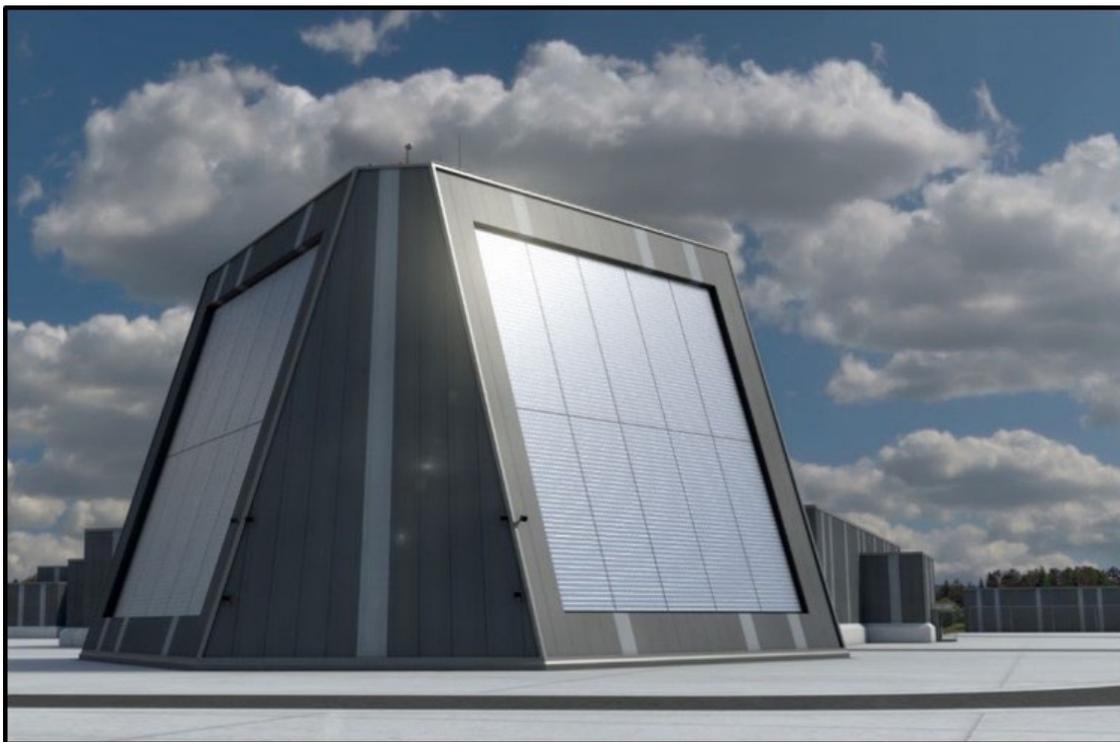




# MISSILE DEFENSE AGENCY

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## Long Range Discrimination Radar Operations, Clear Air Force Station, Alaska



## Draft Environmental Impact Statement

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October 2020

Department of Defense  
Missile Defense Agency  
5700 18th Street  
Fort Belvoir, VA 22060-5573

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## **Acronyms and Abbreviations**

<b>Acronym</b>	<b>Definition</b>
°F	degrees Fahrenheit
AAAQS	Alaska Ambient Air Quality Standards
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AFB	Air Force Base
AFI	Air Force Instruction
AGL	above ground level
AHRS	Alaska Heritage Resources Survey
AICC	Alaska Interagency Coordination Center
APDES	Alaska Pollutant Discharge Elimination System
APE	Area of Potential Effects
AQCR	air quality control region
ARTCC	Air Route Traffic Control Center
AS	Alaska Statute
ATC	air traffic control
BLM	Bureau of Land Management
BMEWS	Ballistic Missile Early Warning System
BP	Before Present
CAA	Clean Air Act
CAFS	Clear Air Force Station
CAP	Civil Air Patrol
CASTNET	Clean Air Status and Trends Network
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2e</sub>	carbon dioxide equivalent
CTAF	Common Traffic Advisory Frequency
DAF	Department of the Air Force
dB	decibel
dBA	A-weighted decibel
Denali National Park	Denali National Park and Preserve

<b>Acronym</b>	<b>Definition</b>
DNL	day-night noise level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOT&PF	Alaska Department of Transportation and Public Facilities
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMF	electromagnetic field
EO	Executive Order
FAA	Federal Aviation Administration
FL	flight level
FNSB	Fairbanks North Star Borough
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GHz	gigahertz
GNSS	global navigation satellite system
GPS	global positioning system
GVEA	Golden Valley Electric Association
HIRF	high-intensity radiated fields
HUC	Hydrologic Unit Code
HWMP	Hazardous Waste Management Plan
ICRMP	Integrated Cultural Resources Management Plan
IEEE	Institute of Electrical and Electronics Engineers
IFR	instrument flight rules
IMPROVE	Interagency Monitoring of Protected Visual Environment
IR	instrument route
J-	jet route designation
JBER	Joint Base Elmendorf-Richardson
JPARC	Joint Pacific Alaska Range Complex
LRDR	Long Range Discrimination Radar
MDA	Missile Defense Agency
MDS	Missile Defense System
MGD	million gallons per day
MOA	Military Operations Area
MSL	Mean Sea Level
MW	megawatt
NAAQS	National Ambient Air Quality Standards

<b>Acronym</b>	<b>Definition</b>
NAVAID	Navigational Aid
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NM	nautical miles
NO <sub>2</sub>	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOTAM	Notice to Airmen
NO <sub>x</sub>	nitrogen oxides
NPS	National Park Service
NRHP	National Register of Historic Places
O <sub>3</sub>	ozone
OPS test	Operations test
Parks Highway	George Parks Highway
PM <sub>10</sub>	particulate matter with a diameter less than 10 microns
PM <sub>2.5</sub>	particulate matter with a diameter less than 2.5 microns
Q-	RNAV Q-route designation
R-	Restricted Area designation
RF	radio frequency
RFR	radio frequency radiation
RNAV	area navigation
ROD	Record of Decision
RS	Revised Statute
RST	Revised Statute 2477 Trail
RWY	Runway
SID	Standard Instrument Departure
SO <sub>2</sub>	sulfur dioxide
SR	slow route
SSPARS	Solid State Phased Array Radar Site
STAR	Standard Terminal Arrival Route
SUA	Special Use Airspace
SWS	Space Warning Squadron
T-	RNAV T-route designation
TAA	Terminal Arrival Area

<b>Acronym</b>	<b>Definition</b>
TACAN	Tactical Air Navigation
TCP	Traditional Cultural Property
TFR	temporary flight restriction
TMDL	Total Maximum Daily Load
tpy	tons per year
TRAF test	Traffic test
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
U.S.C.	United States Code
USCB	United States Census Bureau
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V-	Victor route designation
VFR	visual flight rules
VOCs	volatile organic compounds
VR	visual route
WOUS	Waters of the United States
WP	Waypoint
ZCTA	Zip Code Tabulation Area

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# Executive Summary

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## **Introduction**

The Missile Defense Agency (MDA), in cooperation with the Department of the Air Force (DAF) and Federal Aviation Administration (FAA), has prepared this Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with proposed changes in operational concept and other associated activities for the Long Range Discrimination Radar (LRDR) located at Clear Air Force Station (CAFS), Alaska. This EIS complies with the National Environmental Policy Act of 1969 (NEPA), as amended; the Council on Environmental Quality Regulations for implementing NEPA; and agency-specific NEPA-implementing policies and procedures for MDA, DAF, and FAA.

The LRDR will be a component of the layered Missile Defense System (MDS) with the primary mission to provide continuous and precise tracking and discrimination of missile threats launched against the United States (U.S.). Potential environmental impacts of LRDR construction and operation were evaluated in an Environmental Assessment (EA) dated June 2016. The 2016 EA resulted in a Finding of No Significant Impact (FONSI), and construction of the LRDR and site infrastructure began in July 2017, with completion anticipated in 2020.

When the 2016 EA was developed, the operational concept for the LRDR was to maintain the LRDR in a readiness posture with limited operations, and no additional airspace restrictions were anticipated. Following completion of the 2016 EA and FONSI, the operational concept changed based on the emerging threats to the U.S., and a determination was made that LRDR was required to operate on a continuous basis. Performance testing of the LRDR is necessary to verify that it functions according to design requirements and meets operational needs prior to integration into the layered MDS for continuous operations. As such, MDA, in cooperation with DAF and FAA, prepared an EA for performance testing in 2020 to evaluate impacts associated with testing and limiting the use of the affected airspace during the testing period. The EA resulted in a joint FONSI by MDA and DAF in July 2020, and a separate FONSI and Record of Decision by FAA in August 2020.

The proposed change in concept of operating the LRDR on a continuous basis is evaluated in this EIS.

## **Purpose and Need**

The purpose of the Proposed Action evaluated in this EIS is to (1) support the defense of the U.S. from emerging threats through improved missile tracking and discrimination capabilities by integrating the LRDR as an operational asset into the layered MDS, and (2) make changes in airspace management to accommodate the operation of the LRDR. The Proposed Action is needed to protect the U.S. against long-range missile threats, as directed in the 2014 and 2016 Fiscal Year National Defense Authorization Act, and to protect aviation from the hazard posed by the high-intensity radiated fields (HIRF) resulting from the LRDR.

## **Agency Consultation and Public Involvement**

As required by the National Historic Preservation Act, MDA and DAF have consulted with the State Historic Preservation Office and federally recognized Tribes regarding the Proposed Action.

MDA also conducted public outreach via scoping meetings and stakeholder meetings with aviation associations and local elected officials to determine the range of actions, alternatives, and potential areas

of impact that should be addressed in the EIS. Stakeholder groups and the general public were encouraged to provide comments on the Proposed Action during a 45-day scoping period ending July 5, 2019. During the scoping period, MDA held public scoping meetings in Anchorage, Fairbanks, and Anderson, Alaska.

A total of 42 formal comments were received during the scoping comment period. The main themes expressed in scoping comments were:

- Compatibility of the Proposed Action with Clear Airport operations and potential for growth. Clear Airport is located adjacent to CAFS.
- Navigational safety risks, including aircraft separation distances, aircraft no longer having use of Windy Pass (a mountain pass between Interior and Southcentral Alaska), and aircraft not being able to use the George Parks Highway (Parks Highway) and Nenana River as navigational aids.
- Added flight time and expense to navigate around the proposed Restricted Areas and increasing limitations on flight options.
- Impacts on the USAF Auxiliary Civil Air Patrol (CAP) Alaska Wing Glider Academy for youth at Clear Airport.
- Potential risks to human health and impacts on cellphone reception from the LRDR.
- Impacts on wildlife.
- Potential impacts on private airstrips and property values due to reduced accessibility.

MDA emailed a letter to stakeholders on April 7, 2020, that explained design revisions to the proposed LRDR operations and included an update on the NEPA process. Stakeholders were encouraged to provide input about potential impacts to aviation activities or environmental resources from the proposed airspace restrictions necessary for operation of the LRDR. The main themes expressed in nine responses to the stakeholder letter that are not already included in the above list were:

- Environmental impacts from increases in aircraft emissions.
- Impacts on subsistence resources and activities.
- Relocation of Clear Airport not properly considered.
- Contact information for requesting LRDR “shutdown” in case of emergency.
- Economic impacts on air service companies.
- Concerns that reroutes in rising terrain would be longer than anticipated and that reroutes for lower-altitude air traffic are unnecessary.
- Concerns that the NEPA process and established FAA practices were not followed in regard to construction of LRDR prior to analysis of potential impacts and establishment of temporary flight restrictions (TFRs), respectively.

Stakeholder groups and the public are encouraged to provide comments on the findings of the Draft EIS during the minimum 45-day public comment period. Public comment meetings will be held virtually, including an online open house and a telephone public meeting.

## **Proposed Action**

The Proposed Action consists of both MDA and FAA actions, as described below. Should the agencies decide to implement the Proposed Action, MDA expects that continuous LRDR operations would begin in mid-2021, and FAA would establish the proposed Restricted Areas and publish the airway and procedure amendments in November 2021.

## **LRDR Operational Changes**

MDA proposes to adapt the LRDR operational system requirements and procedures to reflect continuous operations within the radar's field of view. The change to continuous operations would not require additional infrastructure beyond what was described in the 2016 EA.

## **FAA Actions Related to Restricting the Flight of Aircraft**

The change in the LRDR operation procedures would create a hazard in areas of the National Airspace System where the HIRF would exceed FAA certification standards for aircraft electrical and electronic systems that perform functions whose failure would prevent continued safe flight and landing. To address this hazard, FAA would take the following actions related to restricting the flight of aircraft: (1) establish six additional Restricted Areas; (2) if necessary, implement TFRs until those Restricted Areas are in effect; and (3) make changes to federal airways and instrument flight procedures to accommodate the new Restricted Areas.

### Proposed Restricted Areas

A 9.7-square-nautical-mile Restricted Area (R-2206) currently supports an Early Upgraded Warning Radar at CAFS. Existing R-2206 would be expanded by adding six new Restricted Areas to prevent aircraft from being exposed to LRDR-generated HIRF at levels exceeding FAA certification standards for aircraft electrical and electronic systems. Existing R-2206, with a minor modification, would be renamed R-2206A, and the six new Restricted Areas would be identified as R-2206B through R-2206G. Unlike existing R-2206, the six new Restricted Areas would not contact the ground, and their floor altitudes would range from 1,000 to 2,100 feet above mean sea level (MSL) or 400 to 1,500 feet above ground level (AGL). Three of the Restricted Areas would be in effect continuously. The other three would be in effect only Tuesday, Thursday, and Saturday, from 2:00 a.m. to 4:00 a.m. local Alaska time; and other times by Notice to Airmen (NOTAM), or as determined by coordination between MDA, CAFS, DAF, and FAA. Access to Clear Airport would be limited during these times; however, MDA would allow emergency aircraft and medical evacuation flights into and out of Clear Airport as defined in a Letter of Procedure coordinated between MDA, CAFS, DAF, and FAA.

### Temporary Flight Restrictions

In the event that continuous LRDR operations begin before the proposed Restricted Areas are established, FAA would temporarily restrict flight in the same airspace and with the same times of use as for the proposed Restricted Areas. FAA, through the Anchorage Air Route Traffic Control Center, would be responsible for manually rerouting aircraft flying under instrument flight rules (IFR) around the boundaries of the TFRs. Aircraft flying under visual flight rules (VFR) would detour around the TFRs. The period during which TFRs would be in place, if necessary, is referred to in this EIS as the "interim phase." Emergency and medical evacuation flights would be able to access Clear and Healy River Airports as outlined in a Letter of Agreement between MDA, CAFS, DAF, and FAA.

### Federal Airways and Instrument Flight Procedures

FAA would establish a new federal airway (T-399) and amend two federal airways (J-125 and V-436) that currently pass through the proposed Restricted Areas:

- T-399 would provide a low-altitude route around the proposed Restricted Areas between the Anchorage and Fairbanks areas.
- The segment of J-125 from Anchorage to Nenana would be cancelled; the segment from Kodiak to Anchorage would remain.

- The segment of V-436 from Talkeetna to Nenana would be replaced by segments from Talkeetna to Fairbanks that would provide a low-altitude airway. Segments north of Nenana would be cancelled.

