas. Current restrictions on the amount or altitude of chaff and flare use would continue to apply. As a result, inert ordnance and chaff and flare deployment associated with the F-15EX Alternative would have no effects on potentially occurring wildlife (including threatened, endangered, and special status species) underlying the 144 FW airspace.

No effects to migratory birds would be anticipated due to noise from the F-15EX under the 144 FW airspace. As described previously for wildlife and listed species, migratory birds already occupying lands exposed to aircraft noise are generally not affected by minor increases in ambient noise levels as they have already habituated to frequent loud overflight noise (Bowles 1995). Additional analysis for noise impacts on biological resources can be found in Appendix B.

Section CA3.10, *Safety*, established that bird aircraft strikes are currently rare in the airspace and would not be expected to increase markedly above existing conditions/No Action Alternative under the Proposed Action at the 144 FW installation. The F-15EX would fly predominantly above 5,000 feet AGL, which is above where 95 percent of strikes occur. Adherence to the BASH Plan would further reduce the likelihood of bird strike in training airspace. Therefore, no BASH-

related effects to wildlife (including threatened, endangered, and special status species) would be expected due to implementation of the Proposed Action.

It is expected that bald and/or golden eagles in the vicinity of the 144 FW airspace are habituated to aircraft noise and any slight to moderate increase in noise levels. In conjunction with adhering to measures outlined by the 144 FW installation's BASH program, potential "take" as defined by the BGEPA would be effectively mitigated; as such, no significant impacts to eagles would occur with implementation of the Proposed Action.

Overall, wildlife (including threatened, endangered, and special status species) would not be affected by the proposed changes in subsonic and supersonic operations for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-15EX operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 15,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL.

CA3.12.2.2 F-15C Legacy Aircraft

Installation

Effects from noise associated with construction would be similar to those described under the F-15EX Alternative. That is, there would be no effect to threatened, endangered, or special status species since operations of the F-15C legacy aircraft would remain the same as current operations and there would be no increase in operational noise levels.

Airspace

Under the F-15C legacy aircraft alternative, no construction would occur beneath the training airspace. In addition, airspace operations would be the same as current operations. Therefore, there would be no effects to wildlife (including threatened, endangered, and special status species) under this alternative.

CA3.12.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability

and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. No effects to federally or state-listed species would be expected. Overall, impacts to biological resources would not be significant.

CA3.12.3 Summary of Impacts

No effects to sensitive vegetation would occur as part of the Proposed Action because no such species exist at the proposed construction sites for the 144 FW. Noise associated with construction activities and/or aircraft operations would have no effect on wildlife or special status species because they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not be expected to impact biological resources. Impacts on biological resources as a result of the beddown of the F-15EX or retention of the F-15C at the 144 FW installation would not be significant. In addition, there would be no significant impacts to biological resources under the No Action Alternative.

CA3.13 VISUAL IMPACTS

CA3.13.1 Affected Environment

CA3.13.1.1 Installation

Visual Character

Fresno is primarily comprised of sprawling urban and suburban development surrounded by agricultural development. The Sierra Nevada Mountains are the dominant regional visual features, often displaying snowcapped peaks during winter and spring; however, due to the region's poor air quality, these mountains are often not visible from Fresno.

The visual environment at FAT is characteristic of an industrial airfield environment and is primarily surrounded by urban development including industrial, residential, and commercial uses. Agricultural uses are located to the southeast. A system of groundwater recharge ponds is located on FAT property to the northwest and the Fresno Airways Golf Course is located on FAT property to the northeast of the airfield. Views of the golf course include a flat terrain, ornamental and manicured grass and shrubs, and tree cover.

The visual environment at the 144 FW installation is characteristic of a military installation; most structures are one- to two-story buildings constructed primarily of beige brick-tone masonry or beige corrugated metal. Grass lawn areas and ornamental trees and shrubs are prevalent throughout the installation and serve as buffers between buildings, roads, and other developed areas. Public views of the 144 FW installation are available to people traveling on East McKinley

Avenue, although views of the aircraft parking apron and some facilities are obstructed by a noise wall located on the installation paralleling East McKinley Avenue. The viewshed does include views of the Sierra Nevada Mountains when weather and air quality conditions allow. There are no other substantial natural landforms or manmade structures dominating the viewshed.

Light Emissions

Existing light emissions at FAT are associated with runway and taxiway edge lighting, rotating beacons, approach lighting systems, and other visual safety NAVAIDS. Additionally, apron ramp lighting, building security lighting, and street lighting on access roadways create light emissions from FAT. The surrounding community produces light emissions associated with:

- Street lighting for nearby highways (State Route 41, State Route 168, and Sequoia-Kings Canyon Freeway [State Route 180])
- Street lighting on arterial/collector roads
- Headlights/brake lights from automobiles
- Neighboring residential, commercial, and industrial areas (building security lighting, household/commercial interior and exterior lighting)
- City of Fresno urban sky glow
- Lighted parking lots or sports fields

CA3.13.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.13.2 Environmental Consequences

CA3.13.2.1 F-15EX

Installation

Locational Scenario 1

Visual Character

Construction associated with the basing of the F-15EX under Locational Scenario 1 would not have appreciable effects to visual resources at the 144 FW installation, FAT, or the immediate surrounding community. There are no identified sensitive resources or designated historic districts within the viewshed of the proposed construction areas. There would be a construction footprint of 1,148,600 SF, and a majority of the construction would be located entirely within the main 144 FW installation, with the exception of two projects that would be located on other 144 FW parcels

at the airport. During the proposed construction and demolition activities at the installation, the visual characteristics of areas undergoing development would be temporarily altered by the use of construction equipment, and the delivery and stockpiling of construction materials; however, there is an existing perimeter wall surrounding the 144 FW installation that would block most public views of construction within the exiting cantonment area. At the completion of construction, the proposed facilities and associated infrastructure would remain as permanent visual features within the viewshed; however, the principal visual features of the facility would remain consistent with the existing military setting and visual character of the 144 FW installation. Therefore, there would be no significant impacts on visual resources from construction.

Basing of the 21 F-15EX to replace the existing 18 F-15C at the 144 FW and the commensurate 3.6 percent increase in total airfield operations would not have appreciable effects to visual resources. The existing visual character is consistent with that of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through FAT would not be significantly different from existing conditions/No Action Alternative.

Light Emissions

Basing of the 21 F-15EX to replace the existing 18 F-15C at the 144 FW would not substantially increase off-airport light emissions or create visual effects. Construction of new facilities and buildings within the 144 FW installation would include security lighting and street lighting, as applicable. The proposed new taxiway (Project 6, Repair Airfield Pavements) would include taxiway edge lighting and other visual safety navigational aids. Project 6 would replace existing lighting. The existing environment as it relates to light emissions is characteristic of an industrial, military airfield environment. The characteristics of most airport lighting systems create potential sources of annoyance to nearby residents, such as visual NAVAIDS, edge lights, and others, which emanate light emissions. CNEL nighttime flights at the 144 FW would remain consistent with existing conditions/No Action Alternative and would continue to follow current "course rules" at the airfield including minimizing training during CNEL nighttime hours. There would be no appreciable net increase of lighting emissions that is inconsistent with the current FAT airport environment.

Locational Scenario 2

Visual impacts as a result of construction for F-15EX Locational Scenario 2 would be similar to those described for Locational Scenario 1. Locational Scenario 2 would have a 37 percent larger construction footprint (1,588,200 SF) than Locational Scenario 1 and, therefore, impacts would be more intensive in magnitude under this alternative compared to Locational Scenario 1.

Effects related to operations would be similar to those described under the basing of the F-15EX Locational Scenario 1 as they both increase overall aircraft operations at FAT by 3.6 percent compared to existing conditions/No Action Alternative. Therefore, there would be no significant impacts on visual resources from construction or operations.

Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.13.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW retain the F-15C legacy aircraft, impacts would be slightly less intensive in magnitude than the basing of the F-15EX. Construction for the F-15C legacy aircraft would include a construction footprint of 1,062,000 SF. Impacts on visual resources as a result of construction would remain similar to those described under Locational Scenario 1 for the F-15EX.

Effects related to operations would be similar to existing conditions/No Action Alternative as no increase in operations would occur. Therefore, there would be no significant impacts on visual resources from construction or operations.

Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.13.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on visual resources would not be significant.

CA3.13.3 Summary of Impacts

Construction and operations associated with the F-15EX beddown or construction associated with retaining the legacy F-15C aircraft would not have appreciable effects to visual resources at the 144 FW installation, FAT, or the immediate surrounding community. The proposed facilities and

associated infrastructure associated with both locational scenarios would remain consistent with the existing visual character of an airfield environment influenced by existing military and general aviation aircraft. The potential visual impact associated with aircraft operations transiting around or through FAT would not be markedly different from existing conditions/No Action Alternative. Basing of the 21 F-15EX to replace the existing 18 F-15C at the 144 FW and associated construction and operations at FAT would not substantially increase light emissions or create visual effects and therefore would be less than significant for both scenarios. In addition, under the No Action Alternative, impacts on visual resources would not be significant.

CA3.14 INFRASTRUCTURE/UTILITIES/NATURAL RESOURCES AND ENERGY SUPPLY/ TRANSPORTATION/PUBLIC TRANSPORTATION

CA3.14.1 Affected Environment

CA3.14.1.1 Installation

Potable Water

Potable water for the FAT (including the 144 FW installation and the Airways Golf Course) is provided by the City of Fresno (144 FW 2018). Potable water in the area is supplied primarily from the Fresno Sole Source Aquifer that is distributed across Fresno through 260 groundwater wells. This groundwater is supplemented by surface water from the Central Valley Project and Fresno Irrigation District entitlements via the Enterprise Canal (City of Fresno 2023). The City of Fresno Department of Utilities Water Division pumps an average of approximately 125,000 million gallons of water per year to over 550,000 customers (City of Fresno 2022b). In 2021, 5.7 million gallons of potable water were supplied to the 144 FW installation (144 FW 2022a).

Several of the City of Fresno water supply wells are located on the margins of a nearby TCE plume (OHF, Area 1); however, only one well, Municipal Well 70, is impacted by the plume. The groundwater extracted from this well is treated by an aboveground wellhead treatment system before discharge to the drinking water supply grid (see Section CA3.11.1.1, *Hazardous Materials and Waste* regarding the current status of the TCE plume). No concerns are reported to be associated with the City's drinking water quality (FAT 2019).

Wastewater

The 144 FW installation generates wastewater from sanitary and industrial processes. This includes OWSs, discharge, wash rack discharge, floor wash-down, latrines, sinks, and showers. Wastewater generated within FAT (including the 144 FW installation) is conveyed into the municipal sewage system to the Fresno/Clovis Regional Water Reclamation Facility operated by

the City of Fresno, which has an average flow capacity to treat up to 80 million gallons per day (FAT 2019).

Stormwater

FAT's stormwater conveyance system, which includes the 144 FW installation, is typified by overland flow and sheet flow to area drains, pumping stations, and a pipeline collection system that discharges to three primary stormwater retention ponds. Runoff from the ponding stations discharge to the Fresno Irrigation District's Mill Ditch, which flows into the San Joaquin River via the Biola Wasteway (FAT 2015). The stormwater drainage system has been designed to collect and transport surface water runoff from storm events to prevent flooding within the installation and is a separate system from the wastewater (sewage) system.

Electrical and Natural Gas

Electricity and natural gas are supplied to FAT (including the 144 FW installation) by Pacific Gas & Electric. Electricity consumption for 2021 at the 144 FW installation was 4,733,375 kilowatt-hours. Natural gas consumption for 2021 at the 144 FW installation was 54,533 hundred cubic feet (144 FW 2022c).

Solid Waste

Municipal solid waste at the 144 FW installation is managed in accordance with the 144 FW *Integrated Solid Waste Management Plan* (144 FW 2020c) and guidelines specified in AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*. The 144 FW installation generates solid waste in the form of office trash, nonhazardous industrial wastes, normal municipal waste, and construction debris. The City of Fresno Solid Waste Division provides solid waste removal for the installation through a third-party service provider (Mid Valley Disposal). Garbage from the installation is taken to the Cedar Avenue Recycling and Transfer Station and ultimately transported to the American Avenue Landfill in Kerman, California, approximately 26 miles west of the installation. It is estimated that this landfill has the capacity to continue operations until 2031 (FAT 2019) and accepts a peak daily tonnage of up to 3,600 tons. Total landfill solid waste for 2021 generated at the 144 FW installation was 71 tons (144 FW 2021d).

Transportation

Regional access to the 144 FW installation is provided by a combination of regional and local access roadways, intersections, and multimodal facilities. State Route 41 is to the west, State Route 168 to the northwest, and Sequoia-Kings Canyon Freeway (State Route 180) is located to the south. At FAT, a variety of automobile parking and rental car facilities are provided, as well

as accommodations for other ground transportation services such as taxis, shuttles, and transportation network companies. Fresno Area Express provides bus transit services primarily within the City of Fresno and to nearby communities. Currently, Fresno Area Express has two routes that service FAT (FAT 2019). The 144 FW installation is served primarily by local arterial roads and the main access to the installation is on East McKinley Avenue.

CA3.14.1.2 Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.14.2 Environmental Consequences

CA3.14.2.1 F-15EX

Installation

During operation of the F-15EX beddown, 101 new personnel would be based at the 144 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of less than 0.1 percent in Fresno County (see Table CA3.4-1).

Locational Scenario 1

Potable Water

Water consumption would be expected to increase slightly as a result of the small increase in personnel; however, an increase of up to 101 personnel on the installation and 0.1 percent in Fresno County would not be expected to impact regional water supply. Additionally, the demand for water (e.g., if used to control dust) could also increase during demolition and construction phases. However, this increase would be temporary and intermittent and would not be expected to impact regional water supply. Therefore, impacts on potable water would not be significant under this F-15EX Alternative.

Wastewater

Wastewater generation would be expected to increase slightly as a result of the increase of up to 101 personnel on the installation. However, there have been no deficiencies identified with the existing system, and it is expected that the existing sanitary sewer system is generally adequate to

serve the facilities proposed under this alternative. Therefore, impacts on the management of wastewater would not be significant under this F-15EX Alternative.

Stormwater

Under the F-15EX Locational Scenario 1, there would be up to 1,148,600 SF of temporary soil disturbance, including up to 231,300 SF of new impervious surface as a result of proposed construction. In accordance with the EISA Section 438, any temporary increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features; these drainage management features would tie into existing drainage structures where appropriate. The proposed construction activities could temporarily impact the quality of stormwater runoff. However, implementation of appropriate standard construction practices (as described previously), preventative maintenance, and periodic inspections and sampling to detect risk to stormwater, especially during active construction activity, would minimize these potential impacts (see also Section CA3.7.2, *Water Resources*). Therefore, impacts on the existing stormwater drainage system as a result of the proposed construction would be minimal and not significant.

Electrical and Natural Gas

Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in 101 personnel, and the building space and facilities to be constructed would require additional electricity. However, any new facilities and additions associated with this alternative would be implemented with more energy-efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate Leadership in Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. Therefore, average energy consumption would be expected to stay the same or decrease compared to energy consumption associated with existing facilities. In addition, an increase of up to 101 personnel on the installation and 0.1 percent in Fresno County would not be expected to impact regional energy supply.

Construction activity associated with the F-15EX Alternative could result in some interruptions of utility services during construction. These impacts would be temporary, occurring briefly during active construction periods. In addition, the demand for energy (primarily electricity) could increase slightly during demolition and construction phases. The energy supply at the installation and in the region is adequate and would not be affected by this temporary increase in demand. Therefore, impacts related to energy systems would not be significant under this F-15EX Alternative.

Solid Waste

Under the F-15EX Locational Scenario 1, the building space and facilities to be constructed would consist of a 1,148,600 SF construction footprint generating construction and demolition debris requiring landfill disposal. A majority of the construction footprint under this alternative would include Project 6, Repair Airfield Pavements; this project would occur under any of the basing alternatives at FAT (including legacy aircraft). Project 6 would remove the entire existing 702,000 SF apron, which is currently in rapidly declining condition and replace it with new concrete. In addition, demolition of the existing concrete (approximately 26,000 cubic yards/50,895 tons) would occur with the use of a batch plant and aggregate concrete would be removed from the installation. The aggregate concrete would be diverted from the landfill and recycled. The project would also involve the removal of the current shelters; these shelters would be recycled or reused and would not require landfill disposal.

Proposed increases in personnel and equipment use would also contribute to a slight increase in solid waste generation. Impacts on local landfills would not be expected to exceed the permitted throughput or contribute significantly to the remaining capacity. Off-installation contractors completing construction and demolition projects at the 144 FW installation would be responsible for disposing of waste generated from these activities. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the installation. Much of this material can be recycled or reused, or otherwise diverted from landfills. All non-recyclable construction and demolition waste would be collected in a dumpster until removal. Construction and demolition waste contaminated with hazardous waste, ACM, LBP, or other undesirable components would be managed in accordance with AFI 32-7042, *Waste Management* (2017). Therefore, impacts related to solid waste management would not be significant under this F-15EX Alternative.

Transportation

Construction equipment would be driven to proposed construction areas and would be kept on-site for the duration of the respective activity. Construction workers would drive daily in their personal vehicles to and from the construction site. The peak year of construction is anticipated to occur in 2026, when up to 45 workers per day would be on site at one time. Additionally, up to 18 daily trips for the delivery of materials and 49 daily truck trips to import or export material from the construction areas would be anticipated during peak construction. In general, construction traffic would result in increases in the use of on-installation roadways during construction activities; however, increases would be temporary and intermittent (between FY 2024 and 2028), occurring only during active construction periods.

The number of authorized personnel on the installation would increase by up to 101 under the F-15EX beddown. The increase in personnel would create a potential of 101 additional one-way vehicle trips to and from the installation during morning and evening peak periods for these additional personnel. Assuming that each person makes two, one-way trips per day, the implementation of this alternative would add an additional 202 trips onto the existing roadway network after the construction phase is complete. However, regional roads used to access the installation, as well as those located on the installation, have sufficient capacity to manage this increase in traffic without substantial impacts on circulation. Therefore, impacts on transportation infrastructure would not be significant under this F-15EX Alternative.

Locational Scenario 2

Impacts on potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as a result of construction for Locational Scenario 2 would be similar to those described for Locational Scenario 1. Locational Scenario 2 would have a 38 percent larger construction footprint (1,588,200 SF) than Locational Scenario 1 and therefore impacts would be more intensive in magnitude under this alternative compared to Locational Scenario 1.

Impacts related to consumption of energy or natural resources as a result of increases in personnel at the 144 FW would remain similar to Locational Scenario 1 as both scenarios would have an increase of 101 personnel on the installation and 0.1 percent in Fresno County.

Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.14.2.2 F-15C Legacy Aircraft

Installation

Should the 144 FW retain the F-15C legacy aircraft, impacts would be slightly less intensive in magnitude than the basing of the F-15EX. Construction for the F-15C legacy aircraft would include a construction footprint of 1,062,000 SF (8 percent less than the F-15EX Alternative). Impacts on potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as a result of construction would remain similar to those described under Locational Scenario 1 for the F-15EX. The peak year of construction is anticipated to occur in 2026, when up to 38 workers per day would be on site at one time. Additionally, up to 15 daily trips for the delivery of materials and 49 daily truck trips to import or export material from the construction areas would be anticipated during peak construction.

In addition, no personnel increase would occur; impacts related to consumption of energy or natural resources would remain similar to existing conditions/No Action Alternative (see CA3.14.1.1).

Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

CA3.14.2.3 No Action Alternative

Under the No Action Alternative, the 144 FW would not receive the new F-15EX fighter aircraft. Rather, they would retain their F-15C legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with the new fighter aircraft or the legacy aircraft. The entirety of the 144 FW installation would remain in its current location on FAT. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on infrastructure would not be significant.

CA3.14.3 Summary of Impacts

Under the F-15EX beddown locational scenarios for the 144 FW at FAT, there would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel at FAT would not significantly impact regional natural resources or energy supply or existing systems at the 144 FW installation at FAT. Should the 144 FW retain the F-15C legacy aircraft, impacts would be slightly less intensive in magnitude than the basing of the F-15EX. While construction and operations associated with either of these aircraft at the 144 FW installation at FAT would require the use of natural resources and energy supply, none of these alternatives would have the potential to cause demand to exceed available or future supplies of applicable resource, and impacts would not be significant. In addition, under the No Action Alternative, impacts on infrastructure would not be significant.

CA4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

According to CEQ regulations, the cumulative effects analysis of an EIS should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar timeframe. The effects may then be incremental and may result in cumulative impacts. Actions overlapping with or in close proximity to the proposed action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same timeframe tend to offer a higher potential for cumulative effects.

This EIS addresses cumulative impacts by assessing the incremental contribution of the F-15EX and the Legacy F-15C Alternatives at the 144 FW installation to impacts on affected resources from all factors. The NGB and DAF have made an effort to identify actions on or near the affected areas that are under consideration and in the planning stage at this time. These actions are included in the cumulative effects analysis, drawn from the level of detail that exist now. Although the level of detail available for those future actions varies, this approach provides the decision-maker with the most current information to evaluate the consequences of the Proposed Action alternatives.

CA4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

In this section, an effort was made to identify past and present actions in the region and those reasonably foreseeable actions that are in the planning phase at this time. Actions that have a potential to interact with the Proposed Action alternatives are included in this cumulative analysis. This approach enables decision-makers to have the most current information available so that they can evaluate the environmental consequences of the potential beddown of the F-15EX or retention of the F-15C legacy aircraft at the 144 FW installation and training in associated airspace.

The 144 FW is an active military installation that has been in operation at FAT since 1955 and undergoes changes in mission and in training requirements in response to defense policies, current threats, and tactical and technological advances. The installation, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. In addition, tenant organizations may occupy portions of the installation, conduct aircraft operations, and maintain facilities. All of these

actions (i.e., mission changes, facility improvements, and tenant use) will continue regardless of which alternative is selected.

The proposed aircraft beddown for the 144 FW has the potential to interact in a cumulative manner with other projects within the ROI; these other projects are listed in Table CA4.1-1 (at FAT).

Table CA4.1-1 Current and Reasonably Foreseeable Actions at 144 FW Installation, Fresno Yosemite International Airport (FAT), and the Surrounding Area

Action	*Ground Disturbance/ New Impervious Surface*
Past Actions	
• Airport – Construct Parking Structure – Completed 2021 • City of Fresno – Clovis Metro Trail Segment 5 (West side of Clovis Ave from McKinely to Airways Boulevard) – Completed 2022 • City of Fresno – Fresno Animal Center (5277 E. Airways Boulevard) – Completed 2022	• 80,300 SF/None • Unknown • Unknown
Present and Reasonably Foreseeable Future Actions	
• Airport – Upgrade Airfield Guidance Signs and Runway 29R Lighting to LED (2023) • Airport Terminal Expansion (2023–2026) • Airport – Slurry Seal Taxiway Bravo (2024) • Airport – Reconstruct Runway 11L-29R (includes remove and relocate Bravo 3) (2025–2027) • Airport – Airport Traffic Control Tower Replacement (2025–2027)	• Unknown • 112,000 SF/Unknown • Unknown • 14.6 acres/3.31 acres • Unknown

Legend: 144 FW = 144th Fighter Wing; SF = square foot/feet.

CA4.2 ANALYSIS OF CUMULATIVE EFFECTS

The following analysis considers how the impacts of these other actions might affect or be affected by those resulting from the alternatives actions at the 144 FW installation at FAT and whether such a relationship would result in potentially additive impacts. Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources, quantifiable data are not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made based on an understanding of the nature of the project regarding cumulative impacts related to this EIS.

CA4.2.1 Noise

Based upon DoD impact analysis, under the F-15EX beddown alternative, 1,086 more acres off the airport property and 2 additional POIs would be exposed to 65 dB CNEL when compared to existing conditions. In terms of change to CNEL at POIs, 11 POIs would either experience a decrease of up to 1 dB or no change in CNEL, and 38 POIs would experience increases between 1 and 4 dB CNEL. The DAF does not have specific standards for noise impact significance, but due to the changes noted in CNEL, it is estimated that the changes would also be significant. Under FAA Order 1050.1F, the F-15EX Alternative at FAT would result in 7 POIs experiencing significant increases while 1,924 households and 6,010 people would be significantly affected.

One POI, 5,063 households, and 14,977 people would experience a reportable increase in noise according to FAA criteria.

Construction projects associated with the F-15EX actions would occur within the FAT property in areas close to the runways currently exposed to 65 dB CNEL or greater and most of the land adjacent outside of the airport property is primarily commercial. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

Under the F-15C legacy aircraft alternative, impacts from noise would not change from the existing conditions/No Action Alternative and would not be significant. The addition of those projects listed in Table CA4.1-1, would not be expected to substantially add to the noise impacts. However, given that impacts from the F-15EX Alternative would be significant, cumulative impacts would similarly be significant should that alternative be selected. All of the projects described in Table CA 4.1-1 are short-term construction projects that would occur in the airport environs or in areas identified as industrial. Noise associated with the construction projects would not affect sensitive receptors, disturb sleep, interrupt speech, or cause classroom disruptions in the long term. Noise from implementation of these actions would be short-term and localized, and would not be expected to increase the overall CNEL noise contours.

Fighter jet-generated noise would continue to dominate sound levels in the training airspace. Given that the projects listed in Table CA4.1-1 are all local to FAT, cumulative impacts that would be anticipated when considered with the F-15EX aircraft beddown alternative for the 144 FW training airspace would not be significant.

CA4.2.2 Airspace

The replacement of the F-15C with the F-15EX at FAT would not require changes in local airspace. Over time, the replacement of the F-15C aircraft at the installation could result in a 3.6 percent increase in total airfield operations at FAT. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA by both installations would ensure safe air operations within the National Airspace System and SUA. Many of those projects described in Table CA4.1-1 would enhance airfield safety and flow; others would have little impact to the airfield or the airspace. Cumulative impacts would not be significant.

CA4.2.3 Air Quality/Climate Change

The ROI for criteria pollutants comprises Fresno County in California, located in the San Joaquin Valley APCD, and which is a nonattainment area for the 8-hour O_3 (extreme) NAAQS, the 24-hour

$PM_{2.5}$ (serious), and annual $PM_{2.5}$ (serious) NAAQS. All the present and reasonably foreseeable future actions have the potential to interact with the proposed aircraft beddown and affect air quality.

The construction of the additional projects described in Table CA4.1-1 would produce short-term air emissions from fuel burning equipment and particulate matter from ground disturbance. The projects described in Table CA4.1-1 at FAT may overlap the construction and concurrent aircraft operations of either the legacy F-15C or F-15EX aircraft related to the Proposed Action at FAT. As the emissions shown in Tables CA3.3-9, CA3.3-10, and CA3.3-11 of NO_x are anticipated to exceed *de minimis* threshold during various years between 2026 and 2030 based on the alternative selected for implementation (refer to Section CA3.3.3, *Summary of Impacts*), the DAF will consult with the San Joaquin APCD to confirm these emissions would conform with the SIP. This consultation process ensures the short- and long-term emissions from projects described in Table CA4.1-1, considered cumulatively with the Proposed Action alternatives, would not result in the degradation of regional air quality.

CA4.2.3.1 Greenhouse Gases

As described in Chapter 3.0, the CEQ published interim guidance on January 9, 2023, entitled *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (CEQ 2023). For GHGs, the ROI is global and impacts are cumulative by nature. The cumulative analysis evaluates emissions considering the existing conditions and the Proposed Action alternatives. Implementation of the Proposed Action alternatives would contribute directly to emissions of GHGs from the combustion of fossil fuels. Emissions for these alternatives and the No Action Alternative were estimated for the entire training sortie based on the airfield emissions and the annual training hours anticipated. These estimates were prepared to provide a measure of the difference between the Proposed Action alternatives. Emissions were estimated using assumed flight patterns for fuel consumption averages for climb out and approach power settings and the results are presented in Table CA4.2-1. The lifetime GHG emission analysis for the F-15EX is based on the 50-year F-15C/D lifespan. While current DoD estimates for the F-15EX exceed this timeframe, 50 years was used for the purposes of developing comparative lifecycle emission estimates and values for distant future social cost of carbon estimates. Detailed calculations and assumptions are included in Appendix D.

Table CA4.2-1 GHG Emissions Estimates for F-15EX Basing (tons per year)

Activity	*CO_2e*	*metric tons*
F-15C Existing Sorties	45,013	
Airfield Totals	11,942	
Annual GHG total	**56,955**	
50-year lifecycle emissions of F-15C/D	2,847,739	
F-15EX Sorties	**99,919**	
Airfield Totals	12,336	
Annual GHG total	**112,255**	
Total 50-year emissions F-15EX	**5,612,742**	
Annual GHG net change	**55,300**	50,167
50-year net change lifecycle emissions	**2,765,002**	

Legend: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas.

The SC-CO_2, SC-CH_4, and SC-N_2O allow agencies to understand the benefits of reducing each of these GHGs or the social costs of increasing such emissions, in the policy making process. Collectively, these are referenced as the SC-GHG and is defined as the monetary value of the net harm to society associated with adding a small amount of carbon to the atmosphere in a given year. In principle, net harm cost includes the value of all climate change impacts, including but not limited to changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services (IWG 2021). For this analysis, only SC-CO_2 is evaluated as the vast majority of emissions are generated by aircraft flying with turbofan engines. These engines generate no methane emissions and very little N_2O emissions. Quantifying the small quantity of N_2O emissions is a current subject of research.

Because the current lifetime expectancy of the aircraft associated with the Proposed Action, which represent the bulk of emissions, is at least 50 years, the SC-CO_2 analysis covers a 50-year period from 2027 to 2077 for the F-15EX. Table CA4.2-2 identifies the projected cost, in 2020 dollars, of implementing the Proposed Action with F-15EX basing using an average discount rate of 3 percent and what would be anticipated to represent the worst-case scenario, which is defined as the 95th percentile of the 3 percent average (IWG 2021). These costs are totaled in Table CA4.2-2 for the presumed first year of steady state operations (2027) for the F-15EX, and the year 2050 to provide an indication of the increasing monetary value of net harm on an annual basis. While the entire 50-year projected lifecycle would extend to 2077, the data on costs that far into the future are not currently available but can be calculated when the costs are computed and published by the White House Office of Management and Budget.

Table CA4.2-2 SC-CO_2 Select Yearly Estimates for Annual F-15EX Operations Emissions Increase Over 50 Years

Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount*
CO_2			
2027	$59	50,167	$2,937,801
2050	$85		$4,247,170
Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% 95th Percentile average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount, 95th Percentile average damages*
CO_2			
2027	$176	47,228	$8,838,488
2050	$260		$13,041,009

Note: [1]Values from Office of Management and Budget 2021; represented here rounded to closest whole number.
Legend: % = percent; CO_2 = carbon dioxide; SC-CO_2 = social cost of carbon.

There are a number of limitations associated with the modeling used to derive the monetary values presented in Table CA4.2-2, due to the broad scope of scientific and economic issues across the complex global landscape, and the estimates likely underestimate the damages from GHG emissions (IWG 2021). Nonetheless, providing a monetary characterization of GHG impacts is a useful tool for generally assessing impacts from the emissions as well as impacts from implementing mitigation measures to reduce those emissions.

Operational energy (aviation fuel and energy to power aircraft) comprises over 80 percent of the DAF's energy use. Lifecycle emissions for the Proposed Action assume no changes in operations from 2030 to 2080. However, likely reductions would include reductions in ground mobile source emissions as vehicles and equipment continue to be electrified, and as the DAF implements its Climate Action Plan.

Reduction of fuel use offers the most significant opportunity to optimize operational capability while simultaneously reducing GHG emissions. Technological enhancements to achieve this reduction include but are not limited to aerodynamic advancements, streamlined flight planning, incorporation of drag reduction technologies onto current platforms, enhanced engine sustainment practices, introduction of electric AGE, and increases in the use of simulation and augmented reality systems. Additionally, the DAF has instituted an installations portfolio goal of net-zero emissions by FY 2046 (DAF 2022). During the estimated 50-year lifecycle of the Proposed Action, many activities would be incorporated into the DAF functions to reduce GHG emissions across the DAF assets.

CA4.2.4 Socioeconomics/Environmental Justice/Children's Health and Safety

The past, present, and reasonably future actions identified in Table CA4.1-1 include several construction actions within and near the ROI. Construction actions would also be required for the beddown of the F-15EX or to maintain the existing F-15C flying mission. This would add to demand on the local construction industry potentially requiring some construction workers to be hired from outside the ROI. The increased demand for housing and services would be temporary during construction. Construction spending would be a minor beneficial impact on economic activity, employment, and wages. During the construction phase of the alternatives, there are not expected to be significant adverse impacts associated with socioeconomics or environmental justice and there would be minor socioeconomic benefits in the ROI due to the increased economic activity associated with construction spending and employment. Under the F-15EX Alternative, there would be a higher percentage of minority and low-income populations impacted than the reference community, and therefore impacts would be disproportionate. With a higher percentage than the reference community, impacts on children under the age of 18 would be considered disproportionate, while applying DoD criteria, impacts on the elderly population would not be disproportionate.

Past, present, and reasonably future actions identified in Table CA4.1-1 would not alter the acoustic environment, which would continue to be attributed to aircraft noise. Increases in population in the ROI would occur due to the relocation of personnel under the F-15EX beddown alternative; however, the increased population would be a minor percentage of the total population of the ROI. Therefore, cumulative impacts on socioeconomics during construction would be a minor beneficial impact from increased construction spending and employment and cumulative impacts during operation would not be significant. There would be disproportionately high and adverse health or environmental effects on populations of minority, low-income, and children under the age of 18 as a result of the proposed F-15EX aircraft beddown and those projects listed in Table CA4.1-1.

CA4.2.5 Land Use/Noise Compatible Land Use

Off-airport property experiencing noise levels greater than 65 dB CNEL would increase by approximately 1,086 acres for the F-15EX at FAT. Under the F-15EX, there would be an increase of 262 acres of residential land use within the 65 to 70 dB CNEL, and 15 acres within the 70 to 75 dB CNEL. Residential uses are an incompatible and unmitigable land use over 75 dB CNEL; however, no residential land uses are exposed to noise over the 75 dB CNEL under this alternative.

Under the F-15EX, Irwin O. Addicott Elementary School/Scandinavian Middle School would have 3 additional acres exposed within 70 to 75 dB CNEL. Impacts on public land uses as they relate

to school facilities would be considered a significant impact with implementation of appropriate noise level reduction measures.

Under the F-15EX, an additional 260 acres of industrial land uses would be within the 65 to 70 dB CNEL noise contours, 51 acres within the 70 to 75 dB CNEL contours, and 7 acres within the 75 to 80 dB CNEL. Impacts on industrial land uses would not be considered a significant impact with implementation of appropriate noise level reduction measures.

In addition, Fresno Airways Golf Course (located on FAT but open to the general public) would have 8 additional acres of land newly exposed to 75 to 80 dB CNEL. Therefore, impacts on land use as they relate to recreational uses at the Fresno Airways Golf Course would be considered a significant impact without implementation of appropriate noise level reduction measures.

Should the F-15C legacy aircraft alternative be selected, there would be no new impacts on land use. Planned projects in the ROI listed in Table CA4.1-1 would be both on the airfield and/or commensurate with the surrounding land uses in the area. Construction projects would introduce short-term noise increases that would not generate noise levels to cumulatively affect or change land use compatibilities. However, given that impacts on land use from the F-15EX Alternative aircraft beddowns would be significant, cumulative impacts would similarly be considered significant.

CA4.2.6 Department of Transportation, Section 4(f)

Construction and operations associated with the F-15EX beddown or construction associated with retaining the legacy F-15C aircraft would not have appreciable effects to Section 4(f) resources.

Section 4(f) historic sites are present within the 65 dB noise contours; however, there was finding of "no adverse effect" in the Section 106 process which automatically means that there is no constructive use, according to the Section 4(f) regulations. Therefore, impacts on Section 4(f) resources would not be considered significant.

Per Public Law 105–85 (Division A, Title X, Section 1079, November 18, 1997), no military flight operation (including military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303 of Title 49, USC. Therefore, there would be no impacts to these resources under 4(f) and no cumulative effects to consider. Cumulative impacts related to the Proposed Action would not be considered significant."

CA4.2.7 Water Resources/Floodplains/Wild and Scenic Rivers

Under the Proposed Action alternatives at the 144 FW at FAT, proposed construction and modification activities would result in up to 670,900 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. A majority of the 144 FW installation is located outside the 100-year and 500-year floodplains; however, the westernmost portion of the southern ANG parcel next to the Peach/McKinley Basin is located within the 100-year and 500-year floodplains. Projects constructed within or immediately adjacent to the 100-year and 500-year floodplains would be designed, consistent with AFI 32-1023, to address flood risk condition protection requirement minimums outlined in UFC 1-200-01. As such, these projects would be consistent with EO 13690 and impacts on floodplains under Proposed Action alternatives would not be significant. Impacts on water resources as a result of the proposed beddown of the F-15EX or retention of the F-15C aircraft at the 144 FW installation at FAT would not be significant. Similarly, those projects identified in Table CA4.1-1 would implement similar BMPs to manage impacts on both surface water and groundwater and follow flood risk design requirements to adhere to EO 13690. As such, cumulative impacts would not be significant.

CA4.2.8 Geological Resources/Soils/Farmlands

Under the Proposed Action alternatives at the 144 FW installation at FAT, proposed construction and modification activities would result in up to approximately 1,588,200 SF of ground disturbance, as described in Table CA2.1-4. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Construction and modification activities would only occur on soils designated by the NRCS as Prime Farmland if irrigated. However, there would be no conversion of farmland to non-agricultural uses as the land within FAT boundaries has been previously disturbed and is not currently being used as farmland. Impacts on geological, soils, and farmland resources as a result of the proposed beddown of the F-15EX or retention of the F-15C aircraft at the 144 FW installation would not be significant. Similarly, those projects identified in Table CA4.1-1 would implement similar BMPs to manage impacts on ensure that runoff would be contained on-site. As such, cumulative impacts would not be significant.

CA4.2.9 Cultural Resources

There are no known archaeological sites within any of the proposed construction footprints at the 144 FW installation at FAT. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. Building 2606, built in 1966, has not been evaluated for NRHP eligibility. However, modifications for Building 2606 would be confined to the interior of the building, which would not affect the building's potential significance or integrity (ANG 2010). Therefore, there would likely be no adverse effect to historic properties per 36 CFR Section 800.5(b). No traditional cultural resources have been identified at the 144 FW installation at FAT. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Use of the SUA under the Proposed Action would be similar to ongoing operations. Overall, implementation of F-15EX beddown or retention of the legacy F-15C at the 144 FW installation at FAT would not result in significant impacts on cultural resources. Similarly, those projects identified in Table CA4.1-1 are all located at FAT, which has been previously disturbed, so it is unlikely that any cultural resources would be impacted by such construction; however, similar procedures would be in place for that construction activity too. As such, cumulative impacts would not be significant.

CA4.2.10 Safety

Fire and crash response would continue to be conducted by the 144 FW's fire department under all Proposed Action alternatives. Construction activities would not be expected to pose any unusual concerns, and standard construction safety procedures would be implemented for the 144 FW construction projects, as well as those listed in Table CA4.1-1. Some of the projects listed would actually enhance airfield and flight safety. Changes to QD arcs would occur in accordance with all DAF regulations. Additionally, while there are some planned construction projects that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. There are published rules, regulations, and procedures in place to ensure flight safety. The F-15EX would utilize the same airframe as the current and familiar F-15C model. Though the avionics are more advanced, the increase in automation and technology would aid the pilots in reducing total workload therefore improving situational awareness. The DoD's detailed BASH plan would continue to be followed to mitigate and reduce the chances of a BASH event from occurring.

No significant cumulative impacts on safety would be expected with implementation of any of the alternatives.

CA4.2.11 Hazardous Materials/Waste

The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C fleet. Under the F-15EX Alternatives, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase slightly. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action and the present/reasonably foreseeable projects described in Table CA4.1-1 would occur. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP at FAT and all applicable federal, military, state, and local laws and regulations. The pollution prevention and waste minimization practices would continue to be managed in accordance with the HWMP and would include any construction-related materials or waste associated with aircraft operations. Additionally, no changes to the installation's Small Quantity Generator status at FAT would be expected to occur due to the slight increase in hazardous waste generation from aircraft operations. In addition, any projects proposed for construction or modification at FAT would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities at FAT, work would cease until the designated Program Manager(s) establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing IRP or AOC sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are OSHA Hazardous Waste Operations and Emergency Response trained, if required. The present and future projects listed in Table 4.1-1 could involve the use of some hazardous materials and the generation of some hazardous waste during construction; however, the same regulations that would apply to the Proposed Action would be required for these actions. As such, cumulative impacts from hazardous materials, hazardous waste, toxic substances, or contaminated sites are expected to be less than significant.

CA4.2.12 Biological Resources/Coastal Resources/Wetlands

Noise levels at FAT would be expected to increase from the affected environment with the conversion to the F-15EX aircraft. However, these noise levels from operations and construction would not be expected to impact wildlife in the area because they are likely accustomed to the already elevated existing noise levels associated with current aircraft and military operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds, would increase commensurate with the increase in potential airfield operations, though would be managed and minimized with implementation of procedures identified in the BASH plan. No threatened, endangered or special status species are currently known to reside on the 144 FW installation at FAT or within the land area within the projected noise contours. FAT is not located within the Coastal Zone and none of the areas designated for proposed construction projects would occur within proximity of wetlands. Construction-related impacts on the vegetation at the installation and in the vicinity of projects identified in Table CA4.1-1 would be minor due to the lack of native or sensitive vegetation in the project areas. In general, construction activities at the 144 FW installation and at FAT would primarily occur on sites that are already highly altered. These impacts would include the removal of some vegetation and associated wildlife habitat. However, wildlife that use these areas are typical of urban and suburban areas. Though there could be an increase in operations within the SUA, impacts on wildlife would be minimal given that the F-15C aircraft (as well as many other aircraft) already use the SUA, vertical distribution of operations would change minimally, and 93 percent of operations would occur above 10,000 feet AGL.

The past, present, and reasonably foreseeable actions found in Table CA4.1-1 involve construction in relatively small footprints of previously developed and/or disturbed areas, and would not significantly impact biological resources, including special status species, coastal resources, or wetlands. The beddown of the F-15EX or retention of the F-15C legacy aircraft at the 144 FW installation and training in associated airspace, in conjunction with the projects in Table CA4.1-1, would not have significant cumulative impacts on biological resources, coastal resources, or wetlands.

CA4.2.13 Visual Impacts

Construction and operations associated with the F-15EX beddown or construction associated with retaining the legacy F-15C aircraft in addition to those projects listed in Table CA4.1-1 would not have significant impacts on visual resources at the 144 FW installation, FAT, or the immediate surrounding community. The proposed facilities and associated infrastructure associated with all the Proposed Action alternatives would remain consistent with the existing visual character of an airfield environment influenced by existing military, commercial, and civilian aircraft. The potential visual impact associated with aircraft operations transiting around or through FAT would

not be markedly different from existing conditions/No Action Alternative. Basing of the 21 F-15EX to replace the existing 18 F-15C at the 144 FW and associated construction and operations at FAT would not substantially increase light emissions or create visual effects and therefore would be less than significant. Similarly, those projects identified in Table CA4.1-1 would not have significant impacts on visual resources. Therefore, cumulative impacts on visual resources would not be significant.

CA4.2.14 Infrastructure/Utilities/Natural Resources and Energy Supply/ Transportation/Public Transportation

Considering the F-15EX Alternative aircraft beddown at the 144 FW installation at FAT and those projects identified in Table CA4.1-1, short- and long-term demand for all services would increase by a minor degree when considered regionally. The F-15EX beddown alternative and other projects would increase demand for potable water, increase production of wastewater, and create more impervious surfaces to increase stormwater runoff. However, cumulative effects would be anticipated to be minimal because there is current and long-term capacity to meet increased demand for drinking water and disposal of wastewater. For stormwater, BMPs such as silt fencing, vegetation management, and ditching would minimize erosion and sedimentation during the short-term construction phases; retention and detention pond systems would avoid excessive runoff due to increases in impervious surfaces in the long term.

Demand for electricity and natural gas would be expected to increase in the short-term due to construction activities and in the long term due to minor increases in personnel. In the short-term, existing energy systems have the ability to meet increased demand. In the long term, there is capacity to meet the demands of the minor increase in personnel. Further, any new facilities and additions associated with these projects would incorporate Leadership in Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation when compared to facilities currently in place.

Under the Proposed Action alternatives at the 144 FW installation in addition to reasonably foreseeable future projects, it is anticipated that there would be both short- and long-term increases in solid waste generation. During demolition and construction phases, all materials would be disposed in permitted facilities, which have the capacity to accept these materials. In the long term, solid waste generated by the regionally minor increase in personnel could be handled by existing solid waste management systems.

In terms of transportation, the local traffic network has the ability to meet the short-term increases in traffic during construction activities from the construction activities and reasonably foreseeable future projects. The construction of the new parking structure would not impact the local traffic

network as construction was complete in 2021. The proposed terminal and apron expansion project at FAT is proposed for 2024–2027 and potential construction traffic would be deconflicted as part of the planning process. In the long term, the transportation network would be able to meet the needs of the minor increase in personnel. In summary, cumulative impacts on infrastructure due to the Proposed Action alternatives at the 144 FW installation at FAT and reasonably foreseeable future projects would not be significant.

CA4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA CEQ regulations require environmental analyses under an EIS to identify "...any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Building construction material such as gravel and gasoline usage for construction equipment would constitute the consumption of nonrenewable resources. Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

Training operations would involve consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in aircraft. Use of training ordnance would involve commitment of chemicals and other materials. None of these activities would be expected to substantially affect environmental resources because the relative consumption of these materials is expected to change negligibly.

The primary irretrievable impacts of implementation of any of the alternatives at the 144 FW installation at FAT or for any of the alternatives would involve the use of energy, labor, materials and funds, and the conversion of some lands from an undeveloped condition through the construction of buildings and facilities on the installation. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

This page intentionally left blank.

159 FW at NAS JRB New Orleans

This page intentionally left blank.

LA1.0 159TH FIGHTER WING AT NAVAL AIR STATION JOINT RESERVE BASE NEW ORLEANS OVERVIEW

This section presents an overview of the 159 FW, NAS JRB New Orleans, Belle Chasse, LA; the specifics of the Proposed Action as they relate to both the airfield and the associated airspace; construction and facility modifications required at the installation; and changes in personnel that would result if the F-15EX or F-35A were based at the 159 FW installation. Additionally, construction and facility modifications necessary to continue the 159 FW's mission with the currently based F-15C/D aircraft are evaluated in the event that the 159 FW is not selected for either the F-15EX or the F-35A.

The 159 FW installation of the Louisiana Air National Guard (LAANG) is located within the boundaries of NAS JRB New Orleans (Figure LA1.0-1). The 159 FW installation is 16 miles south of downtown New Orleans, LA in the northern part of Plaquemines Parish. The 159 FW installation comprises approximately 111 acres.

The 159 FW is tasked to carry out both federal and state missions. The federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and provide assistance during national emergencies (e.g., natural disasters or civil disturbances). The state mission is to provide protection of life, property, and preserve peace and order, and public safety as directed by the Governor of Louisiana. The 159 FW currently flies and maintains 18 PAA F-15C/D fighter aircraft.

In the sections that follow, LA2.0 presents the installation-specific description of the Proposed Action at the 159 FW installation. Section LA3.0 addresses the affected environment and environmental consequences that could result if the 159 FW installation were selected as one of the F-15EX or F-35A beddown locations. Refer to Chapter 3.0 for a complete and detailed definition of resources and the methodology applied to identify potential impacts. Section LA4.0 identifies other, unrelated past, present, and reasonably foreseeable future actions in the affected environment and evaluates whether these actions could cause cumulatively significant effects when considered along with the F-15EX or F-35A beddown actions. This section also represents the irreversible and irretrievable resources that would be committed if these aircraft were beddown at the 159 FW installation.

Figure LA1.0-1 Location of the 159 FW Installation

LA2.0 159TH FIGHTER WING ALTERNATIVE

Alternatives evaluated in this EIS for the 159 FW include:

- Conversion from 18 PAA F-15C/D to 21 PAA F-15EX aircraft
- Conversion from 18 PAA F-15C/D to 21 PAA F-35A aircraft
- Retention of the 18 PAA F-15C/D aircraft and construction related to this continuing mission
- No Action

If the 159 FW is selected to receive one squadron of F-15EX or F-35A aircraft, there are four components of this action at the 159 FW installation: (1) conversion from F-15C/Ds to F-15EX or F-35As, (2) operations conducted at the airfield and within the SUA by F-15EX or F-35A aircraft, (3) construction and modification projects to support beddown of the F-15EX or F-35A, and (4) personnel changes to meet the requirements for either aircraft. Each component is explained in more detail below. If the 159 FW is not selected to receive the F-15EX or F-35A aircraft, then the 159 FW could still implement construction and modifications to support and extend their legacy aircraft and mission.

LA2.1 159TH FIGHTER WING INSTALLATION AT NAVAL AIR STATION JOINT RESERVE BASE NEW ORLEANS

LA2.1.1 Aircraft Conversion

Currently, the 159 FW has 18 F-15C/D PAA aircraft. If the 159 FW is selected to receive either the F-15EX or the F-35A, the aircraft would be based at the installation by FY 2027–2028 for the F-15EX and 2026 for the F-35A. Drawdown of the 159 FW's F-15C/Ds would be complete approximately 6 months prior to the initial arrival of the new aircraft. Table LA2.1-1 identifies the current type and number of 159 FW PAA aircraft at NAS JRB New Orleans, the number of proposed F-15EX or F-35A aircraft, and the net change in aircraft.

Table LA2.1-1 Current and Proposed Aircraft Beddown (PAA)

Aircraft Type	*Currently Assigned PAA/BAA/AR*	*Proposed PAA/BAA/AR*	*Net Change in Aircraft PAA/BAA/AR*
Based F-15C/D	18/2/1	0	0
F-15EX	0	21/2/1	3/0/0
F-35A	0	21/2/0	3/0/-1

Legend: AR = Attrition Reserve; BAA = Backup Aerospace Vehicle Authorized; PAA = Primary Aerospace Vehicle Authorized.

LA2.1.2 Airfield Operations

The 159 FW has a fighter mission that is assigned to the DAF ACC MAJCOM for their federal mission, and as such they implement a training syllabus associated with ACC. As an integral component of ACC, ANG units defend the homeland of the U.S., as well as deploy forces worldwide to meet threats to ensure the security of the U.S. To fulfill this role, the 159 FW pilots must train as they would fight, which means they must simulate battle conditions in a training environment.

The NGB anticipates that by FY 2027–2028, the 159 FW would be flying 21 F-15EX with up to 8,148 operations per year at the airfield; or by FY 2026 they would be flying 21 F-35A PAA aircraft with up to 8,148 operations per year at the airfield. These operations are compared to 3,934 annual operations currently flown with the F-15C/D (Table LA2.1-2). This would represent a 107 percent increase with either the F-15EX or the F-35A in 159 FW operations at the airfield, and a 19.8 percent increase in total operations at the airfield.

Table LA2.1-2 Current and Proposed Annual Airfield Operations at NAS JRB New Orleans

Aircraft Type	*Total Current Operations[1] (Legacy Aircraft)*	*Proposed F-15EX Operations*	*Proposed F-35A Operations*
Based F-15C/D	3,934	0	0
Proposed Aircraft	0	8,148	8,148
Other Aircraft	17,364	17,364	17364
Total Airfield Operations	21,298	25,512	25,512
Percent Change at Airfield	N/A	19.8%	19.8%

Note: 159 FW F-15C/D and other based military operations based upon FY 2021. Transient operations based upon CY 2019 Air Traffic Activity Analyzer data.
[1]These existing aircraft operations assumed to continue relatively unchanged for the no action estimated for 2026 and 2027.
Legend: % = percent; JRB = Joint Reserve Base; N/A = Not Applicable; NAS = Naval Air Station.

If the 159 FW is not selected to receive the F-15EX or the F-35A aircraft, then ANG operations at the airfield would not change from current operations for the foreseeable future.

In total, NAS JRB New Orleans currently supports about 21,298 operations annually (primarily military operations), with approximately 81.5 percent consisting of other based aircraft, most of which are military aircraft. Based on proposed requirements and deployment patterns, both the F-15EX or F-35A operational aircraft would fly some operations for exercises at other locations during deployments or in preparation for deployments. During such periods, home station flying operations would be reduced accordingly. Some of the home station missions could involve inert ordnance delivery training at approved ranges.

The F-15EXs and F-35As would employ the same departure and landing flight tracks as currently used by the F-15C/Ds. F-15EX and F-35A operations would adhere to existing restrictions, and noise abatement procedures currently in place at NAS JRB New Orleans, which includes actions such as following current "course rules" at the airfield; minimizing training during DNL nighttime hours; minimizing use of afterburner take-offs. The F-15C/D at NAS JRB New Orleans currently fly 0.94 percent of the time between the hours of 10 p.m. and 7 a.m. (environmental night). At this percentage, the F-15C/D annually fly 37 operations during DNL nighttime hours, with the majority of the operations after 10 p.m. being associated with arrivals back to the installation. In addition, overseas deployment departures may occur during environmental night, but would be infrequent. In contrast, the other based aircraft perform approximately 2.3 percent of their operations after 10 p.m., or about 463 operations per year. The 159 FW would plan to fly a schedule similar to what they currently do with regard to environmental night flights, although contingencies such as weather or special combat mission training may result in rare unplanned operations during this period. Typically, all required "after dark" operations could be achieved prior to 10 p.m.

LA2.1.3 Construction and Modification of Facilities

To support the proposed operations, additional infrastructure and facilities would be required at the 159 FW installation. These construction and modifications projects would vary depending on the proposed aircraft selected as shown in Table LA2.1-3. For a more detailed description of individual construction projects, see Appendix C. Figures LA2.1-1 through LA2.1-3 identify the construction locations for the F-15EX and F-35A Alternatives, as well as the legacy construction projects, respectively. Table LA2.1-4 provides a summary of the anticipated construction footprint.

Table LA2.1-3 Summary of Construction and Modification Projects

Project ID	*Project Name*	*F-15EX*	*F-35A*	*Legacy F-15C/D*
1	Repair Hangar Maintenance Shops (Building 5) (Full Rehab)	X	X	X
2	Repair Avionics Building 425 for MEDGP CERF-P/ Demolish Building 144	X	X	X
3	Construct New Communications Facility	X	X	X
4	Renovate/Construct Weapons Load Facility (Building 386)	X	X	X
5	Renovate Building 144	X	X	X
6	Construct Parking Lot	X	X	X
7	Renovate Building 119	X	X	X
8	Renovate Building 820 (located at Alexandria, LA) (Not depicted in figures)	X	X	X
9.1 (Option 1)	ADAL Fuel Lab (renovate Building 503)	X	X	X
9.2 (Option 2)	ADAL Fuel Lab (addition on Building 142)	X	X	X
10	Repair AGE (Building 489)	X	X	

Project ID	*Project Name*	*F-15EX*	*F-35A*	*Legacy F-15C/D*
11	Construct Inert MAC Pad	X	X	
12	Construct Munitions Administration Facility (Joint Navy)	X	X	
13	Repair Munitions M&I (Building 90)	X	X	
14	Repair Munitions Security Fence Line	X	X	
15	Construct Two Munitions Igloos	X	X	
16	Repair Hangar Maintenance Shops (Building 5) (F-15EX specific)	X		
17	ADAL Simulator Facility HVAC (Building 197)	X		
18	Repair OHWS/JWICS Intel (Building 197)	X		
19	ADAL Simulator Facility (Building 197)	X		
20	Fuel Cell Hangar Power Upgrade (Building 195)	X		
21	ADAL Alert Facility	X		
22	Repair Squadron Operations (Building 590) OHWS/JWICS	X		
23	ADAL Squadron Operations (Building 590)	X		
24.1 (Option 1)	Ramp Shelters (up to 18 new shelters)	X		
24.2 (Option 2)	Demolish Two Ramp Shelters (#9 & #18)	X		
24.3 (Option 3)	Ramp Shelters (up to 3 new shelters)	X		
25	Modify Fuel Cell for CFT Storage and Maintenance (Building 195A)	X		
26	Repair Fuel Cell Hangar, Building 195	X		
27	Add Squadron Operations CSO Lockers	X		
28	Construct Flight Simulator Facility		X	
29.1 (Option 1)	Demolish 3 Ramp Shelters & Reorient 3 Shelters		X	
29.2 (Option 2)	Demolish 18 Ramp Shelters and Replace Shelters (Sub options 1-3)		X	
30	Repurpose Building 197 for OHWS/JWICS Intel		X	
31	Repair Fuel Cell, Modify Clean/Dirty (Building 195)		X	
32	Install LRS Levelator (Building 31)		X	
33	Renovate Supply DSP (Building 31)		X	
34	Install Blast Deflectors		X	
35	Repair Engine Shop (Building 385)/Recertify Crane (Building 385B)		X	
36	Repair Supply DSP Roll Up Doors (Option 1) (Buildings 195A/ Building 385A)		X	
37	Repair Squadron Operations Vault (Building 590)		X	
38	Repair Hangar Maintenance Shops (Building 5) (F-35A specific)		X	
39	Repair LRS (HVAC) (Building 31)		X	
40	Construct Munitions Administration Facility (would not include the DON)			X

Legend: ADAL = Addition/Alteration; AGE = Aerospace Ground Equipment; CERF-P = Chemical, Biological, Radiological/Nuclear, and Explosive (CBRNE) – Enhanced Response Force Package; CFT = Conforming Fuel Tank; CSO = Combat Systems Officer; DSP = Defense Support Program; HVAC = Heating, Ventilation, and Air Conditioning; JWICS = Joint Worldwide Intelligence Communication System; LRS = Logistics Readiness Squadron; M&I = Maintenance & Inspection; MAC = Munitions Assembly Conveyor; MEDGP = Medical Group; OWHS = Optimizing Human Weapon System; WLT = Weapons Load Crew Training.
Source: ACC and NGB 2021; NGB 2021a, 2021b; 159 FW 2022.