FAA would amend six instrument flight procedures:

- The note “RADAR REQUIRED” would be added to two departure procedures (MCKINLEY TWO DEPARTURE and PUYVO THREE DEPARTURE) at Fairbanks International Airport.
- One obstacle departure procedure (HEALY ONE DEPARTURE) and two arrival procedures (area navigation [RNAV] Global Positioning System [GPS] Runway 15 and RNAV [GPS]-A) at Healy River Airport would be amended to maintain connectivity to airways.
- At Ted Stevens Anchorage International Airport, the Nenana transition of the TAGER EIGHT ARRIVAL Standard Terminal Arrival procedure would be shortened to begin at the PUYVO waypoint instead of at Nenana. All other segments and portions of the TAGER EIGHT ARRIVAL procedure would remain unchanged.

## **Alternatives**

MDA considered two alternatives to the Proposed Action: the No Action Alternative and the two-tier alternative. Under the No Action Alternative, the LRDR would be operated in a manner that would contain HIRF within existing R-2206 such that no new actions would need to be taken to limit aircraft flight. The No Action Alternative would not satisfy the purpose or need for the Proposed Action.

The two-tier alternative consists of the design for the proposed Restricted Areas that was presented to the public and stakeholder groups during scoping. The overall footprint of this alternative was slightly larger than the Proposed Action and would not have the operational flexibility (i.e., allowing certain areas within the restricted airspace to be in effect only at limited times) that the Restricted Areas of the Proposed Action would allow. The two-tier alternative would have greater impacts on VFR flights and Clear Airport, including reduced access to the airspace overlying the Parks Highway and possible airport closure. Therefore, this alternative was not carried forward for further analysis in the EIS.

## **Environmental Analysis**

The environmental analysis in this EIS addresses environmental categories that have the potential to be affected by the Proposed Action, including issues raised during scoping.

### **Affected Environment**

The corridor between Fairbanks and Talkeetna, where most of the changes related to restricted airspace and aircraft flight paths would occur, includes large areas of vacant and undeveloped land, with several substantial areas of protected conservation lands, including Denali National Park and Preserve, Denali State Park, Talkeetna Recreation River (state designation), and Tanana State Forest. Commercial and general aviation activities throughout the region include commercial airlines, cargo, air charter, air tours, subsistence support, flight instruction, air ambulance or medical evacuation, recreational flying, law enforcement, and fire surveillance and suppression.

The existing Restricted Area (R-2206) at CAFS encompasses a large portion of CAFS from the surface up to 8,800 feet MSL and is associated with operation of the existing radar array. Two federal airways, J-125 and V-436, are located over R-2206 and flights traveling directly from Anchorage to Deadhorse, Alaska, and other destinations pass through airspace above R-2206. CAFS does not have its own airport and is primarily served by Clear Airport, which is untowered and unattended. Clear Airport does not have any published instrument flight procedures and is effectively a VFR airport. Healy River Airport, located

south of CAFS, serves primarily VFR aircraft but has three instrument flight procedures that support about five IFR flights per year. There are six privately owned airstrips located near CAFS that are not associated with an airport.

Windy Pass, between Anchorage and Fairbanks, provides an important connection for VFR air traffic between Interior Alaska and Southcentral Alaska. VFR flights also rely on linear features on the ground for aiding navigation, such as the Nenana River and the Parks Highway in the study area.

### **Environmental Consequences**

**Table ES-1** summarizes the impacts that would be expected from the Proposed Action for each of the environmental categories evaluated in the EIS. MDA's change in LRDR operations would have no impact or negligible adverse impacts on all of the environmental categories except airspace management. FAA's actions related to restricting the flight of aircraft either during the interim phase or after the proposed Restricted Areas have been established would have no impact or negligible adverse impacts on all environmental categories except for airspace management and socioeconomics, which would have minor impacts. Based on the information currently available, relocation of the CAP Glider Academy would result in moderate impacts. The main issues raised during scoping fall under the categories of airspace management, socioeconomics (including the CAP Glider Academy), and safety (risks from HIRF). These topics are discussed following **Table ES-1**.

**Table ES-1. Summary of Impacts**

<b>Environmental Category</b>	<b>Continuous Operation of LRDR</b>	<b>Interim Phase — Implementation of TFRs if Needed</b>	<b>Restricted Areas and Related Actions</b>
<b>Airspace Management</b>	Permanent, negligible to minor adverse	Short-term, negligible to minor adverse	Permanent, negligible to minor adverse
<b>Air Quality</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Biological Resources</b>	Permanent, negligible adverse	Short-term, negligible adverse	Permanent, negligible adverse
<b>Climate</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Hazardous Materials, Solid Waste, and Pollution Prevention</b>	Permanent, negligible adverse	No impact	No impact
<b>Historical, Architectural, Archaeological, and Cultural Resources</b>	No impact	No impact	No impact
<b>Land Use</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Natural Resources and Energy Supply</b>	Permanent, negligible adverse	Short-term, negligible adverse	Permanent, negligible adverse
<b>Noise and Compatible Land Use</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Safety</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Socioeconomics and Environmental Justice</b>	No impact	Socioeconomics: Short-term, negligible to minor adverse <sup>(1)</sup> Environmental Justice: No impact	Socioeconomics: Permanent, negligible to minor adverse <sup>(1)</sup> Environmental Justice: No impact
<b>Subsistence</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Visual Effects</b>	No impact	Short-term, negligible adverse	Permanent, negligible adverse
<b>Water Resources</b>	No impact	No impact	No impact

<b>Environmental Category</b>	<b>Continuous Operation of LRDR</b>	<b>Interim Phase — Implementation of TFRs if Needed</b>	<b>Restricted Areas and Related Actions</b>
<b>Cumulative Impacts</b>	Permanent, negligible, adverse cumulative	Short-term, negligible to minor, adverse cumulative	Permanent, negligible to minor, adverse cumulative

<sup>(1)</sup> Represents the overall impact to socioeconomics. Impacts on the CAP Glider Academy would be moderate.

### Airspace Management

Up to an estimated five daily (1,825 annual) IFR flights would be affected by establishment of the proposed Restricted Areas. Those five flights are a combination of one to two flights daily for each of the following: J-125, V436, and direct flights that depart Anchorage headed toward Deadhorse. Up to an estimated 10 daily (3,650 annual) VFR flights would be affected. During the interim phase when TFRs are in place, the affected IFR flights would be rerouted by air traffic control, VFR aircraft would detour to avoid the TFRs, some instrument flight procedures would not be available, and air traffic control would need to manually direct the affected IFR flights. Once the amended procedures and redesigned airways are established, air traffic control would cease to manually direct IFR flights through the area. Some flight paths would be longer as a result of the Proposed Action, resulting in slight increases in flight times and operation costs as well as slight increases in air emissions and fuel use.

VFR aircraft would be able and allowed to fly beneath the proposed Restricted Areas, although aircraft are only allowed to fly below 500 feet AGL if taking off or landing. The six privately owned airstrips beneath the proposed Restricted Areas would remain accessible. Pilots would still be able to use Windy Pass for transiting between Interior Alaska and Southcentral Alaska.

The limited access to Clear Airport for 6 hours per week during the middle of the night, and other times by NOTAM, would be unlikely to affect users, and provisions would be in place for emergencies (see **Safety** section below). Additionally, except for these times, aircraft would be able to fly directly over the Parks Highway as long as they stay below an altitude of 2,600 feet AGL (3,200 feet MSL) within 0.5 nautical mile of the highway.

### Socioeconomics

FAA's actions related to restricting the flight of aircraft would result in slightly increased flight times, which would result in increased costs to aircraft operators both during the interim phase, if necessary, and once the redesigned airways are established. These economic impacts would be spread across the entire potentially affected aviation industry in Alaska. The Proposed Action would not affect the provision of public services associated with aviation in the study area communities.

The CAP Glider Academy could no longer conduct its glider instruction at Clear Airport due to the proposed Restricted Areas and would have to relocate to another airport such as Ladd Army Airfield or Fort Greely. The impacts of relocation would be minimized if CAP is able to negotiate a long-term arrangement for operation of the Glider Academy that provides participants with no-cost lodging or camping options and discounted meal service. Arrangements for relocating the CAP Glider Academy have not been completed, and costs associated with the new location are not known.

### Safety

LRDR operates by transmitting high levels of radio frequency radiation known as HIRF. Human exposure to HIRF can result in adverse health effects and affect aircraft electrical and electronic systems. A ground-based radio frequency (RF) safety hazard zone would be established to prevent human access to any area that would exceed the Maximum Permissible Exposure level for HIRF. The RF safety hazard zone would be clearly marked and contained entirely within the CAFS boundary. The Maximum Permissible Exposure level for HIRF for the general public would not be exceeded on the ground outside of the CAFS boundary.

The proposed Restricted Areas and interim TFRs (if necessary) would alleviate risks of the increased radiation hazard on aircraft by preventing aircraft from encountering HIRF levels that exceed FAA's HIRF certification standards. HIRF may result in electromagnetic interference of radio, television, or cellular communications, but such interference is unlikely to prevent or reduce effective communications outside

of the Restricted Areas. MDA will be testing S-band (radio waves with frequencies from 2 to 4 gigahertz) capabilities to make sure the LRDR is compatible with other radar systems in the area.

Although Clear Airport would have limited access for 6 hours per week, and other times by NOTAM, it would be made available to emergency aircraft and medical evacuation flights through a process defined in a Letter of Agreement (during the interim phase) or Letter of Procedure (after the proposed Restricted Areas are established). Similarly at Healy River Airport, during the interim phase, emergency and medical evacuation flights would be able to access the airport through the process allowing use of IFR procedures as outlined in the Letter of Agreement. Emergency and medical evacuation flights would access Healy River Airport through the amended instrument flight procedures once they have been established.

## **Mitigation**

The Proposed Action was designed to minimize impacts on the environment and aviation while protecting the U.S. against long-range missile threats. None of the impacts identified in the environmental analysis would reach a level that would necessitate mitigation.

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## 1.0 Purpose and Need for Proposed Action

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### 1.1 Introduction

The Missile Defense Agency (MDA), in cooperation with the Department of the Air Force (DAF) and Federal Aviation Administration (FAA), has prepared this Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with proposed changes in operational concept and other associated activities for the Long Range Discrimination Radar (LRDR) located at Clear Air Force Station (CAFS), Alaska. This EIS complies with:

- The National Environmental Policy Act of 1969 (NEPA), as amended;
- The President's Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508);
- MDA's NEPA Implementing Procedures (79 *Federal Register* 46410);
- DAF's Environmental Impact Analysis Process promulgated at 32 CFR Part 989; and
- FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (FAA 2015).

The LRDR will be a component of the layered Missile Defense System (MDS) with the primary mission to provide continuous and precise tracking and discrimination of missile threats launched against the United States (U.S). Discrimination is a critical capability of missile defense because it provides data needed to distinguish lethal missiles from debris and decoys. The LRDR will also assist with assessing incoming threats to more effectively and efficiently activate land-based systems to intercept such threats.

In 2014 and 2016, the U.S. Congress directed MDA to deploy the LRDR no later than December 31, 2020.<sup>1</sup> Deployment of the LRDR is a multistep process that includes siting, construction, testing, and integration of the LRDR into the MDS.

In response to the Congressional mandate to deploy the LRDR, MDA completed a siting analysis for the LRDR, which selected CAFS out of 50 candidate Department of Defense (DoD) installations in Alaska and identified a preferred site and alternative site out of six potential sites within CAFS (DoD 2016a). MDA and DAF prepared an Environmental Assessment (EA), dated June 2016, to evaluate the potential environmental impacts associated with the construction and operation of the LRDR at CAFS. The preferred site and alternative site identified in the siting analysis were evaluated along with a No Action Alternative. The 2016 EA resulted in a Finding of No Significant Impact (FONSI), and construction of the LRDR began in July 2017, with site infrastructure construction completion anticipated in 2020.

When the 2016 EA was developed, the operational concept for the LRDR was to maintain the LRDR in a readiness posture with limited operations, and no additional airspace restrictions were anticipated. Due to emerging threats, MDA adapted the LRDR testing requirements and proposes to modify the LRDR operational requirements and procedures to reflect continuous operations. Under the adapted concept evaluated in this EIS, the LRDR would operate on a continuous basis.

MDA, in cooperation with DAF and FAA, analyzed the adapted LRDR performance testing requirements and associated activities in an EA dated July 2020. The 2020 EA evaluated the environmental effects of

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<sup>1</sup> See the National Defense Authorization Act (NDAA) for Fiscal Year 2014, Public Law 113-66, Section (§) 235, and the NDAA for Fiscal Year 2016, Public Law 114-92, § 1684.

performance testing and associated temporary flight restrictions (TFRs). The EA resulted in a joint FONSI by MDA and DAF in July 2020, and a separate FONSI and Record of Decision (ROD) by FAA in August 2020. MDA expects to begin a 12- to 18-month period of time-constrained performance testing of the LRDR in fall 2020.

The Proposed Action evaluated in this EIS includes continuous LRDR operations under the changed operational concept, and actions related to restricting the flight of aircraft in the airspace where HIRF from the LRDR operations would exceed FAA certification standards that perform functions whose failure would prevent continued safe flight and landing<sup>2</sup> and therefore pose a hazard to aviation. The Proposed Action is described more fully in **Chapter 2.0**.

## **1.2 Background**

Within the DoD, MDA is responsible for developing, testing, and fielding an integrated, layered MDS to defend the U.S. and its deployed forces, allies, and friends against all ranges of enemy missile threats in all phases of flight. The layered MDS is a defensive system consisting of land-, sea-, and air-based weapon, sensor and communications, and command and control elements that are used to detect and defeat incoming missile threats. As part of the layered MDS, the LRDR will be the lead sensor in a new class of radars optimized to identify threat objects in complex, dense target environments, and to enhance efficient deployment of MDS weapons to intercept such threats.

The LRDR is located at CAFS, which is an 11,438-acre U.S. Air Force (USAF) station in east-central Alaska approximately 56 miles southwest of Fairbanks in the Tanana Valley. CAFS is bordered on the east by the George Parks Highway (Parks Highway; Alaska State Highway 3), on the north by the community of Anderson, and on the west by the Nenana River. CAFS is the home of the 13th Space Warning Squadron (SWS) and the 213th SWS Alaska Air National Guard.

The 13th SWS operates the Upgraded Early Warning Radar, also located at CAFS, which generates early missile launch warning data and provides protection for the North American continent in the event of land-based or sea-launched missile attack. It also provides space surveillance data for space objects orbiting Earth. Operation of the Upgraded Early Warning Radar is independent of the LRDR and is supported by a restricted area,<sup>3</sup> R-2206, which covers approximately 9.7 square nautical miles (NM) (see **Figure 1.2-1** and **Figure 1.2-2**). R-2206 was originally established in 1961 to support the USAF Ballistic Missile Early Warning System (BMEWS). The size and shape of R-2206 have been amended during subsequent years to enhance compatibility between the radars and the aircraft that operate in the vicinity of CAFS. R-2206 was last modified in 1975 when the ceiling was increased from 5,000 feet above mean sea level (MSL<sup>4</sup>) to its present ceiling of 8,800 feet MSL (*Federal Register* 1975). With the exception of

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<sup>2</sup> See 14 CFR § 23.1308 and Appendix J, 14 CFR § 25.1317 and Appendix L, 14 CFR § 27.1317 and Appendix D, and 14 CFR § 29.1317 and Appendix E.

<sup>3</sup> A restricted area is airspace designated by the FAA within which the flight of aircraft, while not wholly prohibited, is subject to restriction (14 CFR § 1.1). No person may operate an aircraft within a restricted area between the designated altitudes and during the time of designation, without advance permission from the using agency or the appropriate FAA facility (14 CFR § 73.13).

<sup>4</sup> MSL refers to indicated altitude when the altimeter is set to the measured atmospheric pressure at mean sea level (i.e., 0 feet MSL).

base operations and emergency services, there are no flight operations allowed within the existing R-2206 restricted airspace. Two FAA airways (J-125 and V-436) currently traverse above R-2206.

Generally, commercial and private air traffic using instrument flight rules (IFR) in the vicinity of CAFS and around R-2206 is controlled by FAA's Anchorage Air Route Traffic Control Center (ARTCC). Flight operations out of nearby military installations involve pilot coordination with the associated installation's air traffic control (ATC), approach control, or ARTCC.

Figure 1.2-1. Clear Air Force Station, Alaska, and R-2206

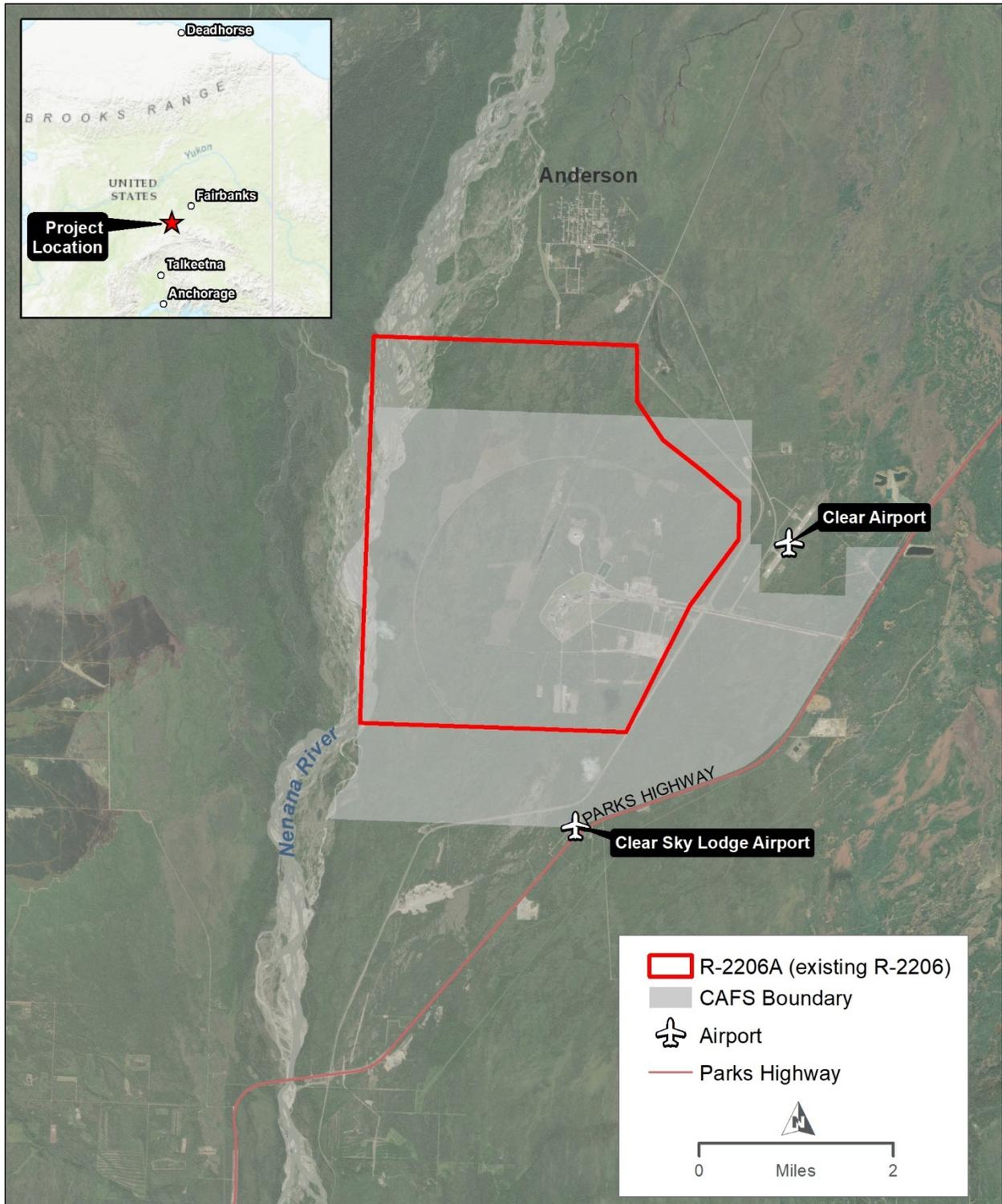


Figure 1.2-2. R-2206 on Fairbanks Sectional Aeronautical Chart



### 1.3 Purpose and Need

The purpose of the Proposed Action evaluated in this EIS is to (1) support the defense of the U.S. from emerging threats through improved missile tracking and discrimination capabilities by integrating the LRDR as an operational asset into the layered MDS, and (2) make changes in airspace management to accommodate the operation of the LRDR. The Proposed Action is needed to protect the U.S. against long-range missile threats, as directed in the 2014 Fiscal Year National Defense Authorization Act (NDAA) and 2016 Fiscal Year NDAA,<sup>5</sup> and to protect aviation from the hazard posed by the HIRF resulting from the LRDR.

### 1.4 Decisions to be Made

MDA will decide whether to operate the LRDR continuously under the changed operational concept. This decision will be based on LRDR system capabilities, the analysis of the missile threat to the U.S., layered MDS performance and operational effectiveness, and potential impacts on the environment and aviation. FAA will decide what actions would be needed to protect aviation from the HIRF resulting from LRDR operations, should MDA decide to operate the LRDR continuously.

### 1.5 Scope of the Environmental Impact Statement

This EIS documents the environmental analysis of the proposed changed operational concept of the LRDR, FAA's proposed actions related to restricting the flight of aircraft in airspace where HIRF resulting from the LRDR operations would exceed FAA certification standards, and the No Action Alternative. **Sections 2.1** and **2.2** describe the Proposed Action and the No Action Alternative, respectively. An alternative Restricted Area configuration considered but not carried forward for further analysis is described in **Section 2.3**.

The environmental analysis in **Chapter 3.0** individually addresses environmental categories that have the potential to be affected by the Proposed Action. These are listed below.

- Airspace Management
- Air Quality
- Biological Resources
- Climate
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Compatible Land Use
- Safety
- Socioeconomics and Environmental Justice
- Subsistence
- Visual Effects
- Water Resources

**Chapter 3.0** provides descriptions of the affected environment, and impacts of the No Action Alternative and Proposed Action, for each category. Cumulative impacts of the Proposed Action are addressed in **Section 3.15**, mitigation is addressed in **Section 3.16**, and **Chapter 4.0** addresses other NEPA requirements. **Chapter 6.0** is a glossary of technical terms used in this EIS. The remainder of the chapters and the appendices provide supporting information.

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<sup>5</sup> See the NDAA for Fiscal Year 2014, Public Law 113-66, Section (§) 235, and the NDAA for Fiscal Year 2016, Public Law 114-92, § 1684.

## **1.6 Federal Environmental Requirements**

The Proposed Action constitutes a federal action subject to the requirements of NEPA, as amended. Accordingly, MDA, in cooperation with DAF and FAA, prepared this EIS to evaluate alternatives; identify and evaluate potential environmental impacts; describe appropriate mitigation measures or other commitments required; and communicate the findings to agency decision-makers, regulators, the general public, and stakeholder groups. In preparing the EIS, MDA and the cooperating agencies complied with the regulations, the implementing procedures, and the order cited in **Section 1.1**.

## **1.7 Interagency and Intergovernmental Coordination and Consultations**

MDA is the lead federal agency for this EIS. DAF and FAA accepted MDA's invitation to be cooperating agencies in accordance with 40 CFR § 1501.6. Cooperating agencies have either jurisdiction or special expertise for certain components of the Proposed Action or for potentially affected operations and resources. DAF is a cooperating agency because the 13th SWS controls and oversees the activities and operations occurring on CAFS. Additionally, the 13th SWS is the using agency for the existing Restricted Area (R-2206) at CAFS. FAA is a cooperating agency because it has special expertise and jurisdiction by law, pursuant to 49 U.S. Code (U.S.C.) § 40101 et seq., for aviation and regulation of air commerce in the interests of aviation safety and efficiency. As cooperating agencies, DAF and FAA provide consultation, review, and comment during development of the EIS.

Interagency and intergovernmental coordination and consultation is an integral part of EIS development and, along with scoping (described in **Section 1.8.1**), helps to determine the range of actions, alternatives, and potential areas of impact that should be addressed in the EIS. MDA and DAF have consulted with the Alaska State Historic Preservation Office and federally recognized Tribes as required by the National Historic Preservation Act (NHPA), Section 106. **Appendix A, Agency Consultation and Correspondence**, contains correspondence documenting the agency consultation for this project.

## **1.8 Summary of Public Participation**

The CEQ and MDA regulations and procedures for implementing NEPA require an early and open process for determining the scope of issues related to the Proposed Action. The purpose of the scoping process is to identify concerns of the general public, stakeholder groups, and agencies and to determine the significant environmental issues related to the Proposed Action that are used to guide the preparation of the EIS.

Involving the general public, stakeholder groups, and agencies in the scoping process provides for open communication between these groups and promotes better decision-making. The general public and stakeholder groups are provided opportunities and means for involvement during scoping and throughout preparation of an EIS. Comments and questions received during this process are used to identify potential environmental impacts on the quality of the human and natural environments.

MDA and the cooperating agencies have conducted and will continue to conduct outreach in accordance with state and federal guidelines and respective agency standards. Public comments will be considered throughout the EIS process, and issues raised in comments will be addressed in the EIS.

### 1.8.1 Scoping

The formal scoping comment period started with publication of the Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on May 17, 2019, and ended July 5, 2019.<sup>6</sup> The NOI was also mailed or emailed to identified stakeholders. A copy of the NOI is provided in **Appendix B**. Stakeholder groups and the general public were encouraged to provide comments on the Proposed Action through a variety of methods during the scoping process.

During the scoping period, MDA held public scoping meetings in Anchorage, Fairbanks, and Anderson, Alaska. The meetings were advertised with printed notices in the *Anchorage Daily News*, the *Fairbanks Daily News-Miner*, and the *Federal Register*. The U.S. Army Corps of Engineers' (USACE) Tribal Coordinator also reached out to the Tribes and Village Corporations in the project vicinity to communicate information about the public meetings. The meeting arrangements were designed to accommodate the needs of elderly, handicapped, non-English-speaking, minority, and low-income populations in accordance with the Americans with Disabilities Act of 1990, 42 U.S.C. § 12101–12213, Executive Order (EO) 12898, and U.S. Department of Transportation (USDOT) Order 5610.2(a). A total of 94 attendees signed in at the public scoping meetings, and most of the attendees were pilots, area residents, and emergency personnel. **Table 1.8-1** provides an overview of the public scoping meetings.

**Table 1.8-1. Public Scoping Meetings Overview**

Location	Number of Attendees	Number of Comments	Comment Format
<b>Anchorage</b> Tuesday, June 4, 2019 4:30–7:00 p.m. Z.J. Loussac Library	15	0	No comments received
<b>Anderson</b> Wednesday, June 5, 2019 5:30–7:30 p.m. Anderson School	37	10	5 written 5 verbal/court reporter
<b>Fairbanks</b> Thursday, June 6, 2019 4:30–7:00 p.m. Carlson Center	42	10	4 written 6 verbal/court reporter

A total of 42 formal comments were received by the end of the comment period on July 5, 2019. These included 9 written comments and 11 verbal comments at public scoping meetings, and 22 comments emailed to the project email address. The main themes expressed in scoping comments are summarized in the following list:

- Incompatibility of the Proposed Action with Clear Airport operations and potential for growth. Clear Airport is located adjacent to CAFS (see **Figure 1.2-1**). Commenters stated concerns regarding access for firefighting and medical evacuations, emergency landings, and hunters.

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<sup>6</sup> An updated NOI announcing an extension to the original 30-day scoping comment period to allow the public sufficient time to review the project materials was published on June 10, 2019 (see **Appendix B** of this EIS).

- Navigational safety risks. Commenters stated concerns about aircraft separation distances, no longer having use of Windy Pass (a mountain pass between Interior and Southcentral Alaska), and not being able to use the Parks Highway and Nenana River as navigational aids.
- Added flight time and expense to navigate around the proposed Restricted Areas and increasing limitations on flight options.
- Impacts on the USAF Auxiliary Civil Air Patrol (CAP) Alaska Wing Glider Academy for youth at Clear Airport. The Glider Academy could no longer be held at Clear Airport.
- Potential risks to human health and impacts on cellphone reception from the LRDR.
- Impacts on wildlife.
- Potential impacts on private airstrips and property values due to reduced accessibility.

### 1.8.2 Public Outreach

In addition to public scoping meetings, the agencies communicated with stakeholder groups, community and local leaders, congressional delegations, state and local agencies, Alaska Native organizations, and tribal entities as part of the public outreach and public participation process. **Chapter 5.0, Notified Parties**, contains the list of stakeholders contacted.

As part of outreach efforts, representatives from MDA and FAA attended the following meetings with stakeholder groups:

- Alaska Civilian and Military Airman’s Council, April 24, 2019, in Fairbanks, Alaska. No formal presentation about the EIS was given at the meeting.
- Alaska Region Aircraft Owners and Pilots Association and the Alaska Airmen Association, May 21, 2019. The meeting was informal.
- Alaska Industry Council on December 11, 2019. FAA provided a description of the Aeronautical Proposal.

MDA also conducted the following public outreach meetings by teleconference:

- Helicopter Association International, April 21, 2020. MDA responded to questions from representatives of the organization regarding airspace design, access, and potential environmental impacts.
- City of Anderson mayor and fire chief, and a local pilot/emergency medical technician who is also a representative of Alaska Airmen Association, April 30, 2020. The topics discussed included airspace design, emergency access, and potential impacts on hunting.

MDA emailed a letter to project stakeholders on April 7, 2020. The email and attached letter (**Appendix B**) explained design revisions to the proposed restricted airspace and included an update on the NEPA process to analyze the impacts of the proposed LRDR operations and related FAA actions to restrict flight of aircraft. The communication also announced MDA’s intent to prepare an EA for the performance testing of the LRDR. Stakeholders were encouraged to provide input by May 1, 2020, on issues related to the potential impacts to aviation activities or any environmental resource from the proposed airspace restrictions necessary for operation of the LRDR. MDA received nine responses to the stakeholder letter about potential impacts. Comment topics related to the Proposed Action of this EIS were:

- Concerns that relocation of Clear Airport was not properly considered.
- Property is “inside the projected LRDR search pattern.”
- Need for general contact information to request LRDR “shutdown” in case of medical evacuation at Clear Airport or in-flight emergency.