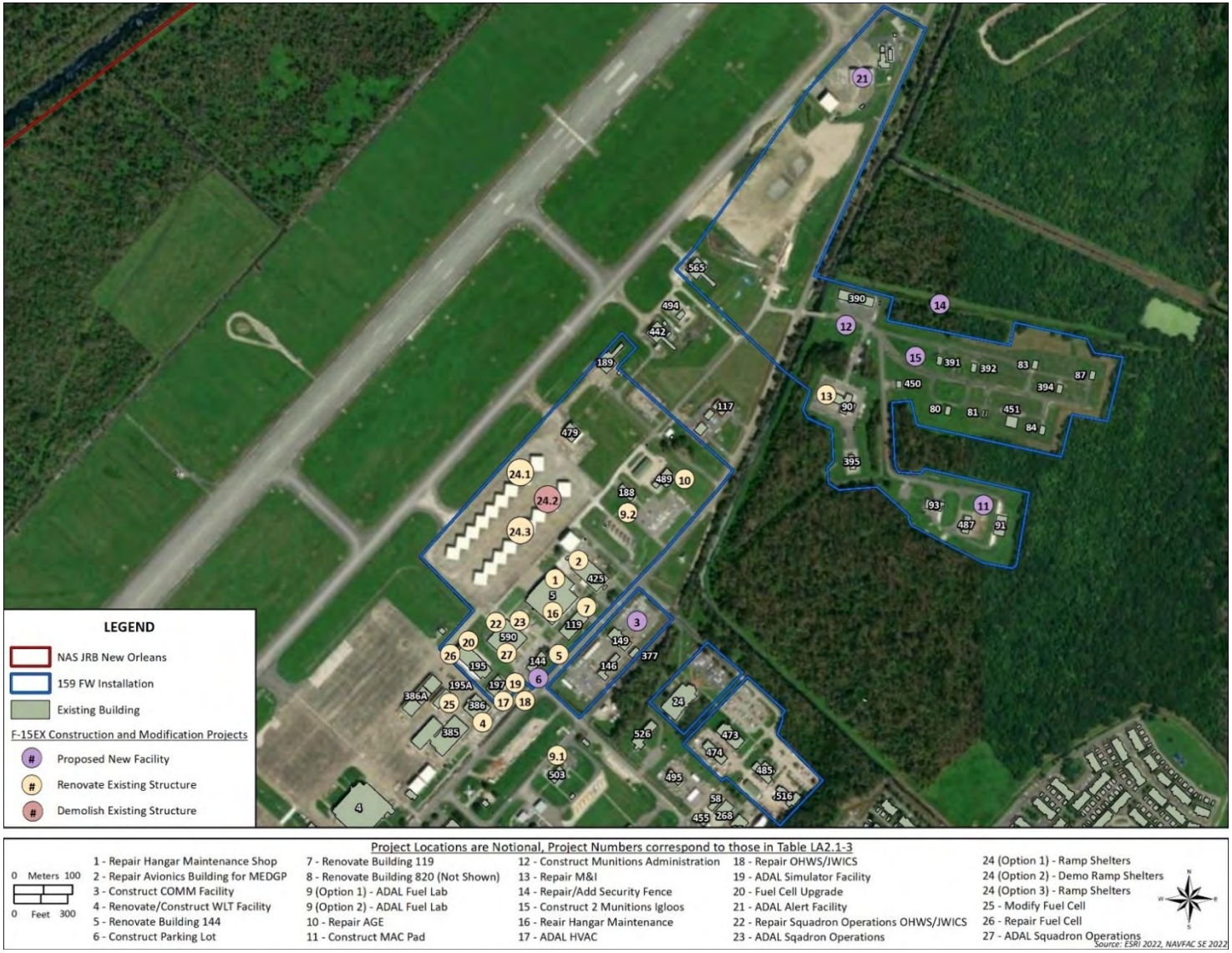


Figure LA2.1-1 Proposed Construction and Modification for the F-15EX Beddown at the 159 FW Installation

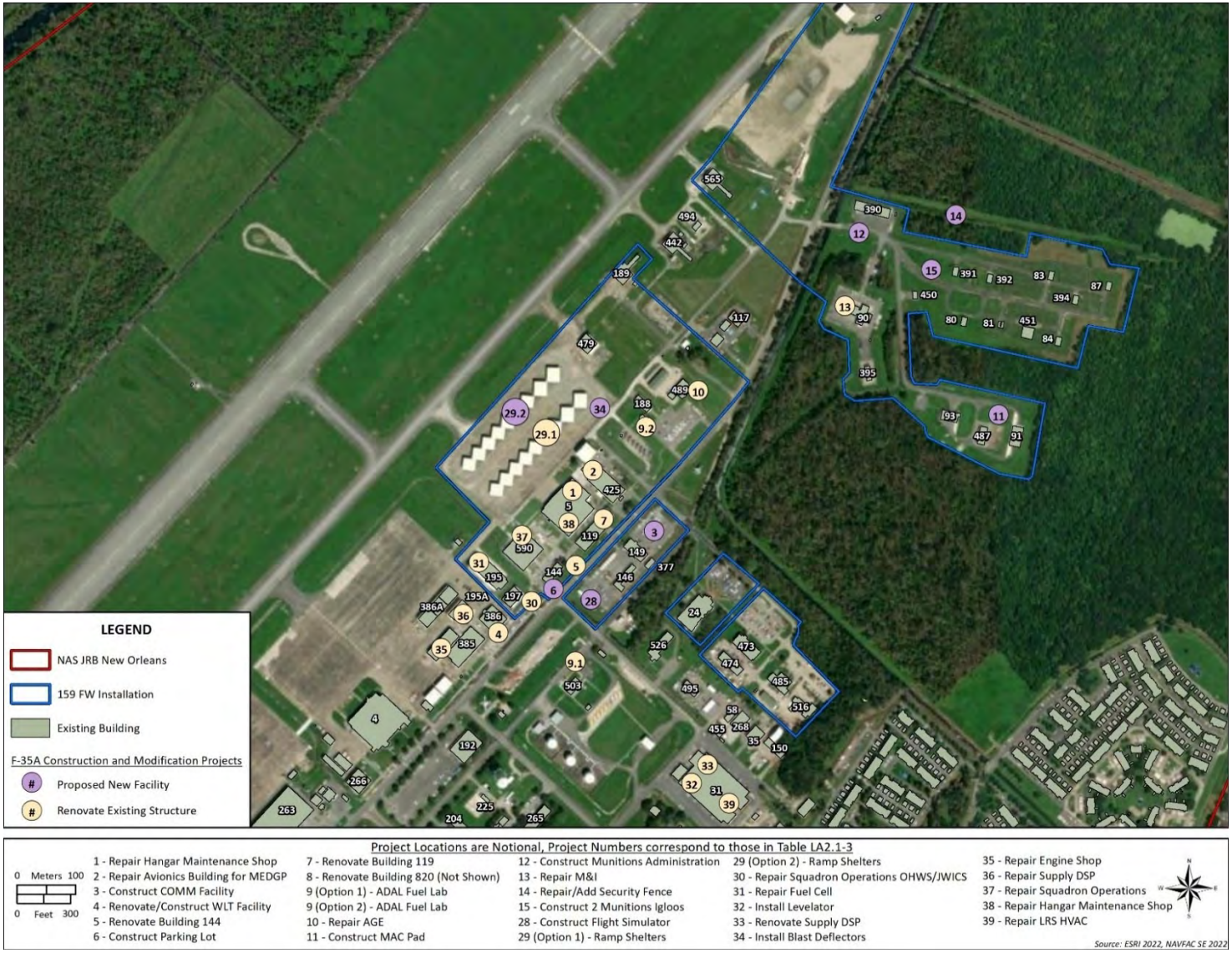


Figure LA2.1-2 159 FW Proposed Construction and Modifications for F-35A Beddown

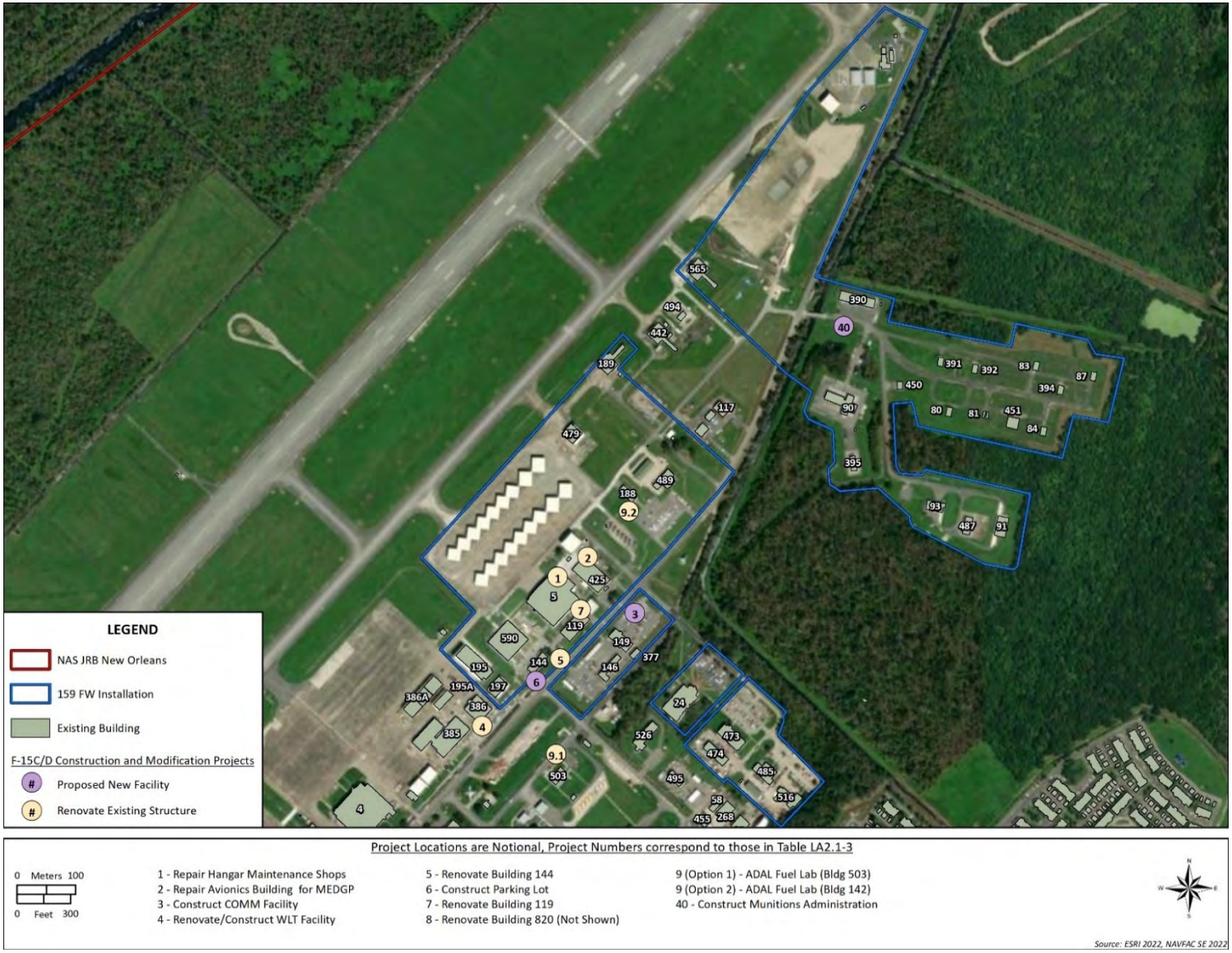


Figure LA2.1-3 159 FW Proposed Construction and Modifications for Legacy Aircraft

Table LA2.1-4 Summary of Construction Footprint

Aircraft Type	*Total SF Disturbance*	*Total SF Net New Impervious*	*Years of Construction*
Based F-15C/D	81,700	62,500	FY 2024[1]–2032
F-15EX	218,800	85,300	FY 2024–2032
F-35A	151,500	100,800	FY 2024–2032

Note: [1]2024 but no sooner than ROD signature.
Legend: FY = Fiscal Year; SF = square foot/feet.

It is anticipated that construction and modifications would begin shortly following the signature of the ROD for all three alternatives to support mission requirements.

LA2.1.4 Personnel

The 159 FW currently supports 191 federal technician civilian employees, 388 AGR, and 941 traditional guardsmen (159 FW 2022). The overall number ANG personnel at the 159 FW installation would vary among the various aircraft beddown alternatives, with an addition of 101 personnel under the F-15EX beddown and 80 personnel under the F-35A beddown. Table LA2.1-5 shows the changes in personnel by aircraft beddown alternatives.

Table LA2.1-5 Proposed Personnel at the 159 FW Installation

Personnel Category	*F-15EX Proposed Increase in Personnel*	*F-35A Proposed Increase in Personnel*	*F-15C/D Change in Personnel*
Officers (including CSOs)	36	15	0
Enlisted	65	65	0
Change in Personnel	101	80	0

Legend: 159 FW = 159th Fighter Wing; CSO = Combat Systems Officer.

LA2.1.5 159th Fighter Wing: Training Airspace and Ranges

The 159 FW uses several airspace units (Table LA2.1-6 and Figure LA2.1-4), including overland MOAs, Restricted Areas, and Warning Areas. Chapter 2.0, Section 2.2.2.1, *Training Airspace and Range Operations*, provides definitions of these airspace units. The beddown of either the F-15EX or the F-35A would not require changes in SUA attributes, though there could be an increase in the use of SUA by the 159 FW.

Table LA2.1-6 159 FW Military Training Airspace

Complex	*Airspace*	*Floor[1]*	*Ceiling[1]*
Claiborne MOA	Claiborne A MOA	100 ft AGL	10,000 ft MSL
	Claiborne B MOA	10,000 ft MSL	18,000 ft MSL
Snake MOA	Snake Low MOA	3,000 ft MSL	6,000 ft MSL
	Snake MOA	6,000 ft MSL	18,000 ft MSL

Complex	*Airspace*	*Floor*[1]	*Ceiling*[1]
Warrior MOA	Warrior 1 Low	100 ft AGL	10,000 ft MSL
	Warrior 1 High	10,000 ft MSL	18,000 ft MSL
	Warrior 2 Low	100 ft AGL	10,000 ft MSL
	Warrior 2 High	10,000 ft MSL	18,000 ft MSL
	Warrior 3 Low	100 ft AGL	10,000 ft MSL
	Warrior 3 High	10,000 ft MSL	18,000 ft MSL
R-3801	R-3801A	0	10,000 ft MSL
	R-3801B	10,000 ft MSL	18,000 ft MSL
	R-3801C	18,000 ft MSL	23,000 ft MSL
R-3803	R-3803A	0	18,000 ft MSL
	R-3803B	18,000 ft MSL	35,000 ft MSL
	R-3803C	0	18,000 ft MSL
	R-3803D	0	18,000 ft MSL
	R-3803E	18,000 ft MSL	35,000 ft MSL
	R-3803F	18,000 ft MSL	35,000 ft MSL
R-3804	R-3804A	0	18,000 ft MSL
	R-3804B	0	10,000 ft MSL
	R-3804C	18,000 ft MSL	35,000 ft MSL
W-59	W-59A	5,000 ft MSL	50,000 ft MSL
	W-59B	5,000 ft MSL	28,000 ft MSL
	W-59C	28,000 ft MSL	50,000 ft MSL
W-148	W-148A	0	6,000 ft MSL
	W-148B	6,000 ft MSL	60,000 ft MSL
W-155	W-155A	0	60,000 ft MSL
	W-155B	0	60,000 ft MSL
	W-155C	0	60,000 ft MSL
W-453	W-453A	0	6,000 ft MSL
	W-453B	6,000 ft MSL	60,000 ft MSL

Note: [1]MSL is the elevation (on the ground) or altitude (in the air) of an object, relative to the average sea level. The elevation of a mountain, for example, is marked by its highest point and is typically illustrated as a small circle on a topographic map with the MSL height shown in either feet, meters, or both. Because aircraft fly across vast landscapes, where points above the ground can and do vary, MSL is used to denote the "plane" on which the floors and ceilings of SUA are established and the altitude at which aircraft must operate within that SUA.

Legend: 159 FW = 159th Fighter Wing; AGL = above ground level; ft = feet; MOA = Military Operations Area; MSL = mean sea level; SUA = Special Use Airspace; R- = Restricted Area; W- = Warning Area.

Figure LA2.1-4 Airspace Associated with the 159 FW

LA2.1.6 Airspace Use

All flight operations would take place in existing training airspace. No additions or alterations of training airspace are associated with the Proposed Action. The NGB expects that the F-15EX and F-35A would operate in the airspace currently used by the 159 FW. Although the F-15EX and F-35A aircraft would use the same airspace units as the current F-15C/D aircraft at the installation, the percentage of use by altitude and number of operations per airspace unit may vary slightly. Table LA2.1-7 provides a breakdown of the percentage of use of each aircraft by altitude for current and proposed operations. All three aircraft fly only approximately 7 percent of the time below 10,000 feet MSL, and 93 percent of the time above 10,000 feet MSL. More details on different altitudes relative to different missions can be found in Chapter 2.0, Section 2.2.2.1, *Training Airspace and Range Operations*. Regardless of the altitude structure and percentage use indicated in Table LA2.1-7, F-15EX and F-35A aircraft (as with the F-15C/Ds) would adhere to all established floors and ceilings of airspace units.

Table LA2.1-7 Approximate 159 FW Current and Proposed Altitude Distribution

Altitude (feet)	*Percentage Use F-15C/D*	*Percentage Use F-15EX*	*Percentage Use F-35A*
500–3,000 AGL	1	1	1
3,000–5,000 AGL	1	1	1
5,000–10,000 MSL	5	5	5
10,000 MSL–18,000 MSL	36	38	24
18,000 MSL–30,000 MSL	17	30	58
Above 30,000	40	25	11

Legend: 159 FW = 159th Fighter Wing; AGL = above ground level; MSL = mean sea level.

LA2.1.7 Ordnance Use and Defensive Countermeasures

LA2.1.7.1 F-15C/D

The F-15C/D aircraft does not carry any air-to-ground ordnance since it does not support and air-to-ground mission. In support of air-to-air training missions, it can carry training missiles and instrument pods (which help record the aircraft's position for training purposes). These training aids do not release from the airplane. Ordnance currently used by the F-15C/D include AIM-120 and AIM-9 missiles as well as a 20mm gun system.

Legacy F-15C/D aircraft are also used to stand ACA missions in support of U.S. National Security. For these missions, the aircraft are loaded with actual air-to-air missiles, and the cannon is loaded with 20mm gun rounds. There are strict regulations about the storage, loading, flying, and unloading of these items.

The F-15C/D aircraft also carries expendable defensive countermeasures for training and for the ACA missions. These provide self-protection against radar-guided weapons, and IR-guided weapons (also called "heat-seeking"). These countermeasures are also subject to strict rules on the storage, loading, flying, and unloading of the countermeasures. Their use in SUA (for training) is also subject to restrictions in terms of types, minimum release altitude, and other conditions.

LA2.1.7.2 F-15EX and F-35A

Most air-to-ground training for the F-15EX and F-35A would be simulated, where nothing is released from the aircraft, and target scoring is done electronically. As was discussed in Chapter 2.0, Section 2.2.2.5, *Ordnance Use*, however, the F-15EX and F-35A (like the F-15C/D) is capable of carrying and employing several types of air-to-air and air-to-ground ordnance (including strafing) and pilots would need training in their use. F-15EX and F-35A pilots would only use ranges and airspace authorized for the type of ordnance being employed and within the number already approved at a range and/or target. Ordnance to be used by the F-15EX and F-35A aircraft includes AIM-120, AIM-9, and AIM 9X missiles, GBU-31 and GBU-39 JDAM as well as a 20mm cannon system (F-15EX) and 25mm cannon system (F-35A). If in the future the NGB identifies weapons systems that are either new or could exceed currently approved levels, appropriate NEPA documentation would need to occur prior to their employment.

Fort Johnson (formerly known as "Fort Polk") Range (R-3803) contains varied target sets for supporting laser and practice/inert air-to-ground weapons training. It is expected that any live-fire training would be conducted during formal training exercises conducted remotely from the 159 FW installation.

Both the F-15EX and F-35A would eventually be capable of conducting the ACA mission. Both aircraft would continue to have the potential requirement to load live air-to-air missiles, and live rounds in the cannon, just like the legacy F-15C/D. They would continue to have the same restrictions on storage and use that exist now.

Like the F-15C/D, the F-15EX and F-35A would employ chaff and flares as defensive countermeasures in training. Chaff and flares are the principal defensive mechanisms dispensed by military aircraft to avoid attack by enemy air defense systems. Use of chaff and flares are permitted in all airspace units identified in Table LA2.1-5 and proposed for use by the F-15EX or F-35A. Flares are not permitted to be released below 2,000 feet AGL over non-government-owned or -controlled property. Based on the emphasis on flight at higher altitudes for the F-15EX and F-35A, roughly 90 percent of flare releases would occur above 15,000 feet MSL. At this altitude, most flares would be released more than seven times higher than the minimum release altitude

permitted (2,000 feet AGL) over non-government-owned or -controlled property and ensure complete burnout before reaching the ground.

The use of defensive countermeasures would not be expected to change. They would be used for Alert missions, and would also be used in training, and would be used at the same rates in the same places, subject to the same restrictions that exist now.

LA3.0 159TH FIGHTER WING AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

LA3.1 NOISE

LA3.1.1 Affected Environment

LA3.1.1.1 Installation

The predominant sources of noise at NAS JRB New Orleans are aircraft operations and industrial operations of an active airfield. Additionally, construction, use of ground support equipment, and vehicular traffic all contribute to the noise environment, though these are transitory and provide a negligible contribution to the overall average noise level at NAS JRB New Orleans.

Based on historical data, the 159 FW flew approximately 1,850 sorties annually with an ASD of 1.37 hours. Each sortie generates one departure and one arrival operation. Additionally, an average of one closed pattern event (each closed pattern event counts as two airfield operations) occurred 50 weeks per year. This activity results in 1,850 departures, 1,850 arrivals, and 234 closed pattern operations per year or 3,934 total airfield operations, as detailed in Table LA3.1-1. The 159 FW avoids operating during the DNL nighttime (10 p.m. to 7 a.m.) as much as practical resulting in an average of 37 total DNL nighttime operations per year. Overall, the 159 FW accounts for approximately 18.5 percent of the NAS JRB New Orleans annual operations.

Table LA3.1-1 NAS JRB New Orleans Current Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Total*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Total*
159 FW	F-15C/D	1,832	19	1,832	19	234	0	3,897	37	3,934
DON	C-130	245	3	245	3	0	0	490	6	496
USMC	AH-1/UH-1	480	20	480	20	2,148	90	3,108	130	3,238
USCG	H-60	808	43	808	43	3,404	180	5,019	265	5,284
DON	F-5E/F	1,200	0	1,200	0	240	0	2,640	0	2,640
Transient Aircraft	Fighter1	403	4	403	4	0	0	806	8	814
	Fighter2	806	8	806	8	0	0	1,611	16	1,627
	Heavy Helicopter	242	2	242	2	0	0	484	4	488
	Helicopter	38	1	38	1	0	0	76	2	78
	Heavy Jet	184	2	184	2	0	0	367	4	371
	Light Jet	324	3	324	3	0	0	648	6	654
	Heavy Turboprop	63	1	63	1	0	0	125	2	127
	Light Propeller	682	14	682	14	0	0	1,364	28	1,392
Grand Total		**7,305**	**119**	**7,305**	**119**	**6,026**	**270**	**20,635**	**508**	**21,143**

Notes: [1]Closed Patterns counted as two operations.
Legend: 159 FW = 159th Fighter Wing; DON = Department of the Navy; JRB = Joint Reserve Base; NAS = Naval Air Station; USCG = United States Coast Guard; USMC = United States Marine Corps.

Other users based at NAS JRB New Orleans include the DON, U.S. Marine Corps, and U.S. Coast Guard, generating more than half of all airfield operations. Transient aircraft (including fighter,

helicopter, jet, and turboprop aircraft) account for the remaining operations at NAS JRB New Orleans, as described in Table LA3.1-1. Additional details of model airfield operations are provided in the 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Figure LA3.1-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the existing conditions at NAS JRB New Orleans. Noise generated from aircraft operations at NAS JRB New Orleans occurs within and outside the airfield. Portions of the 65 dB DNL contour extend northwest of the airfield by 0.4 mile, to the northeast 0.8 mile, and to the southwest 1.8 miles.

Table LA3.1-2 shows the acreage (excluding water bodies) by noise contour band resulting in a total of 918 acres off NAS JRB New Orleans exposed to 65 dB DNL or greater for existing conditions. The acreage that is off NAS JRB New Orleans is comprised of 845 acres exposed to 65 to 70 dB DNL, 72 acres to 70 to 75 dB DNL, 1 acre to 75 to 80 dB DNL, and none exposed to 80 to 85 or greater than 85 dB DNL.

Table LA3.1-2 NAS JRB New Orleans Existing Conditions Noise Exposure Acreage

DNL Band (dB)	*Existing Conditions Acreage*		
	On NAS JRB New Orleans	*Off NAS JRB New Orleans*	*Total*
65–70	795	845	1,640
70–75	641	72	713
75–80	291	1	292
80–85	179	0	179
85+	224	0	224
Total >65 dB	**2,130**	**918**	**3,048**

Legend: > = greater than; dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

The population and household analysis reviewed census block groups and included all households and population for each block group completely within each DNL contour band. For block groups partially within a DNL contour band the number of households and population were scaled based upon the block group area within each DNL contour band from 65 to 80 dB because households in these areas are generally equally distributed throughout each block group. Although not applicable here, households would be counted manually for DNL bands of 80 dB and above because populations in these high noise areas are often not evenly distributed. Table LA3.1-3 lists estimated households and population off NAS JRB New Orleans that are currently exposed to each DNL contour band under existing conditions. Currently, 381 and 4 households are within the 65 to 70 dB and 70 to 75 dB DNL contour bands, respectively. Based upon the average household sizes in these census block groups, an estimated 972 people residing in the vicinity of NAS JRB New Orleans are exposed to 65 to 70 dB DNL and 13 people are exposed to 70 to 75 dB DNL.

Table LA3.1-3 NAS JRB New Orleans Existing Conditions
Estimated Households and Population

DNL Band (dB)	*Existing Conditions*	
	Households	*Population*
65–70	381	972
70–75	4	13
75–80	0	0
80–85	0	0
85+	0	0
Totals	**385**	**985**

Legend: dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

Table LA3.1-4 shows the DNL values at each of the POIs under the existing conditions and Figure LA3.1-1 presents the POI locations. Values range from 34 to 67 dB DNL. One POI, LA-R-05 Good News Avenue and Gravolet Street, is currently exposed to 65 dB DNL or greater, the DoD threshold for land use recommendations for noise sensitive land uses. The second greatest DNL of 60 dB DNL occurs at 4 POIs: LA-H-03 Belle Chasse Community Health Center, LA-R-08 Lake Lynn Drive, LA-S-11 Our Lady of Perpetual Help School, and LA-S-12 Belle Chasse Academy. Additional details describing the POI selection and categories are provided in Chapter 3.0, Section 3.2.5, *Analysis Methodology*.

The supplemental metric analysis included in this EIS and presented below is included to conform with DoD policy described by DNWG (DNWG 2009a).

Table LA3.1-5 presents the classroom learning interference for schools S-01 through S-13 experienced under existing conditions. The 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), provides the same school metrics computed for all other POIs in order to account for any daycare facilities that could occur near other POIs, such as a daycare operated out of a personal residence. As described in the noise study, the school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found classroom learning impacts (DNWG 2009b, 2013a). Current operations at NAS JRB New Orleans results in 6 school POIs that are exposed to exterior $L_{eq(8hr)}$ greater than or equal to 60 dB, with the greatest of 64 dB occurring at LA-S-11 Our Lady of Perpetual Help School and LA-S-12 Belle Chasse Academy. Additional school impact analysis involves determining the number of noise-generated speech interfering events per school day hour that exceed an interior L_{max} of 50 dB (equivalent to an exterior L_{max} of 65 dB for windows open). The number of classroom interfering events is estimated at an average of 1 per school day hour at 11 schools and 2 per hour at 2 schools (LA-S-12 Belle Chasse Academy and LA-S-13 Christian Fellowship Daycare), as presented in Table LA3.1-5. Time above an interior level of 50 dB (equivalent to an exterior of 65 dB for windows open) varies from 4 minutes at 7 schools and 6 to 8 minutes at 6 schools.

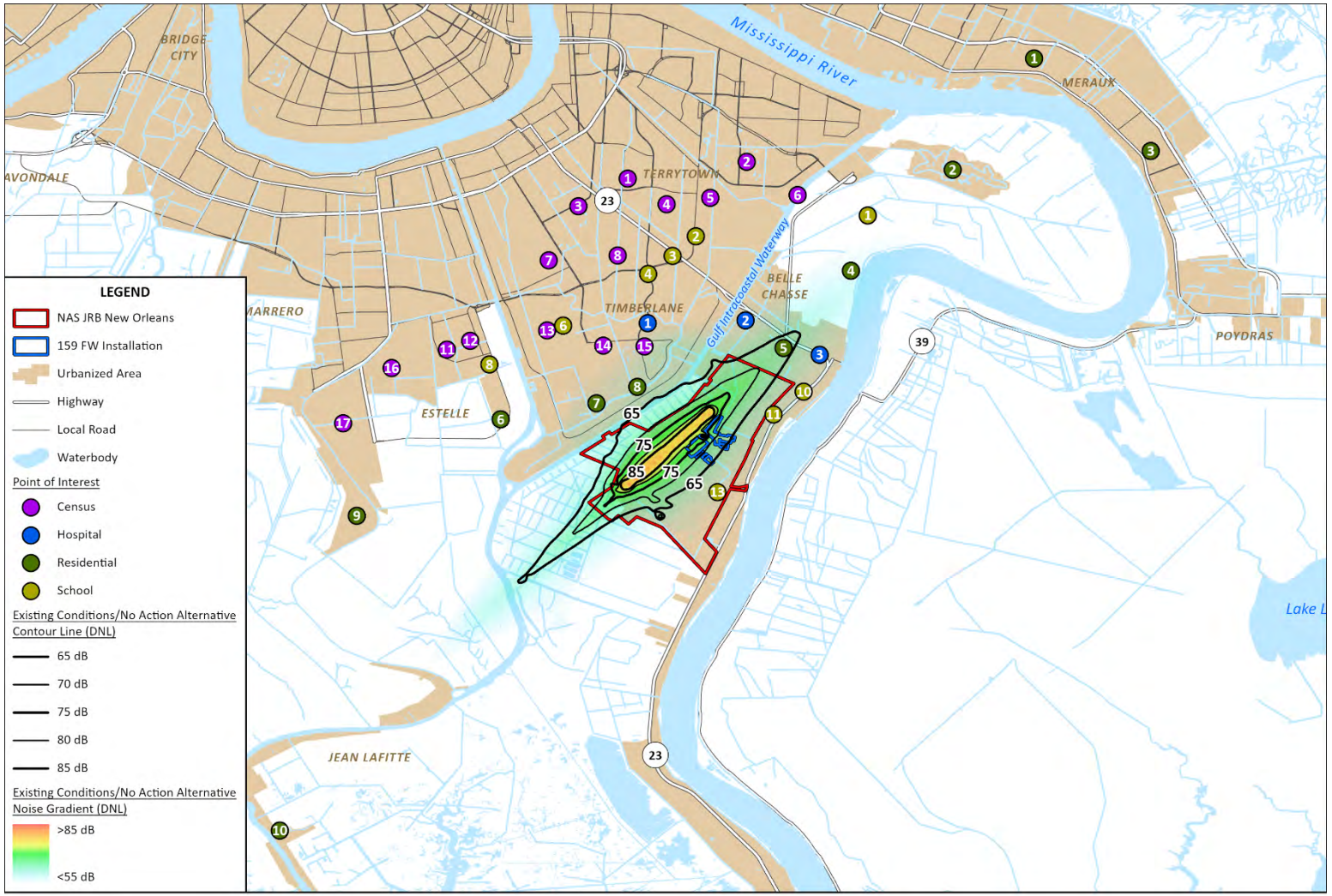


Figure LA3.1-1 Existing Conditions NAS JRB New Orleans – DNL Contours and Gradient

Table LA3.1-4 Existing Conditions POIs Noise Exposure in the Vicinity of NAS JRB New Orleans

Map ID	*Point Type*	*Named POI*[1]	*Existing Conditions DNL*[2] *(dB)*
LA-C-01	Census Tract Centroid	Census Tract 252.02	36
LA-C-02	Census Tract Centroid	Census Tract 6.18	43
LA-C-03	Census Tract Centroid	Census Tract 254	36
LA-C-04	Census Tract Centroid	Census Tract 250.03	40
LA-C-05	Census Tract Centroid	Census Tract 250.05	42
LA-C-06	Census Tract Centroid	Census Tract 6.17	48
LA-C-07	Census Tract Centroid	Census Tract 278.03	43
LA-C-08	Census Tract Centroid	Census Tract 251.02	42
LA-C-09	Census Tract Centroid	Census Tract 251.03	45
LA-C-10	Census Tract Centroid	Census Tract 251.04	50
LA-C-11	Census Tract Centroid	Census Tract 278.10	39
LA-C-12	Census Tract Centroid	Census Tract 278.11	41
LA-C-13	Census Tract Centroid	Census Tract 278.16	44
LA-C-14	Census Tract Centroid	Census Tract 278.14	53
LA-C-15	Census Tract Centroid	Census Tract 278.13	59
LA-C-16	Census Tract Centroid	Census Tract 278.17	40
LA-C-17	Census Tract Centroid	Census Tract 278.20	34
LA-H-01	Healthcare Facility	Bayside Healthcare Center	55
LA-H-02	Healthcare Facility	Padua Community Services Pediatric Residential Program	58
LA-H-03	Healthcare Facility	Belle Chasse Community Health Center	60
LA-R-01	Residential Area	Emily Oaks Drive near E. St Bernard Highway	40
LA-R-02	Residential Area	Clubhouse Drive near Harbour Town Court	49
LA-R-03	Residential Area	Highland Drive near E. St Bernard Highway	44
LA-R-04	Residential Area	Parc Riverwood Drive and Main Street	59
LA-R-05	Residential Area	Good News Avenue and Gravolet Street	**67**
LA-R-06	Residential Area	Census Tract 278.12	48
LA-R-07	Residential Area	Lac du Bay Drive and Lac Saint Pierre Drive	58
LA-R-08	Residential Area	Lake Lynn Drive	60
LA-R-09	Residential Area	Grand Tierre Drive	40
LA-R-10	Residential Area	Jean Lafitte Boulevard	42
LA-S-01	School	Belle Chasse Elementary School and Belle Chasse Primary School	52
LA-S-02	School	Athlos Academy of Jefferson Parish and GB Elementary School	45
LA-S-03	School	George Cox Elementary School	45
LA-S-04	School	Jefferson Rise Charter School	45
LA-S-05	School	Paul J. Solis Elementary School	49
LA-S-06	School	Woodland West Elementary School	45
LA-S-07	School	Brighter Horizons	58
LA-S-08	School	Woodmere Elementary	45
LA-S-09	School	Belle Chasse High School	58
LA-S-10	School	Jacob's Ladder Learning Academy	58
LA-S-11	School	Our Lady of Perpetual Help School	60

Map ID	*Point Type*	*Named POI[1]*	*Existing Conditions DNL[2] (dB)*
LA-S-12	School	Belle Chasse Academy	60
LA-S-13	School	Christian Fellowship Daycare	58

Note: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding NAS JRB New Orleans where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section 3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to DNL of 65 dB or greater.
Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

Table LA3.1-5 NAS JRB New Orleans Existing Conditions Classroom Learning Interference

ID	*Location[1]*	*Outdoor $L_{eq(8hr)}$ (dB)[2]*	*Number of Speech Interfering Events per School Day Hour[3]*	*Time above 50 dB per 8-hour school day (minutes)[3]*
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	56	1	4
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	48	1	4
LA-S-03	George Cox Elementary School	49	1	4
LA-S-04	Jefferson Rise Charter School	49	1	4
LA-S-05	Paul J. Solis Elementary School	53	1	4
LA-S-06	Woodland West Elementary School	49	1	4
LA-S-07	Brighter Horizons	**62**	1	6
LA-S-08	Woodmere Elementary	48	1	4
LA-S-09	Belle Chasse High School	**62**	1	6
LA-S-10	Jacob's Ladder Learning Academy	**62**	1	6
LA-S-11	Our Lady of Perpetual Help School	**64**	1	8
LA-S-12	Belle Chasse Academy	**64**	2	7
LA-S-13	Christian Fellowship Daycare	**62**	2	7

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Bold text represent schools exposed to exterior $L_{eq(8hr)}$ of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
[3]Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
Legend: dB = decibel; ID = Identification; JRB = Joint Reserve Base; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; NAS Naval Air Station.

Table LA3.1-6 presents the existing conditions speech interference based upon the numbers of events per average hour during the DNL daytime period for both a windows open and windows closed condition. The number of speech interfering events with windows open ranges from none at 14 POIs, 1 per average hour at 28 POIs, and up to 2 events per average hour at 1 POI (LA-R-07 Lac du Bay Drive and Lac Saint Pierre Drive). With windows closed, no interfering events per average hour at 26 POIs and 1 event per average hour at 17 POIs.

Table LA3.1-6 NAS JRB New Orleans Existing Conditions Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*Windows Open[2]*	*Windows Closed[3]*
LA-C-01	Census Tract 252.02	0	0
LA-C-02	Census Tract 6.18	0	0
LA-C-03	Census Tract 254	0	0
LA-C-04	Census Tract 250.03	0	0
LA-C-05	Census Tract 250.05	0	0
LA-C-06	Census Tract 6.17	1	0
LA-C-07	Census Tract 278.03	1	0
LA-C-08	Census Tract 251.02	0	0
LA-C-09	Census Tract 251.03	1	0
LA-C-10	Census Tract 251.04	1	0
LA-C-11	Census Tract 278.10	0	0
LA-C-12	Census Tract 278.11	0	0
LA-C-13	Census Tract 278.16	1	0
LA-C-14	Census Tract 278.14	1	1
LA-C-15	Census Tract 278.13	1	1
LA-C-16	Census Tract 278.17	1	0
LA-C-17	Census Tract 278.20	0	0
LA-H-01	Bayside Healthcare Center	1	1
LA-H-02	Padua Community Services Pediatric Residential Program	1	1
LA-H-03	Belle Chasse Community Health Center	1	1
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	0	0
LA-R-02	Clubhouse Drive near Harbour Town Court	1	0
LA-R-03	Highland Drive near E. St Bernard Highway	0	0
LA-R-04	Parc Riverwood Drive and Main Street	1	1
LA-R-05	Good News Avenue and Gravolet Street	1	1
LA-R-06	Census Tract 278.12	1	1
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	2	1
LA-R-08	Lake Lynn Drive	1	1
LA-R-09	Grand Tierre Drive	0	0
LA-R-10	Jean Lafitte Boulevard	0	0
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	1	1
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	0	0
LA-S-03	George Cox Elementary School	1	0
LA-S-04	Jefferson Rise Charter School	1	0
LA-S-05	Paul J. Solis Elementary School	1	0
LA-S-06	Woodland West Elementary School	1	0
LA-S-07	Brighter Horizons	1	1
LA-S-08	Woodmere Elementary	1	0
LA-S-09	Belle Chasse High School	1	1
LA-S-10	Jacob’s Ladder Learning Academy	1	1
LA-S-11	Our Lady of Perpetual Help School	1	1

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
LA-S-12	Belle Chasse Academy	1	1
LA-S-13	Christian Fellowship Daycare	1	1

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

Analysis of the potential for sleep disturbance involves determining the number and SEL of DNL nighttime aircraft events to estimate the PA metric. As detailed in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/), and presented in Table LA3.1-7, PA with windows open or windows closed is negligible at all POIs for existing conditions at NAS JRB New Orleans. This is due to relatively low total DNL nighttime operations at NAS JRB New Orleans and of those DNL nighttime operations, the majority result from helicopter operations, which typically produce a lower SEL when compared with jet aircraft in most situations.

Table LA3.1-7 NAS JRB New Orleans Existing Conditions Estimated PA

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
LA-C-01	Census Tract 252.02	<1%	<1%
LA-C-02	Census Tract 6.18	<1%	<1%
LA-C-03	Census Tract 254	<1%	<1%
LA-C-04	Census Tract 250.03	<1%	<1%
LA-C-05	Census Tract 250.05	<1%	<1%
LA-C-06	Census Tract 6.17	<1%	<1%
LA-C-07	Census Tract 278.03	<1%	<1%
LA-C-08	Census Tract 251.02	<1%	<1%
LA-C-09	Census Tract 251.03	<1%	<1%
LA-C-10	Census Tract 251.04	<1%	<1%
LA-C-11	Census Tract 278.10	<1%	<1%
LA-C-12	Census Tract 278.11	<1%	<1%
LA-C-13	Census Tract 278.16	<1%	<1%
LA-C-14	Census Tract 278.14	<1%	<1%
LA-C-15	Census Tract 278.13	<1%	<1%
LA-C-16	Census Tract 278.17	<1%	<1%
LA-C-17	Census Tract 278.20	<1%	<1%
LA-H-01	Bayside Healthcare Center	<1%	<1%
LA-H-02	Padua Community Services Pediatric Residential Program	<1%	<1%
LA-H-03	Belle Chasse Community Health Center	<1%	<1%
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	<1%	<1%
LA-R-02	Clubhouse Drive near Harbour Town Court	<1%	<1%
LA-R-03	Highland Drive near E. St Bernard Highway	<1%	<1%
LA-R-04	Parc Riverwood Drive and Main Street	<1%	<1%
LA-R-05	Good News Avenue and Gravolet Street	<1%	<1%
LA-R-06	Census Tract 278.12	<1%	<1%
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	<1%	<1%
LA-R-08	Lake Lynn Drive	<1%	<1%

Map ID	*Named POI[1]*	*Windows Open[2]*	*Windows Closed[3]*
LA-R-09	Grand Tierre Drive	<1%	<1%
LA-R-10	Jean Lafitte Boulevard	<1%	<1%
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	<1%	<1%
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	<1%	<1%
LA-S-03	George Cox Elementary School	<1%	<1%
LA-S-04	Jefferson Rise Charter School	<1%	<1%
LA-S-05	Paul J. Solis Elementary School	<1%	<1%
LA-S-06	Woodland West Elementary School	<1%	<1%
LA-S-07	Brighter Horizons	<1%	<1%
LA-S-08	Woodmere Elementary	<1%	<1%
LA-S-09	Belle Chasse High School	<1%	<1%
LA-S-10	Jacob's Ladder Learning Academy	<1%	<1%
LA-S-11	Our Lady of Perpetual Help School	<1%	<1%
LA-S-12	Belle Chasse Academy	<1%	<1%
LA-S-13	Christian Fellowship Daycare	<1%	<1%

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to 80 dB DNL or greater (DNWG 2013b)[1]. As presented in Table LA3.1-2, there is no acreage outside of NAS JRB New Orleans that is exposed to 80 dB DNL or greater, so no people are at risk of the potential for hearing loss for existing conditions.

LA3.1.1.2 Airspace

The 159 FW trains in SUA listed in Table LA2.1-5. This airspace is shared with other units including other services. The 159 FW currently flies 1,850 sorties annually divided across SUA, with 93 percent of time spent above 10,000 feet MSL. In most of the locations, the 159 FW sorties contribute L_{dnmr} less than 35 dB on the ground below the SUA, with 35 dB being the lower noise level limit of the noise modeling software. For reference, an L_{dnmr} of 35 dB is consistent with ambient noise levels typically found in rural or remote areas with minimal or no human sources of noise (vehicle traffic, regular or low altitude aircraft flights, etc.).

Flying activity would occur in overland airspace under existing conditions. Because the overwater training areas, Warning Areas W-59, W-148, W-155, and W-453, are far from land, no amount of

[1]DNWG 2013b. Noise-Induced Hearing Impairment Technical Bulletin. As part of the noise analysis in all future environmental impact statements, DoD components will use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss (PHL). DoD components will use as part of the analysis, as appropriate, a calculation of the PHL of the at risk population.

training there generates significant noise impacts on land. Given these assumptions, noise levels generated by existing operations in overland SUA are 40 dB L_{dnmr} for subsonic operations. The actual distribution of operations across multiple training areas makes the resulting noise much lower than this. However, those levels are too low to accurately assess given the lower noise limit of the modeling software.

To train with the full capabilities, the F-15C/D aircraft employ supersonic flight (flights that exceed the speed of sound) during a small portion of their sorties that occur at the 159 FW overwater ranges at a minimum altitude of 10,000 feet MSL. The fuel demand when flying supersonic limits the amount of time the aircraft could travel at supersonic speeds before having to return to the base to refuel. In general, an aircraft would only travel supersonic for approximately 30 seconds. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the overpressures of booms that reach the ground due to supersonic activity at these altitudes are well below those that would begin to cause physical injury to humans or animals (National Aeronautics and Space Administration 2015). Given the 15-mile distance between the shore and 159 FW overwater supersonic activity, the existing F-15C/D supersonic operations do not impact or generate annoyance to people on land.

LA3.1.2 Environmental Consequences

LA3.1.2.1 F-15EX

Installation

Under this alternative, the 159 FW would replace their 18 F-15C/D aircraft with a squadron of 21 F-15EX aircraft. The following sections describe the noise effects resulting from construction, installation operations, and airspace operations associated with the F-15EX Alternative at NAS JRB New Orleans.

The F-15EX Alternative includes construction projects that would occur within the NAS JRB New Orleans property, which would generate temporary construction noise. The proposed construction sites would be in areas close to the NAS JRB New Orleans runways currently exposed to 65 dB DNL or greater and most of the land adjacent outside of NAS JRB New Orleans is primarily commercial or undeveloped. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

As summarized in Table LA3.1-8, F-15EX operations would amount to 3,832 departures, 3,832 arrivals, and 484 closed pattern operations resulting in a total of 8,148 F-15EX annual operations at NAS JRB New Orleans. The proportion of DNL nighttime operations (10 p.m. to 7 a.m.) would

remain consistent with F-15C/D 159 FW operations at approximately 1 percent. F-15EX would use the same flight tracks and runways as the 159 FW F-15C/D. All current operations by other aircraft (DON, U.S. Marine Corps, U.S. Coast Guard, and transient military) would continue unchanged. Additional noise modeling details are provided in the 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

This EIS confirmed that the air traffic at NAS JRB New Orleans would remain similar to pre-COVID-19 into the near future and through the time any new aircraft would arrive (FY 2026–2027) because military operations were largely unaffected by COVID-19 and military operational training requirements and resulting military operations would remain the same. Thus, the No Action Alternative for this EIS is equivalent to the existing conditions in terms of aircraft operations.

Table LA3.1-8 F-15EX Alternative at NAS JRB New Orleans – F-15EX Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Totals*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Totals*
159 FW	F-15EX	3,794	38	3,794	38	484	0	8,072	76	8,148
DON	C-130	245	3	245	3	0	0	490	6	496
USMC	AH-1/UH-1	480	20	480	20	2,148	90	3,108	130	3,238
USCG	H-60	808	43	808	43	3,404	180	5,019	265	5,284
DON	F-5E/F	1,200	0	1,200	0	240	0	2,640	0	2,640
Transient Aircraft	Fighter1	403	4	403	4	0	0	806	8	814
	Fighter2	806	8	806	8	0	0	1,611	16	1,627
	Heavy Helo	242	2	242	2	0	0	484	4	488
	Helo	38	1	38	1	0	0	76	2	78
	Heavy Jet	184	2	184	2	0	0	367	4	371
	Light Jet	324	3	324	3	0	0	648	6	654
	Heavy Turboprop	63	1	63	1	0	0	125	2	127
	Light propeller	682	14	682	14	0	0	1,364	28	1,392
Grand Total[2]		**9,267**	**139**	**9,267**	**139**	**6,276**	**270**	**24,810**	**547**	**25,357**

Notes: [1]Closed Patterns counted as two operations.
[2]Numbers may not add up due to rounding.
Legend: 159 FW = 159th Fighter Wing; DON = Department of the Navy; JRB = Joint Reserve Base; NAS = Naval Air Station; USCG = United States Coast Guard; USMC = United States Marine Corps.

Figure LA3.1-2 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-15EX Alternative at NAS JRB New Orleans. As with current operations, noise generated from aircraft operations at NAS JRB New Orleans would occur within and outside of the airfield. Portions of the 65 dB DNL contour extend northwest of the airfield by 0.6 mile, to the northeast 0.6 mile, and to the southwest 1.5 miles. Figure LA3.1-3 presents a comparison of the F-15EX Alternative compared with existing conditions/No Action Alternative. Under the F-15EX Alternative at NAS JRB New Orleans, the noise contours would reduce in length along the runway axis (both to the northeast and the southwest), while growing in the directions perpendicular to the main runway (increasing to the northwest and southeast). The growth in width would be due to the growth in numbers of F-15EX sorties and increased F-15EX engine noise, while the shortening in length would mainly be due to the F-15EX's rate of climb, getting further from the ground more quickly.

Table LA3.1-9 shows the acreage breakdown (excluding water bodies) within each noise contour at NAS JRB New Orleans with a total of 1,010 off NAS JRB New Orleans acres that would be exposed to 65 dB DNL or greater noise levels for the F-15EX Alternative. That off-base acreage would be comprised of 824 acres exposed to 65 to 70 dB DNL (a decrease of 21 acres), 178 acres to 70 to 75 dB DNL (an increase of 106 acres), 7 acres to 75 to 80 dB DNL (an increase of 7 acres), and no acreage exposed to 80 to 85 or greater than 85 dB DNL. The general increase of off-base acreage exposed to elevated DNL would be primarily due to the increase in F-15EX operations and greater noise levels generated by the F-15EX during and shortly after liftoff. The steeper climb rate of the F-15EX results in greater altitudes sooner and reduces noise levels experienced at ground level in locations along departure corridors, which partially offsets the increased F-15EX operations and greater engine noise levels.

Table LA3.1-9 F-15EX Alternative at NAS JRB New Orleans – Noise Exposure Acreage

DNL Band (dB)	*F-15EX Alternative Acreage*			*Change Relative to Existing Conditions/No Action Alternative*		
	On NAS JRB New Orleans	*Off NAS JRB New Orleans*	*Total*	*On NAS JRB New Orleans*	*Off NAS JRB New Orleans*	*Total*
65–70	912	824	1,736	+117	-21	+96
70–75	641	178	819	+1	+106	+107
75–80	370	7	377	+78	+7	+85
80–85	223	0	223	+43	0	+43
85+	293	0	293	+70	0	+70
Total >65dB	**2,439**	**1,010**	**3,449**	**+309**	**+92**	**+401**

Legend: dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

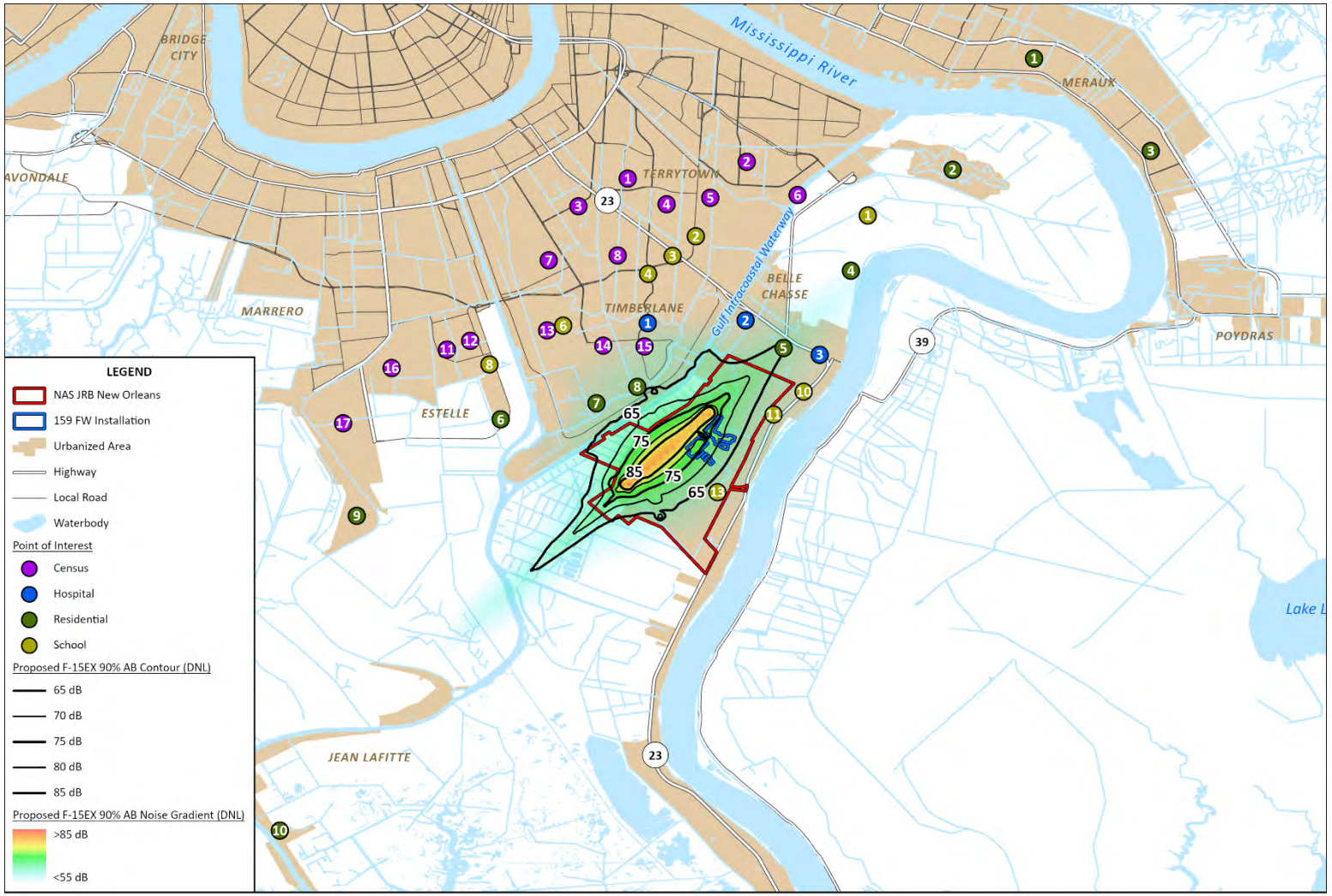


Figure LA3.1-2 F-15EX Alternative at NAS JRB New Orleans – DNL Contours and Gradient

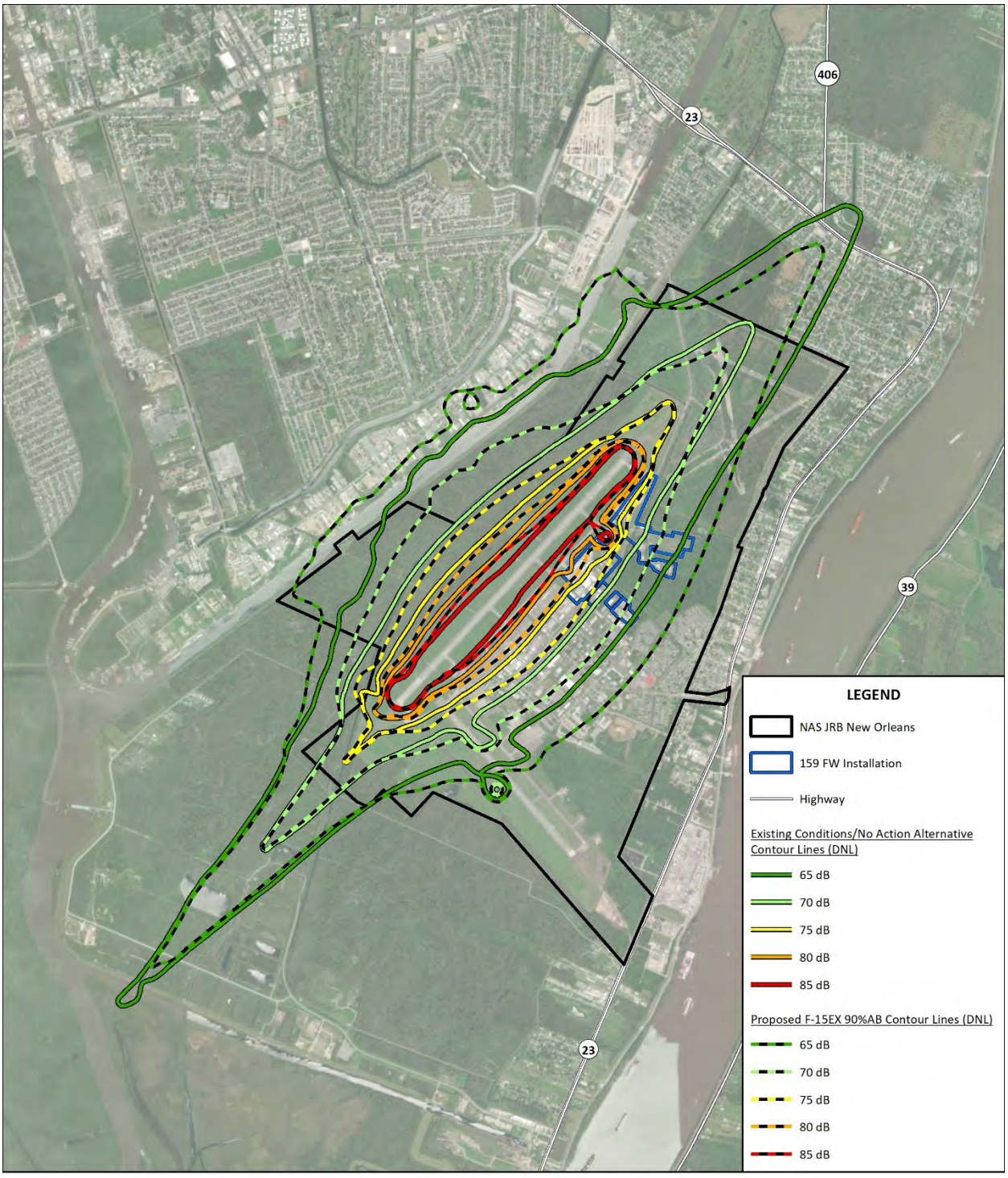


Figure LA3.1-3 F-15EX Alternative Comparison to Existing Conditions/No Action Alternative at NAS JRB New Orleans – DNL Contours

Table LA3.1-10 details the households and estimated population that would be exposed to each DNL contour band under the F-15EX Alternative at NAS JRB New Orleans. A total of 240 households and 628 people would be exposed to 65 to 70 dB DNL, a decrease of 141 fewer households and 344 fewer people. This reduction would be due to the steeper departure climb of the F-15EX that would increase aircraft altitude resulting in a reduction in the length of the 65 dB DNL contour to the northeast over a residential area. Table LA3.1-10 reflects an increase of 5 additional households and 15 people that would be exposed to 70 to 75 dB DNL and 2 additional people that would be exposed to 75 to 80 dB DNL. This calculated increase would be caused by an increase in the 70 and 75 dB DNL contours to the west and southwest of NAS JRB New Orleans. However, as shown in Figure LA3.1-3, the off-base land that would be newly exposed to the 70 and 75 dB DNL appears undeveloped, so no additional people would likely be impacted under this alternative.

Table LA3.1-10 NAS JRB New Orleans F-15EX Estimated Households and Population

DNL Band (dB)	*F-15EX Alternative*		*Change Relative to Existing Conditions/No Action Alternative*	
	Households	*Population*	*Households*	*Population*
65–70	240	628	-141	-344
70–75	10	28	+5	+15
75–80	0	2	0	+2
80–85	0	0	0	0
85+	0	0	0	0
Totals	**250**	**658**	**-136**	**-327**

Note: Households and population estimated using proportion area of census block groups exposed to each contour band which may overestimate impacts in greater DNL bands.
Legend: dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

Table LA3.1-11 illustrates the estimated DNL values at POIs for the F-15EX Alternative at NAS JRB New Orleans and the change compared to existing conditions/No Action Alternative. The values would range from 37 to 65 dB DNL. A single POI, Good News Avenue and Gravolet Street, would be exposed to 65 dB DNL, although at this location the F-15EX would show a reduction of 2 dB from existing conditions/No Action Alternative. Of the 43 POIs, 29 would experience an increase of 1 to 4 dB, 5 would experience no change, and 9 would experience a decrease of 1 to 4 dB DNL.

Table LA3.1-11 DNL at POIs for F-15EX Alternative at NAS JRB New Orleans

Map ID	*Point Type*[1]	*Existing Conditions/No Action Alternative*	*F-15EX Alternative DNL (dB)*[2]	*Change From Existing Conditions/No Action Alternative DNL (dB)*
LA-C-01	Census Tract 252.02	36	38	+2
LA-C-02	Census Tract 6.18	43	43	0
LA-C-03	Census Tract 254	36	39	+3
LA-C-04	Census Tract 250.03	40	42	+2

Map ID	*Point Type*[1]	*Existing Conditions/No Action Alternative*	*F-15EX Alternative DNL (dB)*[2]	*Change From Existing Conditions/No Action Alternative DNL (dB)*
LA-C-05	Census Tract 250.05	42	43	+1
LA-C-06	Census Tract 6.17	48	49	+1
LA-C-07	Census Tract 278.03	43	46	+3
LA-C-08	Census Tract 251.02	42	44	+2
LA-C-09	Census Tract 251.03	45	46	+1
LA-C-10	Census Tract 251.04	50	51	+1
LA-C-11	Census Tract 278.10	39	40	+1
LA-C-12	Census Tract 278.11	41	42	+1
LA-C-13	Census Tract 278.16	44	46	+2
LA-C-14	Census Tract 278.14	53	57	+4
LA-C-15	Census Tract 278.13	59	61	+2
LA-C-16	Census Tract 278.17	40	43	+3
LA-C-17	Census Tract 278.20	34	37	+3
LA-H-01	Bayside Healthcare Center	55	57	+2
LA-H-02	Padua Community Services Pediatric Residential Program	58	58	0
LA-H-03	Belle Chasse Community Health Center	60	58	-2
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	40	38	-2
LA-R-02	Clubhouse Drive near Harbour Town Court	49	47	-2
LA-R-03	Highland Drive near E. St Bernard Highway	44	40	-4
LA-R-04	Parc Riverwood Drive and Main Street	59	57	-2
LA-R-05	Good News Avenue and Gravolet Street	**67**	65	-2
LA-R-06	Census Tract 278.12	48	52	+4
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	58	61	+3
LA-R-08	Lake Lynn Drive	60	63	+3
LA-R-09	Grand Tierre Drive	40	40	0
LA-R-10	Jean Lafitte Boulevard	42	41	-1
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	52	50	-2
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	45	46	+1
LA-S-03	George Cox Elementary School	45	46	+1
LA-S-04	Jefferson Rise Charter School	45	47	+2
LA-S-05	Paul J. Solis Elementary School	49	50	+1
LA-S-06	Woodland West Elementary School	45	47	+2
LA-S-07	Brighter Horizons	58	58	0
LA-S-08	Woodmere Elementary	45	48	+3
LA-S-09	Belle Chasse High School	58	57	-1
LA-S-10	Jacob's Ladder Learning Academy	58	58	0
LA-S-11	Our Lady of Perpetual Help School	60	61	+1
LA-S-12	Belle Chasse Academy	60	63	+3

Map ID	*Point Type*[1]	*Existing Conditions/No Action Alternative*	*F-15EX Alternative DNL (dB)*[2]	*Change From Existing Conditions/No Action Alternative DNL (dB)*
LA-S-13	Christian Fellowship Daycare	58	62	+4

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding NAS JRB New Orleans where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section LA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to DNL of 65 dB or greater.
Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

Table LA3.1-12 displays results for three metrics used to examine noise effects on classroom learning: exterior school day $L_{eq(8hr)}$ with screening threshold of 60 dB (equivalent to interior of 45 dB $L_{eq(8hr)}$ with windows open), number of classroom speech interfering events above 50 dB per school day hour (equivalent to 65 dB outside with windows open), and time above interior 50 dB per 8-hour school day (equivalent to exterior 65 dB). Under the F-15EX Alternative at NAS JRB New Orleans, the number of schools that would experience noise levels above the $L_{eq(8hr)}$ 60 dB screen criteria would be 6, which would be the same as existing conditions/No Action Alternative. The change in $L_{eq(8hr)}$ under the F-15EX Alternative would range from a 1 dB reduction at LA-S-09 Belle Chasse Elementary and High School to an increase of 4 dB at LA-S-13 Christian Fellowship Daycare. The number of speech interfering events during the school day would range from 1 to 2 events per average school day hour. When compared with existing conditions/No Action Alternative, the number of interfering events per average school day hour would increase by 1 at 6 schools and remain the same at 7 schools. The duration of time above 50 dB during a typical school day would range from 4 to 15 minutes. When compared with existing conditions/No Action Alternative, the increase in duration of interfering time at school POIs would range from none at one location to an increase of 1 to 7 minutes per average school day at the remaining locations.