### *Purpose and Need for Proposed Action*

- Diversions to smaller aircraft or air carrier would increase fuel/time and may affect operations and costs.
- Mitigation of [unspecified] LRDR impacts that have not been addressed.
- Concerns that the NEPA process and established FAA practices were not followed in regard to construction of LRDR prior to analysis of potential impacts and establishment of TFRs, respectively.

In addition to the responses to the April 7, 2020, stakeholder letter, MDA received comments on the EA for the LRDR performance testing that also raised concerns relevant to the Proposed Action of the EIS. The topics not already included in the above list were:

- Concerns that reroutes in rising terrain would be longer than anticipated and that reroutes for lower-altitude air traffic are unnecessary.
- Assessment of impacts on aviation costs should consider total operational costs rather than just fuel costs.
- Allowance of bi-directional travel in R-2206F and along the Parks Highway, and safety for aircraft flying under visual flight rules (VFR) in the area.
- Necessary air space to keep Clear Airport viable and functional for multi-faceted use including the Department of Natural Resources, Division of Forestry Heli-base.
- Impacts on the navigable air space that would increase the lateral and vertical dimensions of restricted airspace over a heavily used, major aviation corridor in Alaska, and potentially place pilots and passengers at risk.
- The impacts that the proposed Restricted Areas may have on the primary flight path between the two most populous cities in the state, and the utility of Clear Airport.
- The use of Clear Airport as a safe diversion to wait out poor weather or an emergency landing area for those traveling through Windy Pass would be curtailed.

### **1.8.3 Draft EIS Comment Period**

This EIS includes an assessment and disclosure of potential environmental impacts resulting from the Proposed Action and No Action Alternative. Stakeholder groups and the public are encouraged to provide comments on the Draft EIS during the public comment period. Comments on the Draft EIS will be accepted for a minimum of 52 days during the public comment period scheduled to begin on October 30, 2020, and conclude on December 21, 2020. During this time, public comment meetings will be held virtually and will consist of an online open house and a telephone public meeting.

## **1.9 Related Environmental Documentation**

The following key environmental documents were used during the development of this EIS to provide understanding of related actions, activities, or issues associated with the Proposed Action:

- DoD, 2016b. Environmental Assessment for Long-Range Discrimination Radar at Clear Air Force Station, Alaska, June 2016, and Finding of No Significant Impact, July 2016.
- DoD, 2020. Long Range Discrimination Radar Performance Testing, Clear Air Force Station, Alaska, Environmental Assessment and Finding of No Significant Impact, July 2020.
- FAA, 2020a. Adoption of Environmental Assessment for Long Range Discrimination Radar Performance Testing, Clear Air Force Station, Alaska, and Finding of No Significant Impact and Record of Decision for Temporary Flight Restrictions, August 2020.

A complete list of reference documents used to prepare this EIS is provided in **Chapter 7.0**.

## 2.0 Description of the Proposed Action and Alternatives

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This EIS analyzes two alternatives: the Proposed Action (**Section 2.1**) and the No Action Alternative (**Section 2.2**). **Section 2.3** discusses an alternative that MDA initially considered but eliminated from further analysis because it would result in greater impacts than the Proposed Action.

### 2.1 Proposed Action

The Proposed Action consists of both MDA and FAA actions. MDA would operate the LRDR continuously under the changed operational concept. FAA would take actions related to restricting the flight of aircraft in airspace where the HIRF resulting from LRDR operations would exceed FAA certification standards for aircraft electrical and electronic systems. These actions are described below.

#### 2.1.1 LRDR Operational Changes

The operational concept for the LRDR analyzed in the 2016 EA and FONSI was to maintain the LRDR in a readiness posture. Since the 2016 EA and FONSI were completed, the operational concept for the LRDR has changed due to emerging threats to the U.S. In this EIS, MDA proposes to adapt the LRDR operational system requirements and procedures to reflect continuous operations within the radar's field of view. The change to continuous operations would not require additional infrastructure beyond what was described in the 2016 EA. Referenced in this EIS is a ground-based radio frequency (RF) safety hazard zone established within the boundary of CAFS using fencing and signage, which was included in the 2016 EA.

#### 2.1.2 FAA Actions Related to Restricting the Flight of Aircraft

The change in the LRDR operation procedures would create a hazard in areas of the National Airspace System where the HIRF would exceed FAA certification standards for aircraft electrical and electronic systems. To address this hazard, FAA would take the following actions related to restricting the flight of aircraft: (1) establish six additional Restricted Areas; (2) if necessary, implement TFRs until those Restricted Areas are in effect; and (3) make changes to federal airways and instrument flight procedures to accommodate the new Restricted Areas. These actions are described below, and more detailed information about the changes to airways and procedures is provided in **Section 3.1, Airspace Management**.

##### 2.1.2.1 Proposed Restricted Areas

Developing the proposed Restricted Areas has been an iterative process involving input from subject matter experts from MDA, DAF, and FAA. In developing the proposed Restricted Areas and an alternative (see **Section 2.3**), MDA, DAF, and FAA considered the following selection standards:

- Protecting aircraft from exposure to HIRF levels that exceed FAA certification standards for aircraft electrical and electronic systems.
- Making the dimensions of the affected airspace easily understandable by the general public and stakeholder groups, such as pilots.
- Minimizing the impact on air traffic in the affected area around CAFS.
- Compliance with applicable regulations and FAA orders.

Under the Proposed Action, existing R-2206 would be expanded by adding six new Restricted Areas to prevent aircraft from being exposed to LRDR-generated HIRF at levels exceeding FAA certification

standards for aircraft electrical and electronic systems. Existing R-2206, with a minor modification,<sup>7</sup> would be renamed R-2206A, and the six new Restricted Areas would be identified as R-2206B through R-2206G. The proposed Restricted Areas are described in **Table 2.1-1**. The new Restricted Areas would intersect R-2206A (existing R-2206) above the ground; the proposed Restricted Areas would not contact the ground. The floor and ceiling altitudes of the proposed Restricted Areas are described in feet MSL. At the location of CAFS, ground level is approximately 600 feet above sea level and the terrain is relatively flat. Thus, at 1,000 feet MSL, the altitude of the lowest floors of the proposed Restricted Areas would be approximately 400 feet above ground level (AGL).

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<sup>7</sup> The longitude of the northeast corner of the existing R-2206 would be moved by 1 second to maintain a 100-foot buffer of the Alaska Railroad. The legal descriptions of the proposed Restricted Areas are provided in Appendix C.

Table 2.1-1. Proposed Restricted Areas

Restricted Area	Boundary Description	Floor Altitude <sup>(1)</sup>	Ceiling Altitude	Time of Designation
R-2206A (existing R-2206) <sup>(2)</sup>	<b>Beginning at</b> lat. 64° 19' 44" N., long. 149° 15' 42" W.; to lat. 64° 19' 44" N., long. 149° 10' 18" W.; thence south, 100 feet west of and parallel to the Alaska Railroad to lat. 64° 16' 17" N., long. 149° 10' 14" W.; to lat. 64° 16' 17" N., long. 149° 15' 42" W.; to the point of beginning.	Ground surface	8,800 feet MSL	Continuous
R-2206B	<b>Beginning at</b> lat. 64° 20' 13" N., long. 149° 13' 12" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; to lat. 64° 14' 31" N., long. 149° 13' 43" W.; thence clockwise along a 3.0-NM arc radius centered at lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to the point of beginning; excluding that portion wholly contained in R-2206A.	1,000 feet MSL	1,600 feet MSL	Continuous
R-2206C	<b>Beginning at</b> lat. 64° 19' 27" N., long. 149° 20' 22" W.; thence clockwise along a 4.0-NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 23' 56" N., long. 149° 15' 30" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; to lat. 64° 14' 10" N., long. 149° 14' 01" W.; thence along a 3.0-NM arc radius centered at lat. 64° 16' 55" N., long. 149° 16' 41" W.; to the point of beginning; excluding that portion wholly contained in R-2206A.	1,600 feet MSL	32,000 feet MSL	Continuous
R-2206D	<b>Beginning at</b> lat. 64° 20' 13" N., long. 149° 13' 12" W.; thence clockwise along a 3.0-NM arc radius centered at lat. 64° 17' 20" N., long. 149° 11' 25" W.; to lat. 64° 18' 47" N., long. 149° 05' 23" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding that portion wholly contained in R-2206A.	1,000 feet MSL	1,600 feet MSL	Tuesday, Thursday, & Saturday: 2:00 a.m. to 4:00 a.m. local Alaska time; other times by NOTAM

Description of the Proposed Action and Alternatives

Restricted Area	Boundary Description	Floor Altitude <sup>(1)</sup>	Ceiling Altitude	Time of Designation
R-2206E	<b>Beginning at</b> lat. 64° 23' 56" N., long. 149° 15' 30" W.; thence clockwise along a 4.0-NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding that portion wholly contained in R-2206A.	1,600 feet MSL	2,100 feet MSL	Tuesday, Thursday, & Saturday: 2:00 a.m. to 4:00 a.m. local Alaska time; other times by NOTAM
R-2206F	<b>Beginning at</b> lat. 64° 22' 07" N., long. 149° 03' 09" W.; thence clockwise along the 4.0-NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 19' 19" N., long. 149° 03' 07" W.; to lat. 64 19' 36" N., 149° 03' 18" W.; thence north, along a path 1/2 NM west of Highway 3, Parks Highway; to lat. 64 21' 42" N., long. 149 03' 37" W.; to the point of beginning.	2,100 feet MSL	3,200 feet MSL	Tuesday, Thursday, & Saturday: 2:00 a.m. to 4:00 a.m. local Alaska time; other times by NOTAM
R-2206G	<b>Beginning at</b> lat. 64° 23' 56" N., long. 149° 15' 30" W.; thence clockwise along a 4.0-NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding (1) that portion wholly contained in R-2206A; (2) that portion wholly contained in R-2206F.	2,100 feet MSL <sup>(3)</sup>	32,000 feet MSL	Continuous

Note: lat. = latitude; long. = longitude; NOTAM = Notice to Airmen

<sup>(1)</sup> At the location of CAFS, ground elevation is approximately 600 feet above sea level and the terrain is relatively flat.

<sup>(2)</sup> See 14 CFR § 73.22.

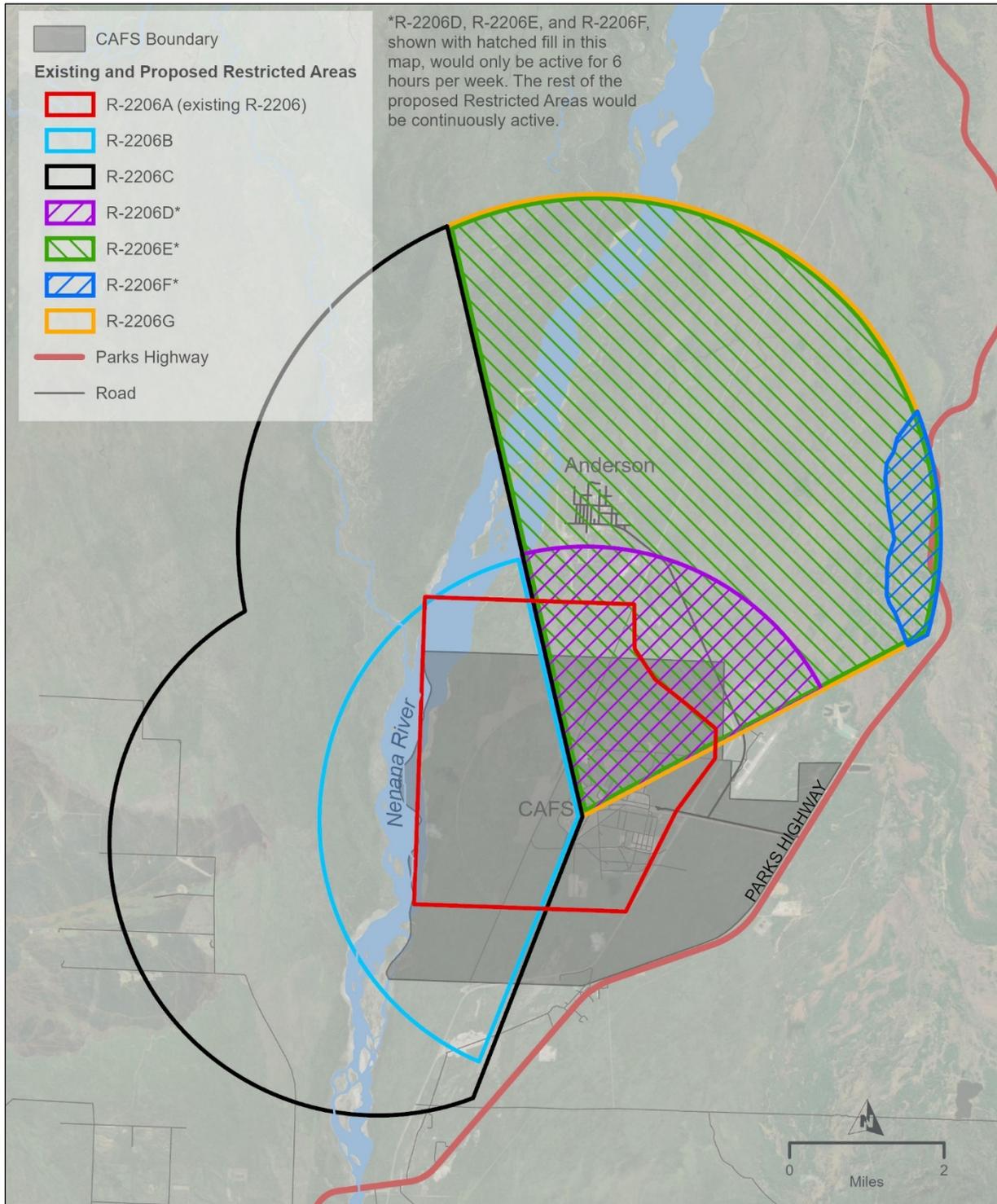
<sup>(3)</sup> The floor of R-2206G is at 3,200 feet MSL where it overlies R-2206F (i.e., in the area of the Parks Highway).

**Figure 2.1-1** provides a plan view and **Figure 2.1-2** provides a perspective depiction of the Restricted Areas. R-2206A (existing R-2206) (red), R-2206B (light blue), R-2206C (outlined in black), and R-2206G (outlined in orange) would operate continuously. R-2206D (purple), R-2206E (green), and R-2206F (dark blue) would be active only during the following periods:

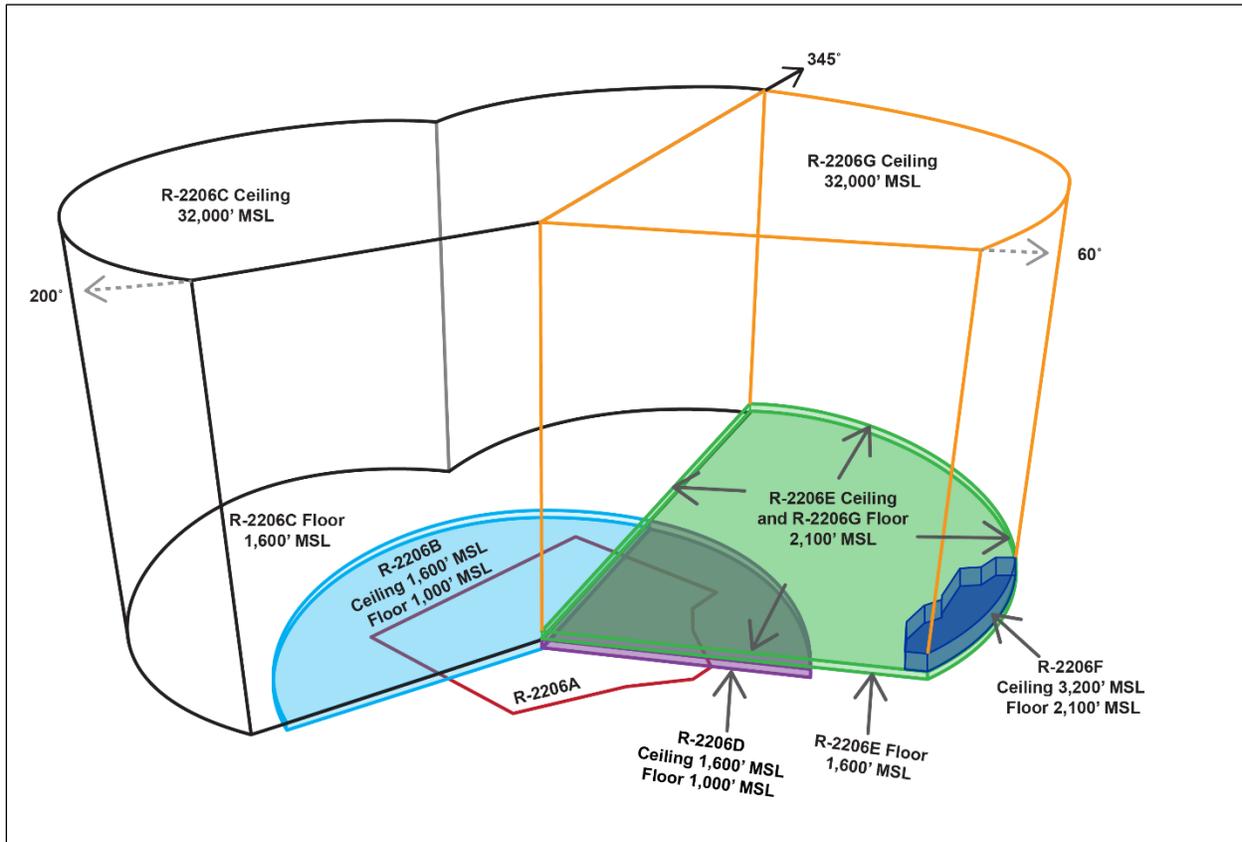
- Prescheduled maintenance or calibration activities every Tuesday, Thursday, and Saturday for a 2-hour period beginning at 2:00 a.m. and ending at 4:00 a.m. local Alaska time;
- Prescheduled test or tracking events with notice provided via Notice to Airmen (NOTAM); and
- As necessary in response to a national security crisis.

During these times, MDA would allow access by emergency aircraft and medical evacuation flights into and out of Clear Airport. The emergency access process would be defined in a Letter of Procedure coordinated between MDA, CAFS, DAF, and FAA. The Letter of Procedure would also define the process in the event that R-2206D, R-2206E, and R-2206F require activation outside the prescheduled periods.

**Figure 2.1-1. Plan View of Proposed Restricted Areas**



**Figure 2.1-2. Perspective Depiction of Proposed Restricted Areas**



*Note: The existing Restricted Area (renamed R-2206A) is shown in red, and its ground-level footprint is depicted two-dimensionally for visual clarity. At the location of CAFS, ground level is approximately 600 feet above sea level and the terrain is relatively flat. MSL= above mean sea level.*

### 2.1.2.2 Interim Phase: Temporary Flight Restrictions and Temporary Rerouting and Detours of Aircraft

In the event that continuous LRDR operations begin before the proposed Restricted Areas are established, FAA would temporarily restrict flight in the same airspace and with the same times of use as for the proposed Restricted Areas (as described in **Section 2.1.2.1**).<sup>8</sup> Legal descriptions of the proposed TFRs are provided in Section 1.2 of **Appendix C**. The period during which TFRs would be in place, if necessary, is referred to in this EIS as the “interim phase.”

During the interim phase, VFR and IFR flights would be restricted from transiting the airspace defined by the TFRs. FAA, through the Anchorage ARTCC, would be responsible for manually rerouting IFR flights around the boundaries of the TFRs. FAA would issue NOTAMs providing notice of the unavailability of airways J-125 and V-436. J-125 would be unavailable via NOTAM between Anchorage (ANC

<sup>8</sup> The boundaries of the TFRs would be the same as defined in **Table 2.1-1** with the exception that for the TFR corresponding to proposed R-2206F, the boundary “along a path 0.5 NM west of Highway 3, Parks Highway” would be defined using points of latitude and longitude (see **Appendix C** of this EIS for detailed description).

Navigational Aid [NAVAID]<sup>9</sup>) and Nenana (ENN NAVAID), and V-436 would be unavailable via NOTAM between the PUYVO waypoint<sup>10</sup> and ENN. IFR flights currently using the federal airway V-436 would either be rerouted onto V-438, which has a higher altitude floor (i.e., 11,000 feet MSL) than V-436 and would require supplemental oxygen, or be rerouted to the path shown with a red dashed line on **Figure 2.1-3**. This path is referred to in this EIS as the West Reroute. IFR flights currently using J-125 would also be rerouted to the West Reroute. Flights cleared for direct flight from Anchorage to Deadhorse would be radar vectored to avoid the TFRs, and VFR pilots would detour around the TFRs.

Clear Airport access would be limited every Tuesday, Thursday, and Saturday from 2:00 a.m. to 4:00 a.m. local Alaska time. MDA, CAFS, DAF, and FAA would coordinate a Letter of Agreement with emergency service providers to enable safe access, landing, and departure at Clear Airport when the airport has limited access. As part of this agreement, MDA would modify HIRF-generating activities to the extent necessary to accommodate emergency flights into and out of the airport.

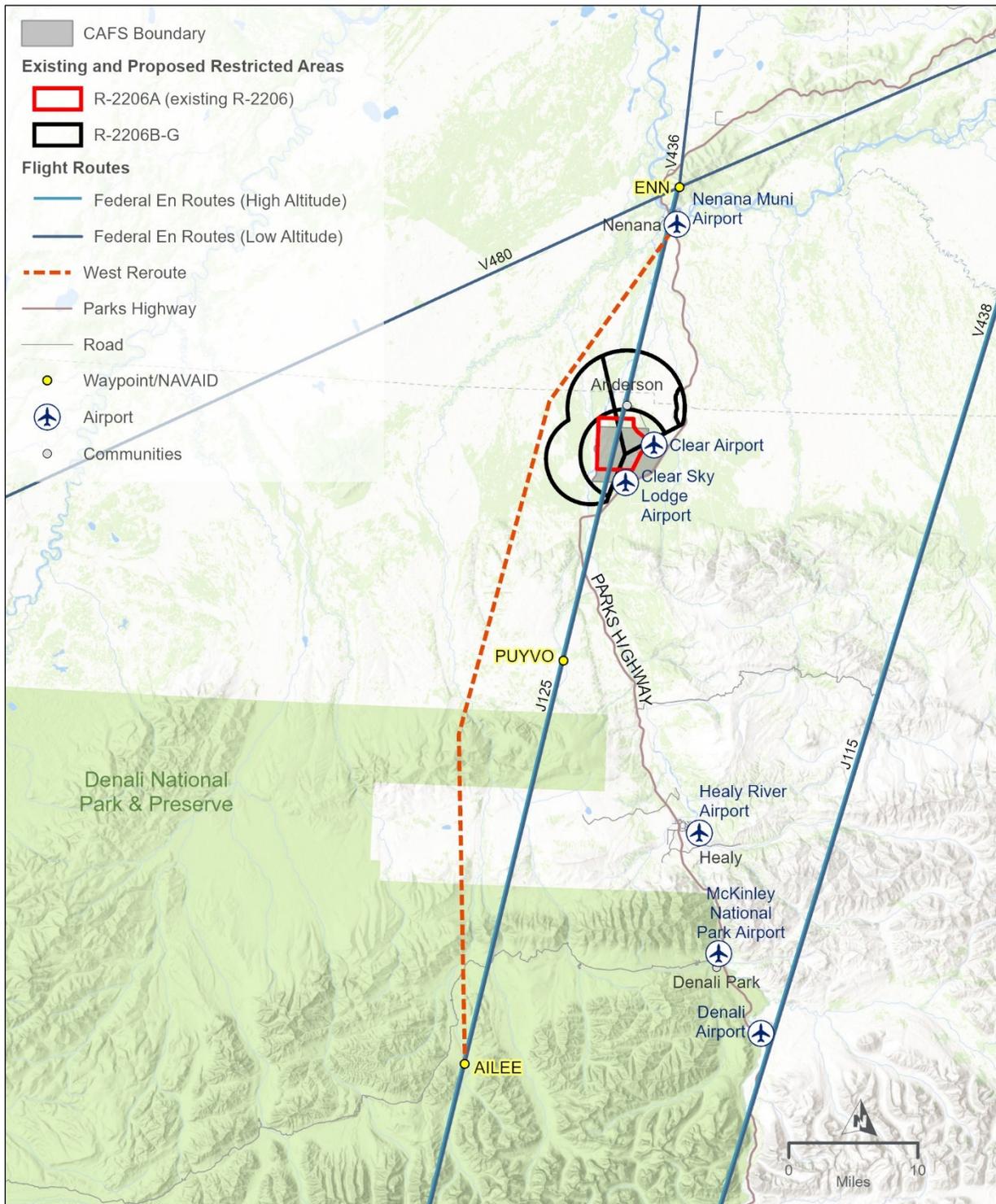
The existing IFR arrival and departure procedures at Healy River Airport would be available through processes defined in the same Letter of Agreement described above for Clear Airport. Air traffic using two departure procedures at Fairbanks International Airport (MCKINLEY TWO DEPARTURE and PUYVO THREE DEPARTURE) would be coordinated by ATC during the interim phase to maintain safe separation from the TFRs. The portion of the TAGER EIGHT ARRIVAL procedure to Ted Stevens Anchorage International Airport between ENN and Talkeetna (TKA NAVAID) which uses V-436 would also be unavailable by NOTAM during the interim phase. ATC would send aircraft direct to the TAGER waypoint where they could resume their approach to Ted Stevens Anchorage International Airport.

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<sup>9</sup> Navigational aids (NAVAIDs) are physical devices on the ground that aircraft can detect and fly to. There are many different kinds of NAVAIDs, such as Very High Frequency Omnidirectional Range / Distance Measuring Equipment, Non-Directional Beacons, Tactical Air Navigation (TACAN) systems, and VOR Test Facilities. For the purposes of this EIS, the term NAVAID is used to refer to navigation points within any of these systems.

<sup>10</sup> Waypoints are specified geographical positions used for navigation. For the purposes of this EIS, the term waypoint is used to refer to navigation points associated with routes and instrument procedures.

**Figure 2.1-3. Proposed West Reroute for Airways J-125 and V-436 during Interim Phase**



### **2.1.2.3 Federal Airways and Instrument Flight Procedures**

Establishment of the proposed Restricted Areas would necessitate changes to federal airways<sup>11</sup> (J, T, and V routes) and instrument flight procedures. These include:

- Establishment of a new federal airway, T-399;
- Amendment of J-125 and V-436; and
- Amendment of six instrument flight procedures:
  - Two departure procedures at Fairbanks International Airport,
  - One departure and two arrival procedures at Healy River Airport, and
  - One arrival procedure at Ted Stevens Anchorage International Airport.

These changes are described briefly below, and more details, along with explanations of airspace management terminology, are provided in **Section 3.1, Airspace Management**, and **Appendix C: Airspace Management – Supporting Documentation and Methodology**.

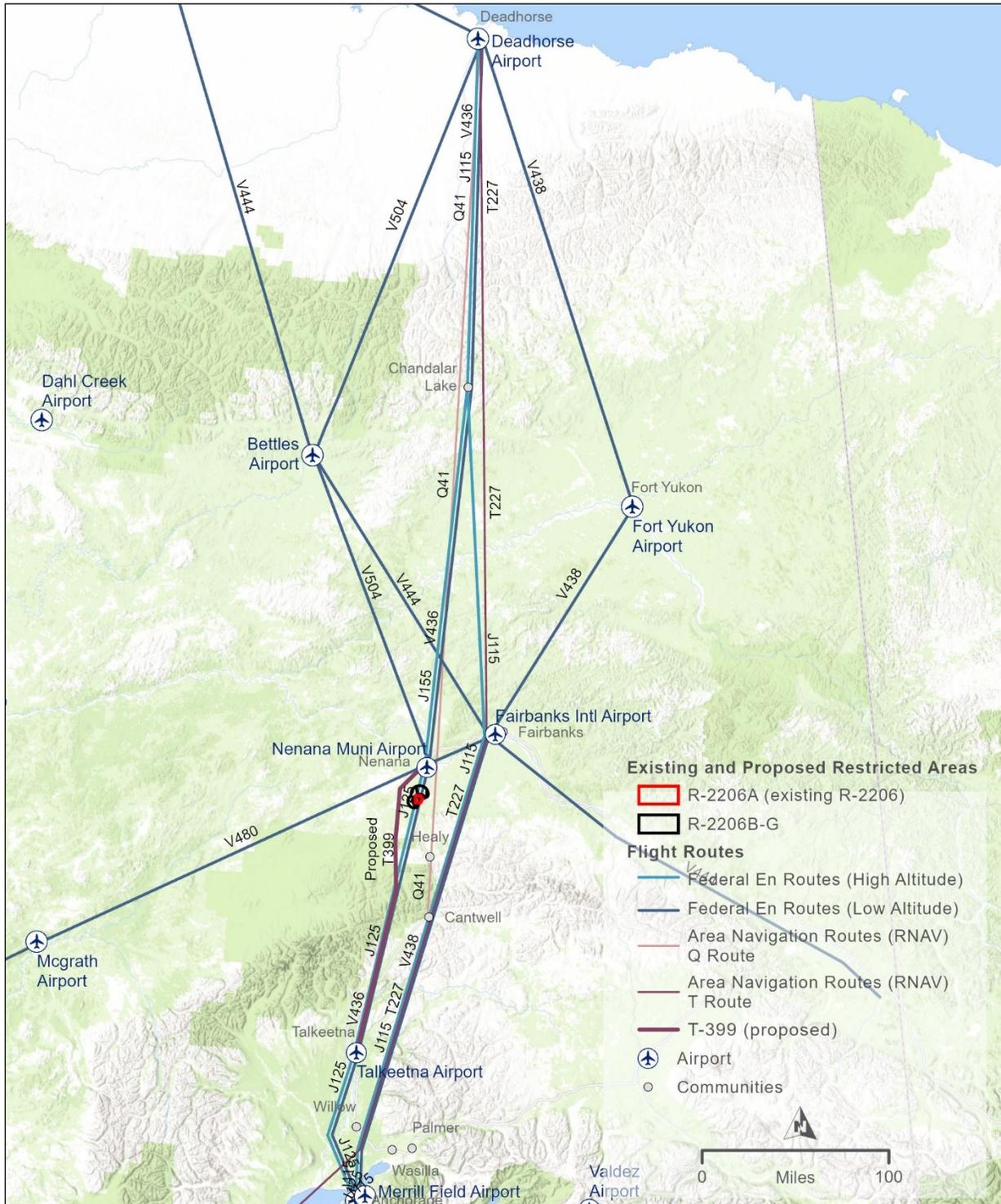
#### **2.1.2.3.1 Federal Airways**

FAA would amend two federal airways (J-125 and V-436) and establish a new federal airway (T-399). The existing J-125 and V-436 and proposed T-399 are shown on **Figure 2.1-4** along with other existing federal airways relevant to the Proposed Action.