Table LA3.1-13 presents speech interference under this alternative based upon the number of events per average hour during the DNL daytime period for both a windows open and windows closed condition. Speech interfering events would range from zero to up to 2 per average hour with windows open. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows open would remain the same at 31 POIs and increase by 1 event per average hour at 12 POIs. With windows closed, the number of speech interfering events per average daytime hour would range from zero to 1. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows closed would not change at 36 POIs and increase by 1 event per average hour at 7 POIs.

Table LA3.1-12 F-15EX Alternative at NAS JRB New Orleans – Classroom Learning Interference

ID	Location	Outdoor $L_{eq(8hr)}$ (dB)		Number of Speech Interfering Events per School Day Hour[1]		Time above 50 dB per 8-hour school day (minutes)[2]	
		F-15EX Alternative[2]	Change From Existing Conditions/ No Action Alternative	F-15EX Alternative	Change From Existing Conditions/ No Action Alternative	F-15EX Alternative	Change From Existing Conditions/ No Action Alternative
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	54	-2	1	0	4	0
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	50	+2	1	0	5	+1
LA-S-03	George Cox Elementary School	50	+1	1	0	5	+1
LA-S-04	Jefferson Rise Charter School	51	+2	1	0	5	+1
LA-S-05	Paul J. Solis Elementary School	54	+1	2	+1	7	+3
LA-S-06	Woodland West Elementary School	51	+2	1	0	9	+5
LA-S-07	Brighter Horizons	**62**	0	2	+1	7	+1
LA-S-08	Woodmere Elementary	51	+3	2	+1	9	+5
LA-S-09	Belle Chasse High School	**61**	-1	2	+1	7	+1
LA-S-10	Jacob's Ladder Learning Academy	**62**	0	2	+1	8	+2
LA-S-11	Our Lady of Perpetual Help School	**65**	+1	2	+1	15	+7
LA-S-12	Belle Chasse Academy	**67**	+3	2	0	12	+5
LA-S-13	Christian Fellowship Daycare	**66**	+4	2	0	12	+5

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the noise study in the 104 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.
[3]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
Legend: dB = decibel; ID = Identification; JRB = Joint Reserve Base; $L_{eq(8hr)}$ = 8-hour equivalent sound level; NAS = Naval Air Station.

Table LA3.1-13 F-15EX Alternative at NAS JRB New Orleans – Speech Interference Events per Average Hour (Daytime)

Map ID	*Named POI*[1]	*F-15EX Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
LA-C-01	Census Tract 252.02	1	1	0	+1
LA-C-02	Census Tract 6.18	1	0	+1	0
LA-C-03	Census Tract 254	1	0	+1	0
LA-C-04	Census Tract 250.03	1	0	0	0
LA-C-05	Census Tract 250.05	1	1	0	0
LA-C-06	Census Tract 6.17	2	1	+1	0
LA-C-07	Census Tract 278.03	1	1	0	+1
LA-C-08	Census Tract 251.02	0	0	0	0
LA-C-09	Census Tract 251.03	1	1	0	0
LA-C-10	Census Tract 251.04	1	1	0	0
LA-C-11	Census Tract 278.10	1	1	0	0
LA-C-12	Census Tract 278.11	1	0	+1	0
LA-C-13	Census Tract 278.16	1	0	0	0
LA-C-14	Census Tract 278.14	1	0	+1	0
LA-C-15	Census Tract 278.13	1	1	0	0
LA-C-16	Census Tract 278.17	1	1	0	0
LA-C-17	Census Tract 278.20	1	1	0	0
LA-H-01	Bayside Healthcare Center	2	2	0	+1
LA-H-02	Padua Community Services Pediatric Residential Program	2	1	+1	0
LA-H-03	Belle Chasse Community Health Center	0	0	0	0
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	0	0	0	0
LA-R-02	Clubhouse Drive near Harbour Town Court	1	1	0	0
LA-R-03	Highland Drive near E. St Bernard Highway	1	0	+1	0
LA-R-04	Parc Riverwood Drive and Main Street	1	0	0	0
LA-R-05	Good News Avenue and Gravolet Street	1	0	0	0
LA-R-06	Census Tract 278.12	1	1	0	+1
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	1	0	0	0
LA-R-08	Lake Lynn Drive	1	1	0	0
LA-R-09	Grand Tierre Drive	1	1	0	+1
LA-R-10	Jean Lafitte Boulevard	1	1	0	0
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	1	1	0	0
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	1	1	0	0
LA-S-03	George Cox Elementary School	1	1	0	0
LA-S-04	Jefferson Rise Charter School	1	1	0	0
LA-S-05	Paul J. Solis Elementary School	1	1	0	+1
LA-S-06	Woodland West Elementary School	1	0	+1	0
LA-S-07	Brighter Horizons	1	0	+1	0
LA-S-08	Woodmere Elementary	1	0	0	0
LA-S-09	Belle Chasse High School	1	1	0	0

Map ID	*Named POI[1]*	*F-15EX Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed[3]*	*Windows Open[2]*	*Windows Closed[3]*
LA-S-10	Jacob's Ladder Learning Academy	2	1	+1	0
LA-S-11	Our Lady of Perpetual Help School	1	1	0	+1
LA-S-12	Belle Chasse Academy	0	0	0	0
LA-S-13	Christian Fellowship Daycare	1	1	0	0

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

The PA was calculated to estimate sleep disturbance resulting from DNL nighttime aircraft noise (Table LA3.1-14). Compared to existing conditions/No Action Alternative, 7 of the 43 POIs would experience a 1 percent increase in PA with windows open and there would be no change with windows closed. No locations would exceed 1 percent PA under the F-15EX Alternative. The reason for this relatively small increase is the proposed 159 FW F-15EX DNL nighttime operations would remain at the same small proportion (approximately 1 percent of operations) as existing conditions/No Action Alternative for the F-15C/D, so PA would remain small at NAS JRB New Orleans.

Table LA3.1-14 F-15EX Alternative at NAS JRB New Orleans – Estimated PA

Map ID	*Named POI[1]*	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed[3]*	*Windows Open[2]*	*Windows Closed[3]*
LA-C-01	Census Tract 252.02	<1%	<1%	0	0
LA-C-02	Census Tract 6.18	<1%	<1%	0	0
LA-C-03	Census Tract 254	<1%	<1%	0	0
LA-C-04	Census Tract 250.03	<1%	<1%	0	0
LA-C-05	Census Tract 250.05	<1%	<1%	0	0
LA-C-06	Census Tract 6.17	<1%	<1%	0	0
LA-C-07	Census Tract 278.03	<1%	<1%	0	0
LA-C-08	Census Tract 251.02	<1%	<1%	0	0
LA-C-09	Census Tract 251.03	<1%	<1%	0	0
LA-C-10	Census Tract 251.04	<1%	<1%	0	0
LA-C-11	Census Tract 278.10	<1%	<1%	0	0
LA-C-12	Census Tract 278.11	<1%	<1%	0	0
LA-C-13	Census Tract 278.16	<1%	<1%	0	0
LA-C-14	Census Tract 278.14	<1%	<1%	0	0
LA-C-15	Census Tract 278.13	1%	<1%	+1%	0
LA-C-16	Census Tract 278.17	<1%	<1%	0	0
LA-C-17	Census Tract 278.20	<1%	<1%	0	0
LA-H-01	Bayside Healthcare Center	<1%	<1%	0	0

Map ID	*Named POI*[1]	*F-15EX Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
LA-H-02	Padua Community Services Pediatric Residential Program	<1%	<1%	0	0
LA-H-03	Belle Chasse Community Health Center	<1%	<1%	0	0
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	<1%	<1%	0	0
LA-R-02	Clubhouse Drive near Harbour Town Court	<1%	<1%	0	0
LA-R-03	Highland Drive near E. St Bernard Highway	<1%	<1%	0	0
LA-R-04	Parc Riverwood Drive and Main Street	<1%	<1%	0	0
LA-R-05	Good News Avenue and Gravolet Street	1%	<1%	+1%	0
LA-R-06	Census Tract 278.12	<1%	<1%	0	0
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	1%	<1%	+1%	0
LA-R-08	Lake Lynn Drive	1%	<1%	+1%	0
LA-R-09	Grand Tierre Drive	<1%	<1%	0	0
LA-R-10	Jean Lafitte Boulevard	<1%	<1%	0	0
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	<1%	<1%	0	0
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	<1%	<1%	0	0
LA-S-03	George Cox Elementary School	<1%	<1%	0	0
LA-S-04	Jefferson Rise Charter School	<1%	<1%	0	0
LA-S-05	Paul J. Solis Elementary School	<1%	<1%	0	0
LA-S-06	Woodland West Elementary School	<1%	<1%	0	0
LA-S-07	Brighter Horizons	<1%	<1%	0	0
LA-S-08	Woodmere Elementary	<1%	<1%	0	0
LA-S-09	Belle Chasse High School	<1%	<1%	0	0
LA-S-10	Jacob's Ladder Learning Academy	<1%	<1%	0	0
LA-S-11	Our Lady of Perpetual Help School	1%	<1%	+1%	0
LA-S-12	Belle Chasse Academy	1%	<1%	+1%	0
LA-S-13	Christian Fellowship Daycare	1%	<1%	+1%	0

Notes: [1]Non-residential POI included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.

Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels beginning at residential areas exposed to 80 dB DNL or greater (DNWG 2013b). As summarized in Table LA3.1-9, no land outside of NAS JRB New Orleans would be exposed to 80 dB DNL or greater, so no residents would experience the potential for hearing loss under this alternative.

There would be some increase of noise impacts in some residential areas, but these areas would remain below 65 dB DNL. Noise impacts under the F-15EX Alternative at NAS JRB New Orleans would not be significant.

Airspace

As tabulated in Section 3.2.5.2, *Special Use Airspace Noise Modeling*, while operating in airspace, the F-15EX would be 2 to 3 dB greater in SEL and 4 to 5 dB greater in L_{max} than the existing F-15C/D for a typical airspace flight profile example at 400 knots and at military power, when comparing single-event noise levels. Individual airspace flights would differ from these noise levels because aircraft speeds and power settings would vary depending upon specific training exercises performed at that time.

Under this alternative, the 159 FW would be assigned F-15EX aircraft with a higher annual flying hour program, resulting in 3,832 sorties per year, a 107 percent increase above existing conditions/No Action Alternative. The F-15EX would continue to train in the airspace currently used by the 159 FW. The mix of types of training events would remain approximately the same as the F-15C/D (see Table LA2.1-2). This analysis presents a 'worst-case' for noise impacts, assuming an entire year of training would occur in the SUA currently used by the 159 FW with no training deployments elsewhere. Based on the increase in sorties of 107 percent along with the greater SEL of the F-15EX, L_{dnmr} in each airspace that would be used by the F-15EX could increase up to 6 dB from the existing conditions/No Action Alternative for subsonic operations (see the 159 FW Noise Study, which can be found on the project website [URL address: www.angf15ex-f35a-eis.com/documents/]). The result would be L_{dnmr} ranging from 46 dB on the upper end down to levels below the noise modeling software's lower limit of prediction (see Section LA3.1.1.1, *Installation*). Therefore, L_{dnmr} would remain relatively low. Additionally, the 159 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most subsonic aircraft airspace sorties would likely not be noticed by any casual observer.

Under the F-15EX Alternative, the F-15EX would replace the F-15C/D for supersonic activity in the 159 FW associated overwater airspace located 15 miles from land and the 10,000 feet MSL minimum altitude would not change. The frequency of supersonic activity in these areas would increase by 107 percent from the existing conditions/No Action Alternative, which would equate to an increase in CDNL of 3 dB. As described in Section 3.2.4.2, *Supersonic Aircraft Noise (Sonic Boom)*, the magnitude of noise generated by each sonic boom depends primarily by altitudes, which would not change. The shape and size of the aircraft plays a smaller role in the magnitude of sonic boom generated. Because the F-15EX and F-15C aircraft both share the same airframe and would operate similarly during supersonic operations, each supersonic generated noise event

for the F-15EX would be the same as the existing F-15C. Therefore, the overall change to CDNL in 159 FW overwater ranges would be up to 3 dB greater than existing conditions/No Action Alternative due to the increase in the number of supersonic sorties.

LA3.1.2.2 F-35A

Under this alternative, the 159 FW would replace their 18 F-15C/D aircraft with 21 F-35A aircraft at NAS JRB New Orleans. The following sections describe the noise effects resulting from construction, installation operations, and airspace operations associated with the F-35A Alternative at NAS JRB New Orleans.

Installation

The F-35A Alternative at NAS JRB New Orleans includes construction projects that would occur within NAS JRB New Orleans property, which would generate temporary construction noise. The proposed construction sites would be in areas close to the NAS JRB New Orleans runways currently exposed to 65 dB DNL or greater and most of the land adjacent and outside of NAS JRB New Orleans is commercial or undeveloped land. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

As summarized in Table LA3.1-15, F-35A operations would amount to 3,832 departures, 3,832 arrivals, and 484 closed pattern operations resulting in a total of 8,148 F-35A annual operations at NAS JRB New Orleans. The proportion of DNL nighttime operations (10 p.m. to 7 a.m.) would remain consistent with current F-15C/D 159 FW operations at approximately 1 percent. F-35A would use the same flight tracks and runways as the 159 FW F-15C/D. All current operations by other aircraft (DON, U.S. Marine Corps, U.S. Coast Guard, and transient military) would continue unchanged. Additional noise modeling details are provided in 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/).

Table LA3.1-15 NAS JRB New Orleans F-35A Alternative Average Annual Operations

Group	*Aircraft*	*Departures*		*Arrivals*		*Closed Patterns*[1]		*Totals*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Totals*
159 FW	F-35A	3,794	38	3,794	38	484	0	8,072	76	8,148
DON	C-130	245	3	245	3	0	0	490	6	496
USMC	AH-1/UH-1	480	20	480	20	2,148	90	3,108	130	3,238
USCG	H-60	808	43	808	43	3,404	180	5,019	265	5,284
DON	F-5E/F	1,200	0	1,200	0	240	0	2,640	0	2,640
Transient Aircraft	Fighter1	403	4	403	4	0	0	806	8	814
	Fighter2	806	8	806	8	0	0	1,611	16	1,627
	Heavy Helo	242	2	242	2	0	0	484	4	488
	Helo	38	1	38	1	0	0	76	2	78

Group	Aircraft	Departures		Arrivals		Closed Patterns[1]		Totals		
		Day	Night	Day	Night	Day	Night	Day	Night	Totals
	Heavy Jet	184	2	184	2	0	0	367	4	371
	Light Jet	324	3	324	3	0	0	648	6	654
	Heavy Turboprop	63	1	63	1	0	0	125	2	127
	Light propeller	682	14	682	14	0	0	1,364	28	1,392
Grand Total[2]		**9,267**	**139**	**9,267**	**139**	**6,276**	**270**	**24,810**	**547**	**25,357**

Notes: [1]Closed Patterns counted as two operations.
[2]Numbers may not add up due to rounding.
Legend: 159 FW = 159th Fighter Wing; DON = Department of the Navy; USCG = United States Coast Guard; USMC = United States Marine Corps.

Figure LA3.1-4 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A Alternative at NAS JRB New Orleans. As with current operations, noise generated from aircraft operations at NAS JRB New Orleans would occur within and outside of the airfield. Portions of the 65 dB DNL contour extend northwest of the airfield by 0.4 mile, to the northeast 1.4 miles, and to the southwest 2.1 miles. Figure LA3.1-5 presents a comparison of the F-35A Alternative compared with existing conditions/No Action Alternative, and the F-35A Alternative at NAS JRB New Orleans would result in an increase in the size of the DNL contours in all directions. The F-35A aircraft is typically louder than the F-15C/D in most situations, which combined with the increase in operations would be the primary reasons for this increase in the size of DNL noise contours.

Table LA3.1-16 shows the acreage breakdown (excluding water bodies) within each noise contour at NAS JRB New Orleans with a total of 2,045 off-base acres that would be exposed to 65 dB DNL or greater noise levels for the F-35A Alternative. That off-base acreage would be comprised of 1,695 acres exposed to 65 to 70 dB DNL (an increase of 851 acres), 317 acres to 70 to 75 dB DNL (an increase of 245 acres), 32 acres to 75 to 80 dB DNL (an increase of 31 acres), and no acreage exposed to 80 to 85 or greater than 85 dB DNL. The general increase in acreage exposed to 65 to 85 dB DNL would be due to the approximate doubling in 159 FW operations and greater noise generated by the F-35A.

Table LA3.1-16 F-35A Alternative at NAS JRB New Orleans – Noise Exposure Acreage

DNL Band (dB)	F-15EX Alternative Acreage			Change Relative to Existing Conditions/ No Action Alternative		
	On NAS JRB New Orleans	Off NAS JRB New Orleans	Total	On NAS JRB New Orleans	Off NAS JRB New Orleans	Total
65–70	747	1,695	2,443	-48	+851	+803
70–75	747	317	1,064	+107	+245	+352
75–80	439	32	471	+147	+31	+179
80–85	212	0	212	+33	0	+33
85+	257	0	257	+33	0	+33
Total >65dB	**2,402**	**2,045**	**4,447**	**+272**	**+1127**	**+1399**

Legend: dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

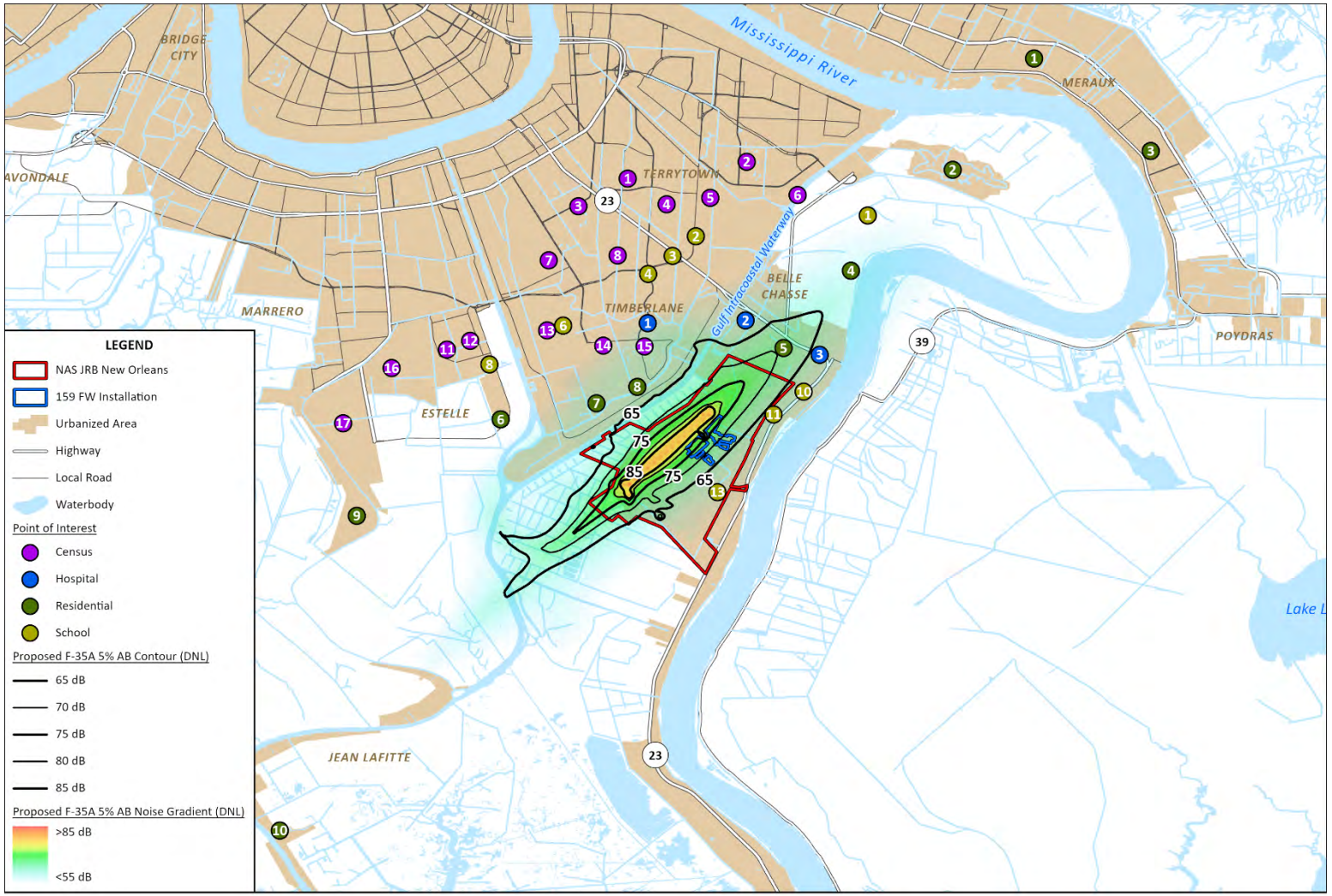


Figure LA3.1-4 F-35A Alternative at NAS JRB New Orleans – DNL Contours

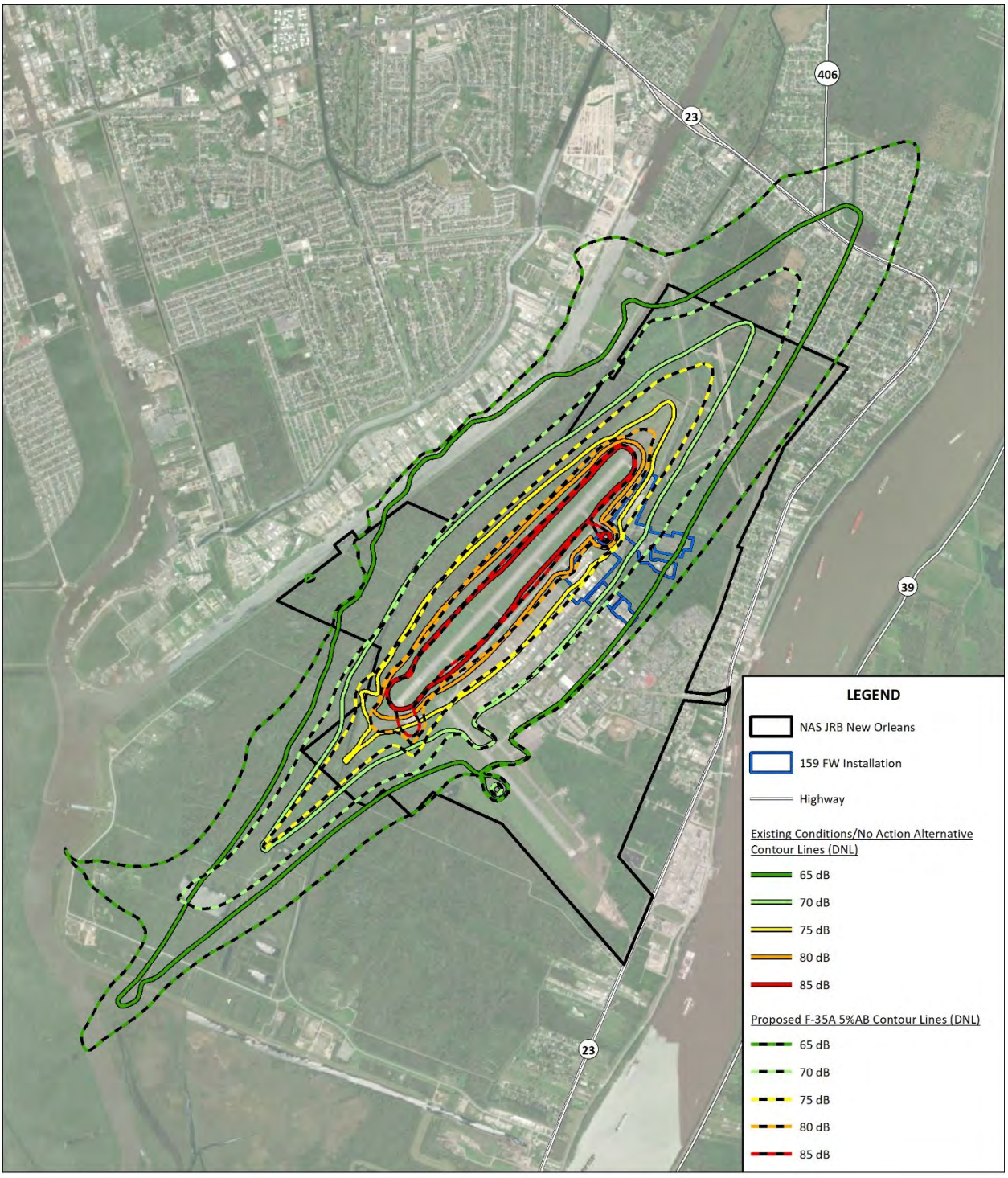


Figure LA3.1-5 F-35A Alternative Comparison to Existing Conditions/No Action Alternative at NAS JRB New Orleans – DNL Contours

Table LA3.1-17 details the households and estimated population that would be exposed to each DNL contour band under the F-35A Alternative at NAS JRB New Orleans. A total of 765 households and 1,977 people would be exposed to DNL of 65 to 70 dB, an increase of 384 additional households and 1,005 more people. This increase would be due to the growth in the size of 65 dB DNL contour to the northeast over a residential area from the increased noise generated by F-35A on departures. Table LA 3.1-17 also reflects an increase of 122 additional households and 310 people that would be exposed to 70 to 75 dB DNL. This calculated increase would be caused by the growth in size of the 70 dB DNL contour to the northeast, west, and southwest of NAS JRB New Orleans. Because the newly exposed areas to the west and southwest are undeveloped, the actual number of people that would be impacted would likely be fewer than estimated. Additionally, Table LA3.1-17 estimates two more households and five more people would be exposed to 75 to 80 dB DNL. Because this new 75 to 80 dB DNL area would occur to the southwest of NAS JRB New Orleans adjacent to the boundary in an undeveloped area, there likely would not be any impacts on people at 75 dB DNL or greater.

Table LA3.1-17 NAS JRB New Orleans F-35A Estimated Households and Population

DNL Band (dB)	*F-35A Alternative*		*Change Relative to Existing Conditions/No Action Alternative*	
	Households	*Population*	*Households*	*Population*
65–70	765	1,977	+384	+1,005
70–75	126	322	+122	+310
75–80	2	5	+2	+5
80–85	0	0	0	0
85+	0	0	0	0
Totals	**893**	**2,304**	**+508**	**+1,320**

Note: Households and population estimated using proportion area of census block groups exposed to each contour band which may overestimate impacts in greater DNL bands.
Legend: dB = decibel; DNL = Day Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

Table LA3.1-18 illustrates the estimated DNL values at POIs for the F-35A Alternative at NAS JRB New Orleans and the change compared to existing conditions/No Action Alternative. The values would range from 38 to 69 dB DNL. A single POI, LA-R-05 Good News Avenue and Gravolet Street, would be exposed to DNL greater than 65 dB. Of the 43 POIs, 1 would experience a decrease of 1 dB, 1 would experience no change, and 41 would experience an increase of 1 to 4 dB DNL.

Table LA3.1-18 DNL at POIs for F-35A Alternative at NAS JRB New Orleans

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-35A Alternative DNL (dB)*[2]	*Change From Existing/ No Action Alternative Conditions DNL (dB)*
LA-C-01	Census Tract 252.02	36	39	+3
LA-C-02	Census Tract 6.18	43	45	+2
LA-C-03	Census Tract 254	36	39	+3
LA-C-04	Census Tract 250.03	40	43	+3
LA-C-05	Census Tract 250.05	42	45	+3
LA-C-06	Census Tract 6.17	48	51	+3
LA-C-07	Census Tract 278.03	43	44	+1
LA-C-08	Census Tract 251.02	42	45	+3
LA-C-09	Census Tract 251.03	45	48	+3
LA-C-10	Census Tract 251.04	50	53	+3
LA-C-11	Census Tract 278.10	39	41	+2
LA-C-12	Census Tract 278.11	41	43	+2
LA-C-13	Census Tract 278.16	44	47	+3
LA-C-14	Census Tract 278.14	53	56	+3
LA-C-15	Census Tract 278.13	59	62	+3
LA-C-16	Census Tract 278.17	40	41	+1
LA-C-17	Census Tract 278.20	34	38	+4
LA-H-01	Bayside Healthcare Center	55	59	+4
LA-H-02	Padua Community Services Pediatric Residential Program	58	62	+4
LA-H-03	Belle Chasse Community Health Center	60	63	+3
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	40	40	0
LA-R-02	Clubhouse Drive near Harbour Town Court	49	51	+2
LA-R-03	Highland Drive near E. St Bernard Highway	44	43	-1
LA-R-04	Parc Riverwood Drive and Main Street	59	61	+2
LA-R-05	Good News Avenue and Gravolet Street	**67**	**69**	+2
LA-R-06	Census Tract 278.12	48	52	+4
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	58	61	+3
LA-R-08	Lake Lynn Drive	60	62	+2
LA-R-09	Grand Tierre Drive	40	43	+3
LA-R-10	Jean Lafitte Boulevard	42	43	+1
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	52	55	+3
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	45	48	+3
LA-S-03	George Cox Elementary School	45	48	+3
LA-S-04	Jefferson Rise Charter School	45	49	+4
LA-S-05	Paul J. Solis Elementary School	49	53	+4
LA-S-06	Woodland West Elementary School	45	48	+3
LA-S-07	Brighter Horizons	58	62	+4
LA-S-08	Woodmere Elementary	45	47	+2
LA-S-09	Belle Chasse High School	58	62	+4
LA-S-10	Jacob's Ladder Learning Academy	58	61	+3
LA-S-11	Our Lady of Perpetual Help School	60	63	+3

Map ID	*Point Type*[1]	*Existing Conditions/ No Action Alternative*	*F-35A Alternative DNL (dB)*[2]	*Change From Existing/ No Action Alternative Conditions DNL (dB)*
LA-S-12	Belle Chasse Academy	60	61	+1
LA-S-13	Christian Fellowship Daycare	58	60	+2

Notes: [1]The census tract POIs located at the centroid point represent neighborhoods surrounding NAS JRB New Orleans where noise sensitive locations (such as residences, schools, place of worship, etc. are likely to occur), which differs from specific Environmental Justice analysis communities analyzed in Section LA3.4, *Socioeconomics/Environmental Justice/Children's Health and Safety*.
[2]Bold text represents points exposed to DNL of 65 dB or greater.
Legend: dB = decibel; DNL = Day Night Average Sound Level; ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

Table LA3.1-19 displays results for three metrics used to examine noise effects on classroom learning: exterior school day $L_{eq(8hr)}$ with screening threshold of 60 dB (equivalent to interior of 45 dB $L_{eq(8hr)}$ with windows open), number of classroom speech interfering events above 50 dB per school day hour (equivalent to 65 dB outside with windows open), and time above interior 50 dB per 8-hour school day (equivalent to exterior 65 dB). Under the F-35A Alternative at NAS JRB New Orleans, the number of schools that would experience noise levels above the $L_{eq(8hr)}$ 60 dB criteria would remain at 6, consistent with existing conditions/No Action Alternative. The change in $L_{eq(8hr)}$ under the F-35A Alternative would range from an increase of 1 to 4 dB, with the greatest increase occurring at LA-S-04 Jefferson Rise Charter School, LA-S-05 Paul J. Solis Elementary School, and LA-S-07 Brighter Horizons. The number of speech interfering events during the school day would range from 1 to 3 events per average school day hour. When compared with existing conditions/No Action Alternative, the number of interfering events per average school day hour would increase by 1 at 9 schools and remain the same at 4 schools. The duration of time above 50 dB during a typical school day would range from 5 to 13 minutes. When compared with existing conditions/No Action Alternative, the duration of interfering time would increase 1 to 6 minutes per average school day.

Table LA3.1-20 presents speech interference under this alternative based upon the number of events per average hour during the DNL daytime period for both a windows open and windows closed condition. Speech interfering events would range from none to up to 2 per average hour with windows open. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows open would increase by 1 event per hour at 22 POIs and not change at 21 POIs. With windows closed, the number of speech interfering events per average daytime hour would range from none to 2. When compared with existing conditions/No Action Alternative, the number of speech interfering events with windows closed would increase by 1 event per hour at 15 POIs and not change at the remaining 28 POIs.

Table LA3.1-19 F-35A Alternative at NAS JRB New Orleans – Classroom Learning Interference

ID	Location	Outdoor $L_{eq(8hr)}$ (dB)		Number of Speech Interfering Events per School Day Hour[1]		Time above 50 dB per 8-hour school day (minutes)[2]	
		F-35A Alternative[2]	Change From Existing Conditions/ No Action Alternative	F-35A Alternative	Change From Existing Conditions/ No Action Alternative	F-35A Alternative	Change From Existing Conditions/ No Action Alternative
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	59	+3	1	0	7	+3
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	51	+3	1	0	7	+3
LA-S-03	George Cox Elementary School	52	+3	1	0	7	+3
LA-S-04	Jefferson Rise Charter School	53	+4	2	+1	8	+4
LA-S-05	Paul J. Solis Elementary School	57	+4	2	+1	8	+4
LA-S-06	Woodland West Elementary School	52	+3	1	0	8	+4
LA-S-07	Brighter Horizons	**66**	+4	2	+1	9	+3
LA-S-08	Woodmere Elementary	50	+2	2	+1	5	+1
LA-S-09	Belle Chasse High School	**65**	+3	2	+1	9	+3
LA-S-10	Jacob's Ladder Learning Academy	**65**	+3	2	+1	10	+4
LA-S-11	Our Lady of Perpetual Help School	**67**	+3	2	+1	12	+4
LA-S-12	Belle Chasse Academy	**65**	+1	3	+1	8	+1
LA-S-13	Christian Fellowship Daycare	**63**	+1	3	+1	13	+6

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the 159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/) because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with NLR of 15 dB due to building attenuation.\
[3]Bold text represents schools exposed to exterior $L_{eq(8hr)}$ of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
Legend: dB = decibel; ID = Identification; JRB = Joint Reserve Base; $L_{eq(8hr)}$ = 8-hour equivalent sound level; NAS = Naval Air Station.

Table LA3.1-20 F-35A Alternative at NAS JRB New Orleans – Speech Interference Events per Average Hour (Daytime)

Map ID	*Named POI*[1]	*F-35A Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
LA-C-01	Census Tract 252.02	1	1	0	+1
LA-C-02	Census Tract 6.18	1	0	+1	0
LA-C-03	Census Tract 254	1	0	+1	0
LA-C-04	Census Tract 250.03	1	0	0	0
LA-C-05	Census Tract 250.05	2	1	+1	0
LA-C-06	Census Tract 6.17	2	2	+1	+1
LA-C-07	Census Tract 278.03	1	0	0	0
LA-C-08	Census Tract 251.02	0	0	0	0
LA-C-09	Census Tract 251.03	2	2	+1	+1
LA-C-10	Census Tract 251.04	2	1	+1	0
LA-C-11	Census Tract 278.10	1	1	0	0
LA-C-12	Census Tract 278.11	1	0	+1	0
LA-C-13	Census Tract 278.16	1	1	0	+1
LA-C-14	Census Tract 278.14	1	0	+1	0
LA-C-15	Census Tract 278.13	1	1	0	0
LA-C-16	Census Tract 278.17	2	1	+1	0
LA-C-17	Census Tract 278.20	2	1	+1	0
LA-H-01	Bayside Healthcare Center	2	2	0	+1
LA-H-02	Padua Community Services Pediatric Residential Program	2	2	+1	+1
LA-H-03	Belle Chasse Community Health Center	0	0	0	0
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	0	0	0	0
LA-R-02	Clubhouse Drive near Harbour Town Court	1	1	0	0
LA-R-03	Highland Drive near E. St Bernard Highway	1	1	+1	+1
LA-R-04	Parc Riverwood Drive and Main Street	1	1	0	+1
LA-R-05	Good News Avenue and Gravolet Street	1	1	0	+1
LA-R-06	Census Tract 278.12	1	1	0	+1
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	1	0	0	0
LA-R-08	Lake Lynn Drive	2	1	+1	0
LA-R-09	Grand Tierre Drive	1	0	0	0
LA-R-10	Jean Lafitte Boulevard	1	1	0	0
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	2	1	+1	0
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	2	1	+1	0
LA-S-03	George Cox Elementary School	2	2	+1	+1
LA-S-04	Jefferson Rise Charter School	2	2	+1	+1
LA-S-05	Paul J. Solis Elementary School	1	1	0	+1
LA-S-06	Woodland West Elementary School	1	0	+1	0
LA-S-07	Brighter Horizons	1	0	+1	0
LA-S-08	Woodmere Elementary	1	0	0	0
LA-S-09	Belle Chasse High School	2	1	+1	0

Map ID	*Named POI[1]*	*F-35A Alternative (events per hour)*		*Change Compared to Existing Conditions/ No Action Alternative (events per hour)*	
		Windows Open[2]	*Windows Closed[3]*	*Windows Open[2]*	*Windows Closed[3]*
LA-S-10	Jacob's Ladder Learning Academy	2	2	+1	+1
LA-S-11	Our Lady of Perpetual Help School	1	0	0	0
LA-S-12	Belle Chasse Academy	0	0	0	0
LA-S-13	Christian Fellowship Daycare	2	2	+1	+1

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; POI = Point of Interest.

The PA was calculated to estimate sleep disturbance resulting from DNL nighttime aircraft noise (Table LA3.1-21). Compared to existing conditions/No Action Alternative, 35 of the 43 POIs would experience no change in PA for windows open, with the remaining 8 POIs experiencing an increase of up to 1 percent PA. For windows closed there is no change from existing conditions/No Action Alternative at any location. No locations would exceed 1 percent PA under the F-35A Alternative. The reason for this relatively small increase is the proposed 159 FW F-35A DNL nighttime operations would remain at the same small proportion (approximately 1 percent of operations) as existing conditions/No Action Alternative for the F-15C/D, so PA would remain small at NAS JRB New Orleans.

Table LA3.1-21 F-35A Alternative at NAS JRB New Orleans – Estimated PA

Map ID	*Named POI[1]*	*F-35A Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed[3]*	*Windows Open[2]*	*Windows Closed[3]*
LA-C-01	Census Tract 252.02	<1%	<1%	0	0
LA-C-02	Census Tract 6.18	<1%	<1%	0	0
LA-C-03	Census Tract 254	<1%	<1%	0	0
LA-C-04	Census Tract 250.03	<1%	<1%	0	0
LA-C-05	Census Tract 250.05	<1%	<1%	0	0
LA-C-06	Census Tract 6.17	<1%	<1%	0	0
LA-C-07	Census Tract 278.03	<1%	<1%	0	0
LA-C-08	Census Tract 251.02	<1%	<1%	0	0
LA-C-09	Census Tract 251.03	<1%	<1%	0	0
LA-C-10	Census Tract 251.04	<1%	<1%	0	0
LA-C-11	Census Tract 278.10	<1%	<1%	0	0
LA-C-12	Census Tract 278.11	<1%	<1%	0	0
LA-C-13	Census Tract 278.16	<1%	<1%	0	0
LA-C-14	Census Tract 278.14	<1%	<1%	0	0
LA-C-15	Census Tract 278.13	1%	<1%	+1%	0
LA-C-16	Census Tract 278.17	<1%	<1%	0	0

Map ID	*Named POI*[1]	*F-35A Alternative*		*Change from Existing Conditions/ No Action Alternative*	
		Windows Open[2]	*Windows Closed*[3]	*Windows Open*[2]	*Windows Closed*[3]
LA-C-17	Census Tract 278.20	<1%	<1%	0	0
LA-H-01	Bayside Healthcare Center	1%	<1%	+1%	0
LA-H-02	Padua Community Services Pediatric Residential Program	1%	<1%	+1%	0
LA-H-03	Belle Chasse Community Health Center	1%	<1%	+1%	0
LA-R-01	Emily Oaks Drive near E. St Bernard Highway	<1%	<1%	0	0
LA-R-02	Clubhouse Drive near Harbour Town Court	<1%	<1%	0	0
LA-R-03	Highland Drive near E. St Bernard Highway	<1%	<1%	0	0
LA-R-04	Parc Riverwood Drive and Main Street	<1%	<1%	0	0
LA-R-05	Good News Avenue and Gravolet Street	1%	<1%	+1%	0
LA-R-06	Census Tract 278.12	<1%	<1%	0	0
LA-R-07	Lac du Bay Drive and Lac Saint Pierre Drive	1%	<1%	+1%	0
LA-R-08	Lake Lynn Drive	1%	<1%	+1%	0
LA-R-09	Grand Tierre Drive	<1%	<1%	0	0
LA-R-10	Jean Lafitte Boulevard	<1%	<1%	0	0
LA-S-01	Belle Chasse Elementary School and Belle Chasse Primary School	<1%	<1%	0	0
LA-S-02	Athlos Academy of Jefferson Parish and GB Elementary School	<1%	<1%	0	0
LA-S-03	George Cox Elementary School	<1%	<1%	0	0
LA-S-04	Jefferson Rise Charter School	<1%	<1%	0	0
LA-S-05	Paul J. Solis Elementary School	<1%	<1%	0	0
LA-S-06	Woodland West Elementary School	<1%	<1%	0	0
LA-S-07	Brighter Horizons	1%	<1%	+1%	0
LA-S-08	Woodmere Elementary	<1%	<1%	0	0
LA-S-09	Belle Chasse High School	<1%	<1%	0	0
LA-S-10	Jacob's Ladder Learning Academy	<1%	<1%	0	0
LA-S-11	Our Lady of Perpetual Help School	<1%	<1%	0	0
LA-S-12	Belle Chasse Academy	<1%	<1%	0	0
LA-S-13	Christian Fellowship Daycare	<1%	<1%	0	0

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB NLR.
[3]Assumes 25 dB NLR.
Legend: ID = Identification; JRB = Joint Reserve Base; NAS = Naval Air Station; PA = Probability of Awakening; POI = Point of Interest.

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels beginning at residential areas exposed to DNL of 80 dB or greater (DNWG 2013b). As summarized in Table LA3.1-16, no land outside of NAS JRB New Orleans would be exposed to 80 dB DNL or greater, so no residents would experience the potential for hearing loss under this alternative.

Due to the increase of households and population exposed to greater than 65 dB DNL noise contours, impacts resulting from the F-35A beddown at NAS JRB New Orleans would be significant.

Airspace

As tabulated in Section 3.2.5.2, *Special Use Airspace Noise Modeling*, while operating in airspace, the F-35A would be 3 to 5 dB greater in SEL and 6 to 8 dB greater in L_{max} than the existing F-15C/D for a typical airspace flight profile example at 400 knots and at military power when comparing single-event noise levels. Individual airspace flights would differ from these noise levels because aircraft speeds and power settings would vary depending upon specific training exercises performed at that time.

Under this alternative, the 159 FW would be assigned F-35A aircraft with a higher annual flying hour program, resulting in 3,832 sorties per year, a 107 percent increase above existing conditions/No Action Alternative. The F-35A would continue to train in the same airspace currently used, and the mix of types of training events would remain approximately the same as the F-15C/D (see Table LA2.1-2). This analysis presents a 'worst-case' for noise impacts, assuming an entire year of training would occur in the SUA currently used by the 159 FW with no training deployments elsewhere. Based on the increase in 159 FW sorties of 107 percent along with the greater SEL of the F-35A, L_{dnmr} in each airspace that would be used by the F-35A could increase up to 8 dB from existing conditions/No Action Alternative for subsonic operations (159 FW Noise Study, which can be found on the project website (URL address: www.angf15ex-f35a-eis.com/documents/). The result would be L_{dnmr} ranging from 48 dB to levels below the noise modeling software's lower limit of prediction (see Section LA3.1.1.1, *Installation*). Therefore, L_{dnmr} would remain relatively low. Additionally, the 159 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most subsonic aircraft airspace sorties would likely not be noticed by any casual observer.

Under the F-35A Alternative, the F-35A would replace the F-15C/D for supersonic activity in the 159 FW associated overwater ranges. The frequency of supersonic activity in these areas would increase by 107 percent from the existing conditions/No Action Alternative, which would equate to an increase in CDNL of 3 dB. The magnitude of noise generated by each sonic boom depends upon the shape and size of the aircraft. Although BOOMAP96 does not include supersonic noise modeling data for the F-35A, noise data for a similar fifth generation fighter, the F-22, suggests that fifth generation fighters generate greater noise levels during supersonic activities than legacy aircraft, like F-15. Given that the dimensions of the F-35A are approximately 20 percent smaller than the F-22, noise levels generated from the F-35A would be between those generated by the F-22 and legacy aircraft like F-15. Using BOOMAP96, a midpoint value between the F-15 and F-22 would result in CDNL for the F-35A estimated to be approximately 4 to 5 dB greater than the F-15C under existing conditions/No Action Alternative. Therefore, the overall change to CDNL in 159 FW overwater ranges under the F-35A Alternative would be up to 8 dB greater than

existing conditions/No Action Alternative resulting from an increase in supersonic sorties and different aircraft characteristics of the F-35A.

LA3.1.2.3 F-15C/D Legacy Aircraft

Under this alternative, the 159 FW would continue to operate F-15C/D aircraft at NAS JRB New Orleans. The following sections describe the impacts resulting from construction, installation operations, and airspace operations associated with maintaining existing F-15C/D aircraft at NAS JRB New Orleans.

Installation

Construction associated with this alternative would include projects that would occur within the NAS JRB New Orleans property, which would generate temporary construction noise. The proposed construction sites would be in areas close to the NAS JRB New Orleans runways currently exposed to 65 dB DNL or greater and most of the land adjacent outside of NAS JRB New Orleans is commercial or undeveloped land. Therefore, the construction activity would not generate significant impacts or warrant additional noise analysis because noise sensitive locations would not be affected.

Under this alternative, 159 FW F-15C/D flight operations at NAS JRB New Orleans would continue and noise impacts associated with installation operations would be the same as existing conditions/No Action Alternative.

Airspace

Under this alternative, 159 FW airspace operations in training areas would continue as described under existing conditions/No Action Alternative; impacts associated with airspace operations would not be significant.

LA3.1.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in the airfield from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on the acoustic environment at the airfield would not be significant.

LA3.1.3 Summary of Impacts

When compared with the existing conditions/No Action Alternative, the F-15EX basing at NAS JRB New Orleans would result in an increase of 92 acres outside of airfield property that would be exposed to 65 dB DNL or greater. The number of households exposed to 65 dB DNL would decrease by 136 and estimated population would decrease by 327 people because the size of DNL contours would decrease over residential areas. The DNL at noise sensitive receptors would increase 1 to 4 dB at 29 POIs. The number of speech interfering events during the school day would increase by 1 event per hour at 6 school POIs with windows open. Existing military jet operations at NAS JRB New Orleans already create interfering events at many of these schools, so replacing the F-15C/D with the F-15EX that generates greater noise levels would not significantly change the amount of time of disruption during the school day, but instead would cause many military jet interfering events to be louder by several decibels. The number of speech interfering noise events would increase by 1 per hour at 12 POIs for windows open and 7 POIs for windows closed. The change in potential for awakening with windows open would increase up to a 1 percent at 7 POIs. L_{dnmr} within the SUA would increase by up to 6 dB but would remain in the 35 to 46 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and is consistent with noise levels in many rural areas.

The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL for the F-15EX Alternative, it is estimated that the changes would not be significant, mainly due to the reduction of DNL contours off-base in areas with noise sensitive locations. Because NAS JRB New Orleans is an exclusively military airfield, the FAA significance standards do not apply. However, in this instance the F-15EX Alternative at NAS JRB New Orleans would not be significant and the changes in noise would be less than 'reportable' under FAA standards.

When compared with the existing conditions/No Action Alternative, the F-35A basing at NAS JRB New Orleans would result in an increase of 1,127 acres outside of airfield property that would be exposed to 65 dB DNL or greater. The number of households exposed to 65 dB DNL would increase by 508 and estimated population exposed would increase by 1,320 people because the size of DNL contours would increase over residential areas. The DNL at noise sensitive receptors would increase 1 to 4 dB at 41 POIs. The number of speech interfering events during the school day would increase by one event per average school day hour at 9 school POIs. Existing military jet operations at NAS JRB New Orleans already create interfering events at many of these schools, so replacing the F-15C/D with the F-35A that generates greater noise levels would not significantly change the amount of time of disruption during the school day, but instead would cause many military jet interfering events to be louder by several decibels. The number of speech interfering noise events would increase by 1 per hour. The change in PA with windows open would increase up to 1 percent at 8 POIs. L_{dnmr} within the SUA would increase by up to 8 dB but would remain

in the 35 to 48 dB range, which is well below the 65 dB threshold considered for noise sensitive land uses and consistent with noise levels in many rural areas.

The DAF does not have specific standards for noise impact significance, but due to the changes noted in DNL for the F-35A Alternative, it is estimated that the changes would be significant, mainly due to the increase in DNL at noise sensitive locations off base. Because NAS JRB New Orleans is an exclusively military airfield, the FAA significance standards do not apply. However, in this instance, the F-35A Alternative at NAS JRB New Orleans would be significant under the FAA criteria because DNL would increase up to 2 dB at noise sensitive areas that would be exposed to greater than 65 dB DNL.

Under the F-15C Legacy Alternative, 159 FW F-15C/D flight operations at NAS JRB New Orleans would continue and noise impacts associated with installation operations would be the same as the existing conditions/No Action Alternative. Therefore, impacts on noise at the airfield would not be significant. Impacts under the No Action Alternative would be similar to the Legacy Alternative.

LA3.2 AIRSPACE

LA3.2.1 Affected Environment

To ensure 159 FW personnel and fleet are combat mission ready, training is conducted at the airfield and in the airspace surrounding it, as well as utilizing the overland and overwater SUA. The SUA consist of MOAs, Restricted Areas, and Warning Areas (see Table LA2.1-5 and Figure LA2.1-4).

LA3.2.1.1 Installation

The 159 FW operates and is based at NAS JRB New Orleans, which has two operational runways. The airfield diagram in Figure LA3.2-1 depicts the runway and taxiway designations, field elevation, and depiction of hangars and buildings. Runway 4/22 is NAS JRB New Orleans only precision instrument runway. General runway details are provided below.

- Runway 4 is 10,000 feet x 200 feet and is a precision instrument runway. The primary surface is a porous mix.
- Runway 22 is 10,000 feet x 200 feet and is a precision instrument runway. The primary surface is as described for Runway 4 above. There is a 1,000-foot displaced threshold on the approach ends of Runway 4 and Runway 22.
- Runway 14 is 6,000 feet x 200 feet and is a non-precision instrument runway. The surface is a porous mix.

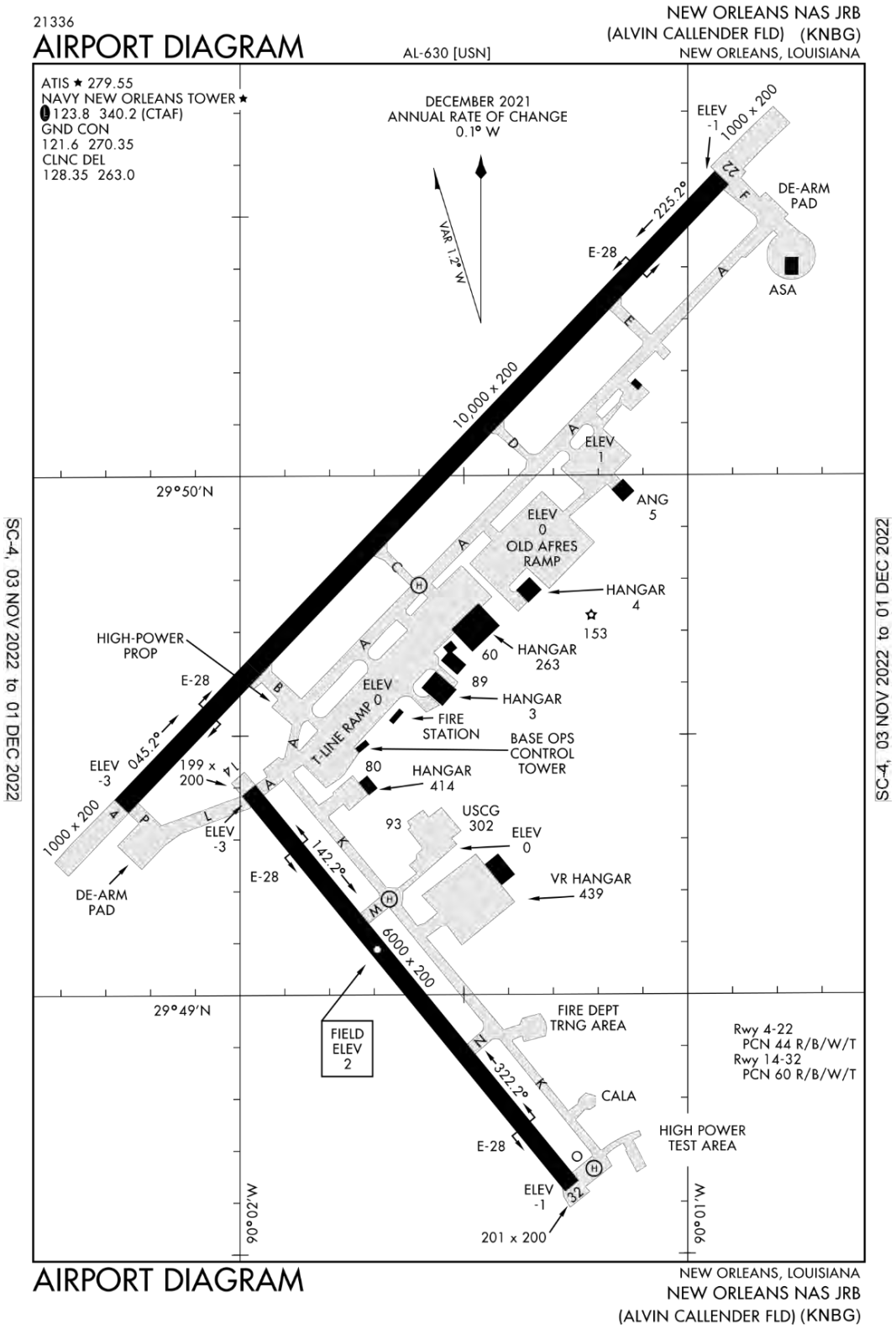


Figure LA3.2-1 NAS JRB New Orleans Airfield Diagram

- Runway 32 is 6,000 feet x 200 feet with 25-foot prepared surface shoulders and a 201-foot displace threshold. The surface is as described for Runway 14.

The airfield provides and maintains the following lighting systems for the hours of darkness or during conditions below VFR minimums. Runway 4/22 is a category one runway served by High Intensity Runway Edge Lights and Approach Lighting System with Sequenced Flashing Lights, and a 4-light Precision Approach Path Indicator for glidepath indication. Runway 14/32 is served by High Intensity Runway Edge Lights and a 4-light Precision Approach Path Indicator. Medium Intensity Taxiway Lighting is on all taxiways. All runways have runway end identifier lights to provide rapid and positive identification of the end of the runway. An airport rotating light beacon is located on the airfield just east of Hangar 4.

Aircraft Arresting Systems are equipped at NAS JRB New Orleans which provides a means of rapidly stopping military aircraft on a runway. NAS JRB New Orleans has the E28 HOOK arresting gear extended length tape aircraft arresting system located on all runways. The Runway 4 arresting system is 1,500 feet from the threshold and Runway 22 is 1,501 feet from the threshold. The Runway 14 arresting system is located at 1,025 feet from the threshold and Runway 32 at 1,025 feet from the threshold. The cable can be raised by ATC with prior coordination.

Airspace Designation

NAS JRB New Orleans is Class "D" Airspace. Class D airfields need an ATC Tower to coordinate airport operations. The NAS JRB New Orleans Class D airspace extends from the surface to and including 2,500 feet MSL. The Class D airspace lies beneath the New Orleans Class B airspace. The Louis Armstrong New Orleans International Airport is 15 nautical miles northwest of NAS JRB New Orleans. The Louis Armstrong New Orleans International Airport's Class B airspace extends above the NAS JRB New Orleans Class D airspace from 4,000–7,000 feet MSL. To enter Class D airspace, two-way communication must be established prior to entering the airspace border. Due to the close proximity of the New Orleans Class B airspace, FAA requires a Mode C transponder and Automatic Dependent Surveillance–Broadcast out equipment to be installed on the aircraft. This equipment provides a means of reporting data and identifying aircraft on an ATC radar scope.

Air Traffic Control Facilities

DON New Orleans Tower is a DoD-operated control tower, operated Monday–Friday, 7 a.m. to 11 p.m. On weekends, the tower is scheduled to be open 9 a.m. to 5 p.m. Exceptions are posted by Notice to Air Missions for holiday closures. NAS JRB New Orleans is also serviced by the

FAA's New Orleans Approach, which controls the airspace surrounding the installation. Houston ARTCC operates the airspace above New Orleans Approach Control airspace.

Navigation Aids

NAS JRB New Orleans provides Harvey VORTAC and Instrument Landing System NAVAIDS. The installation is serviced by seven separate instrument approach procedures and one standard instrument departures.

Federal Airways

The Harvey VORTAC is utilized by both military and civil aircraft and links valuable navigation airways. Like highways in the sky, VOR or "Victor" airways link NAVAID to NAVAID to enable point-to-point pilot navigation. RNAV terminal transition routes, referred to as Tango or "T" routes allow GPS-equipped IFR operations to efficiently fly around certain airspace and provides a more direct route. The following routes are routed from and through the Harvey VORTAC: V-552, V-198–240, and V-198–552.

LA3.2.1.2 Airspace

Warning Areas

Because of the proximity to the Gulf of Mexico, the 159 FW is able to fly to several Warning Areas that are close to NAS JRB New Orleans. The 159 FW utilizes W-59 A/B/C from 5,000 feet to FL500, W-453 A/B from surface to FL600 and W-155 A/B/CW from surface to FL600. Supersonic flight is approved above 10,000 feet when greater than 15 nautical miles from land. Additionally, chaff and flares and electronic attack are authorized within the Warning Areas.

Military Operations Areas

The 159 FW utilizes the Snake MOA and Warrior MOA to conduct training sorties. The Snake MOA is 40 nautical miles east of NAS JRB New Orleans and is divided into two subsections, Snake Low MOA (3,000 feet MSL to 5,999 feet MSL) and Snake MOA (6,000 feet MSL up to, but not including, FL180). Scheduling is through the Mississippi ANG and activation times are documented via Notices to Air Missions. The Warrior MOA is divided into three subsections (Warrior MOA 1–3) with each having a high and low sector. Warrior MOA 1/2/3 Low is 100 feet AGL up to, but not including, 10,000 feet MSL, Warrior MOA 1/2/3 High is 10,000 feet MSL up to, but not including, FL180. The 159 FW also uses the Claiborne MOA, which is northeast of Warrior MOA 1. The Claiborne MOA is subdivided into the Claiborne A MOA, 100 feet AGL up to, but not including, 10,000 feet MSL and Claiborne B MOA from 10,000 feet MSL up to, but

not including, FL180. Both the Claiborne and Warrior MOAs are within Houston ARTCC's airspace and scheduled through Fort Johnson (formerly known as "Fort Polk"), LA.

Restricted Areas

The 159 FW utilizes R-3801, R-3803, and R-3804. R-3801 is subdivided into A/B/C sections which offer usable airspace from the surface to FL230. R-3803 is divided into six subsections, R-3803A-F, which range in altitude from the surface up to, but not including, FL350. R-3804 is subdivided into two subsections with altitudes from surface up to, but not including, FL350.