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<sup>11</sup> An airway is used for en route air traffic that is between IFR departure and arrival procedures.

**Figure 2.1-4. Overview of Existing and Proposed Federal Airways**



**J-125.** The segment of J-125 from Anchorage (ANC NAVAID) to Nenana (ENN NAVAID) would be cancelled because it passes through the proposed Restricted Areas (see **Figure 2.1-5**). The segment from Kodiak (ODK NAVAID) to ANC would remain.

**V-436.** The existing V-436 passes through the proposed Restricted Areas (see **Figure 2.1-6**). The segment from Talkeetna (TKA NAVAID) to ENN would be replaced by segments from TKA to AILEE waypoint to Fairbanks (FAI NAVAID). Segments north of ENN would be cancelled because they would be redundant with the existing T-227 north of Fairbanks. This proposed amendment would provide a low-altitude airway that would be clear of the proposed Restricted Areas and would be available to aircraft that do not meet the requirements necessary to fly the proposed T-399 and V-438.<sup>12</sup>

**T-399.** This new airway, shown in **Figure 2.1-7**, would provide a procedurally separated<sup>13</sup> low-altitude route around the proposed Restricted Areas between the Anchorage and Fairbanks areas. The proposed amendment of V-436 would eliminate an existing option for lateral separation of aircraft arriving at and departing from Fairbanks International Airport. The proposed T-399 would preserve this option. For example, during heavy traffic periods, northbound traffic could use V-438 or the amended V-436, and southbound traffic could use T-399. For capable and qualified aircraft,<sup>14</sup> T-399 would create an alternate route to the amended V-436 that would provide clearance around the proposed Restricted Areas and preserve the lateral separation option.

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<sup>12</sup> V-438 requires supplemental oxygen.

<sup>13</sup> Procedurally separated means that the required aircraft-to-aircraft separation standard is included in the design to allow simultaneous aircraft operation.

<sup>14</sup> Aircraft operating on T routes must have onboard navigational systems that can detect area navigation waypoints.

Figure 2.1-5. Proposed J-125 Amendment

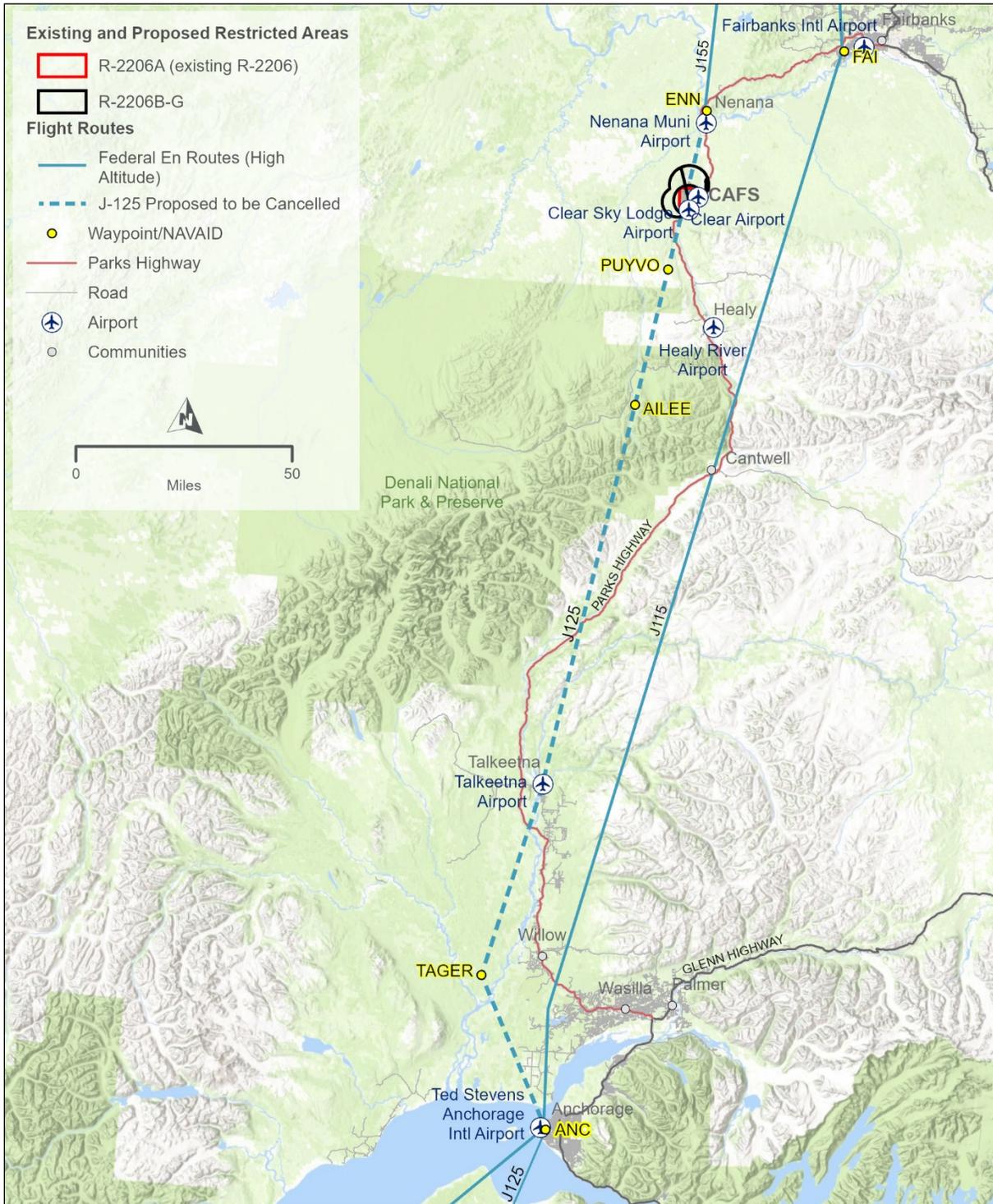


Figure 2.1-6. Proposed V-436 Amendment

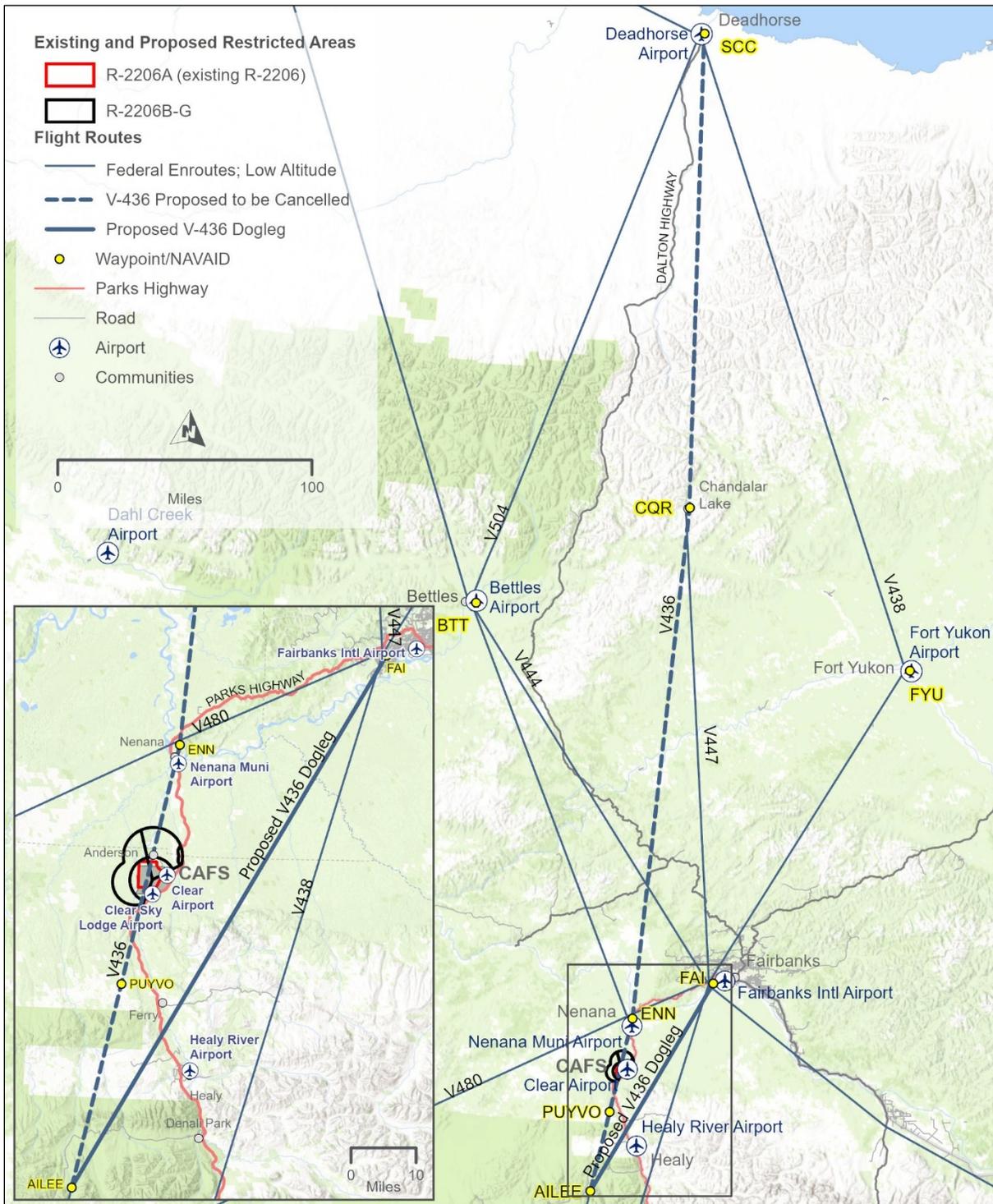
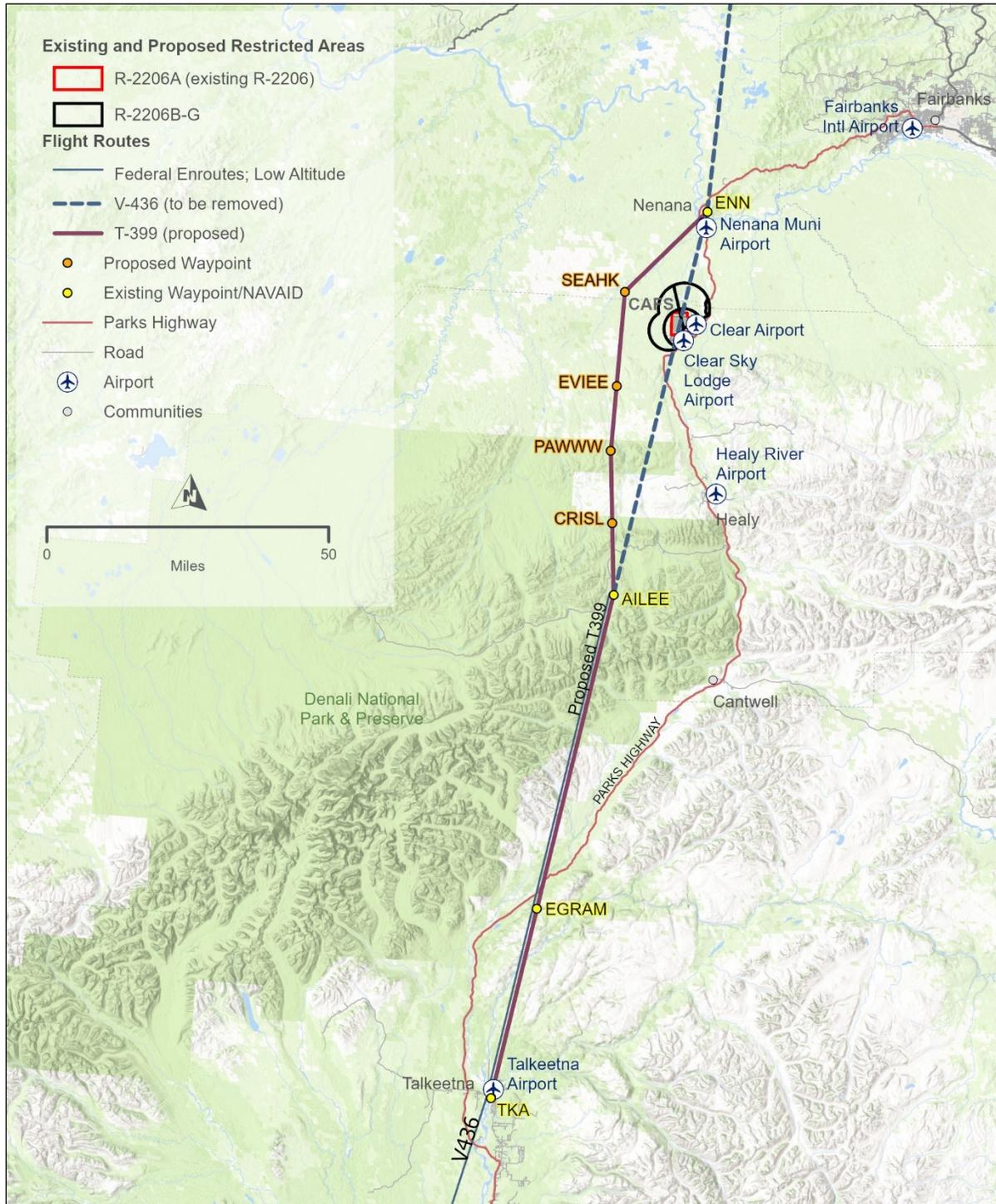


Figure 2.1-7. Proposed New T-399



### 2.1.2.3.2 Instrument Flight Procedures

Instrument flight procedures are established by FAA for IFR arrivals and departures at airports. The proposed amendments to instrument arrival and departure procedures are described below according to their associated airports.

#### Fairbanks International Airport

The note "RADAR REQUIRED" would be added to two departure procedures: PUYVO THREE DEPARTURE Area Navigation (RNAV) Standard Instrument Departure (SID) and MCKINLEY TWO DEPARTURE SID. Without the note, additional lateral separation from the proposed Restricted Area lateral limits would be required. The aeronautical charts depicting these two procedures are shown in Figure 5-2 and Figure 5-3 of **Appendix C**.