LA3.2.2 Environmental Consequences

LA3.2.2.1 F-15EX

Installation

The F-15EX would conduct the same departure and arrival procedures as the current F-15C/D. The total number of airfield operations is taken into account when determining the impact to the airfield. As shown in Table LA2.1-2, the F-15EX would generate an additional 19.8 percent increase to the total airfield operations above existing operations. Consequences of increased operations resulting in more air traffic are generally associated with flight delays at the airfield and/or ATC sector overload. However, the drawdown of F-15C/D aircraft prior to the arrival of the F-15EX would prevent any short-term overlap between F-15C/D and F-15EX aircraft within controlled airspace. Additionally, the increases in operations would have a minimal effect on the air traffic environment. Furthermore, F-15EX would not require any changes in local airspace, procedures, or airfield management.

ATC has various fail safes to use to prevent sector overload, traffic delays, and airspace congestion. These methods include de-combining control positions (reducing workload), and other aircraft specific methods like holding or vectoring. Therefore, impacts on the local ATC environment would not be significant.

Through various methods of separating and sequencing aircraft as defined in FAA Order 7110.65AA, *Air Traffic Control*, there would be no significant impact to controlled airspace by basing the F-15EX at the 159 FW.

Airspace

There are no specific guidelines as to what quantifies SUA saturation point. For example, 4–6 bomber aircraft within a specific MOA could make the MOA be considered saturated, while 8

fighter type aircraft may not. Additionally, with the vast amount of SUA in the region, aircraft can be dispersed throughout the region instead of all being tasked to one SUA.

The F-15EX beddown would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, or ATCAA, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change from existing conditions/No Action Alternative, the impacts on the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the SUA activation times would remain the same. ATC would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Selection of the 159 FW for beddown of the 21 operational F-15EX aircraft would result in minimal impacts on SUA use throughout this region. Under this alternative, the F-15EX aircraft would conduct up to 3,832 annual sorties, an increase of 107 percent above the 1,850 currently flown by the F-15C/D. Based on the ASD of 1.37 hours, beddown of the F-15EX would result in an increase in airspace use of approximately 2,715 hours annually.

Table LA3.2-1 illustrates the projected change in airspace use by altitude associated with the beddown of the F-15EX. The F-15EX would utilize altitudes below 10,000 feet MSL at the same rate as the F-15C/D. Training at altitudes between 10,000 feet MSL to 30,000 feet MSL would increase, while use of altitudes above 30,000 feet MSL would decrease as shown in Table LA3.2-1.

Table LA3.2-1 Existing Conditions/No Action Alternative and Proposed Use by F-15EX by Altitude

Altitude (feet)	***Existing Conditions/ No Action Alternative Percentage Use F-15C/D***	***Proposed Percentage Use F-15EX***	***Change***
500–3,000 AGL	1	1	0
3,000–5,000 AGL	1	1	0
5,000–10,000 MSL	5	5	0
10,000 MSL–18,000 MSL	36	38	+2
18,000 MSL–30,000 MSL	17	30	+13
Above 30,000	40	25	-15

Legend: AGL = above ground level; MSL = mean sea level.

Implementation of this alternative represents the continuation of current SUA activities with increases only to the number of operations, which fall within previously analyzed parameters. Impacts would not be significant.

LA3.2.2.2 F-35A

Installation

The F-35A would conduct the same departure and arrival procedures as the current F-15C/D. Existing control methods would continue to be utilized by ATC to prevent sector overload, reduce traffic delays, and airspace congestion. Utilizing the various ATC methods of separating and sequencing aircraft as defined in FAA Order 7110.65AA, *Air Traffic Control*, would ensure no significant impact to controlled airspace would be expected by basing the F-35A at the 159 FW.

Airspace

The F-35A beddown would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, or ATCAA, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change from existing conditions/No Action Alternative, the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the SUA activation times would remain the same. ATC would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Selection of the 159 FW for beddown of the F-35A aircraft would result in minimal impacts on SUA use throughout this region. Under this alternative, aircraft would conduct up to 3,832 annual sorties, an increase of 107 percent above the 1,850 currently flown by the F-15C/D. Based on the ASD of 1.37 hours, beddown of the F-35A would result in an increase in airspace use of approximately 2,715 hours annually.

Table LA3.2-2 illustrates the projected change in airspace use by altitude associated with the beddown of the F-35A. The F-35A would utilize altitudes below 10,000 feet MSL at the same rate as the F-15C/D. Training at altitudes between 10,000 feet MSL to 18,000 feet MSL and above 30,000 feet MSL would decrease, while those between 18,000 and 30,000 feet MSL would increase as shown in Table LA3.2-2.

Table LA3.2-2 Existing Conditions/No Action Alternative and Proposed Use by F-35A by Altitude

Altitude (feet)	*Existing Conditions/ No Action Alternative Percentage Use F-15C/D*	*Proposed Percentage Use F-35A*	*Change*
500–3,000 AGL	1	1	0
3,000–5,000 AGL	1	1	0
5,000–10,000 MSL	5	5	0
10,000 MSL–18,000 MSL	36	24	-12
18,000 MSL–30,000 MSL	17	58	+41
Above 30,000	40	11	-29

Legend: AGL = above ground level; MSL = mean sea level.

Implementation of this alternative represents the continuation of current SUA activities with increases only to the number of operations, which fall within previously analyzed parameters. Impacts would not be significant.

LA3.2.2.3 F-15C/D Legacy Aircraft

Installation

Should the 159 FW not be selected for either new aircraft, they would retain the current fleet of 18 F-15C/D aircraft and would continue to operate at NAS JRB New Orleans. Aircraft operations would not change from existing conditions/No Action Alternative. The 159 FW would continue to support the F-15C/D mission currently being conducted. There would be no significant impacts on the controlled airspace associated with implementation of this alternative.

Airspace

Should the 159 FW not be selected for either new aircraft, they would retain the current fleet of 18 F-15C/D aircraft and would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur. Operations would remain as described in Section LA2.1.6, *Airspace Use*. There would be no significant impacts on airspace associated with implementation of this alternative.

LA3.2.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy

aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on airspace would not be significant.

LA3.2.3 Summary of Impacts

The replacement of the F-15C/D aircraft with the F-15EX or F-35A would not require changes in local airspace. Over time, the replacement of the F-15C/D aircraft at the installation could result in a 107 percent increase in 159 FW operations (and a 19.8 percent increase in total operations) at the NAS JRB New Orleans airfield and in the airspace. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the National Airspace System and SUA. In summary, impacts on controlled airspace and SUA associated with the beddown of either the F-15EX or F-35A would not generate significant impacts. Similarly, retention of the F-15C/D aircraft or selection of the No Action Alternative would not have significant impacts on airspace.

LA3.3 AIR QUALITY/CLIMATE CHANGE

The following section describes the affected environment associated with the current operations of the 159 FW squadron and examines the extent to which the beddown of an ANG squadron of F-15EX or F-35A at the 159 FW installation (at NAS JRB New Orleans) would be consistent with federal, state, and local air quality regulations. The Climate Change analysis is discussed in the context of Cumulative Impacts as presented in Section LA4.2.3, *Air Quality/Climate Change*.

LA3.3.1 Affected Environment

LA3.3.1.1 Installation

The affected environment for the air quality analysis includes portions of Plaquemines Parish in Louisiana, where NAS JRB New Orleans is located. The Louisiana Department of Environmental Quality is responsible for developing air quality management plans and implementing control measures such as permitting and compliance programs in the state. Plaquemines Parish is part of the Southern Louisiana-Southeast Texas Interstate Air Quality Control Region (40 CFR 81.53).

Plaquemines Parish is in attainment of the NAAQS for all criteria pollutants (EPA 2022a), so the General Conformity Rule does not apply to the air quality analysis performed for this location. Table LA3.3-1 presents the 2017 emission inventories for Plaquemines Parish, which are the most recent data available.

Table LA3.3-1 2017 Criteria Pollutant Emissions for Plaquemines Parish, Louisiana (tons)

Location	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Plaquemines Parish, Louisiana	27,093	16,992	17,371	1,188	1,910	1,025

Legend: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
Source: EPA 2022b.

In the Belle Chasse area, summers are hot and humid, and the winters are short and windy. Over the course of the year, the temperature typically can range from 46°F to 90°F. August is the month with the highest average temperature and January has the lowest. Average rainfall ranges between 4.3 and 9.0 inches per month (National Weather Service 2022). Wind conditions vary throughout the year, and instantaneous wind speed and direction varying more widely than hourly averages. Wind experienced at any given location is highly dependent on local topography and other factors. The predominant average hourly wind direction is variable in Belle Chasse throughout the year – coming most often from the south from late February to mid-July, and from the east from late August to mid-November, and from the north from mid-November to late-February. The windier part of the year lasts from late-September to late-May, with average wind speeds of more than 9.3 miles per hour and the windiest month is March, with an average hourly wind speed of 11.3 miles per hour (Weather Spark 2022).

Section LA2.1.2, *Airfield Operations*, describes the current airfield operations performed by the 159 FW, which flies F-15C/D aircraft that are proposed to be replaced by either the F-15EX or F-35A. For the air quality analysis, only the aircraft to be replaced have been analyzed, as all other aircraft and their activities would remain the same. The current emissions from the annual F-15C/D operations at NAS JRB New Orleans in Plaquemines Parish are presented in Table LA3.3-2. This is based on a flight hour program of approximately 2,550 hours annually, or about 1,850 sorties. Other sources of air emissions associated with aircraft operations include airfield equipment such as generators, lifts, and service carts.; and emissions generated from engine testing in a hush house. Emission estimates were developed for the F-15C/D aircraft using the Pratt and Whitney F100-PW-220 engine. Aircraft operation emission estimates were derived from the DAF's ACAM version 5.0.18b, using installation-specific data including landings and takeoffs, closed patterns, and annual engine testing. Additionally, AGE operations emissions estimates were also derived from ACAM and EPA's NONROAD.

Table LA3.3-2 Annual F-15C/D Emissions Estimates for the 159 FW at NAS JRB New Orleans (tons per year) under Existing Conditions

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C/D Airfield Operations (mobile sources)	**18.56**	**39.53**	**82.59**	**4.13**	**2.79**	**2.57**	**9,860**
Jet Engine Test Cell (stationary source)	0.15	0.38	0.61	0.03	0.02	0.02	104
Total	18.70	39.91	83.20	4.16	2.81	2.58	9,964

Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; JRB = Joint Reserve Base; NAS = Naval Air Station; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The 159 FW currently operates under a Minor Source Air Permit No. 2240-00029-10, which includes emissions from external combustion equipment (e.g., hot water boilers, water heaters, natural gas dryers); engine testing operations (hush house and runway area engine testing); internal combustion equipment (e.g., diesel and natural gas emergency generators, and gasoline-powered arresting gear for aircraft emergency landings); aircraft maintenance-related surface coating operations; and storage tank and fueling operations. The emissions from calendar year 2018 reported under the operating permit for NAS JRB New Orleans are presented in Table LA3.3-3. Fuel combustion in both external and internal combustion equipment, and from engine testing operations account for the majority of NO_x, CO, SO_2, and particulate matter emissions, while storage tanks, fueling stations, surface coatings and solvent use primarily emit VOCs (NAS JRB New Orleans 2020).

Table LA3.3-3 2018 Emissions Estimates for the 159 FW at NAS JRB New Orleans (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
NAS JRB New Orleans Facility-wide Emissions[1]	4.95	14.34	7.95	0.77	1.33	ND[2]

Notes: [1]Includes emissions from stationary point, area, and fugitive sources.
[2]Only one estimate for "total particulate matter" emissions was included in report, which is shown as PM_{10} in the table.
Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; ND = no data available; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.
Source: NAS JRB New Orleans 2020.

LA3.3.1.2 Airspace

The affected environment for air quality comprises the SUA associated with 159 FW flight operations that occur below the mixing height of 3,000 feet AGL, as shown in Table LA2.1-6. The F-15C/Ds currently fly approximately 1 percent of the time below 3,000 feet AGL, which is below the mixing height and where emissions from the flying aircraft can influence ground-level air quality. For the 159 FW SUA, this includes Claiborne A MOA, portions of the Warrior MOA Complex, and portions of the R-3801, R-3803, and R-3804 Complexes which overlie parts of Louisiana and Texas. The NAAQS attainment status for these airspace units is presented in Table LA3.3-4.

Table LA3.3-4 NAAQS Attainment Status for Low-Level Airspace

Airspace	*County(ies)*	*Attainment Status*
Claiborne A MOA (floor 100 feet AGL)	Portions of Rapides, Natchitoches, and Vernon Parishes in Louisiana	Attainment/unclassified for areas under the airspace
Portions of the Warrior MOA Complex: • Warrior 1 Low MOA (floor 100 feet AGL) • Warrior 2 Low MOA (floor 100 feet AGL) • Warrior 3 Low MOA (floor 100 feet AGL)	Portions of Allen, Beauregard, Evangeline, Natchitoches, Sabine, and Vernon Parishes in Louisiana Sabine, Newton, and Jasper Counties in Texas	Attainment/unclassified for areas under the airspace
Portions of R-3801 Complex: • R-3801A (floor is the surface)	Portions of Rapides Parish in Louisiana	Attainment/unclassified for areas under the airspace
Portions of R-3803 Complex: • R-3803A (floor is the surface) • R-3803C (floor is the surface) • R-3803D (floor is the surface)	Portions of Sabine, Natchitoches, and Vernon Parish	Attainment/unclassified for areas under the airspace
Portions of R-3804 Complex: • R-3804A (floor is the surface) • R-3804B (floor is the surface)	Portions of Vernon Parish	Attainment/unclassified for areas under the airspace

Legend: AGL = Above Ground Level; MOA = Military Operations Area; NAAQS = National Ambient Air Quality Standards; R- = Restricted Area.

LA3.3.2 Environmental Consequences

Air quality impacts within the affected environment were reviewed relative to federal, state, and local air pollution standards and regulations. Refer to Chapter 3.0, Section 3.4, *Air Quality/Climate Change*, for a detailed discussion of air quality resource definitions and the analytical methodology for evaluating impacts. As described in Section LA3.3.1, *Affected Environment*, Plaquemines Parish is currently in attainment for all NAAQS, and thus General Conformity does not apply to the Proposed Action at NAS JRB New Orleans. The environmental impact methodology for air quality impacts presented in this EIS was derived by utilizing the same operational data as directed by AFMAN 32-7002, *Environmental Compliance and Pollution Prevention* (4 February 2020). The air analysis for aircraft operations factors in the engine types used in the aircraft, the time spent at or below 3,000 feet AGL at specific engine power settings for criteria pollutant emission estimation, the emission factors associated with those flight modes, engine maintenance run-ups, and other relevant details. These data are included in the DAF ACAM and in supplemental spreadsheets used for analysis. Construction operations similarly evaluate the operation of construction equipment and other fuel-burning sources as the primary emission sources of that activity. These data, along with information on the affected environment and the alternatives, are used to produce a consistent determination of air quality impacts.

Proposed construction varies based on the aircraft proposed for beddown. Construction would also occur to support the legacy aircraft if the 159 FW is not selected for either the F-15EX or the F-35A. All proposed construction would occur within the footprint of the developed installation. To ensure the maximum annual emissions from construction are captured, the calculations have been performed to account for each construction project being completed within 12 months of the year it is programmed (e.g., if a project is planned for implementation in FY 2024, the construction is assumed to occur between January and December 2025), even though some projects would last longer than 12 months. The following assumptions were used for construction projects:

- New building foundations require excavation of at least 1 foot of grade soil.
- Airfield pavements require excavation of at least 3.5 feet of grade soil.
- For the purposes of calculating emissions based on building volume (cubic feet), buildings are assumed to have an average height of 14 feet to account for some variation in the heights across all the proposed projects.
- Parking areas for new buildings are assumed to be 50 percent and sidewalks assumed to be 10 percent of the new building square footage.
- New impervious surfaces are assumed to be concrete or asphalt.
- Where two options are under consideration, the option that would generate the greatest emissions was selected for analysis.

Construction emission estimates were prepared using the DAF air model ACAM. Emissions would primarily be generated by:

- diesel-powered construction equipment operating on-site,
- trucks removing or delivering materials from the construction areas,
- construction worker vehicles,
- application of architectural coatings, and
- dust created by grading and other bare earth construction activities.

Standard construction equipment by phase were applied and detailed information on the emissions estimates and assumptions can be found in Appendix D.

Construction would follow all applicable Louisiana Department of Environmental Quality Air Regulations, such as measures to alleviate dust, noise, and odor nuisance conditions that may occur. Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

LA3.3.2.1 F-15EX

Installation

Construction projects would occur between 2025 and 2033 to support the beddown of the F-15EX, though all critical infrastructure would be completed prior to aircraft arrival. Airfield operations for the F-15EX would be similar to those currently occurring with the F-15C/D at the 159 FW. The primary difference would be that the annual number of airfield operations is projected to increase. The net change in operational emissions at the 159 FW installation are presented in Table LA3.3-5 and assume that 100 percent of the F-15EX aircraft would be on-site and operational in 2027. The F-15EX operations would represent the new emission profile moving forward. The emissions account for the difference in the engine operations between the F-15C/D and the F-15EX, the increase in annual operations, and an increase in commuting personnel who would be assigned to the 159 FW installation as a result of beddown of the F-15EX.

Table LA3.3-5 Annual Airfield Steady State Emissions Estimates for the 159 FW Beginning in 2027 (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C/D Current Airfield Operations	-31.21	-36.43	-136.65	-5.50	-3.50	-3.18	-14,096
F-15EX Airfield Operations	42.97	47.91	208.01	6.41	12.55	11.36	16,353
Net Change in Aircraft Emissions – F-15EX[1]	**11.76**	**11.48**	**71.36**	**0.91**	**9.05**	**8.18**	**2,257**
F-15EX Additional Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
Total	**11.92**	**11.57**	**73.64**	**0.91**	**9.05**	**8.18**	**2,467**

Note: [1]Numbers may not add up due to rounding.
Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The total annual emissions for both construction and operations occurring in a calendar year are presented in Table LA3.3-6.

Table LA3.3-6 Total Annual Emissions Estimates for Construction and Operations with the F-15EX Conversion at the 159 FW (tons per year)

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	1.26	0.97	2.12	0.00	0.04	0.03	407
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.54	0.94	1.67	0.00	0.18	0.03	354
Net Change – F-15EX Operations Emissions (50% transition)	5.88	5.74	35.68	0.45	4.52	4.09	1,128

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
Commuter Emissions (50% transition)	0.076	0.045	1.14	0.00	0.00	0.00	105
2026 Total Net Change Emissions[1]	**6.50**	**6.72**	**38.49**	**0.46**	**4.70**	**4.12**	**1,587**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.23	0.90	1.59	0.00	0.12	0.03	331
Net Change – F-15EX Operations Emissions (100% transition)	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2027 Total Net Change Emissions[1]	**12.15**	**12.47**	**75.23**	**0.91**	**9.17**	**8.21**	**2,798**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	2.01	1.41	2.75	0.00	7.68	0.05	557
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2028 Total Net Change Emissions[1]	**13.93**	**12.98**	**76.39**	**0.92**	**16.73**	**8.23**	**3,024**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.45	0.93	1.62	0.00	0.21	0.03	344
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2029 Total Net Change Emissions[1]	**12.37**	**12.50**	**75.26**	**0.91**	**9.26**	**8.21**	**2,811**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2030 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.18	0.90	1.46	0.00	0.06	0.03	318
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2030 Total Net Change Emissions[1]	**12.10**	**12.47**	**75.10**	**0.91**	**9.11**	**8.21**	**2,785**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2031 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.21	1.11	1.56	0.00	2.83	0.04	365
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2031 Total Net Change Emissions[1]	**12.12**	**12.68**	**75.20**	**0.91**	**11.88**	**8.23**	**2,832**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2032 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.58	1.27	1.94	0.00	0.56	0.04	412
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2032 Total Net Change Emissions[1]	**12.50**	**12.84**	**75.58**	**0.92**	**9.61**	**8.23**	**2,879**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2033 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.84	1.29	2.12	0.00	0.11	0.04	435
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2033 Total Net Change Emissions[1]	**12.76**	**12.86**	**75.76**	**0.92**	**9.16**	**8.23**	**2,902**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2034 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change – F-15EX Operations Emissions	11.76	11.48	71.36	0.91	9.05	8.18	2,257
Commuter Emissions	0.15	0.09	2.28	0.00	0.00	0.00	210
2034 (Steady State) Total Net Change Emissions[1]	**11.92**	**11.57**	**73.64**	**0.91**	**9.05**	**8.18**	**2,467**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.
Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The net change is the difference in emissions resulting from basing the F-15EX as compared to retaining the F-15C/D aircraft. Based on the calculations, the construction and F-15EX operational and commuter emissions associated with the 159 FW would not exceed the comparative indicator threshold for any criteria pollutant, which indicates that any increase in these emissions from the Proposed Action would not affect the attainment status for any NAAQS. The change in criteria pollutant emissions associated with the basing of the F-15EX at the 159 FW installation would not have a significant effect on air quality. A Record of Air Analysis has been prepared and can be found in Appendix D.

Airspace

As described in Section LA3.2.1, *Affected Environment*, with the conversion to the F-15EX aircraft, operations in the SUA would increase by 107 percent compared to the current F-15C/D operations, resulting in airspace use of approximately 1,345 hours annually. The percentage of

time flown below 3,000 feet AGL during F-15EX operations would remain at 1 percent (refer to Table LA3.2-1) and thus the net change in time flown below 3,000 feet AGL annually would increase by approximately 13.5 hours annually. The operations within the SUA would be infrequent and sporadic. Thus, even though there is a slight increase in time spent flying below 3,000 feet AGL, the emissions from the F-15EX operations would not have a significant effect on regional air quality in the SUA.

LA3.3.2.2 F-35A

Installation

Construction projects would occur between 2025 and 2033 to support the beddown of the F-35A, though all critical infrastructure would be completed prior to aircraft arrival. Any new stationary sources for operations (i.e., emergency generators, boilers, or industrial process equipment) would follow the new source review permitting process as required. Any new or modified operational activities regulated under existing permits or regulations would be evaluated for inclusion.

Airfield operations for the F-35A would be similar to those currently occurring with the F-15C/D at the 159 FW. The primary difference would be that the annual number of airfield operations is projected to increase. The net change in operational emissions at the 159 FW installation are presented in Table LA3.3-7 and assume that 100 percent of the F-35A aircraft would be on-site and operational in 2026. The F-35A operations would represent the new emission profile moving forward. The emissions account for the difference in the engine operations between the F-15C/D and the F-35A, the increase in annual operations, and an increase in commuting personnel who would be assigned to the 159 FW installation as a result of beddown of the F-35A.

Table LA3.3-7 Annual Airfield Emissions Estimates for 159 FW Beginning in 2026 (tons per year)

Year	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-15C/D Current Airfield Operations	**-31.21**	**-36.43**	**-136.65**	**-5.50**	**-3.50**	**-3.18**	**-14,096**
F-35A Airfield Operations	1.32	46.10	86.09	6.25	10.23	9.26	16,515
Net Change in Aircraft Emissions – F-35A[1]	**-29.89**	**9.68**	**-50.56**	**0.74**	**6.73**	**6.08**	**2,419**
F-35A – Additional Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
Total	**-29.77**	**9.75**	**-48.75**	**0.74**	**6.73**	**6.08**	**2,586**

Note: [1]Numbers may not add up due to rounding.
Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The total annual emissions for both construction and operations occurring in a calendar year are presented in Table LA3.3-8.

Table LA3.3-8 Total Annual Emissions Estimates for Construction and Operations with the F-35A Conversion at the 159 FW (tons per year)

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.71	8.23	10.21	0.02	0.77	0.44	362
Net Change – F-35A Operations Emissions (50% transition)	-14.95	4.84	-25.28	0.37	3.37	3.04	1,210
Commuter Emissions	0.06	0.04	0.90	0.00	0.00	0.00	83
2025 Total Net Change Emissions[1]	**-14.18**	**13.10**	**-14.16**	**0.39**	**4.14**	**3.48**	**1,655**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2026 Estimated Annual Net Change Air Emissions							
Construction Emissions	2.37	1.54	3.07	0.01	2.00	0.04	766
Net Change – F-35A Operations Emissions (100% transition)	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2026 Total Net Change Emissions[1]	**-27.40**	**11.29**	**-45.68**	**0.75**	**8.73**	**6.12**	**3,352**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2027 Estimated Annual Net Change Air Emissions							
Construction Emissions	1.78	1.03	2.45	0.00	0.12	0.03	459
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2027 Total Net Change Emissions[1]	**-27.99**	**10.77**	**-46.30**	**0.75**	**6.85**	**6.11**	**3,045**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2028 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.59	1.16	1.76	0.00	0.17	0.04	354
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2028 Total Net Change Emissions[1]	**-29.19**	**10.91**	**-46.99**	**0.75**	**6.90**	**6.12**	**2,940**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2029 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.45	0.93	1.62	0.00	0.21	0.03	344
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2029 Total Net Change Emissions[1]	**-29.32**	**10.68**	**-47.13**	**0.75**	**6.95**	**6.11**	**2,930**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2030 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.22	1.16	1.64	0.00	0.07	0.04	351

Emissions Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2030 Total Net Change Emissions[1]	**-29.56**	**10.91**	**-47.11**	**0.75**	**6.80**	**6.12**	**2,937**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2031 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.21	1.11	1.56	0.00	2.83	0.04	365
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2031 Total Net Change Emissions[1]	**-29.56**	**10.86**	**-47.19**	**0.75**	**9.56**	**6.12**	**2,951**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2032 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.58	1.27	1.94	0.00	0.56	0.04	412
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2032 Total Net Change Emissions[1]	**-29.19**	**11.02**	**-46.81**	**0.75**	**7.29**	**6.12**	**2,998**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2033 Estimated Annual Net Change Air Emissions							
Construction Emissions	0.84	1.29	2.12	0.00	0.11	0.04	435
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2033 Total Net Change Emissions[1]	**-28.93**	**11.03**	**-46.64**	**0.75**	**6.85**	**6.12**	**3,021**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**
2034 Estimated Annual Net Change Air Emissions (Steady State)							
Net Change – F-35A Operations Emissions	-29.89	9.68	-50.56	0.74	6.73	6.08	2,419
Commuter Emissions	0.12	0.07	1.80	0.00	0.00	0.00	167
2034 (Steady State) Total Net Change Emissions[1]	**-29.77**	**9.75**	**-48.75**	**0.74**	**6.73**	**6.08**	**2,586**
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Note: [1]Numbers may not add up due to rounding.

Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

The net change is the difference in emissions resulting from basing the F-35A as compared to retaining the F-15C/D aircraft. Based on the calculations, the construction and F-35A operational and commuter emissions associated with the 159 FW installation would not exceed the

comparative indicator threshold for any criteria pollutant, and emissions of VOCs and CO would decrease compared to existing conditions/No Action Alternative. The change in criteria pollutant emissions associated with the basing of the F-35A at the 159 FW installation would not have a significant effect on air quality. A Record of Air Analysis has been prepared and can be found in Appendix D.

Airspace

The use of the airspace with the conversion to the F-35A would be the same as described above for the F-15EX, and thus would not have a significant effect on regional air quality in the SUA.

LA3.3.2.3 F-15C/D Legacy Aircraft

Installation

Should the 159 FW retain the F-15C/D legacy aircraft, impacts from construction activities would be slightly less intensive in magnitude than the basing of the F-15EX or the F-35A. Construction projects required to sustain the current mission would be implemented, and the emissions from the construction activities are shown in Table LA3.3-9. No construction projects with a ground disturbance footprint are currently planned to begin between 2026 and 2028, or after 2033. The year with the highest level of emissions from construction would be 2033, when full renovation of the Hangar Maintenance Shops in Building 5 would occur, followed by 2032, when a new Communications Facility and construction/renovation of the Weapons Load (Building 386) would occur.

Table LA3.3-9 Annual Construction Emissions Estimates for the 159 FW Installation with Construction for Legacy F-15C/D (tons per year)

Emission Source	*VOCs*	*NO_x*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2025 Construction Emissions	0.52	0.92	1.68	0.00	0.07	0.03	351
2029 Construction Emissions	0.39	0.92	1.58	0.00	0.11	0.03	341
2030 Construction Emissions	0.20	1.11	1.50	0.00	0.07	0.04	318
2031 Construction Emissions	0.21	1.11	1.56	0.00	2.83	0.04	365
2032 Construction Emissions	0.58	1.27	1.94	0.00	0.56	0.04	412
2033 Construction Emissions	0.84	1.29	2.12	0.00	0.11	0.04	435
Comparative Threshold	250	250	250	250	250	250	N/A
Exceeds Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Legend: 159 FW = 159th Fighter Wing; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = Not Applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound.

These emissions would result from retaining the F-15C/D aircraft and implementing construction projects in support of that aircraft. Based on the calculations, construction emissions associated with the 159 FW installation would not exceed the comparative indicator threshold for any criteria pollutant. The change in criteria pollutant emissions associated with the construction projects at

the 159 FW installation would not be significant. No additional personnel would be added to the 159 FW installation and the F-15C/D airfield operations would remain the same as existing conditions/No Action Alternative. A Record of Air Analysis has been prepared and can be found in Appendix D.

Airspace

Should the 159 FW not be selected for either new aircraft, they would retain the current fleet of F-15C/D aircraft and would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur, and the existing conditions/No Action Alternative for air quality, as described in Section LA.3.3.1, *Affected Environment*, would remain the same and there would be no impact to regional air quality.

LA3.3.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Impacts on air quality would not be significant.

LA3.3.3 Summary of Impacts

The net change in emissions resulting from implementation of Proposed Action alternatives at the 159 FW installation would not exceed the comparative indicator thresholds for any criteria pollutant. If the F-15EX is selected for beddown, long-term operational emissions associated with the aircraft activity and additional personnel commutes would increase over existing conditions/No Action Alternative but would remain below the comparative indicator threshold for all criteria pollutants. If the F-35A is selected for beddown, long-term operational emissions associated with the aircraft activity and additional personnel commutes would decrease when compared to existing conditions/No Action Alternative for VOCs and CO, and all other criteria pollutants would increase over existing conditions/No Action Alternative, but would remain below the comparative indicator thresholds. If neither aircraft is selected, the F-15C/D would continue to operate and there would be no change in long-term operational emissions. Implementation of the aircraft beddown alternatives at the 159 FW installation or the construction projects required to support the legacy F-15C/D aircraft mission would not cause significant impacts on air quality. Similarly, the No Action Alternative would not cause significant impacts on air quality.

LA3.4 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE/CHILDREN'S HEALTH AND SAFETY

LA3.4.1 Affected Environment

LA3.4.1.1 Installation

Plaquemines, Jefferson, and Orleans parishes comprise the ROI for socioeconomic effects of the Proposed Action at NAS JRB New Orleans. The city of New Orleans and Orleans Parish have the same geographic boundary. Socioeconomic data provided in this section are presented for these three parishes, the State of Louisiana, and the U.S. to characterize existing socioeconomic conditions, which are used to gauge the level of impacts that are associated with project activities. Data have been collected from documents published by federal, state, and local agencies and from state and national databases (e.g., USCB and U.S. Bureau of Labor Statistics).

The ROI for socioeconomic effects is in part driven by access points and built infrastructure that determines where people who work at the installation live, spend money, and pay taxes. However, the analysis of impacts on Environmental Justice, Children's Health and Safety, and the Elderly includes a review of all potential adverse impacts on these communities as discussed in other resource sections of this EIS and the ROI is determined by the extent of the adverse impacts identified. For the Proposed Action, the ROI for Environmental Justice, Children's Health and Safety, and the Elderly includes areas surrounding NAS JRB New Orleans that would experience significant noise increases as identified in Section LA3.1.2, *Environmental Consequences*, including portions of Plaquemines, Jefferson, and Orleans parishes.

Population

In 2020, the populations of Plaquemines, Jefferson, and Orleans parishes were 23,515, 440,781, and 383,997, respectively, for a total population in the ROI of 848,293 (see Table LA3.4-1). In total, the ROI population increased 6.1 percent increase over the previous 10 years driven by growth of 11.7 percent in Orleans Parish. The growth rate in the ROI was higher than in the state of Louisiana (2.7 percent) and lower than that of the U.S. (7.4 percent).

Table LA3.4-1 Population in the ROI over Time

Area	*2010*	*2020*	*Percent Change*
United States	308,745,538	331,449,281	7.4
Louisiana	4,533,372	4,657,757	2.7
Plaquemines Parish	23,042	23,515	2.1
Jefferson Parish	432,552	440,781	1.9
Orleans Parish/City of New Orleans	343,829	383,997	11.7
ROI Total (Combined Parishes)	799,423	848,293	6.1

Legend: ROI = region of influence.
Sources: USCB 2010, 2020a.

Housing

As shown in Table LA3.4-2, in 2020 the ROI had a total of 390,839 housing units, 57,015 of which were vacant. The rental vacancy rates in the parishes were higher than the national level. The median value of owner-occupied housing units in the parishes ranged from a high of $250,000 in Orleans Parish to a low of $193,600 in Jefferson Parish. Median gross rent in the parishes ranged from a high of $1,312 per month in Plaquemines Parish to a low of $986 per month in Jefferson Parish.

Table LA3.4-2 Housing in the ROI

Area	*Total Housing Units*	*Vacant Housing Units*	*Rental Vacancy Rate*	*Median Value of Owner-Occupied Housing Units*	*Median Gross Rent*	*Persons per Household*
United States	138,432,751	16,078,532	5.8%	$229,800	$1,096	2.6
Louisiana	2,074,664	322,708	8.6%	$168,100	$876	2.6
Plaquemines Parish	10,251	1,651	12.2%	$202,700	$1,312	2.7
Jefferson Parish	188,576	18,178	7.2%	$193,600	$986	2.5
Orleans Parish/ City of New Orleans	192,012	37,186	7.5%	$250,000	$1,025	2.4
ROI Total (Combined Parishes)	390,839	57,015	N/A	N/A	N/A	N/A

Legend: % = percent; N/A = Not Applicable; ROI = Region of Influence.
Source: USCB 2020b.

Schools

Across the three parishes there are a total of 265 public and private schools with 134,696 students in the ROI (Table LA3.4-3). The student teacher ratio averaged 16.6 students per teacher in the ROI and ranged from a high of 21.6 students per teacher in public schools in Plaquemines Parish to a low of 9.8 students per teacher in private schools in Orleans Parish.

Table LA3.4-3 Public and Private Schools in the ROI

School Type	*Number of Schools*	*Number of Students*	*Number of Teachers*	*Student Teacher Ratio*
Plaquemines Parish				
Public	9	4,870	225	21.6
Private	None	None	None	None
Subtotal	*9*	*4,870*	*225*	*21.6*
Jefferson Parish				
Public	98	55,222	2,682.8	20.1
Private	41	13,574	999.4	13.6
Subtotal	*139*	*68,796*	*3,682.2*	*18.7*
Orleans Parish				
Public	79	46,547	2,738.5	17.0
Private	38	14,483	1,478.4	9.8
Subtotal	*117*	*61,030*	*4,216.9*	*14.5*
Total	**265**	**134,696**	**8,124.1**	**16.6**

Note: Public School data is from 2020–2021 and Private School data is from 2019–2020.
Legend: ROI = Region of Influence.

Sources: National Center for Education Statistics 2020, 2021.

Employment and Income

Table LA3.4-4 shows the Bureau of Labor Statistics' employment data for the ROI in August 2022 as compared to employment information for Louisiana and the U.S. Unemployment in the ROI (4.5 percent) is higher than both the state (3.8 percent) and national levels (3.8 percent), driven in large part by a rate of 5.5 percent in Orleans Parish.

Table LA3.4-4 Employment in the ROI (August 2022)

Area	*Civilian Labor Force*	*Employed*	*Unemployed*	*Unemployment Rate*
United States	164,971,000	158,714,000	6,256,000	3.8%
Louisiana	2,080,221	2,001,466	78,755	3.8%
Plaquemines Parish	9,747	9,465	282	2.9%
Jefferson Parish	211,586	203,475	8,111	3.8%
Orleans Parish/ City of New Orleans	178,798	169,033	9,765	5.5%
ROI Total (Combined Parishes)	400,131	381,973	18,158	4.5%

Legend: % = percent; ROI = Region of Influence.
Sources: Bureau of Labor Statistics 2022a, 2022b, 2022c.

In 2020, median household income and median earnings for workers in Plaquemines Parish were higher than the national level, but mean household income and per capita income were lower (Table LA3.4-5). Median household income, mean household income, median earnings for workers, and per capita income were all lower than the national level in Jefferson and Orleans Parishes.

Table LA3.4-5 Incomes in the ROI

Area	*Median Household Income*	*Mean Household Income*	*Median Earnings for Workers*	*Per Capita Income*
United States	$64,994	$91,547	$36,280	$35,384
Louisiana	$50,800	$73,759	$32,723	$29,522
Plaquemines Parish	$65,234	$83,657	$37,879	$30,788
Jefferson Parish	$54,825	$77,021	$35,062	$32,939
Orleans Parish/ City of New Orleans	$43,258	$73,963	$31,835	$32,764

Legend: ROI = Region of Influence.
Source: USCB 2020b.

Environmental Justice

Table LA3.4-6 displays the total population, total and percentage of minority, low-income, children under 18 years of age, and elderly populations in the ROI. Table LA3.4-7 displays the same information for those populations affected by the existing noise contours associated with the F-15C/D aircraft.

Table LA3.4-6 Total Population, Minority, Low-income, Children and Elderly Populations in the ROI

Geographic Area	*Total Population*	*Low-Income Population*	*Percent Low-Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
United States	326,569,308	40,821,164	13%	130,317,933	40%	73,296,738	22%	52,362,817	16%
Louisiana	4,664,616	844,295	18%	1,945,145	42%	1,097,559	24%	719,544	15%
Plaquemines Parish	23,305	4,335	19%	8,506	37%	6,040	26%	3,139	14%
Jefferson Parish	434,903	59,147	14%	208,753	48%	96,068	22%	74,514	17%
Orleans Parish/ City of New Orleans	391,249	90,379	23%	271,136	69%	78,059	20%	57,867	15%
ROI Total (Combined Parishes)	849,457	488,438	58%	153,752	18%	180,167	21%	135,520	16%

Legend: % = percent; ROI = Region of Influence.
Source: USCB 2020b, 2021.

Table LA3.4-7 Total Current Population, Minority Low-income, Children and Elderly Populations Affected by Noise Greater than 65 dB DNL

Noise Contour	*Affected Population*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	972	232	24%	30	3%	177	18%	25	3%
70–75	13	2	15%	5	38%	4	31%	1	8%
75–80	0	0	0%	0	0%	0	0	0	0
80–85	0	0	0%	0	0%	0	0	0	0
85+	0	0	0%	0	0%	0	0	0	0
Total	*985*	*234*	24%	*35*	4%	181	18%	26	3%
Combined Three Parish Reference			18%		58%		21%		16%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Areas that have a higher percentage of their population that are low income than their reference county are considered to be a low-income area. Areas where 50 percent of the population or more are from a minority group or where a higher percentage of their population are members of a minority group than their reference county are considered to be a minority area.

In 2020, an estimated 18 percent of the population in the three-Parish ROI had incomes below the poverty level and 58 percent of the residents were recognized as a member of a minority group. Comparing this reference group to those persons affected by the existing noise contours shown in Table LA3.4-7, 24 percent of those individuals are considered to be low-income, which is slightly

higher than the reference group of 18 percent; and 4 percent are recognized as a member of a minority group, which is well below the reference group of 58 percent.

Children's Health and Safety and the Elderly

Table LA3.4-7 shows the population in the ROI that are under 18 years of age, and those that are 65 years of age or older. The three-Parish ROI as a whole has 21 percent children under the age of 18 and 16 percent elderly. Comparing this reference group to those persons affected by the existing noise contours shown in Table LA3.4-7, 18 percent of those individuals are considered to be children under 18, which is lower than the reference group of 21 percent; and 3 percent are elderly, which is much lower than the reference group of 16 percent.

LA3.4.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.4.2 Environmental Consequences

LA3.4.2.1 F-15EX

Installation

Construction and modification projects required for the beddown of the F-15EX would include approximately 29 projects between FY 2024 and FY 2030 and would include a total of 218,800 SF of disturbance (see Tables LA2.1-3 and LA2.1-4).

Under operations of the F-15EX beddown, 101 new personnel would be supported at the 159 FW installation and total airfield operations would increase by approximately 19.8 percent (see Tables LA2.1-5 and LA2.1-2).

Population

The population base and established construction industry in the city of New Orleans and the ROI would be able to support most of the required construction workforce. Any required relocation of workers to the area would be temporary during the construction period. Therefore, any impacts on population during construction of the F-15EX beddown would be minor and temporary and not significant.

During operation of the F-15EX beddown, 101 new personnel would be based at the 159 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel

would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of less than 0.1 percent in the ROI (see Table LA3.4-1). Therefore, any impacts on population as a result of the F-15EX beddown would be minor and not significant.

Housing

During construction, most workers would come from the local area. Specialized workers coming from outside the ROI or workers drawn to the area for employment opportunities may utilize temporary housing options such as hotels, motels, recreational vehicle parks, or housing rentals. This would create a minor increase in demand for housing in the ROI; however, as most workers would be expected to live within commuting distance, this would be a minor temporary impact.

The increase of 101 new personnel along with their families could create a demand for an additional 101 housing units in the ROI. This would be less than 0.1 percent of the total housing units in the ROI and 0.2 percent of the vacant housing units (see Table LA3.4-2). Therefore, any impacts on housing as a result of the F-15EX beddown would be minor and not significant.

Schools

As described above, most construction workers would come from the local area or from within commuting distance, so they would not be bringing new dependent school-aged children to the ROI. The limited number of workers that would come from outside the area would likely not bring families because of the temporary nature of the construction work. Therefore, the number of workers that would relocate to the area during construction and enroll their children in the school system would be small and would be a minor temporary impact and not significant.

According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), 64.7 percent of ANG family members are children, so there would be an expected 104.6 children relocating to the ROI during operation of the F-15EX beddown. Although not all the children would be school-aged, for a conservative estimate if all the children entered the local school system in the ROI, this would be a 0.1 percent increase in the total number of students (see Table LA3.4-3). This would be a minor permanent impact and not significant.

Employment and Income

Preliminary estimates of the construction required under this F-15EX Alternative place the cost of construction between $65 and $78 million. Hiring local construction workers would be beneficial for local employment and income. Local construction spending on materials and equipment would

also further stimulate the local economy providing jobs and income to suppliers in the ROI. This would be a temporary beneficial impact.

The increase of 101 new positions during operation of the F-15EX beddown would be a permanent increase in employment in the ROI. The incomes from the new positions would contribute to the local tax base and spending on local goods and services which would further stimulate the local economy. The 101 positions would represent less than 0.1 percent of the total employment in the ROI (see Table LA3.4-4). Increases in employment and income would be a minor permanent beneficial impact.

Environmental Justice

During construction, adverse impacts from construction noise and traffic would predominantly occur at the installation in areas that are not adjacent to residences and are already exposed to high levels of noise from airfield operations.

Table LA3.4-8 displays the total, minority, low-income, children under the age of 18, and elderly populations that would be exposed to 65 dB DNL or greater noise under the F-15EX Alternative. Under this alternative, 658 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 11 percent are considered minority and 21 percent are considered low income. When compared with the reference population of the three-Parish area, which is 58 percent minority, this does not represent a disproportionate impact. However, comparing the three-Parish reference area for low-income, which is 18 percent, there is a slightly higher percentage of low-income individuals affected (3 percent more) under this alternative, though this is 3 percent lower than with the current noise contours with the F-15C/D aircraft.

Table LA3.4-8 Total Current and Proposed Population, Minority, Low-income, Children and Elderly Populations Affected by Noise Greater than 65 dB DNL Under the F-15EX Alternative

Noise Contour	*Affected Existing Population w/F-15C/D*	*Affected Population w/ F-15EX*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	972	628	131	21%	61	10%	131	21%	20	3%
70–75	13	28	4	14%	9	32%	9	32%	2	7%
75–80	0	2	0	0%	1	50%	1	50%	0	0
80–85	0	0	0	0%	0	0%	0	0	0	0
85+	0	0	0	0%	0	0%	0	0	0	0
Total	*985*	*658*	*135*	21%	*71*	11%	141	21%	22	3%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

Children's Health and Safety and the Elderly

As described in Section LA3.1, *Noise*, under the F-15EX beddown, six school locations would be exposed to outdoor $L_{eq(8hr)}$ at or above 60 dB, all of which are the same six locations from existing conditions/No Action Alternative. Brighter Horizons would remain the same at 62 dB and Belle Chasse High School would have a decrease of 1 dB under the F-15EX beddown, but would still be exposed to outdoor $L_{eq(8hr)}$ at or above 60 dB. Our Lady of Perpetual Help School, Belle Chasse Academy, and Christian Fellowship Daycare would have an increase of 1 dB, 3 dB, and 4 dB, respectively, and would continue to be exposed to outdoor $L_{eq(8hr)}$ at or above 60 dB under the F-15EX beddown. The schools experiencing an increase in noise levels that are incompatible with classroom learning would be an adverse impact on children.

In addition, the increase in the number of speech-interrupting events per school day hour (above 50 dB interior level) would remain similar to the affected environment except for six schools (Paul J. Solis Elementary School, Brighter Horizons, Woodmere Elementary, Belle Chasse High School, Jacob's Ladder Learning Academy, and Our Lady of Perpetual Help School) that would experience one additional event per average hour. The causation of speech interference at schools with increased noise levels may hinder the ability of students (including low-income and minority students) to learn, which would constitute a significant impact to children to include low-income and minority children.

Table LA3.4-8 shows the percent of the population that is under 18 years of age. Under the F-15EX beddown, 658 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 21 percent are under the age of 18, which is the same as the three-Parish reference population. Therefore, the F-15EX Alternative would not disproportionately impact children.

Older adults have been identified as sensitive receptors to potential adverse impacts due to physiological and behavioral changes that come with age (AFCEC 2020). Table LA3.4-8 shows the percentage of the population that are considered elderly. Of the 658 people that would be affected by noise levels of 65 dB or greater, approximately 3 percent would be considered elderly, which is well below the three-Parish reference group of 16 percent. Therefore, the F-15EX Alternative would not disproportionately impact the elderly.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.4.2.2 F-35A

Installation

Under the beddown of the F-35A, construction impacts would be similar to those described for the beddown of the F-15EX. Construction projects would have a slightly smaller footprint, but overall investment and spending would be larger. Preliminary estimates of the construction required under this F-35A Alternative place the cost of construction between $90 and $108 million. Construction workforce impacts would be the same as those described for the beddown of the F-15EX. Therefore, during construction, local spending and employment would result in minor beneficial impacts.

During operation of the F-35A beddown, impacts would be similar to those described for beddown of the F-15EX. The number of new personnel would be 80 rather than the 101 proposed under the F-15EX beddown, so impacts on population, housing, schools, and employment and income would be approximately 20 percent lower than described for the F-15EX Alternative and would not be significant.

During construction, adverse impacts from construction noise and traffic would predominantly occur at the installation in areas that are not adjacent to residences and are already exposed to high levels of noise from airfield operations.

Table LA3.4-9 displays the total, minority, low-income, children under the age of 18, and elderly populations that would be exposed to 65 dB DNL or greater noise under the F-35A Alternative. Under this alternative, 2,304 people would be affected by noise levels of 65 dB or greater. Of the total population exposed to these noise levels, approximately 6 percent are considered minority and 18 percent are considered low income. When compared with the reference population of the three-Parish area, which is 58 percent minority, and 18 percent low income, this does not represent a disproportionate impact to either of these populations.

Table LA3.4-9 Total Current and Proposed Population, Minority, Low-income, Children, and Elderly Populations Affected by Noise Greater than 65 dB DNL Under the F-35A Alternative

Noise Contour	*Affected Existing Population w/F-35A*	*Affected Population w/F-35A*	*Low-Income Population*	*Percent Low Income*	*Minority Population*	*Percent Minority*	*Children Under 18*	*Percent Children Under 18*	*Elderly*	*Percent Elderly*
65–70	972	1,977	345	17%	114	6%	42	2%	130	7%
70–75	13	322	78	**24%**	14	4%	60	19%	7	2%
75–80	0	5	1	20%	1	20%	1	20%	0	0
80–85	0	0	0	0%	0	0%	0	0	0	0
85+	0	0	0	0%	0	0%	0	0	0	0
Total	*985*	***2,304***	***424***	18%	***129***	6%	103	4%	137	6%

Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level.
Source: USCB 2020b, 2021.

As described in Section LA3.1.2, *Environmental Consequences*, under the F-35A beddown, six school locations would be exposed to outdoor $L_{eq(8hr)}$ above 60 dB; however, all of these schools are already experiencing noise levels above the screen criteria level under existing conditions/No Action Alternative. These schools would experience increased noise levels of between 0 and 3 dB, which may contribute to classroom learning interference and would be a minor adverse impact.

In addition, the increase in the number of speech-interrupting events per school day hour (above 50 dB interior level) would remain similar to the F-15EX beddown except three additional schools, Jefferson Rise Charter School, Belle Chasse High School, and Christian Fellowship Daycare, would experience one additional event per average hour. The causation of speech interference at schools with increased noise levels may hinder the ability of students (including low-income and minority students) to learn, which would constitute a minor adverse impact to children to include low-income and minority children.

Table LA 3.4-9 shows that 4 percent of the 2,304 people within the projected noise contours under this alternative would be under 18 years of age, compared to the three-Parish reference population of 21 percent. The table also shows that 6 percent of the people within the projected noise contours would be elderly, compared to the three-Parish reference population of 16 percent. Therefore, children under 18 years of age and the elderly populations would not be disproportionately impacted by the F-35A Alternative.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.4.2.3 F-15C/D Legacy Aircraft

Installation

If neither of the beddown options are selected, the existing F-15C/D flying mission would remain in place at the 159 FW installation until the projected end of the airframe mission or future required mission change proposals are presented. Under this alternative, some construction would be required to sustain the mission and construction impacts would be similar to those described for the F-15EX beddown; however, impacts would be lower due to the lower level of construction. Preliminary estimates of the construction required under this legacy aircraft alternative place the cost of construction between $50 and $60 million. During operations, existing conditions described in Section LA3.4.1.1, *Installation*, would remain unchanged, and no significant impacts would occur. Therefore, as with the beddown alternatives, construction spending would be a minor beneficial impact on economic activity, employment, and wages. There would be no disproportionately adverse health or environmental effects on minority and low-income populations during construction or operation; there would be no environmental health and safety risks that would disproportionately affect children; and there would be no disproportionate impacts on the elderly during construction or operation. Therefore, no significant impacts would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.4.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.

LA3.4.3 Summary of Impacts

Construction projects under all of the alternatives would lead to minor beneficial impacts on the local economy and employment. A significant portion of the workforce could be supplied by the local construction industry, so impacts from non-local construction workers moving into the area would be minimal. Under the F-15EX Alternative, impacts on minority populations would not be disproportionate, whereas impacts on low-income populations would be slightly higher than the

three-Parish reference group. The percent of children under 18 years of age and the elderly that would be affected by the F-15EX noise contours would both be below the three-Parish reference group. Under the F-35A Alternative, the percent of low-income, minority, children under the age of 18, and the elderly would all be below the three-Parish reference populations, and therefore would not be disproportionate. Under the Legacy Alternative, there would be no disproportionately high and adverse health or environmental effects on minority and low-income populations during construction or operation; there would be no environmental health and safety risks that would disproportionately affect children; and there would be no disproportionate impacts on the elderly during construction or operation. Under the No Action Alternative, impacts on socioeconomics would not be significant and impacts on environmental justice, children's health and safety, and elderly would not be disproportionate.

LA3.5 LAND USE/NOISE COMPATIBLE LAND USE

In order to provide a comparable data set between proposed siting alternatives across all fighter wing locations considered for the Proposed Action, local zoning categories were consolidated and/or renamed. Table LA3.5-1 provides a cross-reference between the Jefferson Parish and Plaquemines Parish classifications and those used in this analysis.

Table LA3.5-1 Zoning Classification Used in EIS Analysis

Jefferson and Plaquemines Parish Zoning Classification	*EIS Land Use Classification*
Jefferson Parish	
Commercial, Community Facilities	Commercial
Mixed-Use	Mixed-Use
Production, Distribution, and Repair	Industrial
Resource Land and Water	Open Space/Recreation/Forest
Suburban Residential, Urban Residential	Residential
Plaquemines Parish	
General commercial, neighborhood commercial	Commercial
Heavy, light industrial, industrial park	Industrial
Mobile home park, Multiple family, single-family, two-family residential	Residential
Floodplain, wetlands, water, open space	Open Space/Recreation/Forest
Right of way	Transportation
Unknown (includes wetlands, waterways, roads)	Unknown
Medical Service	Public
Rural	Agricultural

Legend: EIS = Environmental Impact Statement.
Source: Jefferson Parish Government 2022; Plaquemines Parish 2022.

LA3.5.1 Affected Environment

LA3.5.1.1 Installation

The 2012 *Plaquemines Parish Comprehensive Master Plan* (Plaquemines Parish 2012) characterizes the regions' land uses, existing urban growth, and community boundaries, as well as the goals and objectives of the plan. NAS JRB New Orleans has established a DoD AICUZ Program prepared by the DON in accordance with Chief of Naval Operations Instruction 11010.36C (DON 2016a) to help identify and plan for compatible land use and development near NAS JRB New Orleans. In addition, NAS JRB New Orleans has conducted both an *Encroachment Action Plan* (DON 2016b) and a *Joint Land Use Study* (NAS JRB New Orleans 2011) to manage urban encroachment and focus on minimizing incompatible uses away from active airfields.

Figure LA3.5-1 shows the land use and existing noise contours on and in the vicinity of NAS JRB New Orleans. NAS JRB New Orleans includes a military family housing area, community support, and medical facilities located to the southeast of the 159 FW cantonment and "bachelor housing" centrally located within the 159 FW installation to support up to 761 personnel. NAS JRB New Orleans is adjacent to the community of Belle Chasse to the northeast and the Mississippi River runs along the eastern perimeter of the installation across Highway 23, while the Intercoastal Waterway is located to the west.

As shown on Figure LA3.5-1, land use surrounding NAS JRB New Orleans is comprised primarily of open space and agricultural/rural to the south and southwest with some small areas of residential and industrial. A mix of industrial, commercial, open space, and residential surrounds the installation to the west, north, and east. The "unknown" land use designation includes areas of land within the study area that Plaquemines Parish has not designated as a specific land use category; the parcel of "unknown" land use along the western border of the installation is currently a wetland. The open space designation also includes water bodies, wetlands, and floodplains, including the Mississippi River, Intercoastal Waterway, and other water features.

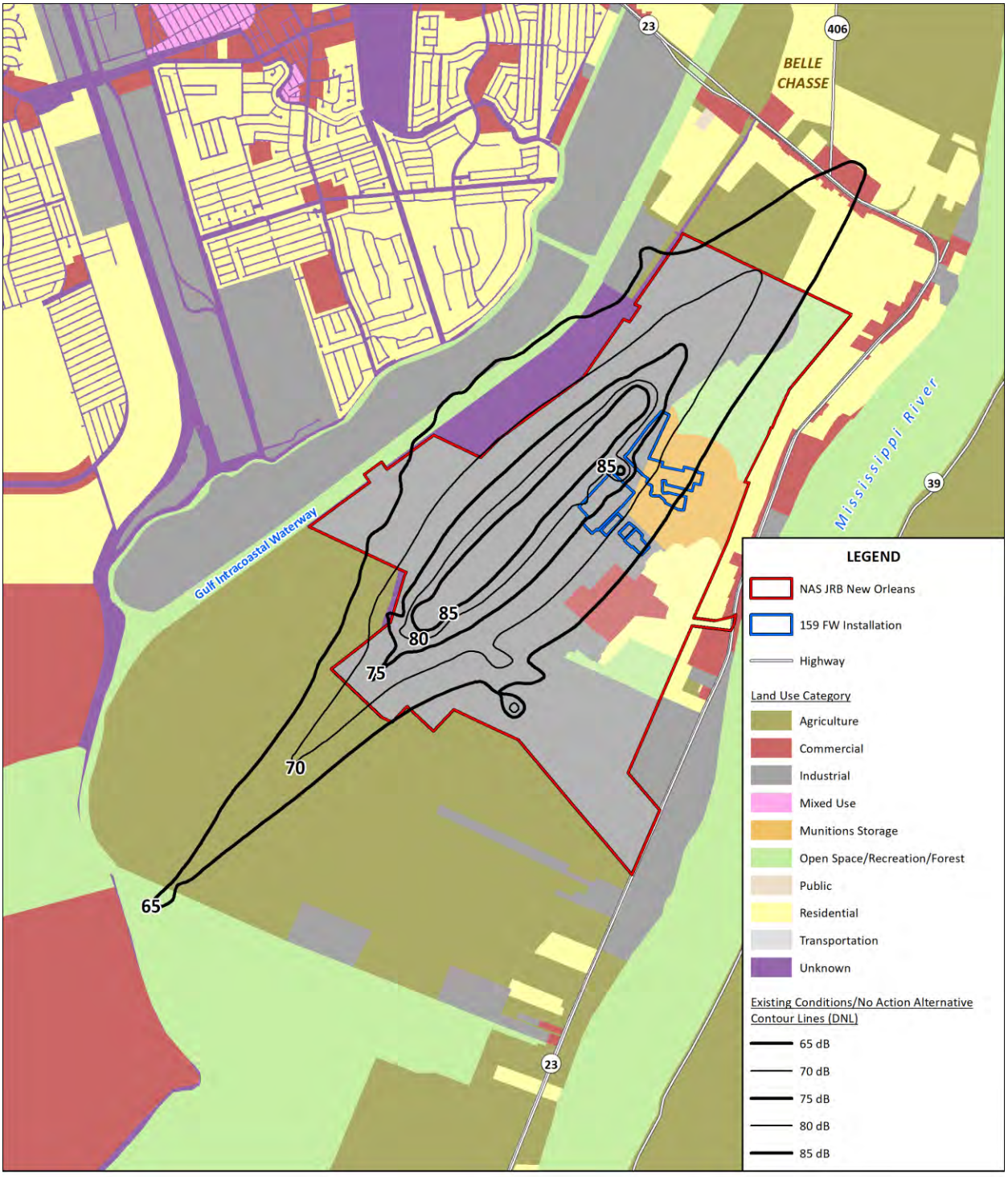


Figure LA3.5-1 Land Uses and Existing Noise Contours within the Vicinity of NAS JRB New Orleans

Land use activities most sensitive to noise typically include residential and commercial use, public services, and areas associated with cultural and recreational uses, such as parks/open space. Land uses surrounding NAS JRB New Orleans are typical of a military airfield and include aircraft operations, roadways, industrial, commercial, and residential activities. The FAA provides compatible land use guidelines for a variety of land uses in 14 CFR Part 150, *Airport Noise Compatibility Planning*. According to these criteria, sound levels up to 65 dB DNL are compatible with land uses such as residences, transient lodging, and medical facilities. Currently, approximately 1,470 acres of off-installation areas of industrial, commercial, open space/recreation/forest (includes the Mississippi River and the Intercoastal Waterway), transportation, unknown, and residential land uses are exposed to noise levels between 65 and 85 dB DNL. Section LA3.1.1, *Noise*, discusses existing noise levels at POIs such as schools and churches located within the greater than 65 dB DNL off-installation noise contour areas. Figure LA3.5-1 shows that existing noise contours extend off-installation primarily to the northeast and to the southwest. North of the installation, contours 65 dB DNL and above overlap with residential, commercial, open space/recreation/forest, and transportation. To the south, contours 65 dB DNL and above extend over open space/recreation/forest land use.

As shown on Figure LA3.10-1 (see Section LA3.10.1, *Safety*), RPZs associated with Runway 04/22 and 14/32 at both ends of the runways extend off installation property into land uses consisting of residential, commercial, open space/recreation/forest, unknown, transportation, agricultural, and industrial land uses.

LA3.5.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.5.2 Environmental Consequences

LA3.5.2.1 F-15EX

Installation

Land use immediately surrounding the 159 FW installation is comprised of commercial, open space/recreation/forest, and industrial uses and would not be affected by the proposed construction footprint (218,800 SF) as all construction and modification activities would occur within the installation boundaries. Additionally, there would be no change to the existing airfield-related RPZs and CZs. Proposed construction activities would be short-term and intermittent but may cause minor traffic and/or noise disruptions to local businesses, military family housing and bachelor housing areas, as well as employees at the 159 FW installation. However, construction activities would be temporary (between FY 2024 and 2032) and would occur during normal business hours

(i.e., between 7 a.m. and 5 p.m., Monday through Friday). The proposed construction activities would improve efficiency in daily operations by providing more efficient and secure operations for the 159 FW. Land uses would be consistent with current functions on the installation and all facilities would be designed and sited to be compatible with existing land uses and safety guidelines. There would be no significant impacts on land use related to construction as a result of basing of the F-15EX aircraft at the 159 FW installation.