#### Healy River Airport

The Healy River Airport currently has three procedures, and all three would need to be amended.

**HEALY ONE DEPARTURE (OBSTACLE) (RNAV)**. HEALY ONE DEPARTURE is an obstacle departure procedure that connects to the en route<sup>15</sup> structure via the PUYVO waypoint on the existing V-436. The changes to V-436 described above would no longer allow a connection for the HEALY ONE DEPARTURE to the en route structure. Therefore, the HEALY ONE DEPARTURE would be amended to permit that connectivity by terminating at a new proposed waypoint (WP122A) on the proposed T-399. The climb gradient would change, and the ZADIR waypoint would be replaced by a new proposed waypoint (WP1720). The holding pattern would be moved northwest from over the PUYVO waypoint to the new proposed WP122A waypoint.<sup>16</sup> Following amendment, the procedure would be renamed HEALY TWO DEPARTURE.

**RNAV (Global Positioning System [GPS]) Runway (RWY) 15**. The current straight-in segment of this instrument approach procedure and the missed approach<sup>17</sup> holding pattern associated with the TOTLE waypoint would overlap the lateral limits of the proposed Restricted Areas. The terminal arrival area would be removed; the three initial approach fixes<sup>18</sup> would be moved to new waypoints WP427 (on proposed T-399), WP122A (also on proposed T-399), and WP63; and a new feeder route would start at

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<sup>15</sup> En route is the volume of airspace outside terminal areas, where the climb, cruise, and descent phases of flight take place and within which various types of air traffic services are provided. The en route phase of flight is that segment of flight from the termination point of a departure procedure to the origination point of an arrival procedure.

<sup>16</sup> Waypoints followed by numbers (e.g., WP1720) are temporary names. These proposed waypoints would be named immediately before the airways are established.

<sup>17</sup> A missed approach refers to when an aircraft approaching an airport to land is unable to complete the arrival procedures and land on the runway. In this situation, the aircraft must ascend into the airspace according to the airport's missed approach procedure and navigate to a holding area to await clearance by ATC for another attempt to land.

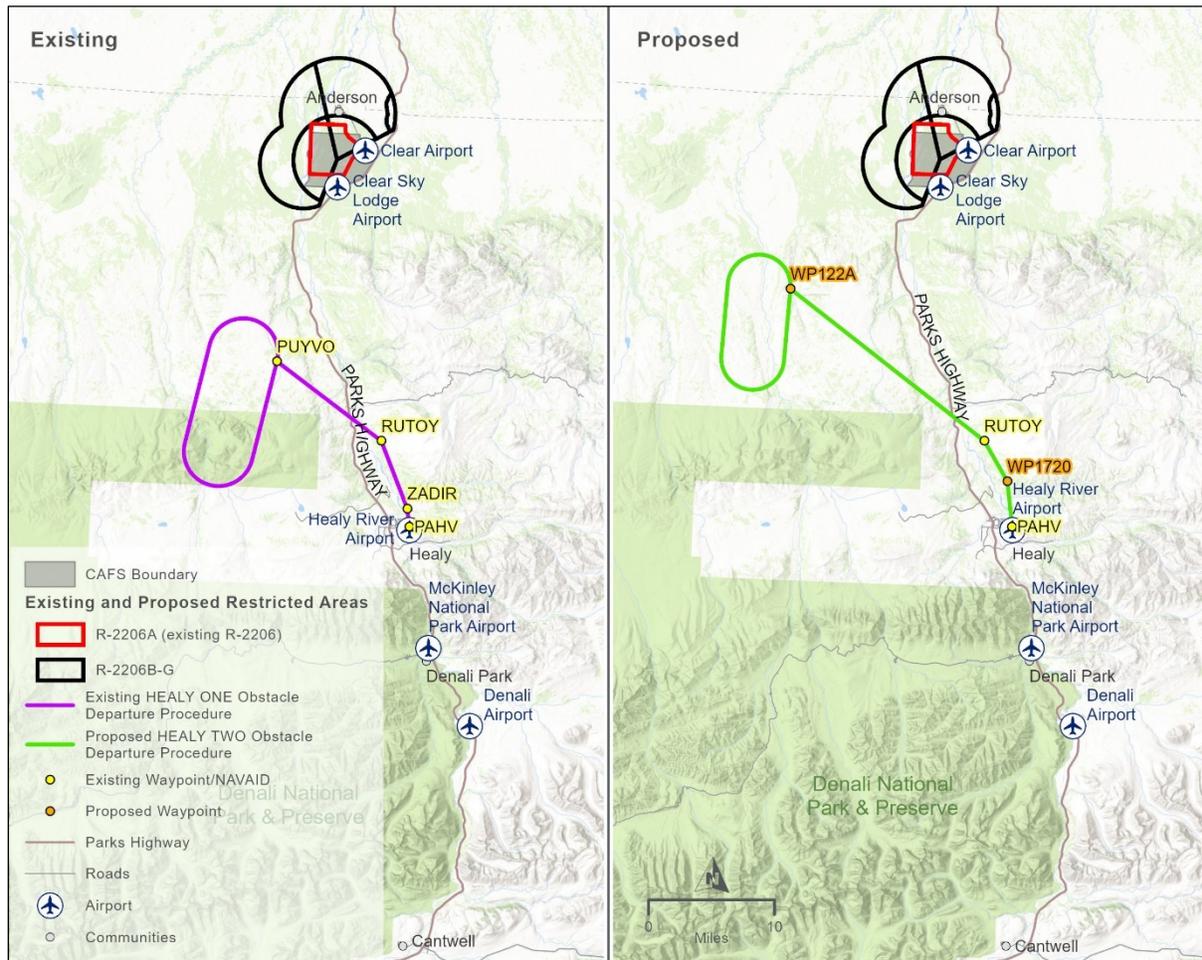
<sup>18</sup> "Fix" is a generic name for a geographical position in the airspace determined by external reference such as a visual reference to the surface or other navigational device. When an aircraft leaves en route air traffic to orient for an approach to land at an airport, it must follow a prescribed procedure to gain clearance to land. Upon gaining clearance to land, the aircraft must be aligned with and proceed along a predefined series of geographical points in the airspace (i.e., the initial approach fix, intermediate fix, and final approach fix) that guide the aircraft toward the runway to land.

WP121. The missed approach holding waypoint would change from the TOTLE waypoint to the new WP122A waypoint.

**RNAV (GPS)-A.** The existing missed approach holding pattern associated with the TOTLE waypoint would overlap with the lateral limits of the proposed Restricted Areas. The missed approach holding waypoint would change from the TOTLE waypoint to the new WP122A waypoint. This holding pattern would mimic that on the HEALY RNAV (GPS) RWY 15 procedure.

The existing Healy River Airport procedures and proposed amendments are depicted in **Figure 2.1-8**, **Figure 2.1-9**, and **Figure 2.1-10**.

**Figure 2.1-8. HEALY ONE DEPARTURE (OBSTACLE) (RNAV) – Obstacle Departure Procedure**



**Figure 2.1-9. RNAV (GPS) RWY 15 – Instrument Approach Procedure**

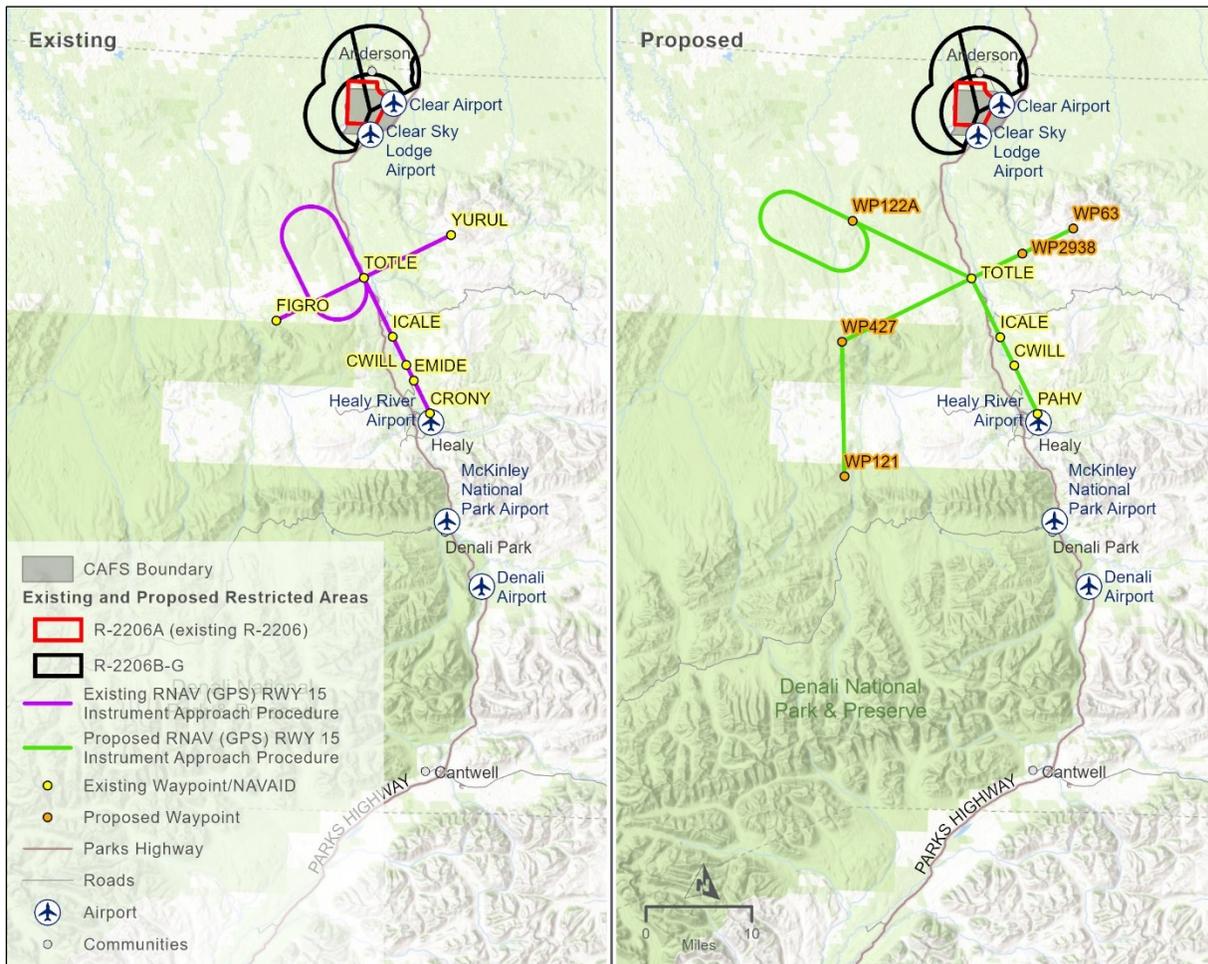
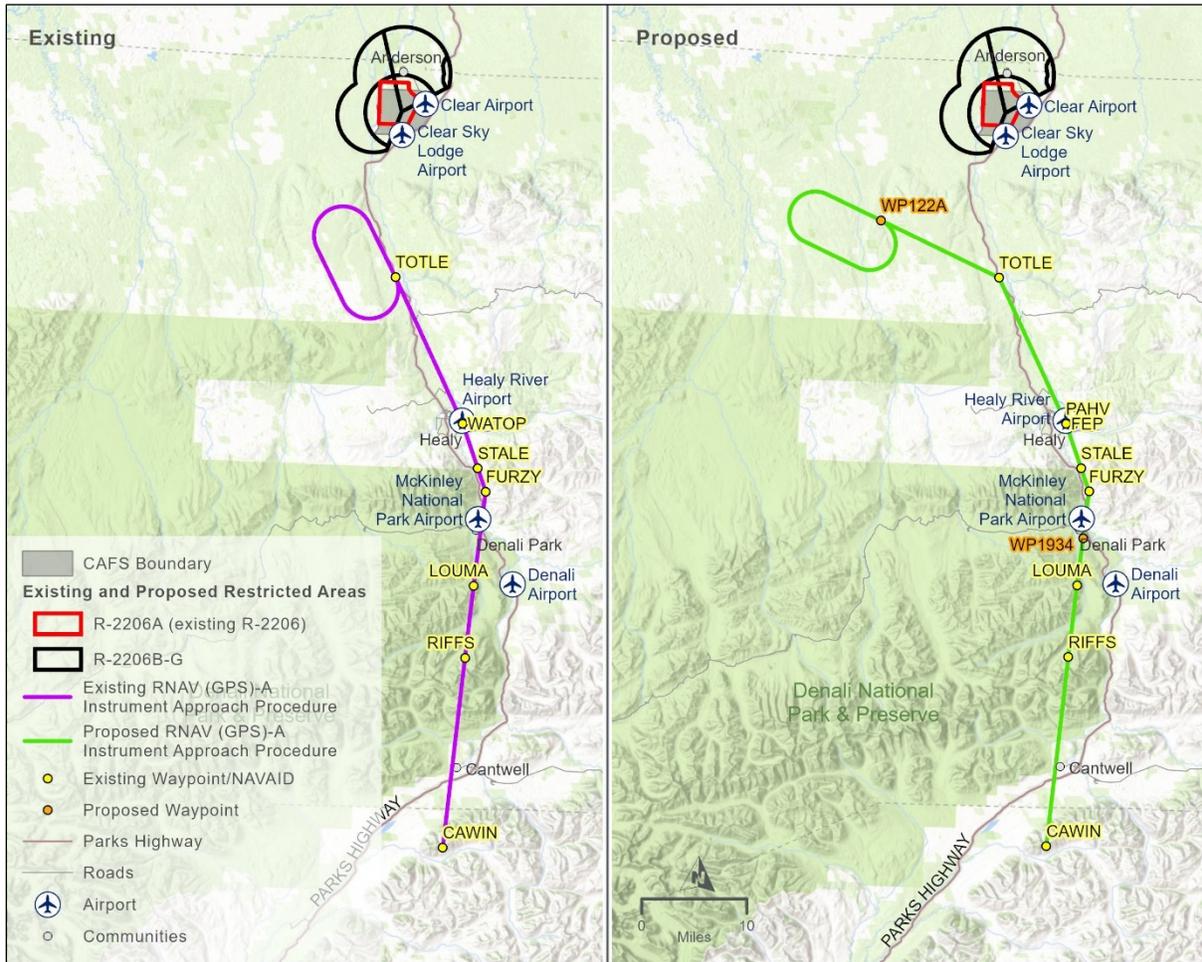