The procedures and standards for analyzing noise exposure compatibility are set forth in FAA 14 CFR Part 150, *Airport Noise Compatibility Planning* and the DoD AICUZ Program supported by the 2012 *Plaquemines Parish Comprehensive Master Plan*, *NAS JRB AICUZ Study* (DON 2016a), *Encroachment Action Plan* (DON 2016b), and *Joint Land Use Study* (NAS JRB New Orleans 2011). At levels greater than or equal to 65 dB DNL, different land uses are either considered compatible, compatible with recommended sound attenuation materials incorporated into the construction, or not recommended. Based on FAA's guidelines, noise sensitive land uses (e.g., residential dwellings, churches, schools, and nursing homes) are considered compatible with aircraft noise at levels below 65 dB DNL. Hence, noise mitigation measures at airports have generally been focused on areas exposed to noise of 65 dB DNL or greater where noise level reduction through incorporation of sound attenuation into the design and construction of a structure may be necessary to achieve compatibility.

Annual airfield operations for the 159 FW would increase by 107 percent with the F-15EX, while total annual airfield operations at NAS JRB New Orleans would increase by 19.8 percent. The land use analysis compares the proposed noise contours to current noise contours, which show the existing noise environment. The comparison of the proposed contours to the current contours shows potential change in noise conditions and land use compatibility (Table LA3.5-2 and Figure LA3.5-2). Basing of the F-15EX at the 159 FW installation would result in an overall increase in the off-installation area affected by noise levels greater than 65 dB DNL by approximately 92 acres.

As shown in Table LA3.5-2, there would be a decrease of 59 acres of residential land use within the 65 to 70 dB DNL. No significant impacts on residential land uses would occur.

Table LA3.5-2 Off-Installation Land Use Acreage Affected by Noise Levels 65 dB and Greater for the F-15EX Aircraft within the Vicinity of NAS JRB New Orleans

Land Use Category	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*	*Current 75–80 dB DNL*	*Proposed 75–80 dB DNL*	*Change in Acres*
Residential	85	26	-59	0	0	0	0	0	0
Commercial	25	0	-25	0	0	0	0	0	0
Industrial	11	131	120	0	0	0	0	0	0
Open Space/Recreation/Forest[1]	62	146	84	0	0	0	0	0	0
Unknown[1, 2 ,3]	220	139	-81	12	110	98	1	5	4
Agriculture	440	382	-58	60	68	8	0	2	2
Transportation	2	0	-2	0	0	0	0	0	0
Total[4]	845	824	**-21**	72	178	**106**	1	7	**6**

Notes: [1]Includes the Mississippi River, Intercoastal Waterway, and other water features.
[2]Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not regulated under Part 150 or AICUZ guidance.
[3]The 'unknown' land use designation includes areas of land within the study area that Plaquemines Parish has not designated as a specific land use category.
[4]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day-Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

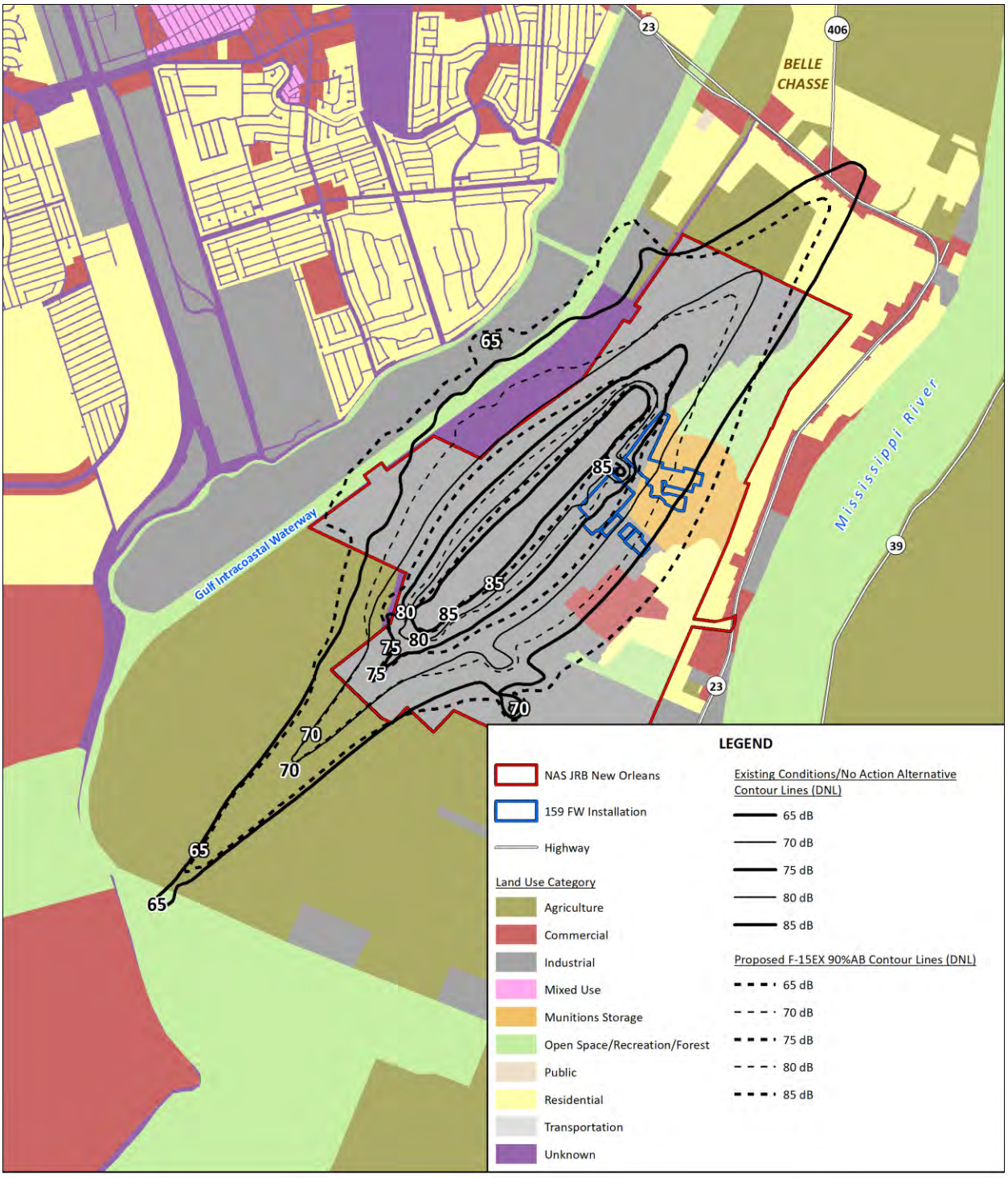


Figure LA3.5-2 Land Use, Existing Noise Contours, and Proposed F-15EX Noise Contours within the Vicinity of NAS JRB New Orleans

Source: ESRI 2022, Jefferson Parish 2022, NAVFAC SE 2022, Plaquemines Parish 2014

Fewer acres designated as Commercial and Transportation land uses would experience noise levels above 65 dB DNL. No significant impacts on these land uses would occur. An additional 120 acres of Industrial land uses would be exposed to 65 to 70 dB DNL. Most industrial land uses are compatible up to 85 dB DNL; no significant impacts on industrial land uses would occur. There would be an increase of 98 acres of "unknown" land uses (includes areas of land within the study area that Plaquemines Parish has not designated as a specific land use category) that would be within the 70 to 75 dB DNL and 4 acres within the 75 to 80 dB DNL. The parcel of "unknown" land use along the western border of the installation is currently a wetland. There would be an increase of 84 acres of Open Space land uses within the 65 to 70 dB DNL. Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural uses are not regulated under Part 150 or AICUZ guidance. Impacts on these land uses would not be considered a significant impact.

Similarly, most agricultural land uses are compatible up to 85 dB DNL with appropriate noise level reduction measures. There would be an increase of 8 acres of agricultural (rural) land uses within the 70 to 75 dB DNL, and 2 acres within the 75 to 80 dB DNL. The agricultural uses are primarily located to the south and north of the installation and are comprised primarily of wetlands. Impacts on agricultural land uses would not be considered a significant impact.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.5.2.2 F-35A

Installation

Basing the F-35A aircraft at the 159 FW installation would be similar in nature to the F-15EX aircraft and would include a construction footprint of 151,500 SF. Impacts would be less intensive in magnitude as there would be a smaller construction footprint (67,300 less SF or 31 percent less than under the F-15EX Alternative) associated with the basing of the F-35A. There would be no significant impacts on land use related to construction as a result of basing of the F-35A aircraft at the 159 FW installation.

Annual airfield operations for the 159 FW would increase by 107 percent with the F-35A, while total annual airfield operations at NAS JRB New Orleans would increase by 19.8 percent. The land use analysis compares the proposed noise contours to current noise contours, which show the existing noise environment. The comparison of the proposed contours to the current contours shows potential change in noise conditions and land use compatibility (Table LA3.5-3 and Figure LA3.5-3). Basing the F-35A at the 159 FW installation would result in an overall increase in the off-installation area affected by noise levels greater than 65 dB DNL by approximately 1,127 acres.

As shown in Table LA3.5-3, there would be an increase of 252 acres of residential land use within the 65 to 70 dB DNL and 8 acres within the 70 to 75 dB DNL. Residential uses are an incompatible and unmitigable land use over 75 dB DNL; no residential land uses would be impacted above 75 dB DNL. Residential uses from 65 to 75 dB DNL are considered incompatible and generally discouraged but could be mitigated with noise level reduction measures achieved through the incorporation of noise attenuation. The use of noise level reduction measures would not eliminate outdoor noise increases. Barring appropriate noise level reduction measures, impacts on residential land uses would be considered a significant impact.

An additional 44 acres of commercial and 107 acres of industrial land uses would be exposed to be within the 65 to 70 dB DNL noise contours. AICUZ and Part 150 guidance states that most commercial uses up to 80 dB are compatible with noise level reduction measures that would be achieved through the incorporation of noise attenuation. Similarly, most transportation (highway and street right-of-way), agricultural, and industrial uses are compatible up to 85 dB DNL with appropriate noise level reduction measures.

There would be an increase of 339 acres of agricultural (rural) land uses within the 65 to 70 dB DNL, 195 acres within the 70 to 75 dB DNL, and 28 acres within the 75 to 80 dB DNL. The agricultural uses are primarily located to the south and north of the installation and are comprised primarily of wetlands. An additional 42 acres of "unknown" land uses (includes areas of land within the study area that Plaquemines Parish has not designated as a specific land use category) would be within the 70 to 75 dB DNL and 3 acres within the 75 to 80 dB DNL. The parcel of "unknown" land use along the western border of the installation is currently a wetland. Open Space land uses would increase 125 acres within the 65 to 70 dB DNL. Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not regulated under Part 150 or AICUZ guidance. Impacts on these land uses would not be considered a significant impact.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

Table LA3.5-3 Off-Installation Land Use Acreage Affected by Noise Levels 65 dB and Greater for the F-35A Aircraft within the Vicinity of NAS JRB New Orleans

Land Use Category	*Current 65–70 dB DNL*	*Proposed 65–70 dB DNL*	*Change in Acres*	*Current 70–75 dB DNL*	*Proposed 70–75 dB DNL*	*Change in Acres*	*Current 75–80 dB DNL*	*Proposed 75–80 dB DNL*	*Change in Acres*
Residential	85	337	**252**	0	8	**8**	0	0	**0**
Commercial	25	69	**44**	0	0	**0**	0	0	**0**
Industrial	11	118	**107**	0	0	**0**	0	0	**0**
Open Space/Recreation/ Forest[1,2]	62	187	**125**	0	0	**0**	0	0	**0**
Unknown[2,3]	220	197	**-23**	12	54	**42**	1	4	**3**
Transportation	2	6	**4**	0	0	**0**	0	0	**0**
Agricultural	440	779	**339**	60	255	**195**	0	28	**28**
Total[4]	845	1,695	**850**	72	309	**237**	1	32	**31**

Notes: [1]Includes the Mississippi River, Intercoastal Waterway, and other water features.
[2]Unclassified land (e.g., unknown, undeveloped land/open space, and water) with no recreational, resource extraction, or agricultural use are not regulated under Part 150 or AICUZ guidance.
[3]The 'unknown' land use designation includes areas of land within the study area that Plaquemines Parish has not designated as a specific land use category.
[4]Numbers may not add up due to rounding.
Legend: dB = decibel; DNL = Day-Night Average Sound Level; JRB = Joint Reserve Base; NAS = Naval Air Station.

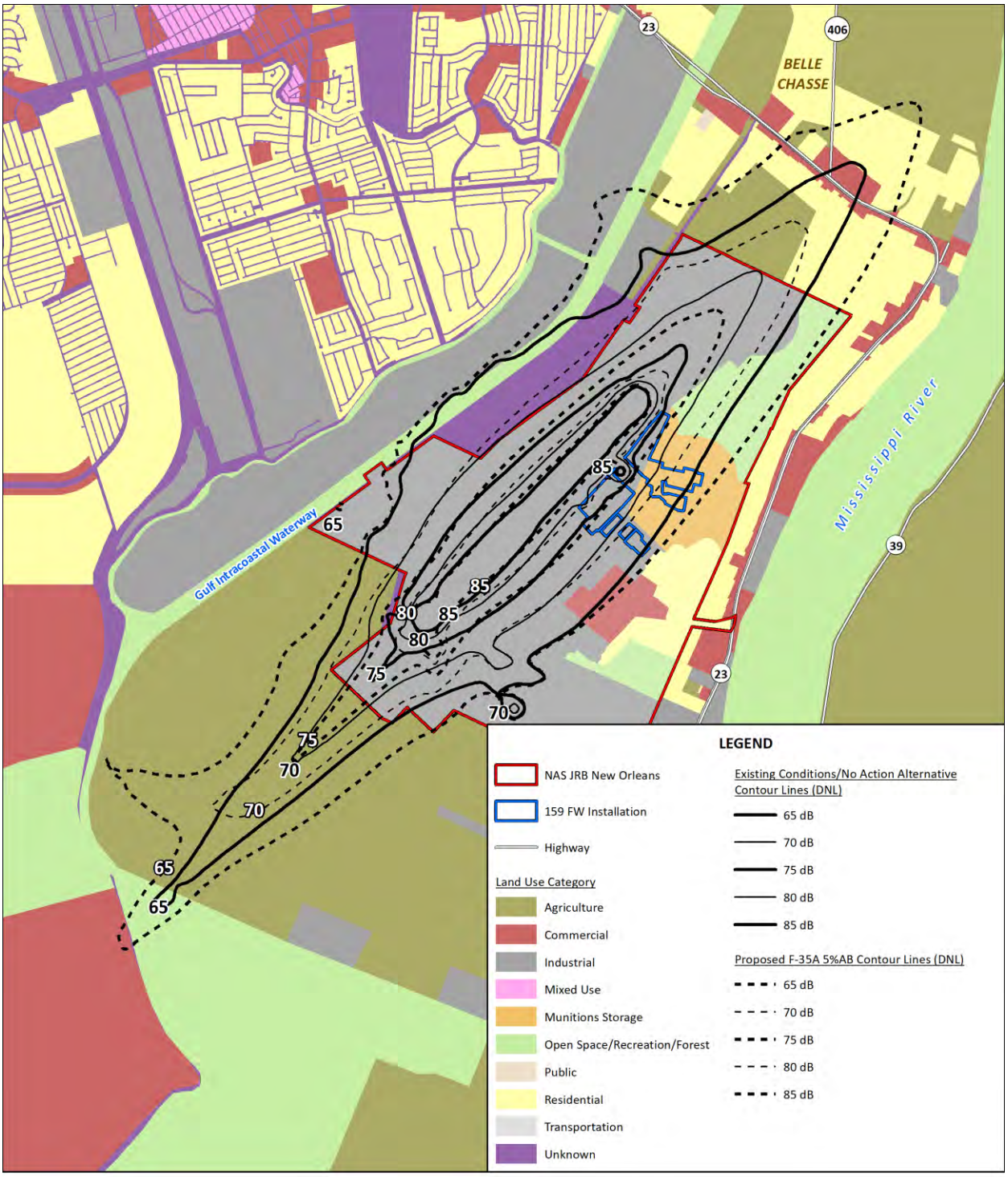


Figure LA3.5-3 Land Use, Existing Noise Contours, and Proposed F-35A Noise Contours within the Vicinity of NAS JRB New Orleans

LA3.5.2.3 F-15C/D Legacy Aircraft

Installation

Should the 159 FW retain the 18 F-15C/D legacy aircraft, impacts from construction would be less intensive in magnitude than basing the F-15EX or the F-35A. Construction for the F-15C/D legacy aircraft would include a construction footprint of 81,700 SF (62 percent and 46 percent less, respectively, than the F-15EX and the F-35A). Impacts related to construction would remain similar to basing the F-15EX or F-35A and impacts related to operations would remain the same as existing conditions/No Action Alternative; impacts on land use would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.5.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on land use would not be significant.

LA3.5.3 Summary of Impacts

Under the aircraft beddown alternatives at the 159 FW installation, off-base property experiencing noise levels greater than 65 dB DNL would increase by approximately 92 acres for the F-15EX and 1,127 acres for the F-35A. Under the F-15EX Alternative, acreage of residential land use would decrease by 59 acres within the 65 to 70 dB DNL. No significant impacts on residential land uses would occur. Under the F-35A, there would be an increase of 252 acres of residential land use within the 65 to 70 dB DNL and 8 acres within the 70 to 75 dB DNL. Barring appropriate noise level reduction measures, impacts on residential land uses would be considered a significant impact.

Should the F-15C/D legacy aircraft alternative or the No Action Alternative be selected, there would be no new impacts on land use. Construction projects would introduce short-term noise increases that would not generate noise levels to affect or change land use compatibilities.

LA3.6 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport. Two of the proposed fighter wings under consideration for new aircraft include the 104 FW at BAF and 144 FW at FAT. These ANG installations are tenants on the civilian airports regulated under FAA and as such are required to undergo Section 4(f) analysis. Because NAS JRB New Orleans is not a civilian airport, it was not analyzed for impacts related to Section 4(f) resources.

LA3.7 WATER RESOURCES/FLOODPLAINS/WILD AND SCENIC RIVERS

LA3.7.1 Affected Environment

LA3.7.1.1 Installation

Groundwater

The aquifer underlying the New Orleans area is called the coastal lowlands aquifer system. It consists of discontinuous beds of sand, silt, and clay that thicken as they approach the Gulf of Mexico and range in age from Oligocene to Holocene. General groundwater flow is toward the south; however, more than 90 years of increasingly large withdrawals of water from the coastal lowlands aquifer system in southern Louisiana have greatly affected the horizontal and vertical groundwater flow (DON 2020, 2022). For example, the direction of groundwater flow near pumping centers is opposite to natural or predevelopment direction, and large withdrawals have induced greater infiltration of precipitation at aquifer outcrop areas and greater streambed leakage. A shallow aquifer exists under NAS JRB New Orleans, but it is not a source of potable water (DON 2020).

Surface Water

NAS JRB New Orleans is located between the Mississippi River and the Gulf Intracoastal Waterway (Figure LA3.7-1). Most of the land on and surrounding NAS JRB New Orleans is below sea level and is protected from flooding by an extensive system of levees maintained by Plaquemines Parish. Due to the elevation of the area surrounding the installation, pumps are required to discharge surface water runoff into canals (DON 2020, 2022).

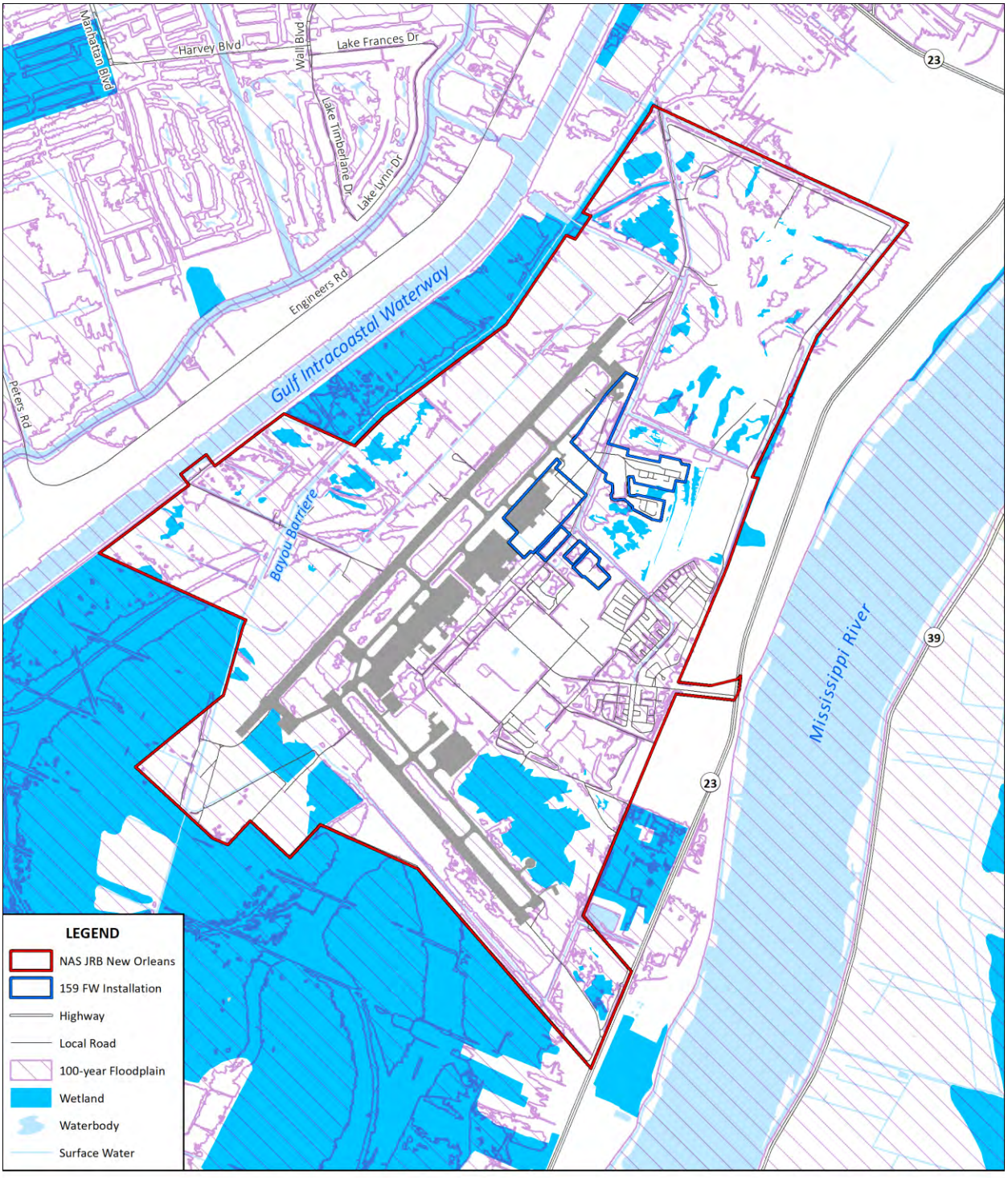


Figure LA3.7-1 Water Resources at NAS JRB New Orleans

Water on NAS JRB New Orleans consists of freshwater wetlands (see Section LA3.12, *Biological Resources/Coastal Resources/Wetlands*), drainage and navigable canals, several small stormwater and retention basins, and numerous open ditches, which are maintained by NAS JRB New Orleans. Pumping stations throughout the area maintain a water level in the canals of 7 to 10 feet below MSL. The installation is permitted to discharge surface water runoff into the Gulf Intracoastal Waterway via Bayou Barriere in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Louisiana Department of Environmental Quality Office of Environmental Services Water Discharge Permit No. LA0051187. The Intracoastal Waterway from Bayou Villars to the Mississippi River is designated as an impaired water body and is on the CWA Section 303(d) list for turbidity (EPA 2023). All drainage canals and ditches at NAS JRB New Orleans eventually flow into Bayou Barriere and are then pumped to the Gulf Intracoastal Waterway and ultimately the Gulf of Mexico (DON 2020, 2022).

Over time, the stormwater conveyance system has deteriorated, either by sediment buildup in conveyance ditches, settlement of wet clay soils causing pipes to have negative slopes and reduced capacity of ditches and culverts (DON 2020, 2022).

The wetlands, drainage and navigable canals, and ditches within NAS JRB New Orleans are assumed to be jurisdictional. However, a jurisdictional determination would need to be performed and submitted to the USACE for verification on which wetlands and waters are waters of the U.S. and are therefore subject to Sections 401 and 404 of the CWA (see Section LA3.12, *Biological Resources/Coastal Resources/Wetland*, for further information on wetlands).

Floodplains

The FEMA 100-year floodplain associated with the Mississippi River Delta affects a large portion of the NAS JRB New Orleans and surrounding areas and is present on much of the project area (FEMA 2021). According to the USACE, the 25-year floodplain elevation at NAS JRB New Orleans is -1.75 feet MSL while the 50-year floodplain elevation is -1.6 feet MSL. Floodplains that fall within a levee system are evaluated for flood potential based on the integrity of the levee system and the surrounding area (DON 2020).

Two off-installation, Plaquemines Parish-maintained pump stations and a drainage canal system provide stormwater flood protection for 6 inches of rainfall over a 24-hour period, comparable to a 2-year storm event. Flooding along roadways, airfield surfaces, and other paved or hardpan areas is often experienced on the installation as a result of precipitation in excess of the drainage system capacity and a lack of surface absorption (DON 2020).

While the levee system surrounding NAS JRB New Orleans provides some flood protection, recent storm events compromised the levee system in several areas in the region. During the 2005

hurricane season, storm surge from Hurricane Katrina breached some levees and resulted in levee failure in several locations of New Orleans, which produced extensive flooding. However, the breaching and/or failures of these levees did not directly impact NAS JRB New Orleans. The USACE is currently improving levees, floodwalls, and floodgates within the New Orleans area to provide 100-year level of risk reduction (DON 2020).

LA3.7.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.7.2 Environmental Consequences

LA3.7.2.1 F-15EX

Installation

Groundwater

Construction activities, as shown in Figure LA3.7-2, and operations under the F-15EX at NAS JRB New Orleans would include stormwater runoff protection measures that would also serve to protect groundwater quality. By implementing BMPs identified in a site-specific SWPPP, to be prepared in adherence with the Construction General Permit (see below under *Surface Water*), stormwater pollutant loading potential would be minimized and thus pollution loading potential to the underlying groundwater basins would be minimized during construction. Impacts on groundwater recharge would be minimized through implementation of LID technologies (see below under *Surface Water*) that would ensure predevelopment hydrology is maintained. Site grading and construction activities would not be expected to reach depths at which groundwater would be affected. However, if groundwater were to be encountered during excavation, then dewatering would occur in compliance with the Construction General Permit and SWPPP. Implementation of stormwater runoff protection measures, as necessary and appropriate, would ensure that impacts on groundwater under this alternative at the NAS JRB New Orleans would not be significant.

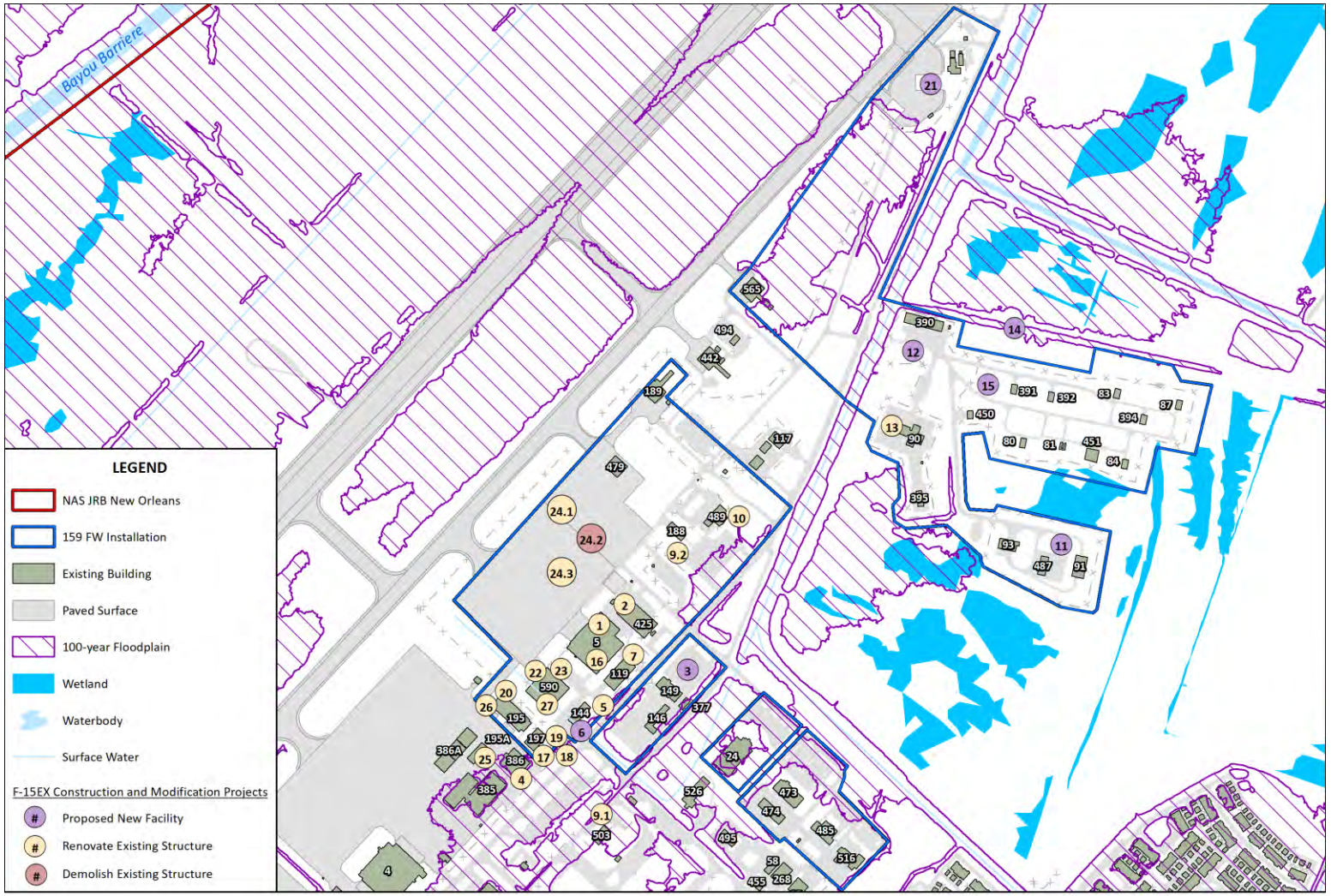


Figure LA3.7-2 Water Resources within the Vicinity of F-15EX Construction and Modification Projects at NAS JRB New Orleans

Surface Water

NAS JRB New Orleans would obtain coverage under the Storm Water General Permit for Construction Activities (General Permit No. LAR100000) with the Louisiana Department of Environmental Quality prior to implementation of individual projects. To obtain coverage under the Construction General Permit, the 159 FW would need to file a Notice of Intent with the Louisiana Department of Environmental Quality. A site-specific and detailed SWPPP would include measures to minimize potential impacts associated with stormwater runoff during construction, including BMPs and standard erosion control measures. These measures could include straw bales, sandbags, silt fencing, earthen berms, tarps or water spraying, soil stabilization, temporary sedimentation basins, and re-vegetation with native plant species, where possible, to decrease erosion and sedimentation. Post construction, to minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the NAS JRB New Orleans SWPPP (NAS JRB New Orleans 2017) and the Louisiana Department of Natural Resources Urban Storm Water Runoff BMP Manual (Louisiana Department of Natural Resources 2008) would be implemented.

Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential.

As a result of the F-15EX beddown, there would be approximately 85,300 SF of net new impervious surfaces from the proposed facility construction and modification activities, as shown in Figure LA3.7-2. This could result in localized increases in surface runoff and total suspended particulates to nearby surface waters. However, integration of LID (see Section LA3.7.2, *Environmental Consequences*) design concepts incorporate site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area and prevent further impacts on the impaired Intracoastal Waterway. All new facilities would be in compliance with the NAS JRB New Orleans SWPPP and in adherence to the surface water runoff discharge effluent limitations, monitoring requirements, and other conditions set forth in Louisiana Department of Environmental Quality Office of Environmental Services Water Discharge Permit No. LA0051187. Implementation of surface runoff measures, as necessary and appropriate, would ensure that impacts on surface water as a result of implementation of this action alternative would be minimal.

Under this alternative, construction and modification projects could have the potential to impact waters of the U.S. (see Section LA3.12.2, *Environmental Consequences*, for further information on wetlands). Prior to construction in areas that would overlap surface waters (see Figure LA3.7-2), a jurisdictional determination would need to be conducted to identify current locations

and conditions of waters of the U.S. in the project area. If jurisdictional waters of the U.S. are identified at the project site, additional planning, design, and permitting would be required. The ANG's preference is to plan and design projects in a manner that would not result in permanent fill of jurisdictional wetlands or other waters of the U.S. If such impacts cannot be avoided at these project sites, compensatory mitigation and federal permitting and state water quality certification, in accordance with Sections 401 and 404 of the CWA, would be necessary for any construction activities affecting these wetlands or other waters of the U.S. NAS JRB New Orleans is committed to conducting the jurisdictional determination and avoiding impacts on waters of the U.S. to the maximum extent practicable and/or compensatory mitigation, as necessary. Therefore, impacts on waters of the U.S under this alternative would not be significant.

Floodplains

Several of the proposed construction and modification projects, described in Table LA2.1-3, are located within the 100-year floodplain (see Figure LA3.7-2). Some of these proposed projects would renovate existing structures that are already located within the 100-year floodplain, such as Project 4, Project 17, Project 18, and Project 9.1; however, these structures are not located in an active floodway (i.e., active river channel). In compliance with the current building codes in the state of Louisiana, all new construction or substantially improved buildings within the 100-year floodplain would have the lowest floor elevated at least 1-foot above the 100-year flood elevation (State of Louisiana 2021). The development, issuance, and analysis provided by this EIS constitutes compliance of EO 11988 and EO 13690. EO 11988 and EO 13690 require that agencies evaluate the potential effects of actions within a floodplain and to avoid floodplains unless the agency determines there is no practicable alternative. Since the proposed projects would involve construction in a floodplain, a Finding of No Practicable Alternative would be required. The ANG has determined that there is no practicable alternative for construction of these facilities outside the floodplain, therefore a Finding of No Practicable Alternative would be prepared. Additionally, no structures would impede the conveyance of flood waters; decrease floodplain capacity; or increase flood elevations, frequencies, or durations. Consistent with AFI 32-1023, design of these facilities would address flood risk condition protection requirement minimums outlined in UFC 1-200-01. Therefore, impacts on floodplains under the F-15EX beddown at NAS JRB New Orleans would not be significant and the project is in compliance with EO 11988 and EO 13690.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.7.2.2 F-35A

Installation

Construction and modification projects under the F-35A Alternative, shown in Figure LA3.7-3, would be similar to those described for the F-15EX beddown and would have approximately 100,800 SF of new impervious surfaces. As such, the impacts related to groundwater, surface water, and floodplain resources would be similar to those described under the F-15EX beddown and would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.7.2.3 F-15C/D Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects, shown in Figure LA3.7-4 to sustain the current mission and would create 62,500 SF of new impervious surfaces. There would be less new impervious surfaces as compared to the other two alternatives, as such impacts on groundwater resources would be minimal. Any increased surface water runoff would be managed by implementing LID strategies, implementation of BMPs, adherence to the SWPPP, and implementing surface runoff measures, as necessary and appropriate, and would ensure that impacts on surface water would be minimal. Under this alternative there would be fewer construction and modification projects located within the 100-year floodplain, than the previous two alternatives; however, similar to and as described under the F-15EX beddown, impacts on floodplains would not be significant and would be in compliance with EO 11988 and EO 13690. Since the proposed projects would involve construction in a floodplain, a Finding of No Practicable Alternative would be required.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

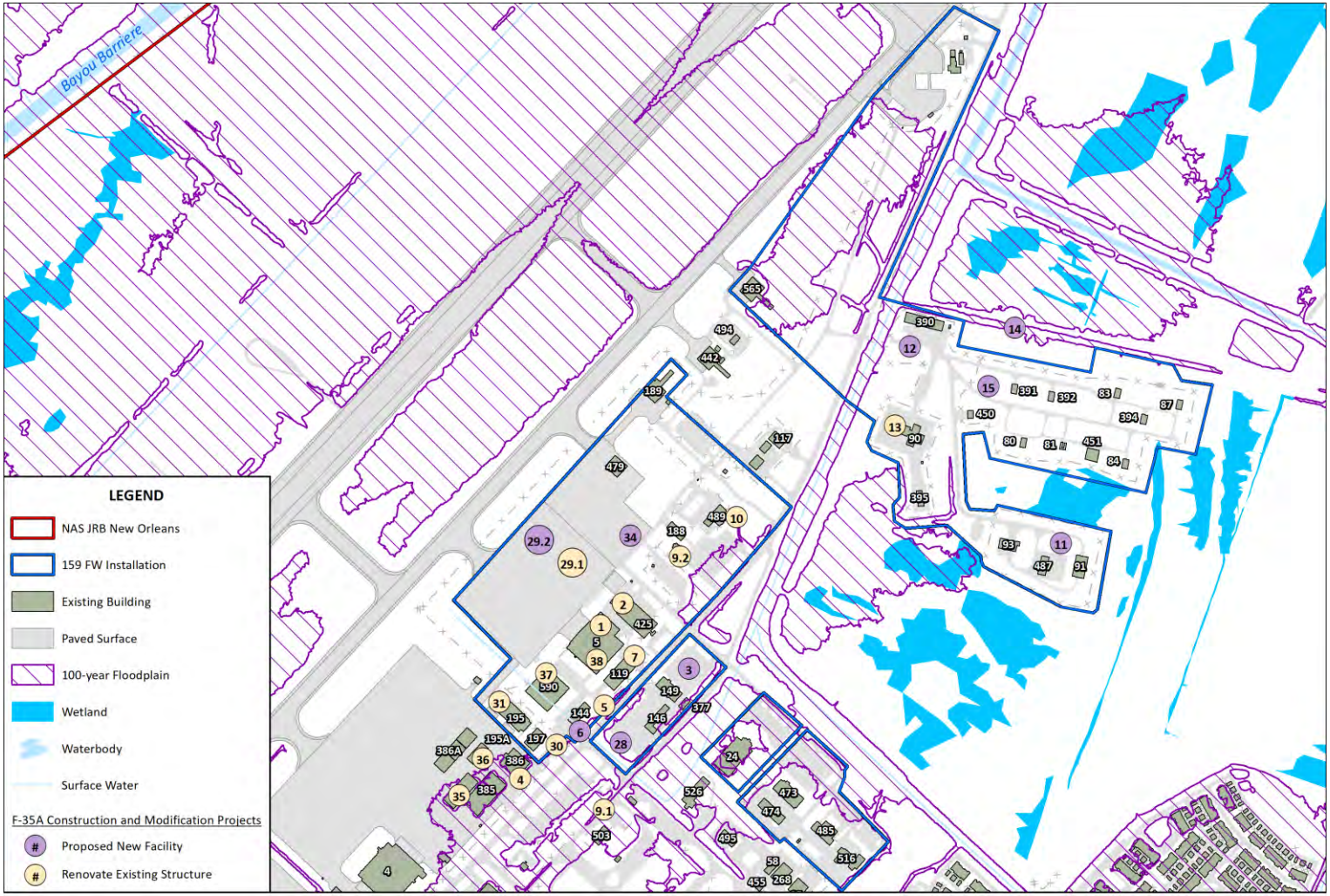


Figure LA3.7-3 Water Resources within the Vicinity of F-35A Construction and Modification Projects at NAS JRB New Orleans

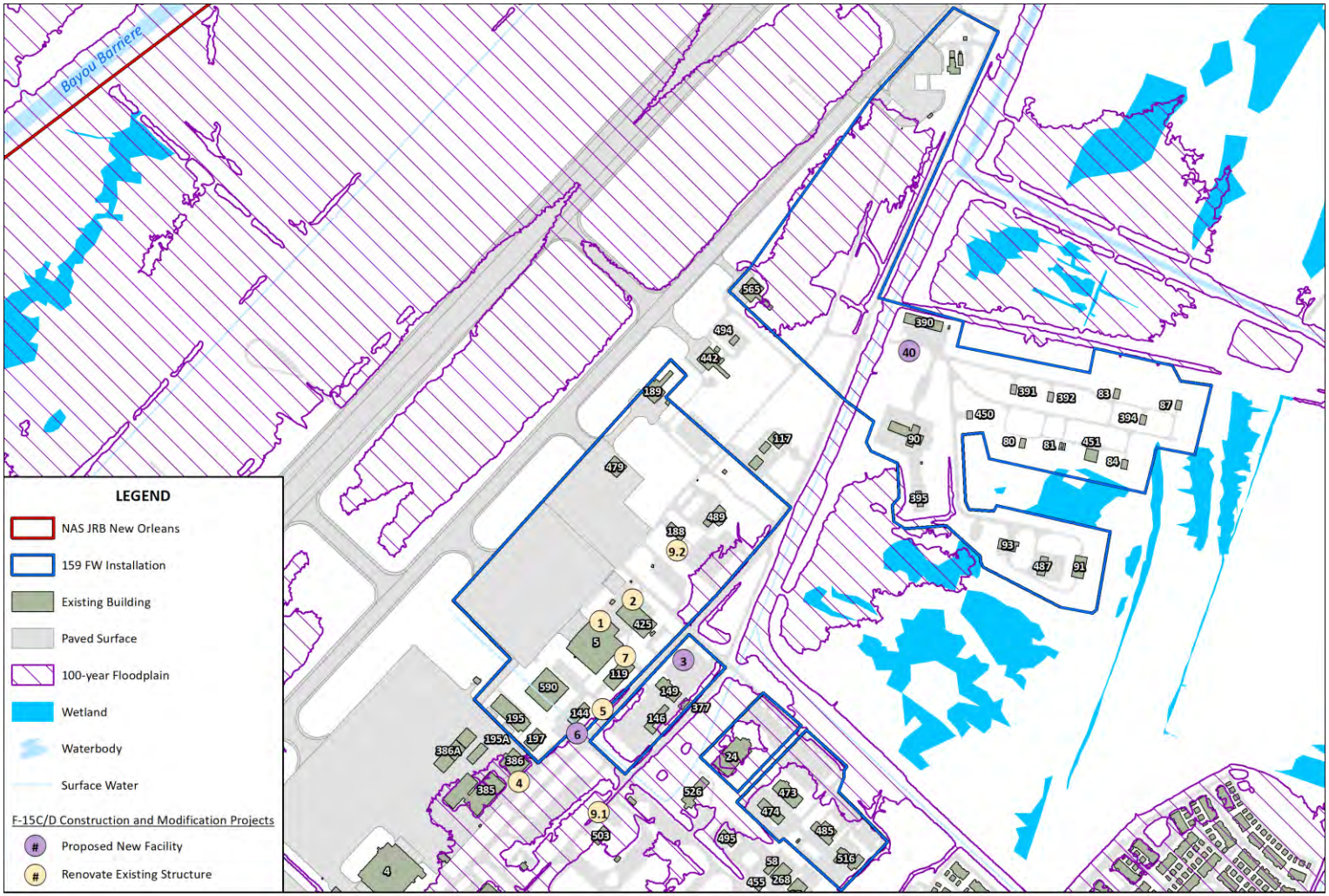


Figure LA3.7-4 Water Resources within the Vicinity of Legacy Aircraft Construction and Modification Projects at NAS JRB New Orleans

LA3.7.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on water resources would not be significant.

LA3.7.3 Summary of Impacts

Under the Proposed Action alternatives at NAS JRB New Orleans, proposed construction and modification activities would result in up to 100,800 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. Some of the proposed construction or modification projects would be located within the 100-year floodplain; however, impacts on floodplains would not be significant and be in compliance with EO 11988, and with preparation of a Finding of No Practicable Alternative. Impacts on water resources as a result of the proposed beddown of the F-15EX, F-35A, retention of the F-15C/D aircraft, or the No Action Alternative at NAS JRB New Orleans would not be significant.

LA3.8 GEOLOGICAL RESOURCES/SOILS/FARMLANDS

Please note that Geological Resources is included in this EIS as a DoD requirement and is not an environmental impact category identified in FAA Order 1050.1 for the FAA.

LA3.8.1 Affected Environment

LA3.8.1.1 Installation

Topography and Geology

The New Orleans area is flat, varying in elevation by only 25 feet, ranging from approximately 20 feet above MSL to 5 feet below MSL. The terrain at NAS JRB New Orleans is even flatter, with elevation ranging from approximately 3.0 feet above MSL to 2.0 feet below MSL (DON 2022).

NAS JRB New Orleans lies within the Mississippi Alluvial Plain within the Gulf Coast Plains. The near-surface geology of the area surrounding NAS JRB New Orleans is the result of a subsiding Mississippi River delta lobe that has been drained, diked, and filled with various dredge material from nearby water bodies (e.g., Mississippi River and adjacent drainage canals) (DON 2022).

Soils

Soils at NAS JRB New Orleans consist of alluvial deposits, with surface deposits of predominantly black to brown clay with high water content. The NRCS maps one soil series where construction and modification projects would occur (Figure LA3.8-1): Rita mucky clay (Ra) (NRCS 2022; DON 2022). This soil series is characteristic of poorly drained areas, having high shrink-swell potentials and wetness.

LA3.8.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.8.2 Environmental Consequences

LA3.8.2.1 F-15EX

Installation

Topography and Geology

Proposed construction and modification activities would result in approximately 218,800 SF of ground disturbance and would require some modification of terrain by cut and fill techniques and other minor grading. However, no obvious topographic features would be affected as a result of implementation of construction and modification activities. Implementation of proposed new construction would not substantially affect the geologic units underlying the installation, as no unique geologic features or geologic hazards are present. Although ground disturbance would occur during construction and modification activities, the majority of construction and modifications would occur over previously disturbed surfaces. Therefore, no significant impacts would occur.

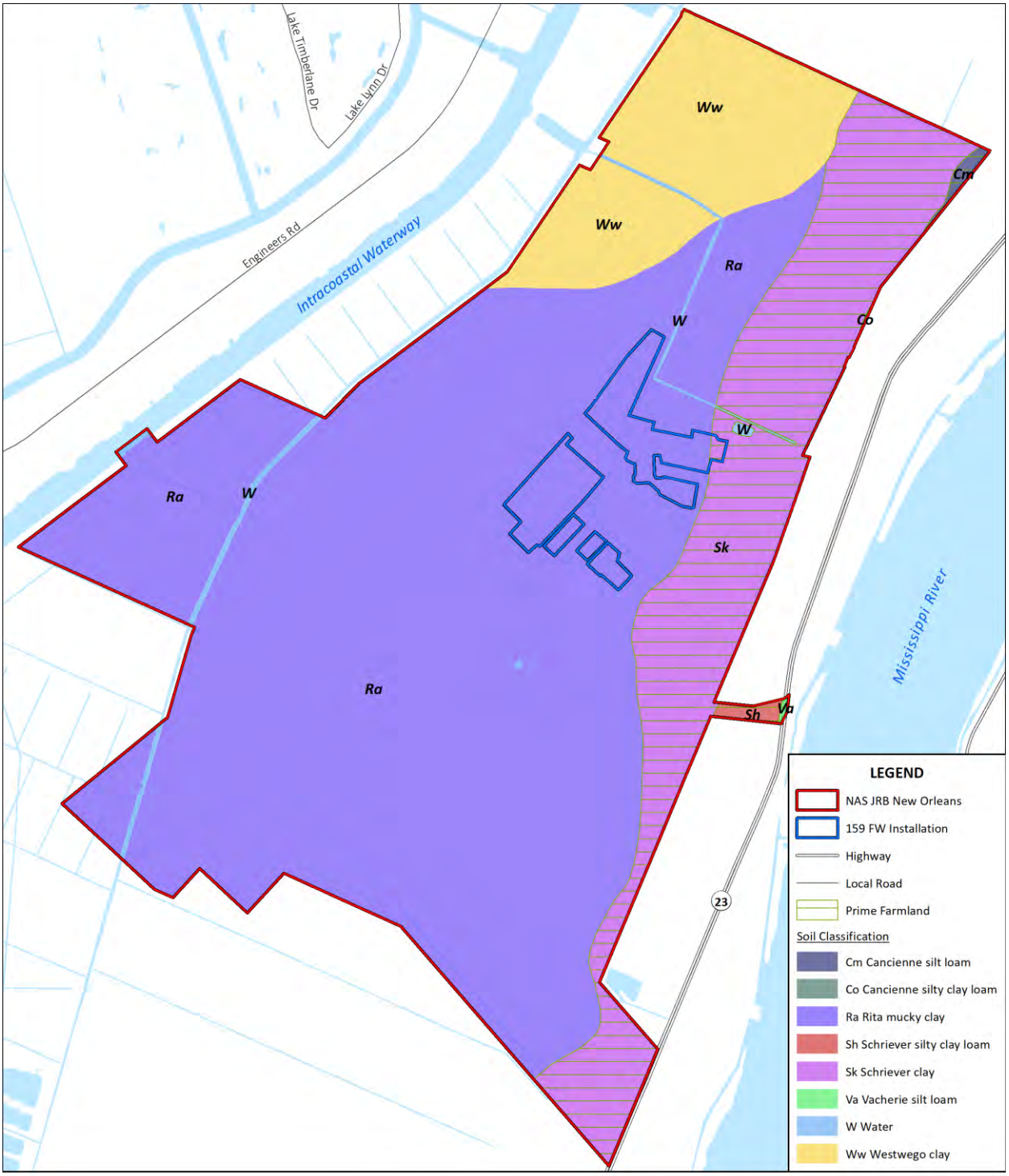


Figure LA3.8-1 Geological Resources at NAS JRB New Orleans

Soils

As shown in Figure LA3.8-1, proposed construction and modification activities would occur only on Rita mucky clay, which is a poorly drained soil with slow permeability that causes it to be wet. It is likely that grading of existing soils and placement of structural fill for new facilities would not substantially alter existing soil conditions at NAS JRB New Orleans because much of the 159 FW installation has been previously disturbed or altered as a result of prior development. The greatest potential impact to soil would occur with use of heavy equipment on wet soils that could cause rutting or compaction, or erosion of soils under very dry conditions.

As discussed in Section LA3.7.2, *Environmental Consequences*, construction activities would be in compliance with the Construction General Permit, which would include a site-specific and detailed SWPPP that coordinates the timing of soil-disturbing activities with the installation of soil erosion and runoff controls. This is an effective way of controlling erosion while soil is exposed and subject to construction activity. Such BMPs could include the use of effective wind erosion controls, stabilization for all disturbed soils prior to storm events, maintaining effective perimeter controls and stabilizing site entrances and exits. Following construction, disturbed areas not covered with impervious surface could be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. Additionally, post construction BMPs, as outlined in the NAS JRB New Orleans SWPPP (NAS JRB New Orleans 2017) and the Louisiana Department of Natural Resources Urban Storm Water Runoff BMP Manual (Louisiana Department of Natural Resources 2008) would minimize erosion during operations. Implementation of these measures, as necessary and appropriate, would ensure that impacts on soils under this action alternative at NAS JRB New Orleans would not be significant.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.8.2.2 F-35A

Installation

Under the F-35A beddown alternative, new construction and modifications projects would result in approximately 151,500 SF of ground disturbance. There would be less ground disturbance than the F-15EX Alternative; however, impacts on topography and geology would generally be similar to those described above. Proposed construction and modification activities under this alternative would occur on Rita mucky clay, which is a poorly drained soil with slow permeability that causes it to be wet. Impacts on soil would be similar to those described above. Construction and modification activities would be in compliance with the Construction General Permit, site-specific

SWPPP, and associated BMPs. Therefore, no significant impacts on geological resources from implementation of this alternative would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.8.2.3 F-15C/D Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would create 81,700 SF of ground disturbance. There would be less ground disturbance compared to the other two alternatives. All ground disturbance would happen on previously disturbed land; therefore, no significant impacts on geological resources would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4-1, *Resources Analyzed in the EIS*).

LA3.8.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on geological resources would not be significant.

LA3.8.3 Summary of Impacts

Under the Proposed Action alternatives at NAS JRB New Orleans, proposed construction and modification activities would result in up to 218,800 SF of ground disturbance. Construction and modification activities would be in compliance with the Construction General Permit. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Impacts on geological resources as a result of the proposed beddown of the F-15EX, F-35A, retention of the F-15C/D aircraft, or the No Action Alternative at NAS JRB New Orleans would not be significant.

LA3.9 CULTURAL RESOURCES

LA3.9.1 Affected Environment

LA3.9.1.1 Installation

Archaeological Resources

Twelve archaeological surveys have been completed at NAS JRB New Orleans from 1975 to 2022, though the entirety of the installation's approximate 3,342 acres has not been surveyed. Eight archaeological resources have been identified as a result of these surveys. These sites include two precontact sites with shell, two historical period artifact scatters, the Sea Train facility, a grocery store, a historical pumping station and associated debris field, and the Idlewild Plantation (Naval Facilities Engineering Systems Command [NAVFAC] Southeast 2008a). However, only one resource, the mid-nineteenth century historic pumping station (Site 16PL164), was recommended as eligible for listing in the NRHP (NAVFAC Southeast 2008a). This site is located within the 159 FW installation boundary. There are no NRHP-listed archaeological sites at NAS JRB New Orleans (NAVFAC Southeast 2008a).

Architectural Resources

Naval Reserve Air Base New Orleans was first established on July 15, 1941, as a basic training center for Naval aviation trainees. The installation was renamed Naval Air Station New Orleans in January 1943 before its current re-designation as NAS JRB New Orleans in 1994. Construction of the installation began in 1954 and was steadily expanded throughout the 1970s and 1980s. A comprehensive architectural inventory and evaluation of built resources at NAS JRB New Orleans was completed in 2008. No districts, buildings, or structures were recommended as being eligible for listing in the NRHP as a result of the architectural inventory (NAVFAC Southeast 2008b). There are no NRHP-eligible or listed architectural properties, historic districts, or historic landscapes at NAS JRB New Orleans (NAVFAC Southeast 2008a).

Traditional Cultural Resources

Government-to-government consultation between the 159 FW and each federally recognized Tribal Nation associated with the NAS JRB New Orleans is being conducted for this action to afford the Tribal Nations the opportunity to provide input in the decision-making process in recognition of their status as sovereign nations, to provide information regarding Tribal concerns per Section 106 of the NHPA, and to provide information on traditional cultural resources that may be present on lands present at the 159 FW.

To date, no traditional cultural resources or Native American sacred places have been identified at NAS JRB New Orleans (NAVFAC Southeast 2008a). There are 17 Tribal Nations that claim tribal affiliation with NAS JRB New Orleans and/or the geography in which the installation occurs (HUD 2022; NAVFAC Southeast 2008a). Government-to-government consultation letters have been sent to the 17 Tribal Nations. See Appendix A for all Section 106 and government-to-government correspondence.

Off-Base

There are no NRHP-eligible or NRHP-listed historic properties located within the 65 dB DNL or greater noise contours surrounding the airfield (National Park Service 2022a). Therefore, off-base historic properties were not further analyzed under this locational scenario.

LA3.9.1.2 Airspace

Table LA3.9-1 presents the NRHP-listed sites underlying the airspace on lands beneath the SUA used by 159 FW (National Park Service 2022b). These historic properties in Louisiana include historic houses, a plantation, churches, courthouse and associated jail, a bridge, a railroad depot, schools, a rustic country store, earthwork fortifications, a log cabin, a hospital building, a United Service Organizations building, a set of grave shelters, and historic districts. The plantation is located under three SUA units: Walker 1 MOA, R-3804A, and R-3804C.

On the lands underlying the Warrior 1 MOA in Texas, there is a historic bridge and the three NRHP-listed historic properties underlying the Warrior 2 MOA in Texas include a courthouse, a plantation, and homestead.

Table LA3.9-1 NRHP Historic Properties Associated with the 159 FW SUA

SUA	***Number of NRHP Properties Under Airspace[1]***
Louisiana	
Snake MOA	1
Warrior 1 MOA	21
Warrior 2 MOA	14
Warrior 3 MOA	3
Texas	
Warrior 1 MOA	1
Warrior 2 MOA	3

Note: [1]Many of the same historic properties are located beneath multiple SUA and across state lines.
Legend: 159 FW = 159th Fighter Wing; MOA = Military Operations Area; NRHP = National Register of Historic Places; SUA = Special Use Airspace.
Source: National Park Service 2022b.

No national monuments, national historic battlefields, or National Historic Landmarks are located under the existing SUA (National Park Service 2022a, 2022c, 2022d).

A fragment of the El Camino Real de los Tejas National Historic Trail is located beneath the Warrior 1 MOA (National Park Service 2022e). The trail served as a political, economic, and cultural link between Mexico City and Los Adaes. El Camino Real de los Tejas was the primary overland route for the Spanish colonization of Texas and northwestern Louisiana (National Park Service 2022f).

Government-to-government consultation between the 159 FW and the 12 Tribal Nations associated with the SUA associated with the 159 FW (HUD 2022) is being conducted to afford the Tribal Nations the opportunity to provide input in the decision-making process in recognition of their status as sovereign nations, to provide information regarding Tribal concerns per Section 106 of the NHPA, and to provide information on traditional cultural resources that may be present on lands underlying the SUA. See Appendix A for all Section 106 and government-to-government correspondence.

To date, no traditional cultural resources or Native American sacred places have been identified within the SUA associated with the 159 FW installation.

LA3.9.2 Environmental Consequences

LA3.9.2.1 F-15EX

Installation

Implementation of F-15EX beddown at the 159 FW installation would include new construction, building demolitions, and site and utility improvements resulting in approximately 218,800 SF of ground disturbance. The majority of the project area consists of the built environment; therefore, encountering unidentified archaeological resources in an undisturbed location is not likely. There is one NRHP-eligible archaeological site within the installation boundary for the 159 FW, but it is not within the APE for the F-15EX project action. It is not expected that undiscovered archaeological resources would be found during implementation of the F-15EX beddown at NAS JRB New Orleans. 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 NAS JRB New Orleans Cultural Resources Manager. The Cultural Resources Manager would secure the location and ensure that all cultural items are left in place and that no further disturbance is permitted to occur. The Cultural Resources Manager would then contact the NAVFAC Historic Preservation Officer and continue

to follow Standard Operating Procedure No. 8, *Inadvertent Discovery of Archaeological Resources*, as outlined in the NAS JRB New Orleans ICRMP (NAVFAC Southeast 2008a).

No traditional cultural resources have been identified at NAS JRB New Orleans. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of this alternative at NAS JRB New Orleans would involve the interior modification of 10 buildings. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. Two buildings would undergo additions and/or external building or site modifications, and one building (Building 144) would be demolished for the implementation of the F-15EX beddown. None of the buildings included in the F-15EX Alternative are eligible for or are listed in the NRHP (NAVFAC Southeast 2008a). Therefore, no architectural resources would be impacted by the F-15EX beddown.

Since no buildings at the 159 FW installation are listed or eligible for the NRHP, and because the NRHP-eligible archaeological site is located outside of the APE, implementation of the project actions will result in no historic properties affected per 36 CFR Section 800.4(d)(1).

Airspace

Under this alternative, the 159 FW would conduct up to 3,832 annual sorties. Based on this, the time spent in the airspace by the 159 FW would increase by approximately 107 percent. With the vast amount of SUA in the region, aircraft can be dispersed throughout instead of all tasked to one SUA. The F-15EX would conduct 76 percent more training in the altitudes 18,000 feet MSL through 30,000 feet MSL than the F-15C/D, which would be above standard MOA altitudes. Noise modeling results suggest an increase of 107 percent of events would result in up to a 6 dB increase in the noise produced in any given area. This increase would be on top of the existing DNL levels, which vary from 46 dB L_{dnmr} on the upper end down to levels below the noise modeling software's lower limit of prediction (see Section LA3.1.2.1, *F-15EX*). Therefore, L_{dnmr} would remain relatively low. Visual intrusions under this alternative would be minimal and would not represent an increase sufficient to cause significant impacts on the settings of cultural resources or adverse effects to historic properties. Due to the high altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft would not be readily visible to observers on the ground.

No additional ground disturbance would occur under the airspace due to the basing of the F-15EX. Use of ordnance and defensive countermeasures would occur in areas already used for these activities. Flares deployed from the aircraft would not pose a visual intrusion either, as flares are small in size and burn only for a few seconds and the high relative altitude of the flights would

make them virtually undetectable to people on the ground. Use of chaff and flare results in residual materials that fall to the ground in a dispersed fashion. However, these residual materials do not collect in quantities great enough to adversely affect the NRHP status of historic properties (DAF 2023).

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-15EX beddown would not result in significant impacts to cultural resources and no historic properties affected per 36 CFR Section 800.4(d)(1)5(b) with respect to cultural resources located at the installation and a finding of no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on these findings for the Proposed Action.

LA3.9.2.2 F-35A

Installation

Implementation of the F-35A beddown at the 159 FW installation would result in approximately 151,500 SF of ground disturbance. No ground disturbance would take place near the known historic property located at NAS JRB New Orleans. It is not expected that undiscovered archaeological resources would be found during implementation of the F-35A beddown. However, in the event of an inadvertent discovery during ground-disturbing operations, the 159 FW would follow the steps as described above under the F-15EX Alternative.

No traditional cultural resources have been identified at NAS JRB New Orleans. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of the F-35A beddown at 159 FW would involve the interior modification of 12 buildings. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. Two buildings would undergo additions and/or external building or site modifications, and one building (Building 144) would be demolished for the implementation of the F-35A beddown. None of the buildings included in the F-35A proposed construction are eligible for or are listed in the NRHP (NAVFAC Southeast 2008a). Therefore, no architectural resources would be impacted by the F-35A beddown.

Since no buildings at the 159 FW installation are listed or eligible for the NRHP, and because the NRHP-eligible archaeological site is located outside of the APE, implementation of the project actions will result in no historic properties affected per 36 CFR Section 800.4(d)(1).

Airspace

Under the F-35A Alternative, the 159 FW would conduct up to 3,832 annual sorties. Based on this, the time spent in the airspace by the 159 FW would increase by approximately 107 percent. The F-35A would conduct 93 percent of its training within the altitudes 18,000 feet MSL through 30,000 feet MSL. In comparison, the F-15C/D only conducts 17 percent of training activities within the same altitude block. Based on the increase in sorties of 107 percent along with the greater SEL of the F-35A, L_{dnmr} in each airspace that would be used by the F-35A could increase up to 8 dB from existing conditions/No Action Alternative. The result would be L_{dnmr} ranging from 48 dB on the upper end down to levels below the noise modeling software's lower limit of prediction (see Section LA3.1.2.2, *F-35A*). Therefore, L_{dnmr} would remain relatively low.

Visual impacts and use of ordnance and defensive countermeasures within the airspace would be the same as described for the F-15EX.

Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

Overall, implementation of the F-35A Alternative would not result in significant impacts and no historic properties affected per 36 CFR Section 800.4(d)(1)5(b) with respect to cultural resources located at the installation, and a finding of no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on these findings for the Proposed Action.

LA3.9.2.3 F-15C/D Legacy Aircraft

Installation

Retaining the existing aircraft would require construction and modification projects to sustain the current mission and would result in approximately 81,700 SF of ground disturbance. No ground disturbance would take place near the known historic property located at NAS JRB New Orleans. It is not expected that undiscovered archaeological resources would be found during implementation of the legacy F-15C/D alternative at 159 FW. However, in the event of an inadvertent discovery during ground-disturbing operations, the installation would follow the steps as described above under the F-15EX and F-35A proposed beddowns.

No traditional cultural resources have been identified at NAS JRB New Orleans. See Appendix A for all Section 106 and government-to-government correspondence.

Implementation of this alternative would involve the interior modification of six buildings. Interior modifications would include demolition, reconstruction, and reconfiguration of interior walls; heating, ventilating, and air conditioning upgrades; and electrical upgrades. One building would undergo an addition, and one building (Building 144) (also Building 386 if Option 2 is selected) would be demolished for the implementation of legacy F-15C/D alternative. None of the buildings included in the construction plans for this alternative are eligible for or are listed in the NRHP (NAVFAC Southeast 2008a).

Since no buildings at the 159 FW installation are listed or eligible for the NRHP, and since the NRHP-eligible archaeological site is outside of the APE, implementation of the project actions will result in no historic properties affected per 36 CFR Section 800.5(b).

Airspace

Under this alternative, the 159 FW's current fleet of 18 F-15C/D aircraft would continue to utilize the existing SUA. No changes to the number of operations or frequency of use would occur. Operations would remain as described in LA2.1.2; therefore, no significant impacts on cultural resources or adverse effects to historic properties would occur.

Overall, implementation of the F-15C/D beddown would not result in significant impacts to cultural resources and no historic properties affected per 36 CFR Section 800.4(d)(1)5(b) with respect to cultural resources located at the installation, and a finding of no adverse effect per 36 CFR Section 800.5(b) with respect to historic properties beneath the SUA. The DAF is seeking concurrence with the SHPO on these findings for the Proposed Action.

LA3.9.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF; however, impacts on cultural resources would not be significant and there would be no adverse effects to historic properties.

LA3.9.3 Summary of Impacts

There are no known historic properties within any of the proposed construction footprints at the 159 FW installation. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation

of work. No buildings associated with the proposed construction have been determined to be eligible for listing in the NRHP. There would be no noise impacts on NHRP listed or eligible resources within the APE because none are present. No traditional cultural resources have been identified at the 159 FW installation. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Use of the SUA under the F-15EX or F-35A Alternatives would increase but would be similar in nature to ongoing operations. Therefore, implementation of the F-15EX, F-35A, legacy F-15C/D, or No Action Alternatives at the 159 FW installation or in the SUA would not result in significant impacts on cultural resources. No known historic properties are present within the APE at the installation; therefore, implementation of the F-15EX, F-35A, F-15C/D, or No Action Alternatives at the 159 FW installation would result in no historic properties affected per 36 CFR Section 800.4(d)(1). Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b).

LA3.10 SAFETY

LA3.10.1 Affected Environment

LA3.10.1.1 Installation

Fire/Crash Response

The NAS JRB New Orleans Fire and Emergency Services responds to all fire/crash incidents at NAS JRB New Orleans, including the 159 FW installation. If increased response is required, the military fire department is party to mutual support agreements with local firefighting agencies (NAVFAC Southeast 2018a).

Accident Potential Zone/Runway Protection Zone

The APZs and CZs that have been established at NAS JRB New Orleans primarily occur within Plaquemines Parish (Figure LA3.10-1). CZs occur almost entirely within the base boundaries, in areas with industrial land use and a small area with open space/recreation/forest land uses. The southeastern CZ of Runway 14/32 extends off-base into areas with industrial and open space/recreation/forest land uses. The northwestern CZ of Runway 14/32 extends off-base in areas with open space/recreation/forest land uses. Industrial areas are not compatible with CZs per AICUZ guidance; however, open space and forest land uses are compatible land uses with CZs (DAF 2020). Runway 4/22 northeastern APZ I extends off-base over open space/recreation/forest land uses as well as residential land uses. Residential areas are not compatible with APZ I under AICUZ guidance.

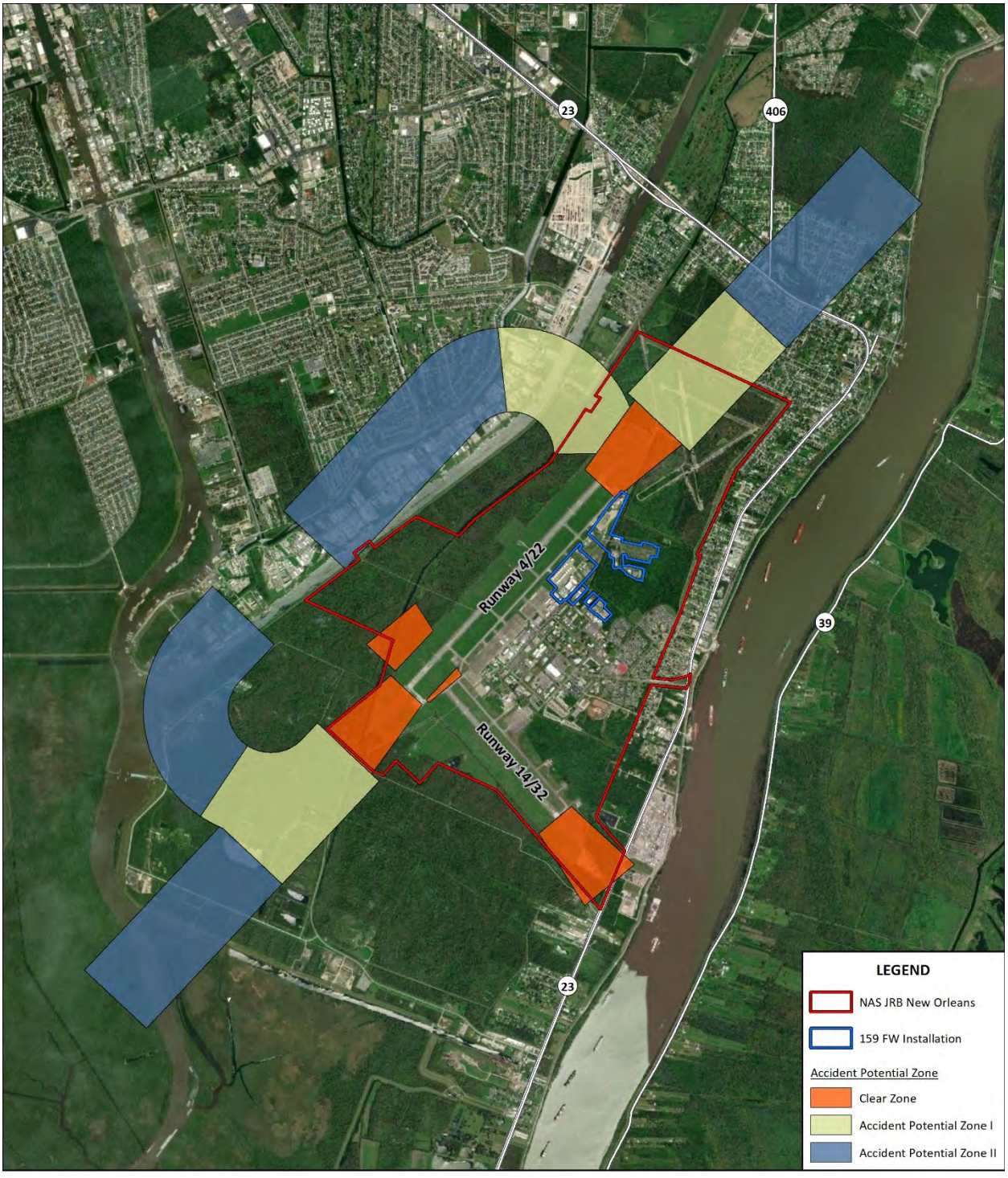


Figure LA3.10-1 APZs at NAS JRB New Orleans

The northeastern APZ II occurs over open space/recreation/forest, commercial, and residential land uses. Single unit detached residential land use is compatible with APZ II under AICUZ guidance; however, multi-family residence residential land use is incompatible with this zone. Runway 4/22 northwestern APZ I and APZ II both overlay industrial, open space/recreation/forest, residential, and unknown land uses. Residential and industrial areas are incompatible with APZ I, while only multi-family dwelling residential land use is incompatible with APZ II. The southwest APZ I is located over off-installation open space/recreation/forest land uses. The two southwest APZ II are located over agricultural or open spaces, commercial, and industrial areas all of which are compatible land uses under AICUZ recommendations.

Explosive Safety

The 159 FW stores, maintains, and uses munitions required for executing their mission (see Section LA2.1.7, *Ordnance Use and Defensive Countermeasures*). The MSA at the 159 FW installation is located within the northeastern parcel of the installation and currently includes nine earth-covered magazines (Buildings 80, 81, 83, 84, 87, 391, 392, 394, and 451), four segregated magazine storage buildings (Buildings 91, 93, 390, and 487), inert ammunition storage building (Building 450), maintenance facility (Building 395), and an ordnance operations facility (Building 90). Figure LA3.10-2 shows QD arcs established for these facilities. Additional areas outside of the MSA where QD arcs have been established include Parking Apron 7, Parking Apron 8, Taxiway K, and Runway 14/32 (Figure LA3.10-2).

Anti-terrorism/Force Protection

Many of the military facilities at the 159 FW were constructed before AT/FP considerations became a critical concern. Thus, many facilities do not currently comply with all current AT/FP standards including the runway which does not have adequate enclave security (NAVFAC 2007). However, as new construction occurs and as facilities are modified, the 159 FW incorporates these standards to the maximum extent practical during project planning and design phases.

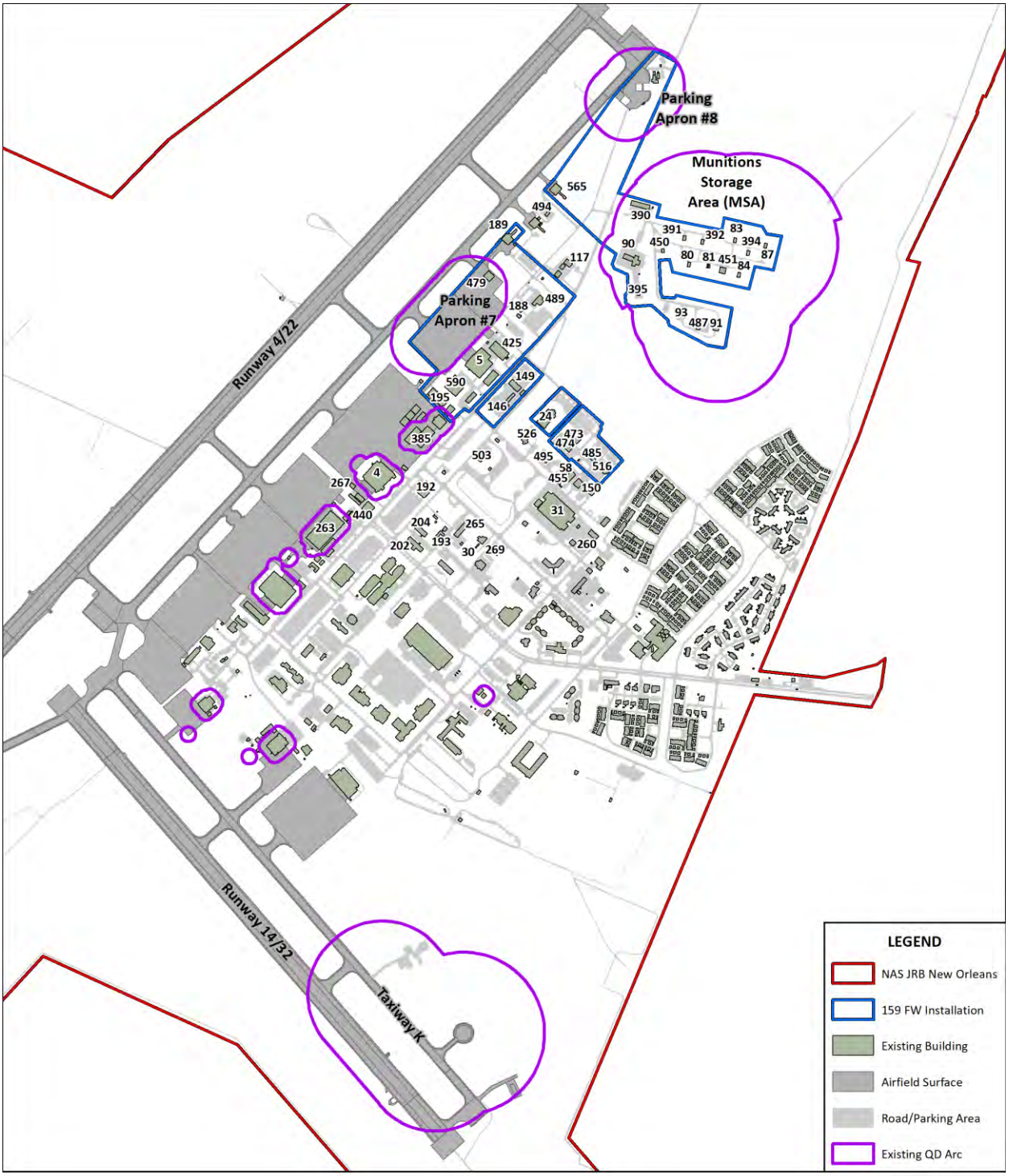


Figure LA3.10-2 Explosive Safety QD Arcs at NAS JRB New Orleans

LA3.10.1.2 Airspace

Flight Safety Procedures

Naval Safety Command recently initiated several facets for proactive flight safety. While investigations after an accident have yielded causality of mishaps, proactive safety entails searching for and measuring precursors that can lead to accidents before they occur. In mission planning, pre-flight, and during flight, safety is at the forefront of all flight operations. In accordance with Chief of Naval Operations Instruction 3750.6S, all naval aviation personnel shall familiarize themselves with the safety management system instruction and other safety directives applicable to them and their assigned duties. All naval aviation activities shall establish and maintain an aggressive naval aviation safety management system, which includes the detection, investigation, and elimination of hazards in naval aviation (DON 2014).

Aircraft flight operations at the 159 FW installation are governed by general flight and operating instructions. Aviation safety requirements are contained in standard operating procedures that must be followed by all aircrews operating from the airfield. DON general regulations that guide aviation and airfield are the Chief of Naval Air Training M-3710.7, *Naval Air Training and Operating Procedures Standardization General Flight and Operating Instructions*; Naval Air Systems Command 00-80T-124, *Naval Air Training and Operating Procedures Standardization Airfield Operations Manual;* and Naval Air Command 00-80T-114, *Naval Air Training and Operating Procedures Standardization Air Traffic Control Manual*.

Aircraft Mishaps

The 159 FW currently flies and maintains 18 PAA F-15C/D aircraft. The F-15 aircraft (all models) have flown 6,982,447 hours since the aircraft entered the DAF inventory in 1972. Over that period, 160 Class A mishaps have occurred, and 127 aircraft have been destroyed. This results in a lifetime Class A mishap rate of 3.20 annual mishaps per 100,000 flight hours and a lifetime destroyed aircraft rate of 1.82 annual aircraft destroyed per 100,000 flight hours (AFSEC 2021).

Bird/Wildlife Aircraft Strike Hazards

There have been 128 bird strikes recorded at NAS JRB New Orleans from 2008–2019 (DON 2021). The abundance of black and turkey vultures at the 159 FW installation creates the highest level of hazard and potential for damage if a strike would occur (DON 2021).

The 159 FW actively implements the NAS JRB New Orleans Instruction 10570.2, *Wildlife Hazard Management Plan*, thereby reducing the potential for a bird strike to occur (DON 2021). Key elements of the plan include monitoring the airfield for bird and other wildlife activity, issuing

bird hazard warnings, initiating bird/wildlife avoidance procedures when potentially hazardous bird/wildlife activities are reported, and submitting BASH reports for all incidents.

LA3.10.2 Environmental Consequences

LA3.10.2.1 F-15EX

Installation

Under the F-15EX Alternative, total flight operations at NAS JRB New Orleans would increase by 4,214, or 19.8 percent over current operations. The NAS JRB New Orleans Fire and Emergency Services would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations under the F-15EX Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the airfield fire department.

There would be no changes required to established RPZs under the F-15EX Alternative. In addition, none of the proposed construction projects would occur within established RPZs, and new construction projects would not result in new airfield obstructions; therefore, no impacts on RPZs would occur under the F-15EX Alternative.

Nine construction projects would occur with the boundaries of existing QD arcs under the F-15EX Alternative: Project 4 (Construct Weapons Load Facility), Project 11 (Construct Inert Munitions Assembly Conveyor Pad), Project 12 (Construct Munitions Administration Facility), Project 13 (Repair Munitions Maintenance and Inspection), Project 14 (Repair Munitions Security Fence Line), Project 15 (Construct Munitions Igloos), Project 21 (Addition and Alteration Alert Facility), Project 24.1 (Construct Ramp Shelters), Project 24.2 (Demolish Ramp Shelters), and Project 24.3 (Construct Ramp Shelters) (see Figure LA2.1-1 and Appendix C for project location and detailed descriptions). In accordance with Air Force Manual 91-201, *Explosive Safety Standards*, all public traffic route distances and inhabited building distances would meet specified net explosive weight QD criteria. No explosives would be handled during construction or demolition activities. Therefore, no additional risk to explosive safety would be expected as a result of implementation of this alternative and no significant impacts would occur.

AT/FP compliance would increase under the F-15EX Alternative as all new construction and modification projects would be conducted in accordance with current AT/FP requirements, thus, beneficial impacts on AT/FP would occur.

Airspace

F-15EX aircrews would follow the local and federal regulations which govern flight within controlled, uncontrolled, and SUA. The F-15EX would continue to follow all local and federal rules and regulations.

The F-15EX utilizes the same airframe from the current and familiar F-15C/D model. Though the avionics are more advanced, the increase in automation and technology would aid the pilots in reducing total workload, therefore, improving situational awareness.

The F-15EX would operate in the same airspace environment as the F-15C/D currently operates. The F-15EX is no different in size from the F-15C/D. Therefore, the overall potential for a bird strike event would not be anticipated to be statistically different from current F-15C/D. Additionally, F-15EX aircrew would be expected to follow applicable rules and procedures outlined in the 159 FW installation BASH Plan, NAS JRB New Orleans Instruction 10570.2, which when followed, would reduce the overall risk of a potential BASH event. Local bird watch conditions or wildlife activity advisories would still be briefed and adhered to in an effort to reduce the likelihood of a bird strike. Therefore, no significant impacts would occur.

LA3.10.2.2 F-35A

Installation

As with the F-15EX Alternative, the NAS JRB New Orleans Fire and Emergency Services would continue to respond to all ANG fire/crash emergencies and currently has the equipment and personnel capacity to handle the increase in aircraft operations under the F-35A Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the airfield fire department.

Proposed renovation and infrastructure improvement projects related to this alternative would not impact aircraft takeoff and landings or penetrate any RPZs. New construction projects are not proposed within RPZs; therefore, construction activity would not result in any greater safety risk or obstructions to navigation. Operations would fall within the same general types as those that have historically occurred at the 159 FW installation. For example, the F-35A would follow established local approach and departure patterns used. Therefore, flight activity and subsequent operations would not require changes to RPZs.

Ten construction projects would occur with the boundaries of existing QD arcs under the F-35A Alternative: Project 4 (Construct Weapons Load Facility), Project 11 (Construct Inert Munitions

Assembly Conveyor Pad), Project 12 (Construct Munitions Administration Facility), Project 13 (Repair Munitions Maintenance and Inspection), Project 14 (Repair Munitions Security Fence Line), Project 15 (Construct Munitions Igloos), Project 29.1 (Demolish and Reorient Ramp Shelters), Project 29.2 (Demolish and Replace Ramp Shelters), Project 34 (Install Blast Deflectors), and Project 35 (Repair Engine Shop) (see Figure LA2.1-2 and Appendix C for project location and detailed descriptions). Per Air Force Manual 91-201, *Explosive Safety Standards,* all public traffic route distances and inhabited building distances would meet specified net explosive weight QD criteria. No explosives would be handled during construction or demolition activities. Therefore, no additional risk to explosive safety would be expected as a result of implementation of this alternative and no significant impacts would occur.

AT/FP compliance would increase under the F-35A Alternative as all new construction and modification projects would be conducted in accordance with current AT/FP requirements, thus, beneficial impacts on AT/FP would occur.

Airspace

F-35A aircrews would follow the local and federal regulations which govern flight within controlled, uncontrolled, and SUA. It is expected that the 159 FW would develop an F-35A Operations Manual to guide policies and procedures set forth by the Commander.

The F-35A has been operational since 2012 and has amassed 225,449 flight hours (AFSEC 2022) with five Class A mishaps to date. History has shown that Class A mishap rates for new aircraft decrease over time. This is due to increased familiarity, training, and exposure on the F-35 aircraft, systems, and flight processes. The 159 FW has not had a Class A mishap since 1998 and the expectation is that through advanced cockpit technology and reduced pilot workload would only aid reducing the chances of a Class A mishap.

The F-35A would operate in the same airspace environment as the current F-15C/D. The F-35A is smaller in size from the F-15C/D. Therefore, the overall potential for a bird strike event can be anticipated to be different from current F-15C/D based on the reduced surface area of the aircraft. Additionally, F-35A aircrew would be expected to follow all applicable rules and procedures outlined in the 159 FW installation BASH Plan, NAS JRB New Orleans Instruction 10570.2, which when followed, would reduce the overall risk of a potential BASH event. Local bird watch conditions and wildlife activity advisories would still be briefed and adhered to in an effort to reduce the likelihood of a bird strike. Therefore, no significant impacts would occur.

LA3.10.2.3 F-15C/D Legacy Aircraft

Installation

Under the F-15C/D legacy aircraft alternative, aircraft replacement would not occur; however, construction and modification projects that are required to maintain the current F-15C/D aircraft would occur. The NAS JRB New Orleans Fire and Emergency Services would continue to respond to all ANG-related fire and emergency incidents, which are not expected to increase as annual operations remain identical to existing conditions/No Action Alternative. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. Any increase in incident response due to construction-related activities would be temporary in frequency and duration and within the current capacity of the 159 FW fire department; therefore, no significant impacts on fire/crash safety would be expected under the legacy aircraft alternative.

Under the legacy aircraft alternative, Project 40 (Construct Munitions Administration Facility) (see Figure LA2.1-3 and Appendix C for project location and description) would occur within existing QD arcs. No munitions movement or handling would occur during construction-related activities. There would be no change to the amount, type, or handling of munitions at the installation under the legacy aircraft alternative; therefore, no significant impacts related to explosive safety would occur.

There would be no change in aircraft under the legacy aircraft alternative, thus, there would be no changes to existing RPZs under this alternative. In addition, there would be no new construction or modification projects occurring within RPZ footprints; therefore, no significant impacts on RPZs would occur under the legacy aircraft alternative.

Construction and modification projects associated with the legacy aircraft alternative would be conducted in accordance with all AT/FP requirements, thus, beneficial impacts on AT/FP would occur.

Airspace

Under this alternative, the 18 legacy F-15C/D would continue to operate as described in Section LA2.1.2, *Airfield Operations*. BASH and mishaps would continue to be mitigated through the 159 FW installation BASH Plan, NAS JRB New Orleans Instruction 10570.2, safety training, technology, and ATC services.

LA3.10.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on safety could emerge since F-15C aircraft may experience increased maintenance needs as the legacy aircraft continue to age.

LA3.10.3 Summary of Impacts

Fire and crash response would continue to be conducted by the NAS JRB New Orleans Fire and Emergency Services under all alternatives. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented. In addition, any increase in incident response due to construction-related activities would be temporary in frequency and duration and would occur within the current capacity of the airfield fire department. No construction would occur within APZs and there would be no new airfield obstructions created by construction or modification projects. QD arcs would not be expected to change from existing conditions/No Action Alternative. While there are some planned construction projects that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements as mandated by the DoD and would increase overall AT/FP compliance.

The F-15EX would utilize the same airframe as the current and familiar F-15C/D model. The avionics for the F-15EX are more advanced, thus the increase in automation and technology would aid the pilots in reducing total workload therefore improving situational awareness. Additionally, the F-35A platform fly-by-wire and advanced systems also aid in cockpit management and improved situational awareness. Reduced workload, improved situational awareness, training and familiarity would only continue to help reduce the chances of mishaps. The 159 FW installation BASH Plan, NAS JRB New Orleans Instruction 10570.2, is used to mitigate and reduce the chances of a BASH event from occurring. The lifetime Class A mishap rates for the F-15 and F-35 are 2.29 and 2.22 per 100,000 hours flown, respectively.

No significant impacts on safety would be expected with implementation of any of the action alternatives. Under the No Action Alternative, as the F-15C aircraft continue to age, maintenance and resulting safety issues could emerge.

LA3.11 HAZARDOUS MATERIALS/WASTE

LA3.11.1 Affected Environment

LA3.11.1.1 Installation

Hazardous Materials

Hazardous materials and petroleum products are used throughout the 159 FW installation to support aircraft maintenance, aerospace ground equipment maintenance, ground vehicle maintenance, and POL management and distribution. Types of hazardous materials found on the 159 FW installation include fuels, POLs, solvents, batteries, aerosols, recovered fuels, hydraulic fluid, paints, and paint strippers. Handling of hazardous materials is in accordance with DoD, federal, state, and local regulations.

ASTs and other containers are used for bulk fluid storage on the 159 FW installation including Jet Fuel F-24, diesel, used oils, motor oil, and waste fuels. Currently, there are 11 ASTs and other bulk fluid storage containers on the installation with various contents and capacities. Individual storage tanks/containers and their location, contents, capacity, tank material, and installation date are described in detail in the NAS JRB New Orleans *Final Spill Prevention, Control, and Countermeasure Plan* dated May 2019 (NAVFAC Southeast 2019). The plan also establishes responsibilities, actions, and responses to spills of hazardous materials that the 159 FW would implement to comply with the requirements of 40 CFR 112, *Oil Pollution Prevention* (NAVFAC Southeast 2019). In addition, because NAS JRB New Orleans stores more than 1 million gallons of petroleum products and conducts fixed over-water transfers of petroleum to marine vessels capable of holding at least 250 barrels of oil at the Fuel Transfer Pier, they have developed the required *Facility Response Plan* dated June 2018 (NAVFAC Southeast 2018a). This plan provides a contingency plan that describes the processes, procedures, and responsibilities for response to, and cleanup of, discharges of POL into or upon the land and navigable waters of the U.S. (NAVFAC Southeast 2018a).

There are no USTs on the 159 FW installation (NAVFAC Southeast 2019).

Hazardous Waste

Hazardous and petroleum wastes are generated throughout the installation during various operations, including aircraft maintenance and repair, painting and corrosion prevention operations, and vehicle maintenance and repair. These hazardous and petroleum wastes include paints, solvents, lubricants, oils, jet fuel, and fuel oil. The 159 FW is a tenant of NAS JRB New Orleans who is permitted as a Large Quantity Generator of hazardous waste by the EPA (EPA

Identification Number LA6170022788). Waste from 159 FW is ultimately disposed of via NAS JRB New Orleans (NAVFAC Southeast 2018b).

A hazardous waste generation point is where a waste is initially created or generated. Satellite Accumulation Areas (SAAs) are accumulation areas at or near the point of generation under the control of the operator generating the waste. Hazardous wastes initially accumulated at an SAA are accumulated in appropriate containers before being transferred to the installation 90-Day Central Accumulation Area, Building 455, where hazardous wastes can be accumulated for no more than 90 days before they are shipped off site to a permitted Hazardous Waste Transportation, Storage, and Disposal facility for disposal or to a recycler. There are 20 SAAs located in 13 buildings (Facilities 489 [3 SAAs], 185, 473, 385, 425 [2 SAAs], 195 [2 SAAs], 189, Hangar 5 [5 SAAs], 90/93, 144, 485, 386) on the 159 FW installation (NAVFAC Southeast 2018b).

OWSs are used to separate oils, fuels, sand, and grease from wastewater and to prevent contaminants from entering the sanitary sewer and stormwater drainage systems. Currently, there are 10 OWSs on the 159 FW installation located at or near Facilities 119, 146, 184, 189, 195, 485, 489, 493, 516, and 565.

Toxic Substances

Regulated toxic substances typically associated with buildings and facilities include asbestos, LBP, and PCBs. A limited ACM survey conducted in 2012 confirmed the presence of asbestos in brown floor tile and mastic in Building 90 (Clean Environments, Inc. 2012). ACMs at NAS JRB New Orleans are generally removed by non-resident contractors during demolition or renovation activities and are managed as special waste for disposal (NAVFAC Southeast 2018b).

An LBP survey of buildings at NAS JRB New Orleans was conducted in November 1996, in which LBP was detected in numerous older buildings. The installation Environmental Office reviews construction and renovation projects involving older structures. Any projects that require alteration or demolition trigger the requirement for LBP surveys. Projects' designs stipulate appropriate abatement and disposal requirements for LBP. Abatement and disposal of LBP is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards (DON 2020).

NAS JRB New Orleans utilizes 117 pad-mounted transformers that contain at least 55 gallons of non-PCB mineral oil. NAS JRB New Orleans has additional transformers filled with non-PCB mineral oil that are pole-mounted (NAVFAC Southeast 2018b). Twenty of the transformers are connected to 159 FW facilities. PCB-containing materials at NAS JRB New Orleans, usually associated with electrical transformers and light ballasts, are generally removed by non-resident contractors. If not identified as non-PCB, the equipment would be sampled for PCB prior to proper disposal (NAVFAC Southeast 2018b).

Contaminated Sites

Defense Environmental Restoration Program

Under the DERP, the IRP is designed to identify, evaluate, and remediate sites where activities may threaten public health, welfare, or the environment and is the basis for response actions at the 159 FW installation under the provisions of CERCLA, as amended. The DON also uses the IRP to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, POLs, and other pollutants and contaminants.

One IRP site has been identified immediately adjacent to the 159 FW installation (Figure LA3.11-1). IRP Site 6 is the former Fuel Tank Strippings Burn Pit (Building 526) located north of Avenue E, west of West 3rd Street, in the location of the current small arms range. The site was in operation as a burn pit from 1957 to 1975. The pit was unlined and used to burn tank strippings (tank bottom sludge) from the Fuel Farm (IRP Site 15). There is potential for AFFF to have been used to extinguish or control the intentional fires according to interviews. The potential use of AFFF for fire extinguishment and control at the Fuel Tank Strippings Burn Pit supports the recommendation that additional investigation should be conducted during a Site Investigation to confirm or refute the presence of PFAS in the environment around the site (NAVFAC Southeast 2021). IRP Site 15 (Fuel Farm) is also located near the 159 FW installation.

As part of a DON-wide installation assessment of potential historical sources of PFAS, a preliminary assessment was conducted at NAS JRB New Orleans in 2021 to investigate potential sources of PFAS and other previously undiscovered releases. These areas are where PFAS may have historically been used and/or released (i.e., at fire stations, firefighter training areas). During the preliminary assessment, 24 sites were identified at NAS JRB New Orleans where PFAS-containing materials were likely used, stored, or released. These sites were recommended for further PFAS evaluation in a Site Investigation (NAVFAC Southeast 2021). Of these 24 sites, nine are located within or adjacent to the 159 FW installation (Table LA3.11-1 and Figure LA3.11-2). In addition to the 24 areas where PFAS releases may have occurred, seven locations were identified through the preliminary assessment process where other hazardous chemical constituents may have historically been released to the environment and do not appear to have been addressed during any previous IRP activities. These locations include petroleum storage tank and fueling operations, transformer and electronic storage areas, disposal areas, pesticide handling areas, and areas of buried materials. The seven sites were recommended for additional evaluation (NAVFAC Southeast 2021). Of these seven locations, one is located within or close to 159 FW installation. This site is the former recycling yard which is an open ground area where there is potential contamination from petroleum, metals, and/or solvents previously stored onsite (Figure LA3.11-2).

Figure LA3.11-1 IRP Sites at NAS JRB New Orleans

Table LA3.11-1 Potential PFAS and Other Areas Recommended for Further Evaluation within the Vicinity of the 159 FW Installation

Site Description	*Building/ Facility #*	*Years of Operation/ Release Date*	*Site Activities*	*Basis For PFAS Evaluation Recommendation*
Fire Station No. 2 (Building 560)	560	2009–present	Fire Station; Routine storage and handling of AFFF in containers and fire trucks.	Storage of AFFF in containers and fire trucks for use. No documented releases, but typical PFAS impacts associated with this type of facility at other bases.
Hangar 5	5	1956–present	AFFF in fire suppression system. Multiple reported/documented releases of AFFF. Site includes retention pond and stormwater ditches.	AFFF-impacted areas include retention pond and stormwater ditches. Multiple reported AFFF releases from fire suppression system. There was notable release in 2002. Malfunction of system resulted in removal of AFFF from pumps in 2014, and from bladders in 2018.
ERP Site 06 - Fuel Tank Strippings Burn Pit	526	1957–1975	An unlined pit used to burn tank strippings from the Fuel Farm. Potential for AFFF to have been used to control or extinguish fires.	Potential for AFFF to have been used to control or extinguish fires.
Runway 4-22 and Runway 14-32	runway	1970s–present	Multiple AFFF releases at multiple locations around runway for aircraft crashes and airshow fires.	Documented releases of AFFF during air shows, and for aircraft crashes in late 1970s; 1998 (exact location unknown); and 2002 (near site 02). The remaining documented crash occurred in 1960 prior to PFAS-containing AFFF use.
AFFF Truck Test Area	N/A	Unknown	AFFF equipment on fire trucks tested in this location.	AFFF equipment on fire trucks tested in this location.
Former HAZMAT Storage	31	1957–2004	New chemicals and hazardous materials were stored in this location until 2004, when Building 501 was constructed. Materials stored included AFFF.	Chemicals stored may have included AFFF and other PFAS-containing materials.
Former DRMO/MWR Equipment Maintenance	43	1957–present	Reported historic DRMO yard (formerly DPDO).	No documented releases, but typical PFAS impacts at other installations.

Site Description	*Building/ Facility #*	*Years of Operation/ Release Date*	*Site Activities*	*Basis For PFAS Evaluation Recommendation*
Former HAZMAT Storage/ Recycling Center	55	1969–present	Storage of hazardous materials and chemicals that likely included AFFF. Currently used as Recycling Center.	New chemicals and hazardous materials were stored in this location from 1957 until approximately 2001, when Building 475 was constructed for LAANG hazardous material storage. Items were temporarily stored by LAANG in and around Buildings 31 and 55 prior to being removed through DRMO, which was located at Keesler Air Force Base in Biloxi, Mississippi.
HAZMAT Storage	268	1973–present	Potential for AFFF containers to have been stored.	Hazardous material storage used by Marine units, which includes ordnance storage. Area is fenced and covered with a drain.
Other Areas Recommended for Further Evaluation within the Vicinity of the 159 FW Installation				
Old Recycling Yard	North of Site 06	Unknown	Petroleum, Metals, Solvents	Former recycling yard (open ground area).

Notes: 159 FW = 159th Fighter Wing; AFFF = Aqueous Film-Forming Form; DPDO = Defense Property Disposal Office; DRMO = Defense Reutilization Marketing Office; ERP = Environmental Restoration Program; HAZMAT = hazardous materials; LAANG = Louisiana Air National Guard; MWR = Morale, Welfare, and Recreation; PFAS = per- and polyfluoroalkyl substances.
Source: NAVFAC Southeast 2021.

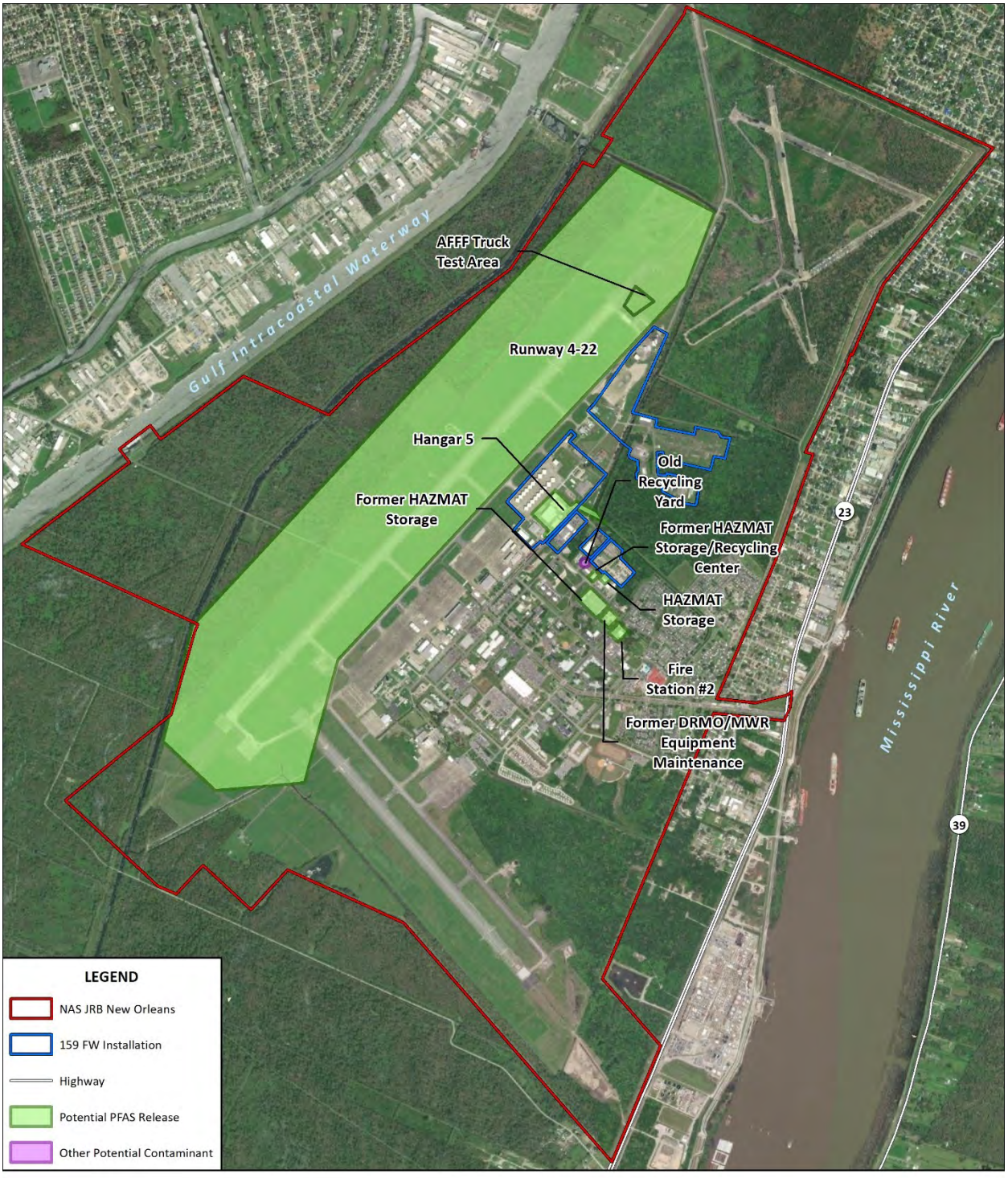


Figure LA3.11-2 Potential PFAS and Other Areas Recommended for Further Evaluation within the Vicinity of the 159 FW Installation

Table LA3.11-1 provides details for the potential PFAS sites and other potential contaminated sites located within the vicinity of the 159 FW installation and the recommendations based upon the 2021 NAS JRB New Orleans Preliminary Assessment results, respectively, and Figure LA3.11-2 shows the potential PFAS use, storage, or release locations and other potential contaminated sites within the vicinity of the 159 FW installation.

LA3.11.1.2 Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.11.2 Environmental Consequences

LA3.11.2.1 F-15EX

Installation

Hazardous Materials

Under the F-15EX Alternative, the quantities of hazardous materials and petroleum substances used throughout the installation could increase over the long term due to the potential increase in aircraft operations. Construction and modification activities under the proposed beddown of the F-15EX at NAS JRB New Orleans would cause short-term increases in the quantities of hazardous materials (e.g., paint) and petroleum products (e.g., vehicle fuel) used and stored on the installation. Currently, most of the F-15C/D aircraft maintenance takes place at the 159 FW installation. Under the F-15EX Alternative, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous material streams would be expected to increase. The 159 FW is responsible for managing these materials in accordance with federal, military, state, and local laws and regulations to protect their employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community. The operating location would be responsible for the safe storage and handling of hazardous materials used in conjunction with all construction activities. Additional aircraft, vehicles, and equipment would increase consumption of operating fluids and fuel; however, the long-term impacts are expected to be minor and not significant with the implementation of the aforementioned hazardous materials management procedures and practices. No direct work would be performed on the ASTs and no additional ASTs are proposed to be installed. Possible impacts associated with these projects include tank ruptures or leaks during construction. The NAS JRB New Orleans has in place a Spill Prevention, Control, and Countermeasure Plan and a Facility Response Plan which would address these impacts should they occur (NAVFAC Southeast 2018a; 2019).

Hazardous Waste

Implementing the F-15EX Alternative would have short-term minor impacts on hazardous waste accumulation. There would be an increase in temporary construction-related hazardous wastes. All construction hazardous waste would be managed by the contractors and would be applicable to all federal and state rules and regulations. The types of hazardous materials needed for maintenance and operation of the F-15EX would be similar to those currently used for maintenance and operation of the F-15C/D fleet; therefore, the waste streams generated would be similar as well. Note that in August 2022, the EPA proposed to designate PFAS as hazardous substances under CERCLA. If this designation is finalized, it would impact the management requirements for excavated material (i.e., soil and groundwater) generated during construction. The volume of waste generated would be tracked and analyzed to determine whether each type of waste is hazardous. The DoD management of PFAS is evolving and a recent Office of the Secretary of Defense decision impacted management requirements. On July 7, 2023, the Assistant Secretary of Defense for Energy, Installations, and Environment, issued a memo "Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States" that directs DoD installations to dispose PFAS-containing materials in hazardous waste landfills, or specialized solid waste landfills with environmental permits, that have composite liners, and gas and leachate collection and treatment systems (Assistant Secretary of Defense for Energy, Installations, and Environment 2023). All waste would be properly disposed of in accordance with federal, military, state, and local requirements. No trash or other solid waste would be buried, burned, or otherwise disposed of at the project site. The F-15EX Alternative would not result in any adverse long-term environmental impacts from hazardous waste generation that would affect the installation. Hazardous waste generation would continue to be managed in accordance with the NAS JRB New Orleans' HWMP and all applicable federal, state, and local laws and regulations. Additionally, no changes to the NAS JRB New Orleans' Large Quantity Generator status would be expected. Under the F-15EX Alternative, the total number of airfield operations would increase; therefore, throughput of hazardous waste streams would be expected to increase.

Toxic Substances

Toxic substances typically associated with buildings and facilities include ACM, LBP, and/or PCBs. No new toxic substances would be used or stored due to the implementation of the F-15EX beddown. A limited ACM survey conducted in 2012 confirmed the presence of asbestos in brown floor tile and mastic in Building 90 (Clean Environments, Inc. 2012). Under the F-15EX Alternative, Building 90 would be renovated (Project 13). ACMs at NAS JRB New Orleans are generally removed by non-resident contractors during demolition or renovation activities and are managed as special waste for disposal (NAVFAC Southeast 2018b).

If ACM is discovered within a building that is to be demolished or renovated, the proper federal and state rules and regulations would be followed, including but not limited to, 40 CFR 61.145, *Standard for Demolition and Renovation* and 29 CFR 1926.1101, *Asbestos Construction Standard*.

An LBP survey of buildings at NAS JRB New Orleans was conducted in November 1996, in which LBP was detected in numerous older buildings. The NAS JRB New Orleans Environmental Office reviews construction and renovation projects involving older structures. Any projects that require alteration or demolition trigger the requirement for LBP surveys. Projects' designs stipulate appropriate abatement and disposal requirements for LBP. Abatement and disposal of LBP is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards (DON 2020). As a BMP, contractors who renovate or demolish buildings testing positive for LBP should be certified by the EPA and follow lead-safe work practices. LBP would be managed and disposed of in accordance with Toxic Substances Control Act, OSHA regulations, Louisiana requirements, and established DON procedures.

The abovementioned state and federal rules and regulations as well as BMPs would be followed by the 159 FW during construction; therefore, there would be no significant impacts with respect to toxic substances with the implementation of the F-15EX beddown.

Contaminated Sites

Defense Environmental Restoration Program

There is one IRP site (IRP 15) that would overlap with Project 9.1 which involves the renovation of the DON POL Lab, Building 503 (Figure LA3.11-3). In addition, one PFAS potential release location (Hangar 5) overlaps with six of the proposed projects (Projects 1, 2, 5, 7, and 16) and is immediately adjacent to Project 23 (Figure LA3.11-4). Project 1 involves the repair and complete rehabilitation of Hangar 5 maintenance shops. Project 2 involves converting the vacant space in Building 425 into an administration space. Project 5 involves the renovation of Building 144. Project 7 involves the renovation of Building 119. Project 16 involves repairs to Hangar 5 or the F-15EX conversion, and Project 23 involves repairs to the Squadron Operations facility (Building 590).

Figure LA3.11-3 IRP Sites within the Vicinity of the Proposed Construction for the F-15EX at the 159 FW Installation

Figure LA3.11-4 Potential PFAS and Other Areas Recommended for Further Evaluation within the Vicinity of the Proposed Construction for the F-15EX at the 159 FW Installation

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities, work would cease until 159 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing IRP or potential PFAS contaminated sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination, including from potential construction dewatering wherein contaminants (e.g., PFAS) could be drawn toward the excavation. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response trained if required.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.11.2.2 F-35A

Installation

Construction and modification projects and operations under the F-35A Alternative would be the same or similar to those described for the F-15EX beddown (see Table LA2.1-3). Thus, the F-35A Alternative would involve similar hazardous material usage, generate similar amounts of hazardous waste and would require similar ACM and/or LBP removal as described under the F-15EX beddown. Project 9.1, which would be implemented for the F-15EX Alternative, would also be implemented for the F-35A Alternative; therefore, the same IRP site (IRP 15) would potentially be impacted (Figure LA3.11-5). There would also be one less contaminated site disturbed as F-35A Alternative does not include the repairs to the Squadron Operations facility (Building 590) (Project 23) (Figure LA3.11-6). As such, the impacts related to contaminated sites also would be less than those described under the F-15EX beddown.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

Figure LA3.11-5 IRP Sites within the Vicinity of the Proposed Construction for the F-35A at the 159 FW Installation

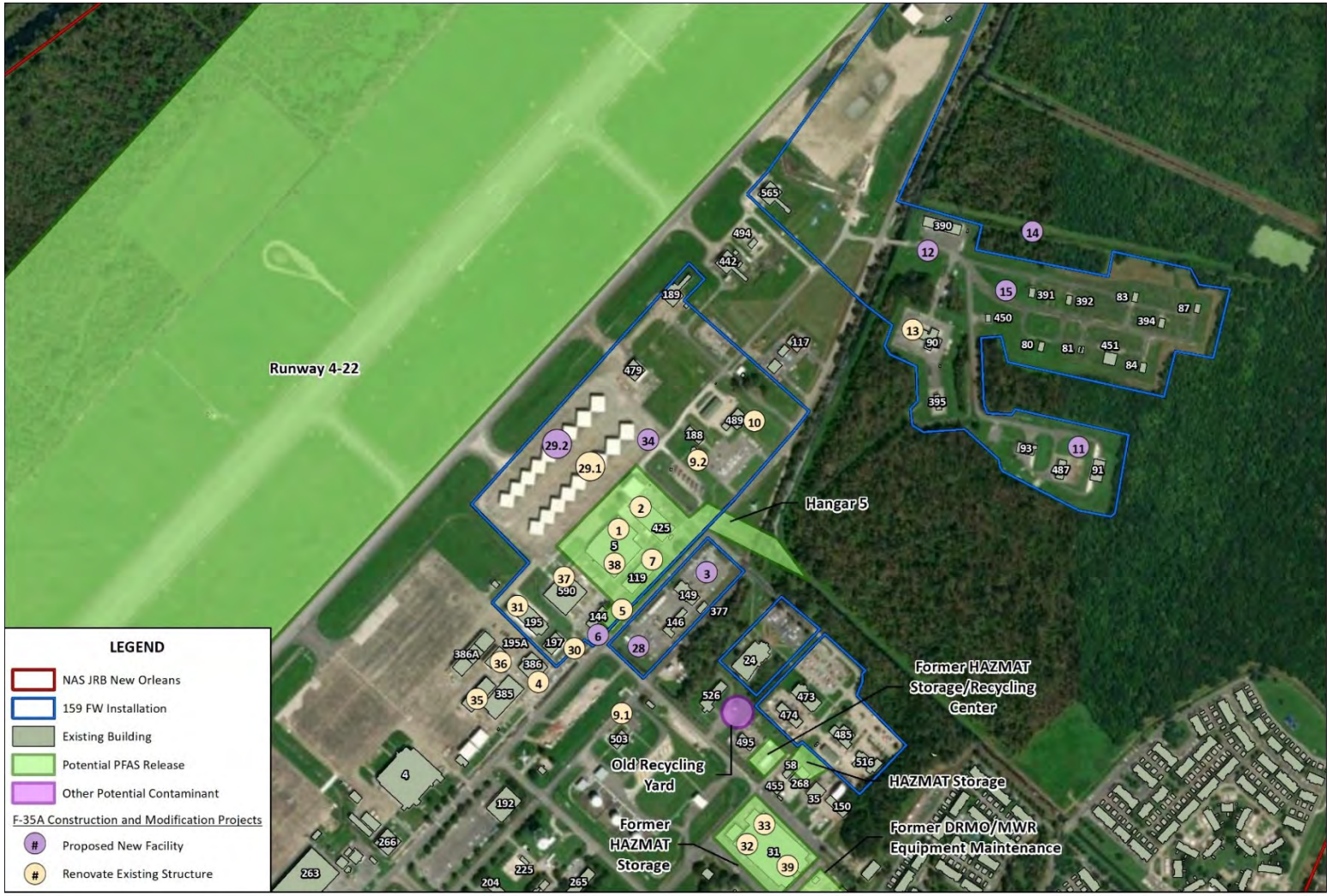


Figure LA3.11-6 Potential PFAS and Other Areas Recommended for Further Evaluation within the Vicinity of the Proposed Construction for the F-35A at the 159 FW Installation

LA3.11.2.3 F-15C/D Legacy Aircraft

Installation

Under this alternative, the planned construction and repair projects required for the current mission would be implemented (see Table LA2.1-3). Construction impacts would be smaller in magnitude than the proposed F-15EX and F-35A Alternatives as overall there would be less construction and modification projects. In addition, there would be no additional aircraft, vehicles, and equipment and hence there would be no change in use of operating fluids and fuel. Thus, this alternative would involve less hazardous material usage, generate less hazardous waste than the F-15EX and F-35A Alternatives, and might require ACM and/or LBP removal if discovered during the renovation and/or demolition of a building.

In regard to the contaminated sites, Project 9.1, which would be implemented for the F-15EX Alternative, would also be implemented for the legacy F-15C/D alternative; therefore, the same IRP site (IRP 15) would potentially be impacted (Figure LA3.11-7). In addition, there would be one less contaminated site disturbed as the Legacy Alternative does not include the repairs to the Squadron Operations facility (Building 590) (Project 23) (Figure LA3.11-8).

Therefore, impacts on hazardous materials, hazardous waste, toxic substances, or contaminated sites would be less than those described for the F-15EX Alternative and similar to those described for F-35A Alternative. Overall, no significant impacts would occur.

Airspace

Airspace is not analyzed for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.11.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on hazardous materials and waste would not be significant.

Figure LA3.11-7 IRP Sites within the Vicinity of the Proposed Construction for the Legacy Aircraft at the 159 FW Installation

Figure LA3.11-8 Potential PFAS and Other Areas Recommended for Further Evaluation within the Vicinity of the Proposed Construction for the Legacy Aircraft at 159 FW Installation

LA3.11.3 Summary of Impacts

The types of hazardous materials needed for maintenance and operation of the F-15EX and the F-35A would be similar to those currently used for maintenance and operation of the F-15C/D fleet. Under the F-15EX and the F-35A Alternatives, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action would occur. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The NAS JRB New Orleans Pollution Prevention Plan (NAVFAC Southeast 2016) would continue to be followed to minimize the amount of hazard materials being utilized on-base and would include any construction-related materials or waste associated with aircraft operations. Additionally, no changes to the NAS JRB New Orleans' Large Quantity Generator status would be expected to occur despite the increase in hazardous waste generation from aircraft operations. Any projects proposed for construction and modification would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities, work would cease until 159 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements including ensuring the field staff are Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response trained if required. As such, there would be no significant impacts on hazardous waste and materials management with the implementation of F-15EX, F-35A, the F-15C/D legacy aircraft, or the No Action alternatives.

LA3.12 BIOLOGICAL RESOURCES/COASTAL RESOURCES/WETLANDS

LA3.12.1 Affected Environment

LA3.12.1.1 Installation

Vegetation

The majority of the 159 FW installation and the areas adjacent to the installation are developed and comprised of landscaped areas such as lawns, ornamental trees, or maintained open fields of grass. However, the area surrounding the southeast portion of the 159 FW installation consists of poorly drained forest stands dominated primarily by black willow (*Salix nigra*) (see *Wetlands* section below). Other common trees within this area include bald cypress (*Taxodium dictichum*) and red maple (*Acer rubrum* var. *trilobum*, *A. rubrum* var. *drummondii*) (DON 2022).

Wildlife

The majority of the wildlife present at the air station and the 159 FW installation consists of species that are highly adapted to developed and disturbed areas. Surveys conducted in 2014 and 2019 on the 159 FW installation observed 122 different bird species. Birds common to the 159 FW installation include a variety of songbirds, hawks, owls, egrets, herons, grackles, pigeons, sparrows, and crows (DON 2022).

Common mammals observed on the 159 FW installation include the white-tailed deer (*Odocoileus virginianus*), feral pigs (*Sus scrofa*), eastern cottontail rabbit (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), nutria (*Myocastor coypus*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), opossum (*Didelphis virginiana*), gray fox (*Urocyon cineroargenteus*), striped skunk (*Mephitis mephitis*), armadillo (*Dasypus* sp.), and bobcat (*Lynx rufus*) (DON 2020, 2022).

Fish may be found only within the canals on the installation. Game fish inhabit deeper waters of canals, while smaller forage fish are found in shallower areas. Fish surveys have not been conducted, but species with the potential to occur in the canals include bluegill (*Lepomis macrochirus*), catfish, carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), topminnow (*Fundulus* spp.), least killifish (*Heterandria formosa*), and similar species (DON 2020, 2022).

Reptiles and amphibians are common in the undeveloped areas of the installation. Frogs, toads, salamanders, turtles, alligators, and snakes are found in association with wetlands and drainage canals. Upland areas provide habitat for lizards, toads, and snakes such as the Western ribbon snake (*Thamnophis proximus*) and canebrake rattlesnake (*Crotalus horridus atricaudatus*). In

total, 51 species of reptiles and amphibians have been recorded at the 159 FW installation (DON 2022).

Threatened, Endangered, and Special Status Species

Table LA3.12-1 lists federally threatened, endangered, candidate, and state listed species potentially occurring in the vicinity of the 159 FW installation. No federally or state listed species have been observed on the 159 FW installation or NAS JRB New Orleans, and there is little to no habitat for these species within the installation boundaries (DON 2022). Eight federally listed, candidate, or proposed for federal listing wildlife species have the potential to occur within the vicinity of the installation, while five are present within the surrounding county, but because the 159 FW installation is located adjacent to agricultural and residential lands and itself consists almost entirely of impervious surfaces, artificial structures and introduced or invasive vegetation, little or no quality habitat exists for these species.

The DAF has identified the following three federally listed species as having the potential to be affected by the Proposed Action, all of which are described below: eastern black rail (*Laterallus jamaicensis jamaicensis*), piping plover (*Charadrius melodus*), and red knot (*Calidris canutus rufa*). There is designated critical habitat for the piping plover and proposed critical habitat for the red knot in coastal Plaquemines Parish, LA, but no critical habitats within the 159 FW installation. As shown in Table LA3.12-1, three federally endangered and one federally threatened plant species are protected in the state of LA and have the potential to occur on the installation. However, none of these four plant species are known to occur within the 159 FW installation or in Plaquemines Parish, LA.

Although the bald eagle (*Haliaeetus leucocephalus*) is not federally listed under the ESA, it is protected under the Bald and Golden Eagle Protection Act. Under the Act, the USFWS defines "take" as the act or attempt to "pursue, shoot, shoot at, poison, wound, kill, trap, capture, trap, collect, molest or disturb" bald and golden eagles. Bald eagles were observed in both 2015 and 2018/2019 surveys at NAS JRB New Orleans, with one active bald eagle nest observed to be located adjacent to Runway 14 (Table LA3.12-2) (NAVFAC 2020). Golden eagles are not known to occur at this installation.

Table LA3.12-1 Federally and State Listed Species Potentially Occurring in the Vicinity of the 159 FW Installation and Under the Airspace

Common Name	*Scientific Name*	*Status*	*Potential Occurrence on the Installation*	*Potential Occurrence Under the Airspace*
Birds				
Eastern black rail	*Laterallus jamaicensis jamaicensis*	T	P	P
Piping plover	*Charadrius melodus*	T, ST	P	P
Red-cockaded woodpecker	*Picoides borealis*	E, SE		P
Red knot	*Calidris canutus rufa*	T, ST	P	P
Mammals				
Northern long-eared bat	*Myotis septentrionalis*	E, ST		P
West Indian manatee	*Trichechus manatus*	T, ST	U	
Reptiles and Amphibians				
Louisiana pinesnake	*Pituophis ruthveni*	T, ST		P
Fish				
Gulf sturgeon	*Acipenser oxyrhinchus desoti*	T, ST	U	
Pallid sturgeon	*Scaphirhynchus albus*	E, SE	U	
Saltmarsh topminnow	*Fundulus jenkinsi*	Pe	U	
Smalltooth sawfish	*Pristis pectinata*	E, SE	U	
Invertebrates				
Monarch Butterfly	*Danaus plexippus*	C	P	N/A
Plants				
American chaffseed	*Schwalbea americana*	E, SE	P	N/A
Earthfruit	*Geocarpon minimum*	T, ST	P	N/A
Louisiana quillwort	*Isoetes louisianensis*	E, SE	P	N/A
Pondberry	*Lindera melissifolia*	E, SE	P	N/A

Legend: 159 FW = 159th Fighter Wing; E = Federally Endangered; N/A = Not Applicable as these groups are not being analyzed under the airspace; P = Potential; Pe = Petitioned for federal listing; SE = State Endangered; ST = State Threatened; T = Federally Threatened; U = Unlikely due to lack of habitat.

Sources: DON 2022; Louisiana Department of Wildlife and Fisheries 2022a, 2022b, 2022c; USFWS 2022.

Table LA3.12-2 Migratory Birds of Conservation Concern that Could Potentially Occur within the 159 FW Installation and Under the Airspace

Common Name	*Scientific Name*	*Season*	*Potential Occurrence on the Installation*	*Potential Occurrence Under the Airspace*
American golden-plover	*Pluvialis dominica*	Spring	P	P
American kestrel	*Falco sparverius paulus*	Year Round		P
Bachman's sparrow	*Aimophila aestivalis*	Year Round		P
Bald eagle[1]	*Haliaeetus leucocephalus*	Year Round	O	P
Black skimmer	*Rynchops niger*	Breeding		P
Brown-headed nuthatch	*Sitta pusilla*	Year Round		P
Chimney swift	*Chaetura pelagica*	Breeding	P	P
Dickcissel	*Spiza americana*	Breeding		P
Eastern whip-poor-will	*Antrostomus vociferus*	Breeding		P
Henslow's sparrow	*Ammodramus henslowii*	Winter		P
Hudsonian godwit	*Limosa haemastica*	Spring		P
Kentucky warbler	*Oporornis formosus*	Breeding	P	P
King rail	*Rallus elegans*	Breeding	P	P
Lesser yellowlegs	*Tringa flavipes*	Spring	P	P
Little blue heron	*Egretta caerulea*	Year Round	P	
Osprey	*Pandion haliaetus*	Year Round	O	P
Painted bunting	*Passerina ciris*	Breeding	P	P
Prairie warbler	*Dendroica discolor*	Breeding		P
Prothonotary Warbler	*Protonotaria citrea*	Breeding	P	P
Red-headed woodpecker	*Melanerpes erythrocephalus*	Year Round		P
Ruddy turnstone	*Arenaria interpres morinella*	Summer		P
Sandwich tern	*Thalasseus sandvicensis*	Breeding		P
Sprague's pipit	*Anthus spragueii*	Spring		P
Swallow-tailed kite	*Elanoides forficatus*	Breeding	P	P
Willet	*Tringa semipalmata*	Breeding		P
Wood thrush	*Hylocichla mustelina*	Breeding	P	P

Note: [1]This is not a Bird of Conservation Concern in this area but warrants attention because of the Bald and Golden Eagle Protection Act.
Legend: 159 FW = 159th Fighter Wing; O= Observed; P = Potential.
Source: DON 2022; USFWS 2022.

In addition, 10 migratory birds found on the USFWS Birds of Conservation Concern list have the potential to occur on the installation.

Eastern Black Rail

The eastern black rail is a subspecies of black rail (*Laterallus jamaicensis*) that inhabits salt, brackish, and freshwater wetlands in the eastern U.S., Mexico, Central America, and the Caribbean

(USFWS 2019). The USFWS listed the eastern black rail as a threatened species on November 9, 2020 (85 Federal Register 63764). Critical habitat has not been designated for this species.

The USFWS has concluded that the eastern black rail is at risk of extinction within the foreseeable future due to continued wetland habitat loss, sea level changes, increasing storm frequency and intensity and increased flood events (which are both associated with high tides and storms), wetland subsidence, and land management practices (e.g., incompatible prescribed fire, grazing, and mechanical treatment activities) (85 Federal Register 63797).

Habitat for black rails includes tidal salt marshes along barrier islands and the mainland fringe, as well as drier coastal prairie. Bird surveys conducted at NAS JRB New Orleans in 2018 and 2019 did not document eastern black rails and important habitats for the species were noted as not being present at NAS JRB New Orleans (NAVFAC 2020). However, the species may occur in habitats adjacent to the installation.

Piping Plover

The piping plover was historically common in certain habitats along the Atlantic and Gulf Coasts, along river systems and lakes of the northern Great Plains, the Great Lakes, and in the Bahamas and West Indies (65 Federal Register 41782). The Atlantic Coast and Northern Great Plains populations of this species were listed as threatened on December 11, 1985 (50 Federal Register 50726–50734). Today, only remnant populations occur throughout the historic range. Piping plovers spend 60 to 70 percent of the year wintering primarily along the Gulf Coast and Atlantic Coast from North Carolina to Florida. The preferred wintering habitats of piping plover include beaches, sandflats, mudflats, algal mats, washover passes, and spoil islands along the Gulf Intracoastal Waterway.

The destruction, modification, and loss of habitat, along with disturbance caused by human recreation, continue to be the primary threats to the piping plover's coastal migration and wintering range. Oil spills, predation, storms, wind farms, and severe cold weather are also of concern. Accelerating sea level rise and increases in storm frequency are thought to compound ongoing habitat losses. Military operations pose minimal threat to nonbreeding piping plovers (USFWS 2020a).

Bird surveys conducted at NAS JRB New Orleans in 2018 and 2019 did not document piping plovers and important habitats for the species were noted as not being present at NAS JRB New Orleans (NAVFAC 2020). However, the species may occur in habitats adjacent to the installation.

Red Knot

The rufa red knot is one of six subspecies of red knot (*Calidris canutus*). The rufa subspecies was listed as threatened on January 12, 2015 (79 Federal Register 73705–73748). During spring and fall migration, red knots rest and feed at critically important staging and stopover sites (USFWS 2020b). Coastal habitats used by red knots in migration and wintering areas are similar in character, generally coastal marine and estuarine habitats with large areas of exposed intertidal sediments. Migration and wintering habitats include both high-energy ocean or bayfront areas, as well as tidal flats in more sheltered bays and lagoons. Preferred wintering and migration habitats are muddy or sandy coastal areas, specifically, bays and estuaries, tidal flats, and unimproved tidal inlets (USFWS 2020b).

Key threats to this subspecies are loss of breeding and nonbreeding habitat due to sea level rise, coastal engineering, coastal development, and arctic ecosystem change. Secondary factors include hunting in nonbreeding areas; predation in nonbreeding areas; harmful algal blooms; human disturbance; oil spills; wind energy development, especially near the coasts; beach cleaning; agriculture; research activities; and disease (USFWS 2020b).

Red knots were not observed during bird surveys at NAS JRB New Orleans in 2018 and 2019, and important habitats for the species were noted as not being present at NAS JRB New Orleans (NAVFAC 2020). However, the species may occur in habitats adjacent to the installation.

Wetlands

Based on a 2001 installation-wide wetland survey, there are large tracts of wetlands on NAS JRB New Orleans consisting of palustrine forested wetlands, smaller isolated palustrine forested wetlands, and emergent wetlands. Approximately 0.27 acre of a jurisdictional palustrine forested wetland occur on the 159 FW installation. Additional jurisdictional wetlands occur adjacent to and within the vicinity of installation (see Figure LA3.7-1). These wetlands are primarily dominated by black willow. Other common trees within this area include bald cypress and red maple (DON 2022).

Coastal Resources

In Louisiana, the Louisiana Coastal Resources Program is administrated by the Department of Natural Resources through the Office of Coastal Management. The primary authority for the Louisiana Coastal Resources Program is the State and Local Coastal Resources Management Act of 1978, as amended (Act 361, Louisiana Revised Statutes 49:214.21 et seq.). The Office of Coastal Management regulates development activities and manages the resources of the Coastal Zone, especially those which have a direct and significant impact on coastal waters. It is the

function of the Office of Coastal Management, through its staff, to maintain, protect, develop, and restore or enhance the invaluable coastal region of the state of Louisiana. The provisions at Louisiana Administrative Code 43: I: 725 et seq. contain the procedures for adoption and approval of Local Coastal Management Programs. Local Coastal Management Programs assist the state Louisiana Coastal Resources Program in managing the state's coastal resources by taking over the regulation of "uses of local concern." Plaquemines Parish has an approved local coastal program.

In addition, the Office for Coastal Management participates in the Coastal Zone Enhancement Program under Section 309 of the CZMA to enhance the Louisiana Coastal Resources Program within nine key areas: wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management planning, ocean and Great Lakes resources, energy and government facility siting, and aquaculture.

The entire 159 FW installation is located within the Louisiana Coastal Zone Boundary. However, the 159 FW installation is not located within any Coastal Barrier Resources System Units.

Existing conditions of coastal resource areas are described in the following sections of this EIS: Section LA3.5, *Land Use*; Section LA3.7, *Water Resources*; Section LA3.9, *Cultural Resources*; and the above subsections of vegetation, wildlife, and wetlands sections of Section LA3.12, *Biological Resources/Coastal Resources/Wetlands*. Background information collected on the existing site includes, but is not limited to, the following:

- Results of previous onsite characterization studies
- Information or issues of concern to coastal resources identified during public scoping meetings, including response letters from USFWS, National Marine Fisheries Service, National Park Service, and Louisiana Department of Natural Resources
- Archeological survey results
- Wetland survey results

Although military installations are considered exempt from jurisdiction of the Office of Coastal Management, impacts on coastal zones are analyzed within this EIS due to the 159 FW installation's geographical location within this zone.

LA3.12.1.2 Airspace

Due to the nature of the actions proposed within the airspace, coastal resources, wetlands, and plant species were excluded from extensive review and analysis because the proposed activities would not result in new ground disturbance, and ordnance delivery and chaff and flare use would not exceed current levels and would occur in locations already used and authorized for those

purposes. In addition, marine species, invertebrates, and fish were excluded from review and analysis as they, too would not likely be impacted by the Proposed Action

Wildlife

The airspace associated with the 159 FW operations covers over 4,800 square miles of land within New Orleans and Texas. Wildlife within these areas occur within the Mississippi Alluvial Plan ecoregion which is generally dominated by bottomland deciduous forests. A wide variety of wildlife species are found within this habitat, including whitetail deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), black bear (*Ursus americana*), gray fox (*Urocyon cinereoargenteus*), opossums, rabbits, wild turkey (*Meleagris gallopavo*), egrets, herons, wood thrush (*Hylocichla mustelina*), yellow-throated vireo (*Vireo flavifrons*), and the American alligator (*Alligator mississippiensis*) (Griffith 2010).

Threatened, Endangered, and Special Status Species

Table LA3.12-1 lists federally threatened, endangered, candidate, and state-listed species with the potential to occur under the airspace. The eastern black rail, piping plover, and red knot were previously described at the installation level. All three of these species have the potential to occur under the airspace. Designated critical habitat for the piping plover and proposed critical habitat for the red knot occur under portions of the airspace. In addition, 25 migratory birds that occur on the USFWS Birds of Conservation Concern list, including the bald eagle, have the potential to occur within the airspace (see Table LA3.12-2).

LA3.12.2 Environmental Consequences

LA3.12.2.1 F-15EX

Installation

Vegetation

Construction of new facilities for the F-15EX at the 159 FW installation would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in a maximum increase of 85,300 SF (1.96 acres) of impervious surfaces. All new construction would occur within already disturbed areas that are currently landscaped or dirt areas. The forested land that would be permanently impacted from construction activities represents a miniscule fraction of the total forested land at the 159 FW installation. In addition, the land that would be permanently impacted is adjacent to disturbed and developed habitats. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Noise associated with construction may cause wildlife to temporarily avoid the area, including those that are protected under the MBTA. Noise associated with construction activities, as well as an increase in general industrial activity and human presence, could evoke reactions in birds. Disturbed nests in the immediate vicinity of construction activity would be susceptible to abandonment and depredation. Additional discussion of noise impacts on animals can be found in Appendix B. However, bird and wildlife populations in the vicinity of the airport where project components would occur are accustomed to elevated noise associated with aircraft and general military industrial use. As a result, indirect impacts from construction noise are expected to be minimal because the ambient noise levels within the vicinity are high under the affected environment and would be unlikely to substantially increase by the relatively minor and temporary nature of the proposed construction and modifications. Under the F-15EX Alternative at the 159 FW installation, impacts on wildlife due to construction would not be significant.

Operational noise levels at the 159 FW installation would be expected to increase from the affected environment with the conversion to the F-15EX aircraft. With the basing of the F-15EX, only the number of aircraft operations would change; there would be no change in where or when individual aircraft operate. Total annual airfield operations by the 159 FW are proposed to increase by 4,214 operations (107 percent). As a result of the aircraft conversion and the increase in operations, an additional 92 acres of land off the air station property would be exposed to noise levels greater than 65 dB. The majority of this area is open space lands. Changes in operational noise are not expected to impact wildlife species in the area because species on and near the installation are likely accustomed to elevated noise levels associated with aircraft and military operations.

An increase in airfield operations may result in a slight increased opportunity for bird/wildlife aircraft strikes to occur, including those with migratory birds. However, adherence to the existing BASH program would minimize the risk of bird/wildlife aircraft strikes (see Section LA3.10, *Safety*). The 159 FW has developed procedures designed to minimize the occurrence of bird/wildlife aircraft strikes and has documented detailed procedures to monitor and react to heightened risk of bird/wildlife aircraft strikes. When risk increases, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for increased bird/wildlife aircraft strikes within the airspace.

Threatened, Endangered, and Special Status Species

No federally listed species in Table LA3.12-1 have been observed at the 159 FW installation. Although the candidate Monarch butterfly, endangered American chaffseed, threatened earthfruit,

endangered Louisiana quillwort, and endangered pondberry have the potential to occur on the installation, habitat for these species within the installation boundary is extremely limited due to the urbanized nature of the cantonment area. A similar conclusion was reached by USFWS in a separate EA; they concurred that no threatened, endangered, or candidate species are likely to exist on the installation (DON 2022). Therefore, proposed activities that would occur at this installation would have no effect on any of these species or their habitats.

The threatened eastern black rail, threatened piping plover, and threatened red knot are not known to occur on the installation; however, they may occur in habitats adjacent to the installation. The DAF has concluded that the Proposed Action may affect, but is not likely to adversely affect, these species, per the analysis included below, and in coordination with the Navy, is seeking concurrence from the USFWS through informal consultation.

Impacts on potentially occurring federally or state listed species on or near the installation would be similar to those described under wildlife. Studies indicate that wildlife species, whether they are common or protected species, already occupying lands exposed to airfield noise are generally not affected by slight to moderate increases in ambient noise levels, as they have already habituated to periodic to frequent loud overflight noise. Similarly, bald eagles are known to occur at the 159 FW installation and, as recently as 2019, were observed nesting in habitat adjacent to an active runway on the installation (NAVFAC 2020). For the reasons previously described, it is expected that bald eagles in the vicinity of the 159 FW installation are habituated to aircraft noise and any slight to moderate increase in noise levels would not rise to the level of "take" as defined by the Bald and Golden Eagle Protection Act.

The military is authorized to take birds covered under MBTA during military readiness activities, provided the military implements necessary avoidance, minimization, and conservation measures if such readiness activities may significantly impact a population(s) of MBTA-covered species. These avoidance and conservation measures should be developed in coordination with USFWS. Regardless, no effects to migratory birds occurring on the installation would be expected by the noise from the F-15EX since they would already be habituated to aircraft noise from existing operations. An increase in airfield operations may result in a slight increased opportunity for bird/wildlife aircraft strikes to occur, including those with migratory birds. However, adherence to the existing BASH program would minimize the risk of bird/wildlife aircraft strikes (see Section LA3.10, *Safety*).

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure LA3.7-1).

Coastal Resources

Construction and operations for the F-15EX would take place within the coastal zone. A Coastal Consistency Determination is being prepared to address the Proposed Action's consistency with the enforceable polices of the Louisiana State's Coastal Zone Management Program.

Airspace

Wildlife

No construction would occur beneath the training airspace; however, inert ordnance would be deployed in ranges authorized for their use. Existing range management procedures and vegetation removal guidelines would be adhered to and vegetation management measures currently in place would persist. Impacts on wildlife habitat would not be significant. Chaff and flare deployment is expected to remain the same as current levels conducted by F-15C/D aircraft and would occur within the same training areas. Current restrictions on the amount or altitude of chaff and flare use would continue to apply. As a result, chaff and flare deployment associated with the F-15EX Alternative would have no significant impact on wildlife habitat.

Impacts on wildlife would not be significant. In general, animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and in the case of bird species, whether the animals are in the incubation/nesting phase. Additional analysis for noise impacts on biological resources can be found in Appendix B. Noise modeling results suggest subsonic noise levels would increase approximately 2 to 3 dB in SEL and 4 to 5 dB greater in L_{max} within the airspace and would be up to 46 L_{dnmr}; well below the 112 dB shown to elicit major biological responses. Long-term impacts are anticipated to be negligible. Impacts on migratory birds under the MBTA would not be significant.

Section LA3.10, *Safety*, established that bird aircraft strikes are currently rare in the airspace and would not be expected to increase substantially under this alternative. The F-15EX would fly predominantly above 5,000 feet AGL, which is above where 95 percent of strikes occur. Adherence to the BASH Plan would further reduce the likelihood of bird strike in training airspace.

Overall, impacts on wildlife from proposed changes in subsonic and supersonic operations would not be significant for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-15EX operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 10,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL.

Threatened, Endangered, and Special Status Species

Impacts on potentially occurring federally or state listed species underlying the 159 FW airspace would be similar to those described within the wildlife section. Under the F-15EX Alternative for the 159 FW, the amount of time the 159 FW would conduct operations in the associated airspace would increase by approximately 107 percent. Also, chaff and flare deployment would be expected to remain the same as current levels conducted by F-15C aircraft and would occur within the same training areas. Current restrictions on the amount or altitude of chaff and flare use would continue to apply. As a result, chaff and flare deployment associated with the F-15EX Alternative would have no adverse effects on potentially occurring federally or state listed species underlying the 159 FW airspace.

No effects to migratory birds would be anticipated due to noise from the F-15EX under the 159 FW airspace. As described previously for wildlife and listed species, migratory birds already occupying lands exposed to airfield noise are generally not affected by minor increases in ambient noise levels as they have already habituated to frequent loud overflight noise (Bowles 1995). Additional analysis for noise impacts on biological resources can be found in Appendix B.

In general, federally and state listed species would not be adversely affected by the proposed change in subsonic and supersonic operations for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-15EX operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 10,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL.

The eastern black rail, piping plover, and red knot all have the potential to occur under the airspace. The DAF, in coordination with the Navy, is conducting an informal ESA section 7 consultation with the USFWS on potential impacts to these species. For the reasons described above, the DAF has concluded that the Proposed Action may affect, but is not likely to adversely affect, the eastern black rail, piping plover, and red knot. The Proposed Action would not destroy or adversely modify critical habitat for the piping plover or proposed critical habitat for the red knot, as there would be no impacts to habitat under the airspace. In addition, although bald eagles are known to occur and nest in areas below the airspace, there would be no change to airspace configurations. Adverse effects to bird species are not expected from proposed changes in airspace use, as previously described; therefore, impacts to bald eagles would be less than significant and would not rise to the level of "take" under the Bald and Golden Eagle Protection Act. The results of the USFWS consultation will be included in Appendix A1.

LA3.12.2.2 F-35A

Installation

Vegetation

Construction of new facilities for the F-35A at the 159 FW installation would cause similar impacts as under the F-15EX Alternative. It would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in a maximum increase of 100,800 SF (2.31 acres) of impervious surfaces. All of the new construction would occur within already disturbed areas that are currently landscaped or dirt areas. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Impacts from noise associated with construction would be similar to that described under the F-15EX Alternative. Operational noise levels under this alternative at the 159 FW installation would also be similar to the F-15EX Alternative with the conversion to the F-35A aircraft. Under this alternative, the number of aircraft operations would be the same as under the F-15EX Alternative. An additional 1,127 acres of land off the airport property would be exposed to noise levels greater than 65 dB. The majority of this area is open space lands. Changes in operational noise are not expected to impact wildlife species in the area because species on and near the installation are likely accustomed to elevated noise levels associated with aircraft and military operations.

Threatened, Endangered, and Special Status Species

Impacts from noise associated with construction and operations to threatened, endangered, and special status species would be the same as described under the F-15EX Alternative. No federally or state listed species have been observed at the 159 FW installation and there is little to no habitat for these species within the installation boundaries. Overall, impacts to federally and state listed species would be less than significant. Similar to the F-15EX Alternative, the eastern black rail, piping plover, and red knot may occur in habitats adjacent to the installation, and the bald eagle is known to occur and nest on the installation. Therefore, the DAF, in coordination with the Navy, is conducting informal consultation with the USFWS for the reasons described under the F-15EX Alternative.

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure LA3.7-3).

Coastal Resources

Construction and operations for the F-35A Alternative would take place within the coastal zone. A Coastal Consistency Determination is being prepared to address the Proposed Action's consistency with the enforceable polices of the Louisiana State's Coastal Zone Management Program.

Airspace

Wildlife

Under the F-35A Alternative, no construction would occur beneath the training airspace. Impacts from operations to wildlife under the F-35A Alternative would be similar to that described under the F-15EX Alternative. Noise modeling results suggest subsonic noise levels would increase approximately 3 to 5 dB in SEL and 6 to 8 dB greater in L_{max} within the airspace and would be up to 48 L_{dnmr}; well below the 112 dB shown to elicit major biological responses. Long-term impacts are anticipated to be negligible. Impacts on migratory birds under the MBTA would not be significant.

Threatened, Endangered and Special Status Species

Impacts on potentially occurring federally or state listed species underlying the 159 FW airspace would be similar to those described under the F-15EX Alternative. Under the F-35A Alternative

for the 159 FW, the amount of time the 159 FW would conduct operations in the associated airspace would increase by approximately 107 percent.

In general, federally and state listed species would not be affected by the proposed change in subsonic and supersonic operations for the following reasons: (1) the probability of an animal or nest experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown; (2) the majority (98 percent) of the F-35A operations would occur above 5,000 feet AGL; and (3) supersonic flight would only occur above 10,000 feet MSL in the airspace, with 90 percent of these supersonic events above 30,000 feet MSL. However, the DAF, in coordination with the Navy, has initiated informal consultation with the USFWS, as described above.

LA3.12.2.3 F-15C/D Legacy Aircraft

Installation

Vegetation

Construction of new facilities for the F-15C/D legacy aircraft at the 159 FW installation would occur primarily on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in a maximum increase of 62,500 SF (1.43 acres) of impervious surfaces. All of the new construction would occur within already disturbed areas that are currently landscaped or dirt areas. Therefore, impacts on vegetation would not be significant under this alternative.

Wildlife

Impacts from noise associated with construction would be similar to that described under the F-15EX Alternative. However, there would be no impacts from increased operational noise levels since operations of the F-15C/D legacy aircraft would remain the same as current operations.

Threatened, Endangered, and Special Status Species

Impacts from noise associated with construction for the F-15C/D legacy aircraft would be similar to that described under the F-15EX Alternative. However, there would be no effects from increased operational noise levels since operations of the F-15C/D legacy aircraft would remain the same as current operations.

Wetlands

None of the areas designated for proposed construction projects would occur within proximity of wetlands. Therefore, construction activities would have no impact on wetlands (see Figure LA3.7-4).

Coastal Resources

Construction and operations under this alternative would take place within the coastal zone. A Coastal Consistency Determination is being prepared to address the proposed action's consistency with the enforceable polices of the Louisiana State's Coastal Zone Management Program.

Airspace

Wildlife

Under the F-15C/D legacy aircraft alternative, no construction would occur beneath the training airspace. In addition, operations would be the same as current operations. Therefore, there would be no impacts on wildlife under this alternative.

Threatened, Endangered, and Special Status Species

Impacts on potentially occurring federally or state listed species underlying the 159 FW airspace would be the same as current operations. Therefore, there would be no effects to federally or state listed species under this alternative.

LA3.12.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on biological resources would not be significant.

LA3.12.3 Summary of Impacts

No sensitive vegetation exists at the proposed construction sites for the 159 FW, and so construction activities would not be expected to affect the flora on the installation under any of the aircraft beddown alternatives. Noise associated with construction activities and/or aircraft

operations would not affect wildlife or threatened and endangered species, as they are already likely habituated to disturbances from existing training and flight operations. Moreover, anticipated changes to use of the SUA would not be expected to impact biological resources. The DAF, in coordination with the Navy, has initiated informal ESA section 7 consultation with USFWS on potentially occurring federally threatened and endangered species. The results of the USFWS consultation will be included in Appendix A1. It is anticipated that impacts on biological resources as a result of the beddown of the F-15EX or F-35A, retention of the F-15C/D, or the No Action Alternative at the 159 FW installation would not be significant.

LA3.13 VISUAL IMPACTS

FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. Two of the proposed alternatives (104 FW and 144 FW) are tenants at a civil airport regulated under FAA and as such are required to undergo visual impacts analysis. NAS JRB New Orleans is not collocated with a civil airport regulated under FAA; therefore, visual resources were not analyzed for NAS JRB New Orleans.

LA3.14 INFRASTRUCTURE/UTILITIES/NATURAL RESOURCES AND ENERGY SUPPLY/ TRANSPORTATION/PUBLIC TRANSPORTATION

LA3.14.1 Affected Environment

LA3.14.1.1 Installation

Potable Water

Plaquemines Parish Water Department in the City of Belle Chasse provides potable water for the 159 FW installation. Potable water in the area is supplied primarily by treated water from the Mississippi River stored in seven elevated potable water storage tanks located within the parish (City of Belle Chasse 2020). In 2010, about 85.1 million gallons per day of water were withdrawn in Plaquemines Parish, Louisiana (U.S. Geological Survey 2013). In 2021, 27.9 million gallons of potable water were supplied to the 159 FW installation (NAVFAC 2007).

Wastewater

The 159 FW installation generates wastewater from sanitary and industrial processes. This includes domestic and industrial wastewater. Wastewater generated within the 159 FW installation is conveyed into the Plaquemines Parish Water Department municipal sewage system which has a capacity of 7.3 million gallons per day (Plaquemines Parish 2012). In 2007, the average daily

wastewater rate at the installation was 2 million gallons, while maximum capacity was 3 million gallons per day (NAVFAC 2007).

Stormwater

The stormwater collection system at the 159 FW installation consists of a series of canals, open ditches, and culverts that discharge to the Bayou Barriere, a receiving canal parallel to the Intracoastal Waterway (NAVFAC 2007). The stormwater drainage system has been designed to collect and transport surface water runoff from storm events to prevent flooding within the installation and is a separate system from the wastewater (sewage) system.

Removal of stormwater runoff is handled through a contract with the Plaquemines Parish Drainage District, which operates a pumping station on the Intracoastal Waterway. During severe weather events, the existing stormwater system can be inadequate to remove sufficient runoff and prevent flooding to facilities on the installation (NAS JRB New Orleans 2011).

Electrical and Natural Gas

Electricity is supplied to the 159 FW installation by Louisiana Power and Light of New Orleans. Louisiana Gas Service Company supplies natural gas. Electricity consumption for 2021 at the 159 FW installation was 37,822,000 kilowatt-hours (NAS JRB New Orleans 2022). Natural gas average consumption for 2021 at the 159 FW installation was 586 hundred cubic feet (NAS JRB New Orleans 2022).

Solid Waste

Municipal solid waste at the 159 FW installation is managed in accordance with the NAS JRB New Orleans Integrated Solid Waste Management Plan (NAVFAC Southeast 2015) and guidelines specified in Chief of Naval Operations Instruction 5090.1D Chapter 28. The 159 FW installation generates solid waste in the form of office trash, nonhazardous industrial wastes, normal municipal waste, and construction debris.

Currently, nonhazardous solid wastes are collected in dumpsters located throughout the installation and then transported to a landfill by a contracted service. Total 2020 landfill solid waste generated at NAS JRB New Orleans was 594 tons (NAS JRB New Orleans 2021). Nearby landfills with remaining capacity include:

- Gentilly Construction and Demolition Landfill in Orleans Parish with 264 months remaining capacity as of 2021

- Riverside Recycling and Disposal Landfill in Plaquemines Parish with 145 months remaining capacity as of 2021
- Highway 90 Construction and Demolition Landfill in Jefferson Parish with 1,788 months remaining capacity as of 2021 (Louisiana Department of Environmental Quality 2021).

Transportation

Regional access to the 159 FW installation is provided by three main routes, Louisiana State Highway 406 (Woodland Highway) to the north, Louisiana State Highway 23 (Belle Chasse Highway) to the northeast, and General DeGaulle Drive (State Highway 428). Highway 3017 (Peter's Road) is located to the west of the installation. Belle Chase Highway provides the main access to the front gate. Two primary streets, Fowler Street and Russell Avenue, provide access to the installation, and two secondary roadways Chambers Avenue and Olson Avenue, provide access to local roads.

LA3.14.1.2 Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.14.2 Environmental Consequences

LA3.14.2.1 F-15EX

Installation

During operation of the F-15EX beddown, 101 new personnel would be based at the 159 FW installation. According to the DoD's *2020 Demographics Profile of the Military Community* (DoD 2020), there are approximately 1.6 family members for every ANG member. New personnel would likely move from outside the ROI and bring their family members with them which would lead to a total population increase in the area of 262.6 people. This would be an increase of less than 0.1 percent in Plaquemines Parish (see Table LA3.4-1).

Potable Water

Water consumption would be expected to increase slightly as a result of the small increase in personnel; however, an increase of up to approximately 101 personnel on the installation and less than 0.1 percent in Plaquemines Parish would not be expected to impact regional water supply. Additionally, the demand for water (e.g., if used to control dust) could also increase during demolition and construction phases. However, this increase would be temporary and intermittent and would not be expected to impact regional water supply.

Wastewater

Wastewater generation would be expected to increase slightly as a result of the increase of up to 101 personnel on the installation. However, there have been no deficiencies identified with the existing system, and it is expected that the existing sanitary sewer system is generally adequate to serve the facilities proposed under this alternative.

Stormwater

Under this alternative, there would be up to 218,800 SF of temporary soil disturbance, including up to 85,300 SF of new impervious surface as a result of proposed construction. In accordance with the EISA Section 438, any temporary increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The proposed construction activities could temporarily impact the quality of stormwater runoff (see Section LA3.7.2, *Water Resources*). In addition, during severe weather events, the existing stormwater system at the 159 FW installation can be inadequate to remove sufficient runoff and prevent flooding to facilities (NAS JRB New Orleans 2011). However, implementation of appropriate standard construction practices (as described previously), preventative maintenance, and periodic inspections and sampling to detect risk to stormwater, especially during active construction activity, would minimize these potential impacts. Therefore, impacts on the existing stormwater drainage system as a result of the proposed construction would be minimal.

Electrical and Natural Gas

Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in 101 personnel, and the building space and facilities to be constructed would require additional electricity. However, any new facilities and additions associated with the basing of the F-15EX aircraft would be implemented with more energy-efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate Leadership in Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. Therefore, average energy consumption would be expected to stay the same or decrease compared to energy consumption associated with existing facilities. In addition, an increase of up to 101 personnel on the installation and less than 0.1 percent increase in Plaquemines Parish would not be expected to impact regional energy supply.

Construction activity associated with the basing of the F-15EX aircraft could result in some interruptions of utility services during construction. These impacts would be temporary, occurring

briefly during active construction periods. In addition, the demand for energy (primarily electricity) could increase slightly during demolition and construction phases. The energy supply at the installation and in the region is adequate and would not be affected by this temporary increase in demand.

Solid Waste

The building space and facilities to be constructed would generate construction and demolition debris requiring landfill disposal. Proposed increases in personnel and equipment use would also contribute to an increase in solid waste generation. However, impacts on local landfills would not be expected to exceed the permitted throughput or contribute significantly to the remaining capacity. Off-installation contractors completing construction and demolition projects at the 159 FW installation would be responsible for disposing of waste generated from these activities. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the installation. Much of this material can be recycled or reused, or otherwise diverted from landfills. All non-recyclable construction and demolition waste would be collected in a dumpster until removal. Construction and demolition waste contaminated with hazardous waste, ACM, LBP, or other undesirable components would be managed in accordance with NAS JRB New Orleans policies and procedures and other applicable DoD, federal, state, and local regulations (see Section LA3.11.1, *Affected Environment*).

Transportation

Construction equipment would be driven to proposed construction areas and would be kept on-site for the duration of the respective activity. Construction workers would drive daily in their personal vehicles to and from the construction site. The peak year of construction is anticipated to occur in 2028, when up to 10 workers per day would be on site at one time. Additionally, up to 11 daily truck trips for the delivery of supplies or to import and export material from the construction areas would be anticipated during peak construction. In general, construction traffic would result in increases in the use of on-installation roadways during construction activities; however, increases would be temporary and intermittent (between FY 2024 and 2032), occurring only during active construction periods.

The number of authorized personnel on the installation would increase by up to 101 under this alternative. The increase in personnel would create a potential of 101 additional one-way vehicle trips to and from the installation during morning and evening peak periods for these additional personnel. Assuming that each person makes two, one-way trips per day, the implementation of this alternative would add an additional 202 trips onto the existing roadway network after the construction phase is complete. However, regional roads used to access the installation, as well as

those located on the installation, have sufficient capacity to manage this increase in traffic without substantial impacts on circulation. Therefore, impacts on transportation infrastructure would not be significant with the basing of the F-15EX aircraft.

Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.14.2.2 F-35A

Installation

Basing of the F-35A aircraft at the 159 FW installation would be similar in nature to the basing of the F-15EX aircraft and would include a construction footprint of 151,500 SF. Impacts would be less intensive in magnitude as there would be a smaller construction footprint (67,300 less SF or 31 percent less than the F-15EX basing) associated with the basing of the F-35A.

After basing of the F-35A aircraft, electricity consumption at the installation could increase by up to 8 percent associated with increased flight simulator demands and additional cooling requirements. This projected increase is based on prior utility billing data and interviews with installations that previously converted to the F-35A aircraft. Increases are variable depending upon the installation climate and resulting heating, ventilation, and air conditioning demands. Increased energy efficiency resulting from the proposed new facilities and additions would partially offset increased use attributable to the change in aircraft (NGB 2023).

Natural gas use is also expected to increase after basing of the F-35A aircraft, particularly in climates with cold winters and attendant heating demands. The increase in natural gas demand to accommodate the F-35A is estimated to be approximately 40,000 hundred cubic feet annually, an 18 percent increase from existing natural gas demand at the installation (NGB 2023).

The energy supply at the installation and in the region is adequate and would not be affected by this increase in demand. In addition, basing of the F-35A aircraft would include an addition of 80 personnel, 21 fewer personnel stationed at the 159 FW installation when compared to the F-15EX. Impacts related to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes related to increases in personnel would be similar in nature to those impacts for the F-15EX aircraft but would be slightly less intensive in magnitude as there would be less personnel being stationed at the installation. As such, impacts would not be significant.

Airspace

Airspace was not evaluated for this resource (see Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.14.2.3 F-15C/D Legacy Aircraft

Installation

Should the 159 FW retain the F-15C/D legacy aircraft, impacts would be less intensive in magnitude than the basing of the F-15EX and the F-35A. Construction for the F-15C/D legacy aircraft would include a construction footprint of 81,700 SF (62 percent and 46 percent less, respectively, than the F-15EX and the F-35A). In addition, no personnel increase would occur; impacts related to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes would remain similar to existing conditions/No Action Alternative (see Section LA3.14.1, *Affected Environment*).

Airspace

Airspace was not evaluated for this resource (Table 4.0-1, *Resources Analyzed in the EIS*).

LA3.14.2.4 No Action Alternative

Under the No Action Alternative, the 159 FW would not receive either the new F-15EX or F-35A fighter aircraft. Rather, they would retain their F-15C/D legacy aircraft. There would be no change in airfield or SUA operations from existing conditions, no change in the number of personnel, and no construction or modifications associated with either the new fighter aircraft or the legacy aircraft. Mission capability and readiness would be adversely affected. This alternative does not meet the purpose and need of the NGB and DAF. Impacts on infrastructure, utilities, transportation, natural resources and energy supplies would not be significant.

LA3.14.3 Summary of Impacts

Under all aircraft basing alternatives, there would be no substantial changes expected to potable water, wastewater systems, stormwater management, energy supply systems, solid waste management, or transportation routes as an increase in up to 101 personnel would not significantly impact regional natural resources or energy supply or existing systems at the 159 FW installation. Impacts on infrastructure as a result of implementing the F-15EX aircraft would be slightly more intensive in magnitude when compared to the F-35A as there would be 21 more personnel and a 31 percent larger construction footprint (additional 67,300 SF). Retaining the F-15C/D legacy aircraft would have the least impacts on infrastructure as no additional personnel would be stationed and the 81,700 SF construction footprint is 62 percent and 46 percent less, respectively,

than the F-15EX and the F-35A basing. While construction and operation of the F-15EX or F-35A beddown or retaining the F-15C/D legacy aircraft at the 159 FW would require the use of natural resources and energy supply, the Proposed Action would not have the potential to cause demand to exceed available or future supplies of applicable resource. Impacts on infrastructure at the 159 FW installation as a result of the proposed F-15EX or F-35A beddown, retaining the F-15C/D legacy aircraft, or the No Action Alternative would not be significant.

LA4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

According to CEQ regulations, the cumulative effects analysis of an EIS should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar timeframe. The effects may then be incremental and may result in cumulative impacts. Actions overlapping with or in close proximity to the proposed action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same timeframe tend to offer a higher potential for cumulative effects.

This EIS addresses cumulative impacts by assessing the incremental contribution of the F-15EX, F-35A, and the legacy F-15C/D alternative to impacts on affected resources from all factors. The NGB and DAF have made an effort to identify actions on or near the affected areas that are under consideration and in the planning stage at this time. These actions are included in the cumulative effects analysis, drawn from the level of detail that exist now. Although the level of detail available for those future actions varies, this approach provides the decision-maker with the most current information to evaluate the consequences of the three aircraft beddown alternatives.

LA4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

In this section, an effort was made to identify past and present actions in the region and those reasonably foreseeable actions that are in the planning phase at this time. Actions that have a potential to interact with the Proposed Action alternatives are included in this cumulative analysis. This approach enables decision-makers to have the most current information available so that they can evaluate the environmental consequences of the potential beddown of the F-15EX, F-35A, or retention of the F-15C/D legacy aircraft at the 159 FW installation and training in associated airspace.

The 159 FW is an active military installation that undergoes changes in mission and in training requirements in response to defense policies, current threats, and tactical and technological advances. The installation, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. In addition, tenant organizations may occupy portions of the installation, conduct aircraft operations, and maintain facilities. All of these actions (i.e., mission changes, facility improvements, and tenant use) would continue regardless of which alternative is selected.

The proposed aircraft beddowns for the 159 FW have the potential to interact in a cumulative manner with other projects within the ROI; these other projects are listed in Table LA4.1-1.

Table LA4.1-1 Current and Reasonably Foreseeable Actions at 159 FW Installation, NAS JRB New Orleans, and the Surrounding Area

Action	*Ground Disturbance / New Impervious Surface*
Past Actions	
Airfield Bird/Animal Aircraft Strike Hazard Wetlands Fill Project at NAS JRB New Orleans, Louisiana	Grading/filling of 44 acres of wetlands, 15 of which were jurisdictional. 2014.
Springwood Estates Subdivision Phase 1, Woodland Highway, Belle Chasse, Louisiana	Clearing of 150 forested acres since 2002. As of 2011 75% complete.
Federal Aviation Administration VORTAC Facility Vegetation Clearing at NAS JRB New Orleans, Louisiana	72 acres cleared for CZ.
Adversary Aircraft Transitions at NAS Fallon, Nevada, and NAS JRB New Orleans, Louisiana. As part of this action, twelve of the F-5N/F adversary aircraft in use by Fighter Composite Squadron Thirteen (VFC-13) at NAS Fallon replaced the F/A-18C adversary aircraft currently at NAS JRB NOLA. This included a decrease in 14 personnel and no increase in operations.	No new construction or ground disturbance associated with this action.
Present and Reasonably Foreseeable Future Actions	
Construction of an Alert Facility and Apron at NAS JRB New Orleans, Louisiana	Expected to be completed by 2024. SF unknown.
Combat Aircraft Loading Area (Project #P473). Project would construct a new 21,600 SF Combat Aircraft Loading Area on the 'Plans' north side of the runway. Total ground disturbance would be 27,000 SF.	27,000 SF of disturbance, 21,600 SF new impervious surface.
Construct Runway 14/32 Overrun Extension. Project would construct an 16,670 SY overrun extension for Runway. Total ground disturbance would be 20,000 SY.	20,000 SY (180,000 SF) of disturbance, 16,670 SY (150,030 SF) of new impervious surface.
Runway Approach Obstructions, BASH, and Vegetation Control at NAS JRB New Orleans	Unknown disturbance.
Relocation of the NAS JRB New Orleans Main Gate and Construction of Perimeter Road	Unknown disturbance.
Proposed new Bourbon MOA with a floor of 4,000 feet MSL and a ceiling up to FL 180, overlain by ATCAA. Would be adjacent to Snake High/Low MOA. Activities would be consistent with adjacent MOAs.	None.
Federal Highway Administration LA 23: Belle Chasse Bridge and Tunnel Replacement	0.42 acre of jurisdictional wetland filled. Unknown disturbance.
Springwood Estates Subdivision Phase 2, Woodland Highway, Belle Chasse, Louisiana	300 acres of forested land would be cleared.
Additional Residential Development, Woodland Highway, Belle Chasse, Louisiana	1,200 acres of forested land would be cleared.
Commercial and Industrial Development, Engineers Road and Peters Road, Jefferson Parish	200 acres would be developed.
Peters Road Extension, Plaquemines Parish	1,000 acres of forested land would be cleared/fragmented.

Legend: 159 FW = 159th Fighter Wing; ATCAA = Air Traffic Control Assigned Airspace; BASH = Bird/Wildlife Aircraft Strike Hazard; CZ = Clear Zone; FL = Flight Level; JRB = Joint Reserve Base; MOA = Military Operations Area; MSL = Mean Sea Level; NAS = Naval Air Station; SF = square foot/feet; SY = square yard; VORTAC = Very High Frequency Omnidirectional Range and Tactical Air Navigation.

LA4.2 ANALYSIS OF CUMULATIVE EFFECTS

The following analysis considers how the impacts of these other actions might affect or be affected by those resulting from the alternatives actions at the 159 FW installation and whether such a relationship would result in potentially additive impacts. Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources, quantifiable data are not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made based on an understanding of the nature of the project regarding cumulative impacts related to this EIS.

LA4.2.1 Noise

Under the F-15EX aircraft beddown alternative, 92 more acres off the NAS JRB New Orleans property would be exposed to noise levels equal to or greater than 65 dB DNL, while no new POIs would be exposed to 65 dB DNL. The DNL at noise sensitive receptors would increase 1 to 4 dB at 29 POIs when compared with existing conditions/No Action Alternative. The number of school POIs that would be exposed to $L_{eq(8hr)}$ above 60 dB, the screening threshold for noise impacts for classrooms, would not change from existing conditions/No Action Alternative. There would be some increase of noise levels in some residential areas as a result of the F-15EX beddown, but these areas would remain below 65 dB DNL. Noise impacts under the F-15EX Alternative, with consideration of all projects described in Table LA4.1-1 at NAS JRB New Orleans, would not be significant.

Under the F-35A aircraft beddown alternative, 1,127 more acres off the NAS JRB New Orleans property would be exposed to noise levels equal to or greater than 65 dB DNL, while no new POIs would be exposed to 65 dB DNL. The DNL at noise sensitive receptors would increase 1 to 4 dB at 41 POIs when compared with existing conditions/No Action Alternative. The number of school POIs that would be exposed to $L_{eq(8hr)}$ above 60 dB, the screening threshold for noise impacts for classrooms, would not change from existing conditions/No Action Alternative. The number of households and population exposed to greater than 65 dB DNL noise contours would represent a significant noise impact. Noise impacts under the F-35A Alternative, with consideration of all projects described in Table LA4.1-1 at NAS JRB New Orleans, would similarly be significant.

Under the F-15C/D legacy aircraft alternative, impacts from noise would not change from existing conditions/No Action Alternative and would not be significant. The addition of those projects listed in Table LA4.1-1 would not be expected to substantially add to the noise impacts. All of the projects described in Table LA4.1-1 are short-term construction projects that would occur in the airport environs or in areas identified as industrial. Noise associated with the construction projects would not affect sensitive receptors, disturb sleep, interrupt speech, or cause classroom disruptions

in the long term. Noise from implementation of these actions would be short-term and localized, and would not be expected to increase the overall DNL noise contours.

Fighter jet-generated noise would continue to dominate sound levels in the training airspace. Given that the projects listed in Table LA4.1-1 are all local to NAS JRB New Orleans, cumulative impacts in the training airspace that would be anticipated when considered with the F-15EX or F-35A aircraft beddown alternatives for the 159 FW installation would not be significant.

LA4.2.2 Airspace

The replacement of the F-15C/D aircraft with the F-15EX or F-35A would not require changes in local airspace. Over time, the replacement of the F-15C/D aircraft at the installation could result in a 19.8 percent increase in total airfield operations at the NAS JRB New Orleans. This increase in airfield operations would have a minimal effect on the local air traffic environment. Close coordination of scheduling and use of SUA would ensure safe air operations within the NAS and SUA. Many of those projects described in Table LA4.1-1 would enhance airfield safety and flow; others would have little impact to the airfield or the airspace. Cumulative impacts would not be expected to be significant.

LA4.2.3 Air Quality/Climate Change

The ROI for criteria pollutants comprises Plaquemines Parish in Louisiana, which is in attainment for all criteria pollutant NAAQS. All the present and reasonably foreseeable future actions shown in Table LA4.1-1 have the potential to interact with the aircraft beddowns and affect air quality. The construction of the additional projects described in Table LA4.1-1 would produce short-term air emissions from fuel burning equipment and particulate matter from ground disturbance.

The construction projects that would occur as described in the Table LA4.1-1 may overlap the construction of the Proposed Action alternatives, but as the emissions shown Section LA3.3.2, *Environmental Consequences*, are below the comparative threshold, the short-term emissions from these projects considered cumulatively with the Proposed Action alternatives would not result in the short- or long-term degradation of regional air quality. Thus, based on the project descriptions, the impacts of these projects in conjunction with the implementation of the Proposed Action alternatives would not have a significant impact on air quality in the ROI.

LA4.2.3.1 Greenhouse Gases

As described in Chapter 3.0, the CEQ published interim guidance on January 9, 2023, entitled *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (CEQ 2023). For GHGs, the ROI is global and impacts are cumulative by nature.

The cumulative analysis evaluates emissions considering existing conditions and the Proposed Action alternatives. Implementation of the Proposed Action alternatives would contribute directly to emissions of GHGs from the combustion of fossil fuels. Emissions for these alternatives and the No Action Alternative were estimated for the entire training sortie based on the airfield emissions and the annual training hours anticipated. These estimates were prepared to provide a measure of the difference between the alternatives. Emissions were estimated using assumed flight patterns for fuel consumption averages for climb out and approach power settings and the results are presented in Tables LA.4.2-1 and LA.4.2-2. The lifetime GHG emission analysis for both the F-15EX and the F-35A is based on the 50-year F-15C/D lifespan. While current DoD estimates for both the F-35A and F-15EX exceed this timeframe, 50 years was used for the purposes of developing comparative life cycle emission estimates and values for distant future social cost of carbon estimates. Detailed calculations and assumptions are included in Appendix E.

Table LA4.2-1 GHG Emissions Estimates for F-15EX (tons per year)

Activity	*CO_2e*	*metric tons*
F-15C Existing Sorties	39,372	
Airfield Totals	14,096	
Annual GHG total	**53,468**	
50-year lifecycle emissions of F-15C/D	2,673,406	
F-15EX Sorties	**99,924**	
Airfield Totals	16,353	
Annual GHG total	**116,277**	
Total 50-year emissions F-15EX	**5,813,836**	
Annual GHG net change	**62,809**	56,979
50-year net change lifecycle emissions	**3,140,430**	

Note: [1] F-15C/D flight operations would continue unchanged under the Legacy airframe alternative.
[2] The No Action Alternative is identical to the Legacy F-15C/D alternative except no construction activities would occur.
Legend: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas.

Table LA4.2-2 GHG Emissions Estimates for F-35A (tons per year)

Activity	*CO_2e*	*metric tons*
F-15C Existing Sorties	39,372	
Airfield Totals	14,096	
Annual GHG total	**53,468**	
50-year lifecycle emissions of F-15C/D	2,673,406	
F-35A Sorties	**96,766**	
Airfield Totals	16,515	
Annual GHG total	113,281	
Total 50-year emissions F-35A	5,664,061	
Annual GHG net change	59,813	54,262
50-year net change lifecycle emissions	2,990,655	

Legend: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas.

The SC-CO_2, SC-CH_4, and SC-N_2O allow agencies to understand the benefits of reducing each of these GHGs or the social costs of increasing such emissions, in the policy making process. Collectively, these are referenced as the SC-GHG and is defined as the monetary value of the net

harm to society associated with adding a small amount of carbon to the atmosphere in a given year. In principle, net harm cost includes the value of all climate change impacts, including but not limited to changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services (IWG 2021). For this analysis, only SC-CO_2 is evaluated as the vast majority of emissions are generated by aircraft flying with turbofan engines. These engines generate no methane emissions and very little N_2O_2 emissions. Quantifying the small quantity of N_2O_2 emissions is a current subject of research.

Because the current lifetime expectancy of the aircraft associated with the Proposed Action, which represent the bulk of emissions, is at least 50 years, the SC-CO_2 analysis covers a 50-year period from 2027 to 2077 for the F-15EX and 2026 to 2076 for the F-35A. Table LA4.2-3 identifies the projected cost, in 2020 dollars of implementing the Proposed Action with F-15EX basing using an average discount rate of 3 percent and what would be anticipated to represent the worst-case scenario, which is defined as the 95th percentile of the 3 percent average (IWG 2021). These costs are totaled in Table LA4.2-3 for the presumed first year of steady state operations (2027) for the F-15EX, and the year 2050 to provide an indication of the increasing monetary value of net harm on an annual basis. While the entire 50-year projected lifecycle would extend to 2077, the data on costs that far into the future are not currently available but can be calculated when the costs are computed and published by the White House Office of Management and Budget.

Table LA4.2-3 SC-CO_2 Select Yearly Estimates for Annual F-15EX Operations Emissions Increase Over 50 Years

Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount*
CO_2			
2027	$59	56,979	$3,336,692
2050	$85		$4,823,844
Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% 95th Percentile average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount, 95th Percentile average damages*
CO_2			
2027	$176	56,979	$10,038,565
2050	$260		$14,811,698

Note: [1]Values from OMB 2021; represented here rounded to closest whole number.
Legend: % = percent; CO_2 = carbon dioxide; SC-CO_2 = social cost of carbon.

Table LA4.2-4 identifies the projected cost, in 2020 dollars of implementing the Proposed Action with F-35A basing. The same value percentiles are used to assess costs, but the analysis begins with the year 2026, the presumed first steady state year for the F-35A beddown. All other assumptions are the same as presented for the F-15EX cost analysis.

Table LA4.2-4 SC-CO_2 Select Yearly Estimates for Annual F-35A Operations Emissions Increase Over 50 Years

Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount*
CO_2			
2026	$57	54,262	$3,119,497
2050	$85		$4,593,783
Year	*[1]SC-CO_2 Estimates (2020$/Metric Ton @ 3% 95th Percentile average damages)*	*F-15EX Annual Net Change Emissions in Metric Tons*	*SC-CO_2 Emissions 2020$ – 3% average discount, 95th Percentile average damages*
CO_2			
2026	$173	54,262	$9,369,342
2050	$260		$14,105,291

Note: [1]Values from OMB 2021; represented here rounded to closest whole number.
Legend: % = percent; CO_2 = carbon dioxide; SC-CO_2 = social cost of carbon.

There are a number of limitations associated with the modeling used to derive the monetary values presented in Tables LA4.2-3 and LA4.2-4, due to the broad scope of scientific and economic issues across the complex global landscape, and the estimates likely underestimate the damages from GHG emissions (IWG 2021). Nonetheless, providing a monetary characterization of GHG impacts is a useful tool for generally assessing impacts from the emissions as well as impacts from implementing mitigation measures to reduce those emissions.

Operational energy (aviation fuel and energy to power aircraft) comprises over 80 percent of the DAF's energy use. Lifecycle emissions for the Proposed Action assume no changes in operations from 2030 to 2080. However, likely reductions would include reductions in ground mobile source emissions as vehicles and equipment continue to be electrified, and as the DAF implements its Climate Action Plan.

Reduction of fuel use offers the most significant opportunity to optimize operational capability while simultaneously reducing GHG emissions. Technological enhancements to achieve this reduction include but are not limited to aerodynamic advancements, streamlined flight planning, incorporation of drag reduction technologies onto current platforms, enhanced engine sustainment practices, introduction of electric AGE, and increases in the use of simulation and augmented reality systems. Additionally, the DAF has instituted an installations portfolio goal of net-zero emissions by FY 2046 (DAF 2022). During the estimated 50-year lifecycle of the Proposed Action, many activities would be incorporated into the DAF functions to reduce GHG emissions across the DAF assets.

LA4.2.4 Socioeconomics/Environmental Justice/Children's Health and Safety

The past, present, and reasonably future actions identified in Table LA4.1-1 include several construction actions within and near the ROI. Construction actions would also be required for the beddown of the F-15EX or F-35A or to maintain the existing F-15C/D flying mission. This would add to demand on the local construction industry potentially requiring some construction workers to be hired from outside the ROI. The increased demand for housing and services would be temporary during construction. Construction spending would be a minor beneficial impact on economic activity, employment, and wages. During the construction phase of the alternatives, there would be no significant adverse impacts associated with socioeconomics or environmental justice and there would be minor socioeconomic benefits in the ROI due to the increased economic activity associated with construction spending and employment. Under the F-15EX Alternative, impacts on minority populations would not be disproportionate. Impacts on low-income populations would be slightly higher than the three-Parish reference group, though lower than with the existing F-15C/D aircraft. The percent of children under 18 years of age and the elderly that would be affected by the F-15EX noise contours would both be below the three-Parish reference group. Under the F-35A Alternative, the percent of low-income, minority, children under the age of 18, and the elderly would all be below the three-Parish reference populations, and therefore would not be disproportionate. Additionally, the past, present, and reasonably future actions identified in Table LA4.1-1 would not alter the acoustic environment, which would continue to be attributed to aircraft noise. Increases in population in the ROI would occur due to the relocation of personnel under the beddown alternatives; however, the increased population would be a minor percentage of the total population of the ROI. Therefore, cumulative impacts on socioeconomics during construction would be a minor beneficial impact from increased construction spending and employment and cumulative impacts during operation would not be significant. There would not be disproportionately high and adverse health or environmental effects on any minority or low-income populations, or children due to cumulative impacts.

LA4.2.5 Land Use/Noise Compatible Land Use

Under the alternative aircraft beddown alternatives at the 159 FW installation, acreage of off-base property experiencing noise levels greater than 65 dB DNL would increase by approximately 92 acres for the F-15EX and 1,127 acres for the F-35A. Under the F-15EX, residential land use acreage would decrease. Under the F-35A, an additional 252 acres of residential land use would fall within the 65 to 70 dB DNL and 8 acres within the 70 to 75 dB DNL. Residential uses from 65 to 75 dB DNL are considered incompatible and generally discouraged but could be mitigated with noise level reduction measures achieved through the incorporation of noise attenuation. Barring appropriate noise level reduction measures, impacts on residential land uses would be considered a significant impact. Should the F-15C/D legacy aircraft alternative be selected, there

would be no new impacts on land use. Planned projects in the ROI listed in Table LA4.1-1 would be both on the airfield and/or commensurate with the surrounding land uses in the area. Construction projects would introduce short-term noise increases that would not generate noise levels to cumulatively affect or change land use compatibilities. As such, cumulative impacts would not be significant.

LA4.2.6 Department of Transportation, Section 4(f)

FAA has jurisdiction by law relating to the DAF/NGB Proposed Action where there is a military use of a civil airport location. The 159 FW is a tenant at NAS JRB New Orleans, which is not under FAA jurisdiction. As such, NAS JRB New Orleans was not analyzed for impacts related to Section 4(f) resources.

LA4.2.7 Water Resources/Floodplains/Wild and Scenic Rivers

Under the Proposed Action alternatives at NAS JRB New Orleans, proposed construction and modification activities would result in up to 100,800 SF of new impervious surfaces. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Predevelopment hydrology would be maintained through compliance with LID and Section 438 of the EISA. BMPs would continue to be implemented to minimize impacts on both surface water and groundwater. Some of the proposed construction or modification projects would be located within the 100-year floodplain; however, impacts on floodplains would not be significant and be in compliance with EO 11988. The ANG has determined that there is no practicable alternative for construction of these facilities outside the floodplain; therefore, a Finding of No Practicable Alternative will be prepared. Impacts on water resources as a result of the proposed beddown of the F-15EX, F-35A, or retention of the F-15C/D aircraft at NAS JRB New Orleans would not be significant. Similarly, those projects identified in Table LA4.1-1 would implement similar BMPs to manage impacts on both surface water and groundwater. As such, cumulative impacts would not be significant.

LA4.2.8 Geological Resources/Soils/Farmlands

Under the Proposed Action alternatives at NAS JRB New Orleans, proposed construction and modification activities would result in up to 218,800 SF of ground disturbance. Site-specific SWPPPs would be prepared for each construction project to ensure that runoff would be contained on-site. Impacts on geological resources as a result of the proposed beddown of the F-15EX, F-35A, or retention of the F-15C/D aircraft at NAS JRB New Orleans would not be significant. Similarly, those projects identified in Table LA4.1-1 would implement similar BMPs to manage impacts on ensure that runoff would be contained on-site. As such, cumulative impacts would not be significant.

LA4.2.9 Cultural Resources

There are no known historic properties within any of the proposed construction footprints at the 159 FW installation. In the event of an inadvertent discovery during ground-disturbing operations, work would cease, and procedures would be implemented to manage the site prior to continuation of work. No buildings associated with the proposed construction have been determined to be eligible for listing in the NRHP. There would be no noise impacts on NHRP listed or eligible resources within the APE because none are present. No traditional cultural resources have been identified at the 159 FW installation. Government-to-government consultation with associated Tribal Nations is ongoing and will continue throughout the EIAP. Use of the SUA under the Proposed Action would be similar to ongoing operations. Overall, implementation of F-15EX, F-35A, or legacy F-15C/D beddowns at 159 FW installation would not result in significant impacts on cultural resources nor result in historic properties affected per 36 CFR Section 800.4(d)(1) because there are no known historic properties present within the APE at the installation. Known historic properties are present within the APE under the airspace; however, there would be no adverse effect per 36 CFR Section 800.5(b). Similarly, many of those projects identified in Table LA4.1-1 are located at NAS JRB New Orleans, which has been previously disturbed. Those residential and commercial development projects listed in Table LA4.1-1 would follow similar procedures for inadvertent discoveries, so it is unlikely that any cultural resources would be impacted by such construction. As such, cumulative impacts would not be significant.

LA4.2.10 Safety

Fire and crash response would continue to be conducted by the NAS JRB New Orleans Fire and Emergency Services under all aircraft beddown alternatives. Construction activities are not expected to pose any unusual concerns, and standard construction safety procedures would be implemented for the 159 FW construction projects as well as the construction projects listed in Table LA4.1-1. Many of the projects listed would actually enhance airfield and flight safety. No construction of incompatible structures would occur within APZs and there would be no new airfield obstructions created by construction or modification projects. QD arcs would not be expected to change from existing conditions/No Action Alternative. While there are some planned constructions that would take place within QD arcs, all DAF regulations would be met to ensure proper protocols and distances are met. All new construction projects would implement AT/FP requirements as mandated by the DoD and would increase overall AT/FP compliance.

The F-15EX would utilize the same airframe as the current and familiar F-15C/D model. Though the avionics are more advanced the increase in automation and technology would aid the pilots in reducing total workload therefore improving situational awareness. Additionally, the F-35A platform fly-by-wire and advanced systems also aid in cockpit management and improved

situational awareness. Reduced workload, improved situational awareness, training and familiarity would only continue to help reduce the chances of mishaps. The 159 FW installation BASH Plan, NAS JRB New Orleans Instruction 10570.2 is used to mitigate and reduce the chances of a BASH event from occurring. The lifetime Class A mishap rates for the F-15 and F-35 are 2.29 and 2.22 per 100,000 hours flown, respectively.

No significant cumulative impacts on safety are expected with implementation of any of the alternatives.

LA4.2.11 Hazardous Materials/Waste

The types of hazardous materials needed for maintenance and operation of the F-15EX and the F-35A would be similar to those currently used for maintenance and operation of the F-15C/D fleet. Under the F-15EX and the F-35A Alternatives, the total number of airfield operations would increase; therefore, throughput of petroleum substances and hazardous waste streams would be expected to increase slightly. Additionally, it is expected that short-term increases in the quantity of fuel used during construction activities for this action and the present/reasonably foreseeable projects listed in Table LA4.1-1 would occur. Hazardous waste generation (e.g., used oil, used filters, oily rags) would continue to be managed in accordance with the installation's HWMP and all applicable federal, state, and local regulations. The NAS JRB New Orleans Pollution Prevention Plan (NAVFAC Southeast 2016) would continue to be utilized to minimize the amount of hazard materials being utilized on the base and would include any construction-related materials or waste associated with aircraft operations. Additionally, no changes to the NAS JRB New Orleans' Large Quantity Generator status would be expected to occur due to the slight increase in hazardous waste generation from aircraft operations. In addition, any projects proposed for construction and modification would be inspected for ACM and LBP according to established procedures prior to any renovation or demolition activities.

If contaminated media (e.g., soil, groundwater) were encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation and potential construction dewatering for installation of building footers) for proposed construction activities, work would cease until 159 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation, as necessary, if existing ERP or AOC sites were to be affected. Prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements. The present and future projects listed

in Table LA4.1-1 could involve the use of some hazardous materials and the generation of some hazardous waste during construction; however, the same regulations that would apply to the Proposed Action would be required for these actions. As such, cumulative impacts from hazardous materials, hazardous waste, toxic substances, or contaminated sites are expected to be less than significant.

LA4.2.12 Biological Resources/Coastal Resources/Wetlands

Noise levels would be expected to increase from the affected environment with the conversion to either the F-15EX or the F-35A aircraft. However, these noise levels from operations and construction would not be expected to impact wildlife in the area because, as discussed in Section LA3.12.2.1 they are likely accustomed to elevated noise levels associated with current aircraft and military operations.

The opportunity for bird-aircraft strikes to occur, including those with migratory birds, would increase commensurate with the increase in potential airfield operations, though would be managed and minimized with implementation of procedures identified in the BASH plan. No threatened and endangered or special status species are currently known to reside on the 159 FW installation or within the land area within the projected noise contours, though several have the potential to occur as discussed in Section LA4.12.2. The threatened eastern black rail, threatened piping plover, and threatened red knot are not known to occur on the installation; however, they may occur in habitats adjacent to the installation. The DAF has concluded that the Proposed Action may affect, but is not likely to adversely affect, these species, and in coordination with the Navy, is seeking concurrence from the USFWS through informal consultation.

Construction-related impacts on the vegetation at the installation and in the vicinity of projects identified in Table LA4.1-1 would be minor due to the lack of sensitive vegetation in the project areas. Construction and operations for the F-35A would take place within the coastal zone. The DAF is preparing a Coastal Consistency Determination to address the proposed action's consistency with the enforceable polices of the Louisiana State's Coastal Zone Management Program. The Airfield Bird/Animal Aircraft Strike Hazard Wetlands Fill Project described in Table LA4.1-1 would impact wetlands at NAS JRB New Orleans; however, the Proposed Action would not impact wetlands. In general, construction activities at the 159 FW installation and at NAS JRB New Orleans would primarily occur on sites that are already highly altered. These impacts would include the removal of some vegetation and associated wildlife habitat. However, wildlife that use these areas are typical of urban and suburban areas. Though there could be an increase in operations within the SUA, impacts on wildlife would be minimal given that the F-15C/D aircraft (as well as other aircraft) already use the SUA, vertical distribution of operations would change minimally, and 93 percent of operations would occur above 10,000 feet AGL. In

general, no impacts on any federally or state threatened, endangered, or special status species would be expected as a result of any of the alternative aircraft beddowns at the 159 FW installation or those projects listed in Table LA4.1-1. As mentioned in Section LA4.12.2, the eastern black rail, threatened piping plover, and threatened red knot all have the potential to occur within the airspace. The DAF, in coordination with the Navy, has initiated informal ESA section 7 consultation with the USFWS on potential impacts to these species. For the reasons described earlier, the DAF has concluded that the Proposed Action may affect, but is not likely to adversely affect, the eastern black rail, piping plover, and red knot. The Proposed Action would not destroy or adversely modify critical habitat for the piping plover or proposed critical habitat for the red knot, as there would be no impacts to habitat under the airspace. Therefore, cumulative impacts on biological resources would not be significant.

LA4.2.13 Visual Impacts

FAA has jurisdiction by law relating to the DAF/NGB Proposed Action at civilian airfields. The 159 FW is a tenant on NAS JRB New Orleans, where FAA has no jurisdiction regarding the airfield. As such, NAS JRB New Orleans was not analyzed for impacts related to visual resources.

LA4.2.14 Infrastructure/Utilities/Natural Resources and Energy Supply/ Transportation/Public Transportation

Considering the alternative aircraft beddowns at the 159 FW installation as well as those projects identified in Table LA4.1-1, short- and long-term demand for all services would increase by a minor degree when considered regionally. The beddown alternatives and other projects would increase demand for potable water, increase production of wastewater, and create more impervious surfaces to increase stormwater runoff. However, cumulative effects would be anticipated to be minimal because there is current and long-term capacity to meet increased demand for drinking water and disposal of wastewater. For stormwater, BMPs such as silt fencing, vegetation management, and ditching would minimize erosion and sedimentation during the short-term construction phases; retention and detention pond systems would avoid excessive runoff due to increases in impervious surfaces in the long term.

Demand for electricity and natural gas would be expected to increase in the short-term due to construction activities and in the long term due to minor increases in personnel. In the short-term, existing energy systems have the ability to meet increased demand. In the long term, there is capacity to meet the demands of the minor increase in personnel. Further, any new facilities and additions associated with these projects would incorporate Leadership in Energy and Environmental Design and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation when compared to facilities currently in place.

Under any the three aircraft beddown alternatives at the 159 FW installation in addition to reasonably foreseeable future projects, it is anticipated that there would be both short- and long-term increases in solid waste generation. During demolition and construction phases, all materials would be disposed in permitted facilities, which have the capacity to accept these materials. In the long term, solid waste generated by the regionally minor increase in personnel could be handled by existing solid waste management systems.

In terms of transportation, the local traffic network has the ability to meet the short-term increases in traffic during construction activities from the construction activities and reasonably foreseeable future projects. In the long term, the transportation network would be able to meet the needs of the minor increase in personnel. In summary, cumulative impacts on infrastructure due to the aircraft beddown alternatives at the 159 FW installation and reasonably foreseeable future projects would not be significant.

LA4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA CEQ regulations require environmental analyses under an EIS to identify "...any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Building construction material such as gravel and gasoline usage for construction equipment would constitute the consumption of nonrenewable resources. Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

Training operations would involve consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in aircraft. Use of training ordnance would involve commitment of chemicals and other materials. None of these activities would be expected to substantially affect environmental resources because the relative consumption of these materials is expected to change negligibly.

The primary irretrievable impacts of implementation of any of the alternatives at the 159 FW installation or for any of the alternatives would involve the use of energy, labor, materials and funds, and the conversion of some lands from an undeveloped condition through the construction of buildings and facilities on the installation. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

5 References

This page intentionally left blank.

5.0 REFERENCES

5.1 CHAPTER 1.0

Author	*Date*	*Title*
Tirpak, J.A	18 Apr 2019	F-15EX vs. F-35A. How the two aircraft compare.

5.2 CHAPTER 2.0

Author	*Date*	*Title*
Department of the Air Force (DAF)	2011	Supplemental Report. Environmental Effects of Training with Defensive Countermeasures. September.
Department of the Air Force Instruction (DAFI)	2023	Department of the Air Force Instruction 10-503, Strategic Basing. 12 June.
Federal Aviation Administration (FAA)	2021	Federal Aviation Administration Aerospace Forecast Fiscal Years 2021-2041.
National Guard Bureau (NGB)	2022	Waters of the United States Delineation Report, Barnes Air National Guard, 104 FW, BAF, Westfield, Massachusetts
NGB	2023a	Noise Study, 104 Fighter Wing at Westfield-Barnes Regional Airport (BAF), Massachusetts for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement
NGB	2023b	Noise Study, 144 Fighter Wing at Fresno Yosemite International Airport (FAT), California for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement
NGB	2023c	Noise Study, 159 Fighter Wing at NAS JRB New Orleans, Louisiana for the Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement
NGB	2023d	Waters of the United States Delineation Report, Airways Golf Course, Fresno, California
NGB	2023e	Bat Survey Report, 144 Fighter Wing, Air National Guard, Fresno County, California
NGB	2023f	Flora and Fauna Survey Report for Airways Golf Course, Fresno County, California

5.3 CHAPTER 3.0

Author	*Date*	*Title*
Air Force Civil Engineer Center (AFCEC)	2020	Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process.
AFCEC	2017	Air Force Public Affairs, Frequently Asked Questions, Aqueous Film Forming Foam Replacement and Containment, As of 13 April 2017.
Air Force Safety Center (AFSEC)	2019	Wildlife Strikes by Phase of Operation, Headquartered Kirtland Air Force Base, Albuquerque NM. November 2019. Accessed September 2022 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/
AFSEC	2021	F-15 Aircraft Mishap Report. https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/.

Author	*Date*	*Title*
AFSEC	2022	Aircraft Mishap Rates F-35. 7 February 2022. Accessed on 9 September 21 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
American National Standards Institute (ANSI)	1988	Quantities and Procedures for Description and Measurement of Environmental Sound. Part 1.
American National Standards Institute (ANSI)/Acoustical Society of America (ASA)	2018	Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6 (A Technical Report prepared by ANSI-Accredited Standards Committee S12 and registered with ANSI). July.
Battis, J.C.	1983	Seismo-Acoustic Effects of Sonic Booms on Archaeological Sites, Valentine Military Operations Area. Air Force Geophysical Laboratory. Report AFGL-TR-83-0304.
Berglund, B. and T. Lindvall	1995	Community Noise. Center for Sensory Research, Stockholm, Sweden.
Bureau of Indian Affairs	2022	Tribal Leaders Directory Database.
Council on Environmental Quality (CEQ)	1997	Environmental Justice Guidance under the National Environmental Policy Act. 10 December.
CEQ	2023	National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. 88 Fed. Reg. 1196-1212. 9 January.
Department of the Air Force (DAF)	2019	Air Force Instruction 90-802, Risk Management. 1 April.
DAF	2022	Air Force Instruction 91-202, The US Air Force Mishap Prevention Program. 12 April.
Department of Defense (DoD)	2018	Department of Defense Instruction 6055.07, Mishap Notification, Investigation, Reporting, and Record Keeping, Incorporating Change 1. 31 August.
DoD	2020	DoD Instruction 4165.57, Air Installations Compatible Use Zones. 13 December.
Department of Defense Noise Working Group (DNWG)	2013	Technical Bulletin, Noise-Induced Hearing Impairment, Defense Noise Working Group. December.
DNWG	2009a	Technical Bulletin: Using Supplemental Noise Metrics and Analysis Tools. March.
DNWG	2009b	Technical Bulletin: Sleep Disturbance from Aviation Noise. December.
Deputy Assistant Secretary of Defense	2022	Memorandum Adopting the Advanced Acoustic Model for Assessing Community Exposure to Fixed-wing Aircraft Noise.
Environmental Justice Interagency Working Group	2016	Promising Practices for EJ Methodologies in NEPA Reviews. Report of the Federal Interagency Working Group on Environmental Justice & NEPA Committee. March.
Environmental Laboratory	1987	Corps of Engineers Wetlands Delineation Manual. 4 Waterways Experiment Station, Technical Report Y-87-1. Vicksburg, Mississippi. January.
Federal Aviation Administration (FAA)	2015	Aviation Emissions and Air Quality Handbook. Version 3, Update 1. January.
FAA	2021	Federal Aviation Administration Aerospace Forecast Fiscal Years 2021-2041.
FAA	2022	FAA Order JO 7400.10D, Special Use Airspace. 16 February.

Author	*Date*	*Title*
FAA	2023	FAA Order JO 7400.2P, Procedures for Handling Airspace Matters. 17 March.
FAA	2023	1050.1F Desk Reference (v3). June. Accessed at: https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref
Federal Interagency Committee on Urban Noise (FICUN)	1980	Guidelines for Considering Noise in Land Use Planning and Control. June.
Fidell, S., B. Tabachnick, V. Mestre, and L. Fidell	2013	Aircraft noise-induced awakenings are more reasonably predicted from relative than from absolute sound exposure levels. *J. Acoust. Soc. Am.* 134(5), 3645-3653.
Gierens, K., S. Matthes, and S. Rohs	2020	How Well Can Persistent Contrails Be Predicted? *Aerospace* 7(12), 169, doi:10.3390/aerospace7120169.
Gierens, K.M., U. Schumann, H.G.J. Smit, M. Helten, and G. Zängl	1997	Determination of humidity and temperature fluctuations based on MOZAIC data and parametrisation of persistent contrail coverage for general circulation models. *Annales Geophysicae* 15(8), 1057–1066, doi:10.1007/s00585- 997-1057-3.
Government Accounting Office	1998	Report to the Honorable Harry Reid, U.S. Senate. Environmental Protection, DOD Management Issues Related to Chaff. September.
Haber, J. and D. Nakaki	1989	Sonic Boom Damage to Conventional Structures. HSD-TR-89. April.
Hall, L.S., P.R. Krausman, and M.L. Morrison	1997	The Habitat Concept and a Plea for Standard Terminology. *Wildlife Society Bulletin* 25:173-182.
Hershey, R.L. and T.H. Higgins	1976	Statistical Model of Sonic Boom Damage. ADA 028512. July.
Intergovernmental Panel on Climate Change	2007	Climate Change 2007: Working Group I: the Physical Science Basis: 2.10.2 Direct Global Warming Potentials.
Kärcher, B.	2018	Formation and radiative forcing of contrail cirrus. *Nature Communications* 91, 9(1), 1–17, doi:10.1038/s41467-018-04068-0.
National Institute for Occupational Safety and Health (NIOSH)	1998	Criteria for a Recommended Standard: Occupational Noise Exposure, Chapter 1.
National Park Service	1998	National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties.
Plotkin, K.J., V.R. Desai, C.L. Moulton, M.J. Lucas, and R. Brown	1989	Measurements of Sonic Booms due to Air Combat Maneuver Training at White Sands Missile Range. Wyle Research Report WR 89-18.
Smith, D.G., D.H. Ellis, and T.H. Johnson	1988	Raptors and Aircraft. *In* R.L. Glinski, B. Giron-Pendleton, M.B. Moss, M.N. LeFranc, Jr., B.A. Millsap, and S.W. Hoffman, eds. *Proceedings of the Southwest Raptor Management Symposium*. National Wildlife Federation. Pages 360-367. Washington, D.C.
Sutherland, L.C.	1990	"Effects of Sonic Boom on Structures," Lecture 3 of Sonic Boom: Prediction and Effects, AIAA Short Course, October.
Undersecretary of Defense for Acquisition Technology and Logistics	2009	Memorandum on Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis.
United Nations Framework Convention on Climate Change	2014	Report of the Conference of the Parties on its Nineteenth Session Held in Warsaw from 11 to 23 November 2013. 31 January.

Author	*Date*	*Title*
United States Air Force (USAF)	1996	Occupational and Environmental Health Directorate at Wright-Patterson Air Force Base OH. AL/OE-MN-1996-0001.
USAF	2016	United States Air Force F-35A Operational Beddown – Pacific Final Environmental Impact Statement. February.
USAF	2020	Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention
USAF	2023	Air Force to Eliminate PFAS-containing Foam From Hangar Fire Suppression Systems. 3 March.
United States Census Bureau (USCB)	2011	Overview of Race and Hispanic Origin: 2010 (2010 Census Briefs).
United States Department of Housing and Urban Development (HUD)	2022	HUD Tribal Directory Assessment Tool Version 3.0.
United States Department of the Navy (DON)	2018	Chief of Naval Operations Instruction 3500.39D, Operational Risk Management. 29 March.
DON	2022	Chief of Naval Operations Manual M-5100.23. Navy Safety and Occupational Health Manual, Incorporating Change 2. 5 September.
United States Environmental Protection Agency (EPA)	2009	40 CFR Chapter I, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, Final Rule. 15 December. Accessed at https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-section-202a-clean
EPA	2014	Resource Conservation and Recovery Act Orientation Manual. October.
EPA	2022a	Criteria Air Pollutants. Accessed November 11, 2022 at: https://www.epa.gov/criteria-air-pollutants. Last updated August 9, 2022.
EPA	2022b	GHG Emissions Factors Hub. Excel tool last modified April 1, 2022. Accessed November 17, 2022 at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub
EPA	2022c	Inventory of U.S. Greenhouse Gas Emissions and Sinks. Accessed November 17, 2022 at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks. Last updated April 14, 2022.
EPA	2022d	Environmental Justice. Accessed January 10, 2023 at: https://www.epa.gov/environmentaljustice/learn-about-environmental-justice
EPA	2023	Per- and Polyfluoroalkyl Substances (PFAS), Proposed PFAS National Primary Drinking Water Regulation. Accessed August 17, 2023 at: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

5.4 CHAPTER 4: 104TH FIGHTER WING

Author	*Date*	*Title*
104th Fighter Wing (104 FW)	n.d.	104 FW Projects spreadsheet.
104 FW	2008	Final Hazardous Waste Management Plan, Massachusetts Air National Guard. September.

Author	*Date*	*Title*
104 FW	2011	Final Environmental Assessment, Proposed Construction for the 104th Fighter Wing, Massachusetts Air National Guard, Westfield-Barnes Airport, Massachusetts. February.
104 FW	2015	Air Force Instruction 11-2F-15, Volume 3, Chapter 8. F-15 Local Operating Procedures. 15 June.
104 FW	2019a	Mishap Response Plan Change 1. November.
104 FW	2019b	104th Fighter Wing Bird/Wildlife Aircraft Strike Hazard (BASH) Plan 91-212. December.
104 FW	2020a	Installation Development Plan Final. Massachusetts Air National Guard Westfield, MA. July.
104 FW	2020b	Final Community Involvement Plan Update. Barnes Air National Guard Base, 104th Fighter Wing, Barnes Municipal Airport, Westfield, Massachusetts. June.
104 FW	2020c	Final Expanded Site Inspection Report for PFAS. Massachusetts Air National Guard. September.
104 FW	2020d	104 FW Barnes Air National Guard Base, Integrated Solid Waste Management Plan. December.
104 FW	2021a	Aircraft/Ground Mishap Data. FY 2017–2021.
104 FW	2021b	Wildlife Strikes by Fiscal Year and Class (2016–2022). November.
104 FW	2021c	Final Spill Prevention, Control, and Countermeasure Plan. Barnes Air National Guard Base, Massachusetts. September.
104 FW	2021d	Final Report: Flora and Fauna Survey, Air National Guard – 104th Fighter Wing, Barnes Air National Guard Base, Westfield, Massachusetts. September.
104 FW	2021e	104 FW Barnes Air National Guard Utilities Data Spreadsheet.
104 FW	2022a	Personal communication. Email from Jennifer Baker, ANG 104 FW/EM to Lisa Woeber, Stantec dated 11 November.
104 FW	2022b	Phase V Status Report (Through December 2021) for Former Underground Storage Tank/Tank Sludge Disposal Area, Installation Restoration Program Site 2 Release Tracking Number 1-0288. 25 February.
104 FW	2022c	Draft Waters of the United States Delineation Report, Barnes Air National Guard, Westfield, MA.
Air Combat Command (ACC) and National Guard Bureau (NGB)	2021	F-35A/F-15EX Ops 10/2/3 Site Survey Outbrief 104 FW, Barnes ANGB, version 3, SCN 20-03. 25 June.
Air Force Civil Engineer Center (AFCEC)	2020	Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process.
Air Force Safety Center (AFSEC)	2021	Aircraft Mishap Rates F-15. 28 December 21. Accessed on 9 September 2021 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
AFSEC	2022	Aircraft Mishap Rates F-35. 7 February 2022. Accessed on 9 September 21 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
ANG	2019	Integrated Natural Resources Management Plan, Barnes Air National Guard.
ANG	2021	ICRMP 104th FW/Barnes Municipal Airport 2020-2025, Barnes ANGB. 27 October.
Assistant Secretary of Defense for Energy, Installations and Environment	2023	Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States. July 11.

Author	*Date*	*Title*
Association of Dam Safety Officials	2022	Dam Safety Inspection Granville Reservoir Dam Hampden County, Massachusetts. Accessed at: https://data.ydr.com/dam/massachusetts/hampden-county/granville-reservoir-dam/ma00707/
Bowles, A.E.	1995	Responses to wildlife noise. Wildlife and recreationists: Coexistence through management and research 109-156.
Bureau of Labor Statistics	2022a	Economic News Release, Employment Situation 2022 M08 Results. Table A-1: Employment Status of the civilian population by sex and age. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/empsit.toc.htm.
Bureau of Labor Statistics	2022b	Economic News Release, State Employment and Unemployment 2022 M08 Results. Table 2: Civilian labor force and unemployment by state and selected area, not seasonally adjusted. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/laus.toc.htm
Bureau of Labor Statistics	2022c	Local Area Unemployment Statistics. County Data: Labor force data by county, not seasonally adjusted, latest 14 months. Accessed on 3 October 2022 at: https://www.bls.gov/lau/.
City of Westfield	2018	City of Westfield Zoning Map. Available at: https://www.cityofwestfield.org/DocumentCenter/View/7957/Zoning_Map_2019
City of Westfield	2022	Westfield Department of Public Works Water Division, Water Quality Report, January 1, 2021 through December 31, 2021 PWS ID# 1329000. Available at: https://www.cityofwestfield.org/DocumentCenter/View/11167/2021-Water-Quality-Report
Council on Environmental Quality (CEQ)	2023	National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. 88 Fed. Reg. 1196-1212. 9 January.
DNWG	2009a	Using Supplemental Noise Metrics and Analysis Tools. December.
DNWG	2009b	Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics. December.
DNWG	2013a	Speech Interference from Aircraft Noise. December.
DNWG	2013b	Noise-Induced Hearing Impairment Technical Bulletin. December.
Department of Defense (DoD)	2020	2020 Demographics Profile of the Military Community. Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy. Available at: https://www.militaryonesource.mil/data-research-and-statistics/military-community-demographics/.
Department of Housing and Urban Development (HUD)	2022	HUD Tribal Directory Assessment Tool Version 3.0.
Department of the Air Force (DAF)	2021	Air Force Manual 11-2F-15, Volume 3, 144th Fighter Wing Supplement, Flying Operations, F-15 Operations Procedures. 29 November.
DAF	2022	Climate Action Plan. October.
DAF	2023	Draft Programmatic Environmental Assessment for Training with Defensive Countermeasures. March.
Dugan, Lt Col Jeremy	2023	Email regarding 104 FW Fire Department. 13 June.

Author	*Date*	*Title*
Edwards Public Library	2022	History of Southampton (1500–1940). Accessed on 10 November at: https://historicalresourcesofsouthampton.org/history-of-southampton/
Federal Aviation Administration (FAA)	2008	Modification and Establishment of Restricted Areas and Other Special Use Airspace, Adirondack Airspace Comples; Fort Drum, NY. Federal Register, Vol. 73, No. 188. 55723-55726. 26 September.
FAA	2022	Westfield-Barnes Regional Airport Runway 15 Obstruction Removal, Taxiway B, and Southwest Quadrant Environmental Assessment. 28 February.
FAA	2023	1050.1F Desk Reference (v3). June. Accessed at: https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref
Federal Emergency Management Agency (FEMA)	2014	Flood Insurance Rate Map Hampden County, Massachusetts. Panel 190 of 586. Map Number 25013C0190F. 17 September.
Historical Marker Project	2022	Apremont Park. Accessed on 10 November 2022 at: https://historicalmarkerproject.com/markers/HM11Y8_apremont-park_Westfield-MA.html
Interagency Working Group (IWG)	2021	Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. February.
Maine Department of Inland Fisheries and Wildlife	2022	State List of Endangered & threatened species. Accessed 27 September 2022 at: https://www.mass.gov/info-details/rare-species-viewer
Massachusetts Department of Environmental Protection (MassDEP)	2020	Commonwealth of Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, Solid Waste Program, Active Landfills. January.
Massachusetts Division of Fisheries and Wildlife	2022	Rare species viewer. Accessed 27 September 2022 at: https://www.mass.gov/info-details/rare-species-viewer
Massachusetts Historic Commission	2022	Massachusetts Cultural Resource Information System. Accessed on 8 November 2022 at: https://www.mass.gov/info-details/massgis-data-mhc-historic-inventory. Last updated 3 October 2022.
National Aeronautics and Space Administration	2015	NASA Armstrong Fact Sheet: Sonic Booms. Accessed 13 July 2023 at: https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-016-DFRC.html. .
National Center for Education Statistics	2020	Private School Universe Survey data for the 2019-2020 school year. Search for Private Schools: Hampden County, Massachusetts. Accessed on 24 October 2022 at: https://nces.ed.gov/surveys/pss/privateschoolsearch/
National Center for Education Statistics	2021	Common Core of Data Public School data 2020-2021, 2021-2022 school years. Search for Public Schools: Search Criteria = Hampden County, Massachusetts. Accessed on 24 October 2022 at: https://nces.ed.gov/ccd/schoolsearch/.
National Guard Bureau (NGB)	2021a	Site Survey Report F-15EX, 104 FW, Barnes Municipal Airport ANG, MA, Facilities Working Group. 4 September.
NGB	2021b	Site Survey Report F-35A, 104 FW, Barnes Municipal Airport ANG, MA, Facilities Working Group. 3 September.
NGB	2023	National Guard Bureau, Memorandum for Record, Increased Utility Use Attributable to F-35A. 30 August.

Author	*Date*	*Title*
NGB and 104th Fighter Wing (104 FW)	2020	Final Air Quality Management Plan, Barnes Air National Guard Base. 31 August.
National Park Service	2022a	National Rivers Inventory, Westfield Massachusetts. Accessed on September 21, 2022.
National Park Service	2022b	National Register of Historic Places. Accessed on 28 September 2022 at: https://www.nps.gov/subjects/nationalregister/database-research.htm. Last updated 28 June 2022.
National Park Service	2022c	National Historic Landmarks. Accessed on 2 October 2022 at: https://www.nps.gov/subjects/nationalhistoriclandmarks/list-of-nhls-by-state.htm.
National Park Service	2022d	National Historic Trails. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/nationaltrailsystem/national-historic-trails.htm.
National Park Service	2022e	National Monument List. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/archeology/national-monument-facts-and-figures.htm. Last updated 15 March 2022.
National Park Service	2022f	Battlefields. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/battlefields/visit.htm. Last updated 17 August 2022.
National Transportation Safety Board	2022	Aviation Results.
National Weather Service	2022	NOWData – NOAA Online Weather Data: Monthly Climate Normals (1991-2020) for the Westfield Barnes Municipal Airport. Accessed on October 2, 2022 at: https://www.weather.gov/wrh/Climate?wfo=box
Natural Heritage and Endangered Species Program	2023	Priority Habitats of Rare Species. Massachusetts Division of Fisheries and Wildlife.
Natural Resources Conservation Service (NRCS)	2022	Web Soil Survey and Farmland Classification. Accessed on 9 September 2022 at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.
New York Department of Environmental Conservation	2022	List of endangered, threatened and special concern fish & wildlife species of New York State. Accessed 28 September 2022 at: https://www.dec.ny.gov/animals/7494.html
New York State Historic Preservation Office (SHPO)	2022	Indian Nation Areas of Interest Map. Accessed on 1 February 2023 at: https://parks.ny.gov/shpo/environmental-review/. Last updated March 2022
Pioneer Valley Planning Commission	2014	Valley Vision 4: The Regional Land Use Plan for the Pioneer Valley. February 2014. Accessed at: https://www.pvpc.org/sites/default/files/PVPC%20Valley%20Vision%204%20Land%20Use%20Plan%20FINAL%202-18-14.pdf
State of Massachusetts	2022	State of Massachusetts MassGIS Data: 2016 Land Cover/Land Use. Accessed at: https://www.mass.gov/info-details/massgis-data-2016-land-coverland-use#overview-
The Cultural Landscape Foundation	2022	Adirondack Forest Preserve. Accessed on 30 September 2022 at: https://www.tclf.org/adirondack-forest-preserve.
UMass Donahue Institute	2020	104th Fighter Wing Fiscal Year 20 Economic Impact Data. Economic and Public Policy Research.
United States Census Bureau (USCB)	2010	2010 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Springfield city, Massachusetts; Hampden County, Massachusetts; and Massachusetts. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045221

Author	*Date*	*Title*
USCB	2020a	2020 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Springfield city, Massachusetts; Hampden County, Massachusetts; and Massachusetts. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045221
USCB	2020b	2016-2020 American Community Survey 5-year estimates. Accessed via tables: DP03, DP04, B01001, B03002, and B17017, for locations = Massachusetts; Hampden County, Massachusetts; Hampshire County, Massachusetts; Springfield city, Massachusetts; All Block Groups within Hampshire County, Massachusetts; and All Block Groups within Hampden County, Massachusetts. Available at: https://data.census.gov/cedsci/advanced
USCB	2021	2017-2021 American Community Survey 5-year estimates. Accessed via table B01001, for locations = Massachusetts; Hampden County, Massachusetts; Hampshire County, Massachusetts; Springfield city, Massachusetts; All Block Groups within Hampshire County, Massachusetts; and All Block Groups within Hampden County, Massachusetts. Available at: https://data.census.gov/cedsci/advanced
United States Environmental Protection Agency (EPA)	2012	Approval and Promulgation of Air Quality Implementation Plans; Massachusetts; Determination of Attainment of the 1997 Ozone Standard for the Western Massachusetts Nonattainment Area. 77 Fed, Reg, 36404-36405 (June 19, 2012). Accessed at: https://www.govinfo.gov/content/pkg/FR-2012-06-19/pdf/2012-14719.pdf#page=1
EPA	2022a	Nonattainment Areas for Criteria Pollutants (Green Book). Accessed on 12 October 12 at: https://www.epa.gov/green-book
EPA	2022b	2017 National Emissions Inventory (NEI) Data. Accessed on 2 October 2022 at: https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
United States Fish and Wildlife Service (USFWS)	2021	Birds of Conservation Concern 2021. Migratory Bird Program. Accessed on September 28, 2022 at: https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf
USFWS	2022	Information for planning and consultation. Accessed 27 September 2022 at: : https://ipac.ecosphere.fws.gov/location/index
Weather Spark	2022	Climate and Average Weather Year Round at Barnes Municipal Airport. Accessed 13 October 2022 at: https://weatherspark.com/y/147226/Average-Weather-at-Barnes-Municipal-Airport-Massachusetts-United-States-Year-Round.
BAF	2021	Stormwater Pollution Prevention Plan, Facility: Westfield-Barnes Regional Airport. June.

5.5 CHAPTER 4: 144TH FIGHTER WING

Author	*Date*	*Title*
144th Fighter Wing (144 FW)	n.d.	Facilities Board Attachments.
144 FW	2007	Environmental Baseline Survey, 144th Fighter Wing California Air National Guard. June.
144 FW	2014	Comprehensive Base Map. 28 April.

Author	*Date*	*Title*
144 FW	2018	Installation Development Plan, Final. California Air National Guard, Fresno Air National Guard Base, Fresno, California. October.
144 FW	2019a	144 Fighter Wing Instruction 13-204, Airfield Operations. 10 April.
144 FW	2019b	Final Site Inspection Report Air National Guard Phase II Regional Site Inspections for Per- and Polyfluoroalkyl Substances, Fresno Air National Guard Base, Fresno, California. March.
144 FW	2020a	Final Air Quality Management Plan, Fresno Yosemite International Air National Guard Station. 20 November.
144 FW	2020b	144 FW Bird-Aircraft Strike Hazard Plan 91-212. Fresno ANGB. California Air National Guard, California, USA.
144 FW	2020c	Integrated Solid Waste Management Plan. 11 September.
144 FW	2021a	144th Fighter Wing. Bird Strike Report 2017–2021, Fresno ANGB. California Air National Guard, California, USA.
144 FW	2021b	Hazardous Waste Management Plan, California Air National Guard, 144 Fighter Wing, Fresno ANG Base, California. March.
144 FW	2021c	Final Spill Prevention, Control, and Countermeasure Plan, California Air National Guard, 144 Fighter Wing, Fresno ANG Base, California. 20 December.
144 FW	2021d	144 Fighter Wing, California Air National Guard. Solid Waste Report.
144 FW	2022a	Fiscal Year 2022 Economic Impact Statement. 144th Fighter Wing, Fresno Air National Guard Base.
144 FW	2022b	144th Fighter Wing Aircraft and Ground Mishap Data 5 Years Report, Fresno ANGB. California Air National Guard, California, USA.
144 FW	2022c	144 FW Fiscal Year 2020–2021 Utilities Data spreadsheet.
Air Combat Command (ACC) and National Guard Bureau (NGB)	2021	F-35A/F-15EX Ops 10/2/3 Site Survey Outbrief 144 FW, Fresno ANGB, version 3, SCN 20-03. 14 May.
Air Force Civil Engineer Center (AFCEC)	2020	Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process.
Air Force Safety Center (AFSEC)	2021	Aircraft Mishap Rates F-15. 28 December 2021. Accessed 9 September 21 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
Air National Guard (ANG)	2010	Final Integrated Cultural Resources Management Plan 2009-2013. June.
ANG	2023	Permit to Operate – Facility C-216.
Army National Guard and United States Army Corps of Engineers (USACE)	2020	Final Preliminary Assessment Report Fresno TASMG, California, Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites ARNG Installations, Nationwide. February
Askins, Maj Jason	2023	Personal communication. Email from Maj Jason Askins NGB/A4AM to Kate Bartz and Lisa Woeber, Stantec dated February 2.
Assistant Secretary of Defense for Energy, Installations and Environment	2023	Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States. July 11.
Bowles, A.E.	1995	Responses to wildlife noise. Wildlife and recreationists: Coexistence through management and research 109-156.

Author	*Date*	*Title*
Bureau of Labor Statistics	2022a	Economic News Release, Employment Situation 2022 M08 Results. Table A-1: Employment Status of the civilian population by sex and age. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/empsit.toc.htm
Bureau of Labor Statistics	2022b	Economic News Release, State Employment and Unemployment 2022 M08 Results. Table 2: Civilian labor force and unemployment by state and selected area, not seasonally adjusted. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/laus.toc.htm
Bureau of Labor Statistics	2022c	Local Area Unemployment Statistics. County Data: Labor force data by county, not seasonally adjusted, latest 14 months. Accessed on 3 October 2022 at: https://www.bls.gov/lau/
California Air Pollution Control Officers Association	2023	California Emissions Estimator Model®. Accessed at: http://www.aqmd.gov/caleemod/.
California Air Resources Board	2022	Facility Details: California Air National Guard (Facility ID 216). Accessed 12 November 2022 at: https://www.arb.ca.gov/app/emsinv/iframe/facinfo/facdet.php?co_=10&ab_=SJV&facid_=216&dis_=SJU&dbyr=2020&dd=
California Department of Fish and Wildlife	2022a	State and federally listed endangered and threatened animals of California. Accessed on 29 September 2022 at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline
California Department of Fish and Wildlife	2022b	State and federally listed endangered, threatened and rare plants of California. Accessed on 29 September 2022 at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109390&inline
California Office of Historic Preservation	2020	California Historical Resource Status Codes. March 1.
City of Fresno	n.d.	Fire Suppression. Fire Department. Accessed on 23 September 2022 at: https://www.fresno.gov/fire/fire-suppression/
City of Fresno	2022a	Parks Locator, Parks and Recreation Facilities Finder. Accessed at: https://cityoffresno.maps.arcgis.com/apps/webappviewer/index.html?id=53f212b20a0f47efb6681df6c8ad2eaa
City of Fresno	2022b	City of Fresno Department of Public Utilities, Water Sources. September.
City of Fresno	2023	City of Fresno, Department of Public Utilities, Water Resources, Surface Water. Accessed on 21 February 2023 at: https://www.fresno.gov/publicutilities/water-quality-operations-testing/water-source-distribution/
Council on Environmental Quality (CEQ)	2023	National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. 88 Fed. Reg. 1196-1212. 9 January.
Defense Noise Working Group (DNWG)	2009a	Using Supplemental Noise Metrics and Analysis Tools. December.
DNWG	2009b	Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics. December.
DNWG	2013a	Speech Interference from Aircraft Noise. December.
DNWG	2013b	Noise – Induced Hearing Impairment Technical Bulletin. December.

Author	*Date*	*Title*
Department of Defense (DoD)	2020	2020 Demographics Profile of the Military Community. Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy. Available at: https://www.militaryonesource.mil/data-research-and-statistics/military-community-demographics/
Department of Housing and Urban Development (HUD)	2022	HUD Tribal Directory Assessment Tool Version 3.0.
Department of the Air Force (DAF)	2021	Air Force Manual 11-2F-15, Volume 3, 144th Fighter Wing Supplement, Flying Operations, F-15 Operations Procedures. 29 November.
DAF	2022	Climate Action Plan. October.
DAF	2023	Draft Programmatic Environmental Assessment for Training with Defensive Countermeasures. March.
Department of Toxic Substances Control	2022	EnviroStor, Fresno Air Terminal/Old Hammer Field (J09CA0823)(10450005). Accessed on 28 October.
Federal Aviation Administration (FAA)	2023	1050.1F Desk Reference (v3). June. Accessed at: https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref
Federal Emergency Management Agency (FEMA)	2009	Flood Insurance Rate Map, Fresno County California and Unincorporated Areas. Panel 1590 of 3525. Map number 06019C1590H. 18 February.
Fresno County	2022	Fresno County GIS Portal. Accessed September 15, 2022 at: https://gisportal.co.fresno.ca.us/portal/home/
Fresno Unified Public School District	2022	Scandinavian Middle School Website. Accessed at: https://scandinavian.fresnounified.org/sports-schedules/
Fresno Yosemite International Airport (FAT)	2013	Fresno Yosemite International Airport Wildlife Hazard Management Plan. November.
FAT	2015	Industrial Activities Stormwater Pollution Prevention Plan for Fresno Yosemite International Airport. 23 June.
FAT	2017a	Noise Exposure Map Update. September.
FAT	2017b	Surface Movement Guidance and Control System Plan, Fresno International Airport, Fresno CA. May. Accessed September 2022 at: https://flyfresno.com/wp-content/uploads/2022/11/SMGCS-05-18-2017-with-Jeppesen.pdf
FAT	2019	Fresno Yosemite International Airport, Final Master Plan Update 2018 Technical Report. February.
Griffith, G.E., J.M. Omernik, D.W. Smith, T.D. Cook, E. Tallyn, K. Moseley, and C.B. Johnson	2016	Ecoregions of California (poster): U.S. Geological Survey Open-File Report 2016–1021, with map, scale 1:1,100,000. Accessed August 2022 at: http://dx.doi.org/10.3133/ofr20161021
Historical Marker Database	2022	Walker's Pass Historical Marker. Accessed on 2 October 2022 at: https://www.hmdb.org/m.asp?m=159834
Interagency Working Group (IWG)	2021	Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. February.
National Aeronautics and Space Administration	2015	NASA Armstrong Fact Sheet: Sonic Booms. Accessed 13 July 2023 at: https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-016-DFRC.html.

Author	*Date*	*Title*
National Center for Education Statistics	2020	Private School Universe Survey data for the 2019-2020 school year. Search for Private Schools: Fresno and Kings Counties, California. Accessed on 24 October 2022 at: https://nces.ed.gov/surveys/pss/privateschoolsearch/
National Center for Education Statistics	2021	Common Core of Data Public School data 2020-2021, 2021-2022 school years. Search for Public Schools: Search Criteria = Fresno and Kings Counties, California. Accessed on 24 October 2022 at: https://nces.ed.gov/ccd/schoolsearch/
National Guard Bureau (NGB)	2013a	Environmental Assessment for the Replacement of the Jet Fuel Storage Complex and Demolition and Return of the Former Marine Corps Parcel to the Airport. September.
NGB	2013b	F-15 Aircraft Conversion Environmental Impact Statement. 144th Fighter Wing, California Air National Guard, Fresno-Yosemite International Airport. March.
NGB	2017	Integrated Cultural Resources Management Plan Waiver Award to the 144th Fighter Wing, Fresno-Yosemite International Airport Air National Guard Base, Fresno, California. 2 June.
NGB	2021	Site Survey Report F-15EX, 144 FW, Fresno Yosemite Int'l ANG, CA, Facilities Working Group. 31 August.
NGB	2022	Final Bat Survey Report. 144th Fighter Wing, Air National Guard, Fresno County, California. October.
NGB	2023	144th Fighter Wing. Waters of the United States Delineation Report, Fresno Air National Guard, Fresno, California.
National Park Service	2022a	National Register of Historic Places. Accessed on 28 September 2022 at: https://www.nps.gov/subjects/nationalregister/database-research.htm. Last updated 28 June 2022.
National Park Service	2022b	National Rivers Inventory, Fresno California. Accessed on 21 September 2022 at: https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm
National Park Service	2022c	Pioneer Deep Space Station. Accessed on 2 October 2022 at: https://www.nps.gov/parkhistory/online_books/butowsky4/space21.htm
National Park Service	2022d	National Historic Trails. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/nationaltrailsystem/national-historic-trails.htm
National Park Service	2022e	Old Spanish National Historic Trail. Accessed on 2 October 2022 at: https://www.nps.gov/olsp/learn/historyculture/index.htm. Last Updated 31 August 2020.
National Park Service	2022f	National Monument List. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/archeology/national-monument-facts-and-figures.htm. Last updated 15 March 2022.
National Park Service	2022g	Cesar E. Chavez National Monument. Accessed on 2 October 2022 at: https://www.nps.gov/cech/learn/historyculture/index.htm. Last updated on 10 August 2020.
National Park Service	2022h	Battlefields. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/battlefields/visit.htm. Last updated 17 August 2022.
National Weather Service	2022	NOWData – NOAA Online Weather Data: Monthly Climate Normals (1991–2020) for the Fresno Area and Hanford Municipal Airport. Accessed on October 2, 2022 at: https://www.weather.gov/wrh/Climate?wfo=hnx.

Author	*Date*	*Title*
Natural Resources Conservation Service (NRCS)	2022	Web Soil Survey. Accessed on 12 September 2022 at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.
Nevada Department of Wildlife	2022	Species information. Accessed on 29 September 2022 at: https://www.ndow.org/species-information/
Office of Management and Budget (OMB)	2021	Social Cost of Greenhouse Gases Annual Values. Accessed on 6 July 2023 at: https://www.whitehouse.gov/omb/information-regulatory-affairs/regulatory-matters/#scghgs
San Joaquin Valley Air Pollution Control District (APCD)	2022	About the District. Accessed on 10 October 2022 at: https://ww2.valleyair.org/about/
Southern San Joaquin Valley Information Center	2023	F-35 Beddown at Fresno International Airport Records Search File No.: 23-338 Results. August 29.
United States Census Bureau (USCB)	2010	2010 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Fresno City, California; Lemoore city, California; Fresno County, California; Kings County, California; and California. Accessed at: at: https://www.census.gov/quickfacts/fact/table/US/PST045221
USCB	2020a	2020 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Fresno city, California; Lemoore city, California; Fresno County, California; Kings County, California; and California. Accessed at: https://www.census.gov/quickfacts/fact/table/US/PST045221.
USCB	2020b	2016-2020 American Community Survey 5-year estimates. Accessed via tables: DP03, DP04, B01001, B03002, and B17017, for locations = California; Fresno County, California; Kings County, California; Fresno City, California; Lemoore City, California; All Block Groups within Fresno County, California; and All Block Groups within Kings County, California. Accessed at: https://data.census.gov/cedsci/advanced.
USCB	2021	2017-2021 American Community Survey 5-year estimates. Accessed via table: B01001, for locations = California; Fresno County, California; Fresno City, California, All Block Groups within Fresno County, California. Accessed at: https://data.census.gov/cedsci/advanced.
United States Environmental Protection Agency (EPA)	2022a	Nonattainment Areas for Criteria Pollutants (Green Book). Accessed on 12 October 2022 at: https://www.epa.gov/green-book
EPA	2022b	EPA to Reexamine Health Standards for Harmful Soot that Previous Administration Left Unchanged. Accessed on 13 October 2022 at: https://www.epa.gov/newsreleases/epa-reexamine-health-standards-harmful-soot-previous-administration-left-unchanged. Last updated June 21, 2022.
EPA	2022c	2017 National Emissions Inventory (NEI) Data. Accessed on 2 October 2022 at: https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
United States Fish and Wildlife Service (USFWS)	2022	Information for planning and consultation. Accessed 28 September 2022 at: https://ipac.ecosphere.fws.gov/location/index

Author	*Date*	*Title*
Weather Spark	2022	Average Weather in Fresno and Lemoore. Accessed 13 October 2022 at: https://weatherspark.com/y/1482/Average-Weather-in-Fresno-California-United-States-Year-Round and https://weatherspark.com/y/1490/Average-Weather-in-Lemoore-California-United-States-Year-Round

5.6 CHAPTER 4: 159TH FIGHTER WING

Author	*Date*	*Title*
159th Fighter Wing (159 FW)	2022	CY 2021 Semi-Annual Facilities Board and EMSG Meeting Minutes. 11 January.
Air Combat Command (ACC) and National Guard Bureau (NGB)	2021	F-35A/F-15EX Ops 10/2/3 Site Survey Outbrief 159 FW, NAS JRB New Orleans, version 3, SCN 20-03. 30 July.
Air Force Civil Engineer Center (AFCEC)	2020	Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process.
Air Force Safety Center (AFSEC)	2021	Aircraft Mishap Rates F-15. 28 December 21. Accessed on 9 September 2021 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
AFSEC	2022	Aircraft Mishap Rates F-35. 7 February 2022. Accessed on 9 September 2021 at: https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/
Assistant Secretary of Defense for Energy, Installations and Environment	2023	Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing Per- and Polyfluoroalkyl Substances in the United States. July 11.
Bowles, A.E.	1995	Responses to wildlife noise. Wildlife and recreationists: Coexistence through management and research 109-156.
Bureau of Labor Statistics	2022a	Economic News Release, Employment Situation 2022 M08 Results. Table A-1: Employment Status of the civilian population by sex and age. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/empsit.toc.htm
Bureau of Labor Statistics	2022b	Economic News Release, State Employment and Unemployment 2022 M08 Results. Table 2: Civilian labor force and unemployment by state and selected area, not seasonally adjusted. Accessed on 3 October 2022 at: https://www.bls.gov/news.release/laus.toc.htm
Bureau of Labor Statistics	2022c	Local Area Unemployment Statistics. County Data: Labor force data by county, not seasonally adjusted, latest 14 months. Accessed on 3 October 2022 at: https://www.bls.gov/lau/
City of Belle Chasse	2020	Chasse Water District, The Water We Drink, Annual Water Quality Report, page 1. 2020. Accessed at: https://plaqueminesparish.com/DocumentCenter/View/1327/2020-Belle-Chasse-Water
Clean Environments, Inc.	2012	ACM Survey, NONAS Bldg 90. September.
CEQ	2023	National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. 88 Fed. Reg. 1196-1212. 9 January.
Defense Noise Working Group (DNWG)	2009a	Using Supplemental Noise Metrics and Analysis Tools. December.

Author	*Date*	*Title*
DNWG	2009b	Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics. December.
DNWG	2013a	Speech Interference from Aircraft Noise. December.
DNWG	2013b	Noise – Induced Hearing Impairment Technical Bulletin. December.
Department of Defense (DoD)	2020	2020 Demographics Profile of the Military Community. Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy. Available at: https://www.militaryonesource.mil/data-research-and-statistics/military-community-demographics/
Department of Housing and Urban Development (HUD)	2022	HUD Tribal Directory Assessment Tool Version 3.0.
Department of the Air Force (DAF)	2020	A Guide to the Air Installations Compatible Use Zones Program.
DAF	2022	Climate Action Plan. October.
DAF	2023	Draft Programmatic Environmental Assessment for Training with Defensive Countermeasures. March.
DON	2014	Chief of Naval Operations Instruction 3750.6S. Naval Aviation Safety Management System. 13 May.
DON	2016a	Air Installations Compatible Use Zones (AICUZ) Program Technical Review in Accordance with Chief of Naval Operations Instruction 11010.36c for NAS JRB New Orleans, Belle Chasse, Louisiana. June.
DON	2016b	Final Encroachment Action Plan at Naval Air Station Joint Reserve Base (NAS JRB) New Orleans. November.
DON	2020	Environmental Assessment for Runway Approach Obstructions, Bash, and Vegetation Control at Naval Air Station Joint Reserve Base New Orleans. May.
DON	2021	NASJRBNOLA Instruction 10570.2,Wildlife Hazard Management Plan. 15 January.
DON	2022	Naval Air Station Joint Reserve Base New Orleans, Louisiana Integrated Natural Resources Management Plan 2022 Update. April.
Federal Emergency Management Agency (FEMA)	2021	Flood Insurance Rate Map Plaquemines Parish, Louisiana. Panel 59 of 1550. Map Number 22075C0059E. 15 January.
Griffith, G.	2010	Level III North American Terrestrial Ecoregions: United States Descriptions. May.
Interagency Working Group (IWG)	2021	Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. February.
Jefferson Parish Government	2022	Jefferson Parish, Louisiana Land Use Graphic Information Systems Data. June.
Louisiana Department of Environmental Quality	2021	Biennial Solid Waste Capacity Report to the House Natural Resources and Environment Committee and Senate Committee on Environmental Quality. Fiscal Year 2020 and Fiscal Year 2021. Louisiana Department of Environmental Quality, Office of Environmental Services, Water Permits Division. Baton Rouge, Louisiana. Accessed on 6 September 2023 at: https://deq.louisiana.gov/assets/docs/Land/CapacityReport2021.pdf
Louisiana Department of Natural Resources	2008	Urban Storm Water Runoff Best Management Practices (BMPs) for Coastal Louisiana Nonpoint Source Pollution.

Author	*Date*	*Title*
Louisiana Department of Wildlife and Fisheries	2022a	Louisiana's Animal Species of Greatest Conservation Need (SGCN) – 2022.
Louisiana Department of Wildlife and Fisheries	2022b	Louisiana's Plant Species of Greatest Conservation Need (SGCN) – 2022.
Louisiana Department of Wildlife and Fisheries	2022c	Rare Species and Natural Communities by Parish. Accessed on September 14, 2022 at: https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish
National Aeronautics and Space Administration	2015	NASA Armstrong Fact Sheet: Sonic Booms. Accessed 13 July 2023 at: https://www.nasa.gov/wp-content/uploads/2021/09/120274main_FS-016-DFRC.pdf.
National Center for Education Statistics	2020	Private School Universe Survey data for the 2019-2020 school year. Search for Private Schools: Jefferson Parish, Louisiana; Orleans Parish, Louisiana; and Plaquemines Parish, Louisiana. Accessed on 24 October 2022 at: https://nces.ed.gov/surveys/pss/privateschoolsearch/
National Center for Education Statistics	2021	Common Core of Data Public School data 2020-2021, 2021-2022 school years. Search for Public Schools: Search Criteria = Jefferson Parish, Louisiana; Orleans Parish, Louisiana; and Plaquemines Parish, Louisiana. Accessed on 24 October 2022 at: https://nces.ed.gov/ccd/schoolsearch/
National Guard Bureau (NGB)	2021a	Site Survey Report, F-15EX, 159 FW, NAS JRB New Orleans, LA, Facilities Working Group. 7 September.
NGB	2021b	Site Survey Report, F-35A, 159 FW, NAS JRB New Orleans, LA, Facilities Working Group. 14 September.
NGB	2023	National Guard Bureau, Memorandum for Record, Increased Utility Use Attributable to F-35A. 30 August.
National Park Service	2022a	National Monument List. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/archeology/national-monument-facts-and-figures.htm. Last updated 15 March 2022.
National Park Service	2022b	National Register of Historic Places. Accessed on 28 September 2022 at: https://www.nps.gov/subjects/nationalregister/database-research.htm
National Park Service	2022c	Battlefields. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/battlefields/visit.htm. Last updated 17 August 2022.
National Park Service	2022d	National Historic Landmarks. Accessed on 2 October 2022 at: https://www.nps.gov/subjects/nationalhistoriclandmarks/list-of-nhls-by-state.htm
National Park Service	2022e	National Historic Trails. Accessed on 30 September 2022 at: https://www.nps.gov/subjects/nationaltrailsystem/national-historic-trails.htm
National Park Service	2022f	National Historic Trail TX, LA. El Camino Real de los Tejas. Accessed on 2 October 2022 at: online: https://www.nps.gov/elte/learn/historyculture.index.htm
National Weather Service	2022	NOWData – NOAA Online Weather Data: Monthly Climate Normals (1991-2020) for the Chalmette, Louisiana. Accessed on 17 November 2022 at: https://www.weather.gov/wrh/Climate?wfo=box
Natural Resources Conservation Service (NRCS)	2022	Web Soil Survey for NAS JRB New Orleans. Accessed 3 August 2022 at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

Author	*Date*	*Title*
Naval Air Station (NAS) Joint Reserve Base (JRB) New Orleans	2011	Naval Air Station Joint Reserve Base New Orleans Joint Land Use Study. March.
NAS JRB New Orleans	2017	NAS JRB New Orleans Storm Water Pollution Prevention Plan. September.
NAS JRB New Orleans	2020	CY2018 Air Emissions Inventory and Compliance Assessment Report, Naval Air Station Joint Reserve Base New Orleans, New Orleans, Louisiana. September.
NAS JRB New Orleans	2021	NAS JRB New Orleans FY 2020 ISWM Metric Data Waste Print Report. September.
NAS JRB New Orleans	2022	159 FW DUERS Data Query for Utility Consumption spreadsheet NAS JRB New Orleans.
Naval Facilities Engineering Systems Command (NAVFAC)	2007	Naval Air Station Joint Reserve Base New Orleans Master Plan. December.
NAVFAC	2020	Installation Migratory Bird Species and Vegetation Survey Final Report, Naval Air Station Joint Reserve Base New Orleans. January.
NAVFAC Southeast	2008a	Integrated Cultural Resources Management Plan for Naval Air Station Joint Reserve Base New Orleans, Belle Chase, Plaquemines Parish, Louisiana. 3 September.
NAVFAC Southeast	2008b	Architectural Inventory and Evaluation at Naval Air Station Joint Reserve Base New Orleans, Belle Chase, Plaquemines Paris, Louisiana. 3 September.
NAVFAC Southeast	2015	Naval Air Station Joint Reserve Base New Orleans, Integrated Solid Waste Management Plan. February
NAVFAC Southeast	2016	Final Pollution Prevention Management Plan Update. Naval Air Station Joint Reserve Base, Louisiana. February.
NAVFAC Southeast	2018a	Facility Response Plan, Naval Air Station (NAS) Joint Reserve Base (JRB) New Orleans. June.
NAVFAC Southeast	2018b	Final Hazardous Waste Management Plan, Naval Air Station Joint Reserve Base, New Orleans. September.
NAVFAC Southeast	2019	Spill Prevention, Control, and Countermeasure (SPCC) Plan, Naval air Station Joint Reserve Base, New Orleans, Belle Chasse, Louisiana. May.
NAVFAC Southeast	2021	Final Preliminary Assessment Report. NAS JRB New Orleans, Louisiana. January.
Plaquemines Parish	2012	2012 Plaquemines Parish Comprehensive Master Plan, Plaquemines Parish Government, Pointe-a-la-Hache, Louisiana.
Plaquemines Parish	2022	Plaquemines Parish, Louisiana Land Use Land Cover Geographic Information System Data. October.
State of Louisiana	2021	Legislature of the State of Louisiana Revised Statutes. Chapter 15 Floodways, Floodplains, Drainage and Water Quality. June.
United States Census Bureau (USCB)	2010	2010 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Louisiana; Plaquemines Parish, Louisiana; Jefferson Parish, Louisiana; Orleans Parish, Louisiana; and New Orleans city, Louisiana. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045221

Author	*Date*	*Title*
USCB	2020a	2020 Decennial Census. Accessed via USCB QuickFacts Report for Locations = United States; Louisiana; Plaquemines Parish, Louisiana; Jefferson Parish, Louisiana; Orleans Parish, Louisiana; and New Orleans city, Louisiana. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045221
USCB	2020b	2016-2020 American Community Survey 5-year estimates. Accessed via tables: DP03, DP04, B01001, B03002, and B17017, for locations = Louisiana; Orleans Parish, Louisiana; Jefferson Parish, Louisiana; Plaquemines Parish, Louisiana; All Block Groups within Jefferson Parish, Louisiana; All Block Groups within Orleans Parish, Louisiana; All Block Groups within Plaquemines Parish, Louisiana. Available at: https://data.census.gov/cedsci/advanced
USCB	2021	2017-2022 American Community Survey 5-year estimates. Accessed via table B01001, for locations = Louisiana; Orleans Parish, Louisiana; Jefferson Parish, Louisiana; Plaquemines Parish, Louisiana; All Block Groups within Jefferson Parish, Louisiana; All Block Groups within Orleans Parish, Louisiana; All Block Groups within Plaquemines Parish, Louisiana. Available at: https://data.census.gov/cedsci/advanced
United States Environmental Protection Agency (EPA)	2022a	Nonattainment Areas for Criteria Pollutants (Green Book). Accessed on 12 October 2022 at: https://www.epa.gov/green-book
EPA	2022b	2017 National Emissions Inventory (NEI) Data. Accessed on 2 October 2022 at: https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
Environmental Protection Agency (EPA)	2023	Waterbody Report. Intracoastal Waterway-From Bayou Villars to Mississippi River. Accessed at https://mywaterway.epa.gov/waterbody-report/LADEQWPD/LA020601_00/2022
United States Fish and Wildlife Service (USFWS)	2019	Species Status Assessment Report for the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Version 1.3. August.
USFWS	2020a	Piping Plover (5-19 *Charadrius melodus*) 5-Year Review: Summary and Evaluation. March.
USFWS	2020b	Species Status Assessment Report for the Rufa Red Knot (*Calidris canutus rufa*) Version 1.1. September.
USFWS	2022	IPaC Resource List. Accessed on 14 September 20022 at: : https://ipac.ecosphere.fws.gov/location/index
United States Geological Survey (USGS)	2013	Water Resources of Plaquemines Parish, Louisiana, Fact Sheet 2013-3031.
Weather Spark	2022	Climate and Average Weather Year Round in Belle Chasse, Louisiana. Accessed 17 November 2022 at: https://weatherspark.com/y/12424/Average-Weather-in-Belle-Chasse-Louisiana-United-States-Year-Round

This page intentionally left blank.

6 List of Preparers

This page intentionally left blank.

6.0 LIST OF PREPARERS

Name/Organization	*Experience*	*Years of Experience*
Kate Bartz Stantec GS	M.S., Landscape Architecture and Environmental Planning, 1994 B.S., Environmental Studies, 1987	37
Katie Briscoe *(RPA)* Stantec GS	M.S., Historic Preservation, 2012 M.A., Archaeology, 2010 B.A., History, 2008	4
Elizabeth Pruitt Stantec GS	M.S., Biology, 1996 B.S., Biology, 1992	27
Stephanie Clarke *(GISP)* Stantec GS	B.S., Biology and Environmental Studies, 2015	7
Scott Coombs Stantec GS	M.S., Marine Sciences, 2006 B.S., Hydrological/Geological Sciences, 1997	24
Gary Cozzetti Stantec GS	B.S., Aviation Management, 2021	20
Chris Davis *(AICP, PMP)* Stantec GS	M.S., Environmental Management, 2000 B.S., Environmental Studies, 1998	24
Josh DeGuzman *(AWB)* Stantec GS	B.S., Wildlife Management and Conservation, 2015	7
Howie Fendley Stantec GS	B.S., Biochemistry, 1994	21
Travis Gahm Stantec GS	B.S., Biology, 2009	13
Lesley Hamilton, Stantec GS	B.A., Chemistry, 1988	33
Caitlin Jafolla *(AICP)* Stantec GS	B.A., Urban Studies and Planning, 2012	10
Patrick Kester Stantec GS	B.S., Mechanical Engineering, 2006	12
Amanda Kreider *(AICP, PMP)* Stantec GS	M.S., Fire Ecology, 2002 B.S., Wildlife Ecology, 1998	21
Claudia Laughlin Stantec GS		32
Leah McCormick *(AICP)* Stantec GS	M.S., Environmental Science and Management, 2017 B.S., Environmental Systems and Earth Sciences, 2014	8
Isla Nelson Stantec GS	B.A., Anthropology, 2001	20
Geoff Olander Stantec GS	B.S., Mechanical Engineering, 1990	31
Oliver Pahl Stantec GS	B.S., Environmental Economics, Policy, 2003	12
Derek Stadther Stantec GS	M.Eng., Acoustics, 2014 B.S., Physics, 2012	8
Vanessa Williford Stantec GS	M.A., Environmental Sustainability and Development, 2014 B.S., Resource and Environmental Management, 2002	19
Kim Wilson Stantec GS		41
Lisa Woeber Stantec GS	B.B.A., Business Administration, 1998	24

This page intentionally left blank.