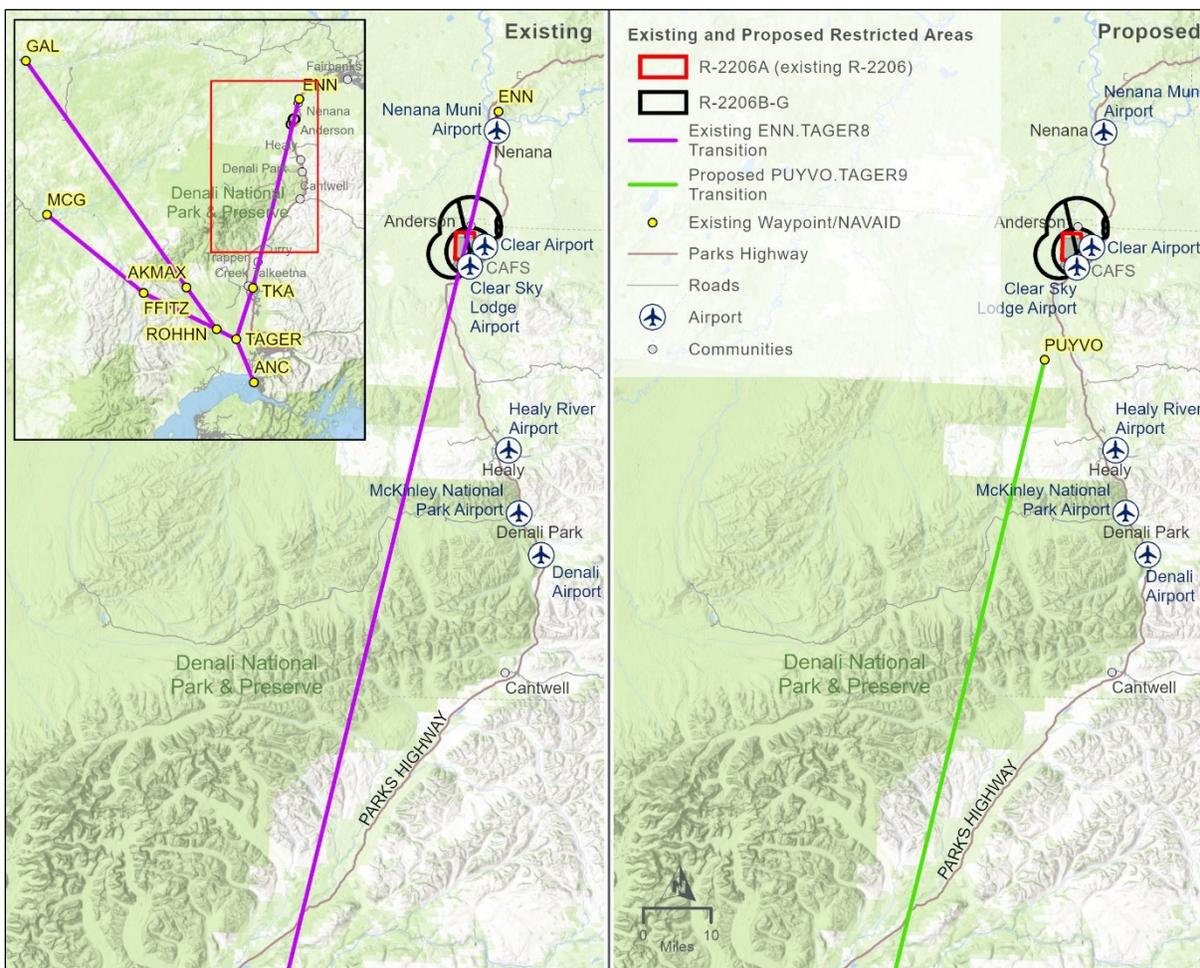
Figure 2.1-10. RNAV (GPS)-A – Instrument Approach Procedure



### Ted Stevens Anchorage International Airport

The segment of the TAGER EIGHT ARRIVAL Standard Terminal Arrival (STAR) procedure (see **Figure 2.1-11**) between Nenana and the TAGER waypoint would be shortened to begin at the PUYVO waypoint. The Nenana transition (ENN.TAGER8) would be renamed PUYVO.TAGER9. All other segments and portions of the TAGER EIGHT STAR procedure would remain unchanged.

**Figure 2.1-11. TAGER EIGHT ARRIVAL – STAR Procedure**



#### 2.1.3 Timing

Should the agencies decide to implement the Proposed Action, MDA expects that continuous LRDR operations would begin immediately following performance testing, which is currently scheduled to end in mid-2021, and FAA would establish the proposed Restricted Areas and publish the airway and procedure amendments in November 2021. If necessary, TFRs would be implemented between the start of continuous operations and establishment of the proposed Restricted Areas.

### 2.2 No Action Alternative

Under the No Action Alternative, the LRDR would be operated in a manner that would contain HIRF within existing R-2206, except during a national security crisis. FAA would not take any new actions to limit aircraft outside of existing R-2206, except as necessary. The No Action Alternative would not meet

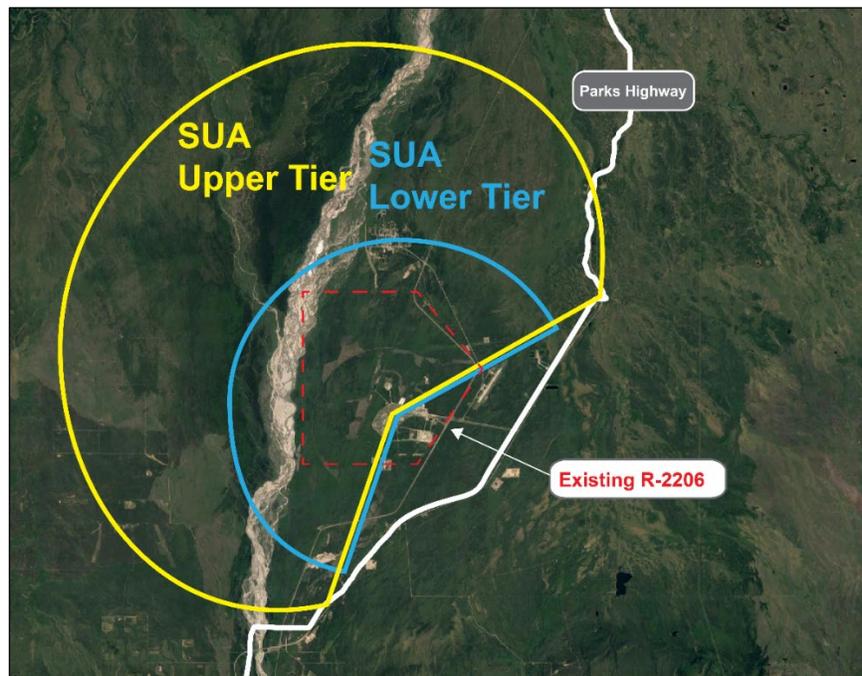
the congressional mandate to fully support the defense of the U.S. from emerging threats. The LRDR would not meet current operational requirements for the MDS and would not have the ability to adapt to rapidly evolving adversary tactics and technologies. The No Action Alternative would not satisfy the purpose or need for the Proposed Action.

### 2.3 Alternative Considered and Eliminated from Further Analysis

When the NOI to Prepare an EIS was published, MDA had developed a two-tier design for expanding existing R-2206 to allow for continuous operation of the LRDR. This was the alternative presented to the public and stakeholder groups during scoping, and, at the time, the expanded restricted airspace was referred to by a more general term of Special Use Airspace (SUA).<sup>19</sup> Under this alternative (referred to below as the “two-tier alternative”), the lower tier of the proposed SUA would have extended vertically from 1,000 feet MSL to 1,600 feet MSL and have a footprint similar to the combined footprint of R-2206B and R-2206D of the Proposed Action. The upper tier would have extended from 1,600 feet MSL to 32,000 feet MSL. The upper tier footprint would be similar to but slightly larger than the combined footprint of R-2206C and R-2206G of the Proposed Action.

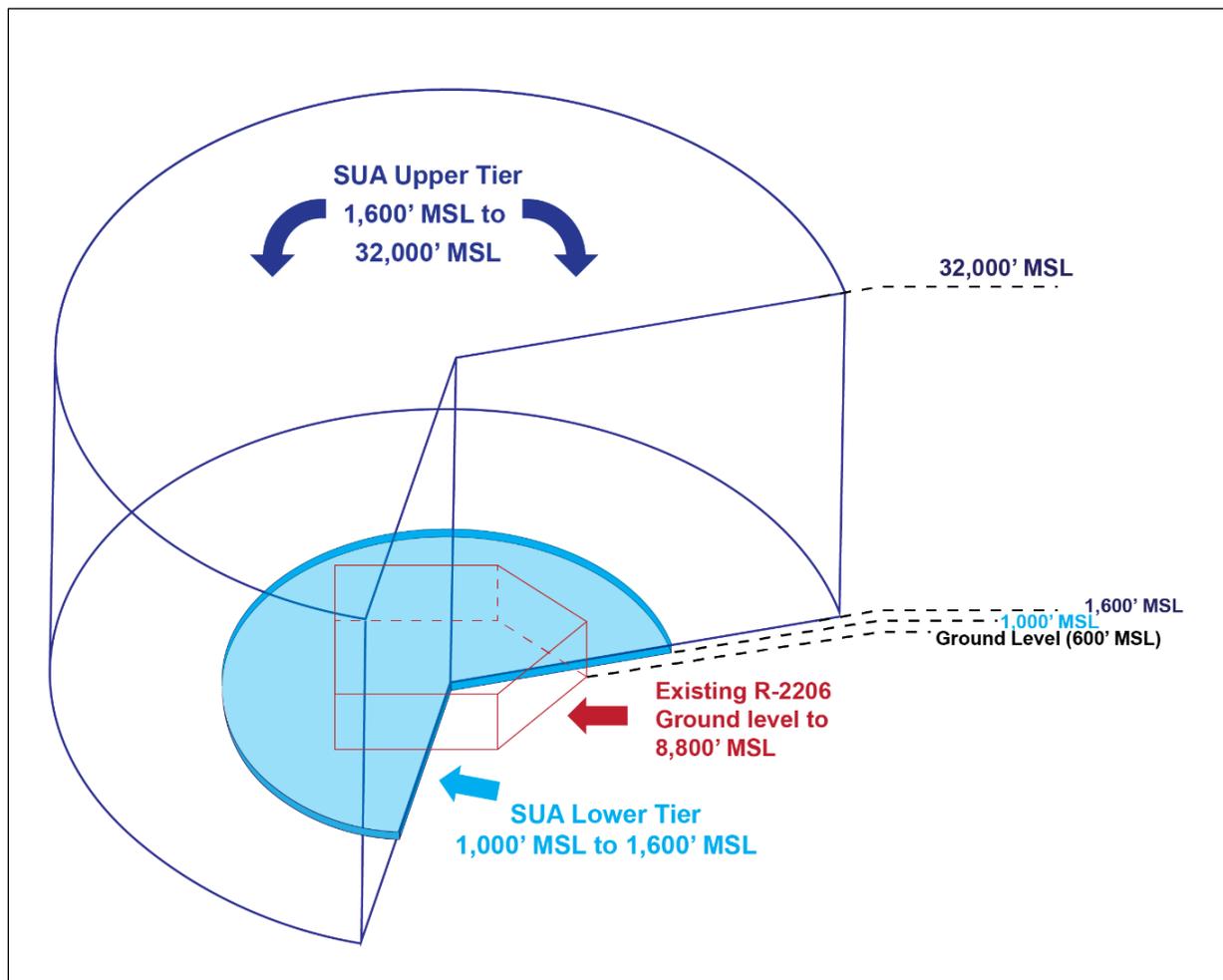
**Figure 2.3-1** depicts a map view of the two-tier alternative. Existing R-2206 is outlined with a dashed red line in this figure. **Figure 2.3-2** depicts a perspective view of the two-tier alternative.

**Figure 2.3-1. Two-Tier Alternative Map View**



<sup>19</sup> SUA consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. A Restricted Area is a type of SUA.

Figure 2.3-2. Two-Tier Alternative Perspective



During scoping, MDA and FAA determined that the two-tier alternative could result in impacts on the following:

- Nearby public and private airports, including possible closure of the Clear Airport
- Aircraft currently using Clear and Healy River Airports and the airspace near existing R-2206
- Federal IFR airways/routes V-436, J-125, and Q-41
- Two departure procedures at Fairbanks International Airport
- Two arrival procedures at Ted Stevens Anchorage International Airport
- All instrument flight procedures at Healy River Airport, which consist of two arrival procedures and one departure procedure

In order to eliminate or minimize potential impacts associated with the two-tier alternative, MDA and FAA redesigned the proposed SUA with six Restricted Areas as part of the Proposed Action described above (see **Figure 2.1-2**). This new design offers greater operational flexibility compared to the two-tier alternative and would decrease impacts on VFR flights. In addition, the SUA footprint was adjusted at key locations to reduce impacts on local air traffic and the Clear Airport. These adjustments included allowing greater access to the airspace overlying the Parks Highway, a feature that is commonly used as a visual

navigation aid. With these design changes and applying the selection standards presented in **Section 2.1.2.1**, MDA and FAA determined that the Proposed Action would have fewer environmental impacts than the two-tier alternative and concluded that the two-tier alternative should not be carried forward for further analysis in the EIS.

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## 3.0 Environmental Analysis

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MDA's NEPA implementing procedures state that "analyzing potential environmental impacts includes assessing the direct, indirect, and cumulative impacts that can reasonably be expected from taking the proposed action or reasonable alternatives. When there are direct or indirect effects on an aspect of the environment, then MDA must also consider cumulative effects." The scope and detail of the environmental analysis should be reasonably related to the scope and the probable environmental impacts of the proposed action and alternative actions. Both MDA's NEPA implementing procedures (79 *Federal Register* 46410) and DAF's Environmental Impact Analysis Process (32 CFR Part 989) dictate that the topics covered by an EIS be guided by the issues determined during the scoping process. The topics analyzed in the following sections cover the issues identified during scoping, as described in **Section 1.8.1, Scoping**.

The environmental resources and categories presented in this chapter are also consistent with environmental impact categories typically analyzed in NEPA documents for FAA actions as listed in Section 4-1 of FAA Order 1050.1F and described in more detail in the 1050.1F Desk Reference (FAA 2020b).

Several FAA environmental categories (coastal resources, farmland, and Section 4(f)) are not included as separate sections in this EIS. Coastal resources are not relevant to the geographic area of the Proposed Action, and there would be no ground-disturbing activities to affect farmland. Section 4(f) of the U.S. Department of Transportation Act of 1966 (now codified at 49 U.S.C. § 303) provides that the Secretary of Transportation may approve a transportation project that requires the use of any publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance; or land from any publicly or privately owned historic site of national, state, or local significance, only if there is no feasible and prudent alternative to the use of such land and the program or project includes all possible planning to minimize harm resulting from the use of these lands. Because the Proposed Action does not involve a transportation project, Section 4(f) is not applicable. Therefore, Section 4(f) is not considered further in this EIS.

For each environmental category, **Chapter 3.0** defines the category and includes:

- Evaluation criteria used for the analysis of impacts, which take into consideration, to the extent relevant, the impact thresholds and other factors identified in Exhibit 4-1 of FAA Order 1050.1F and the 1050.1F Desk Reference that are used by FAA to determine the significance of the impacts of a proposed action;<sup>20</sup>
- Identification of the study area, which is the geographic area within which impacts to the category resulting from the Proposed Action would occur (in Affected Environment);
- The environmental conditions of the potentially affected geographic area (Affected Environment); and
- Reasonably foreseeable environmental impacts of the No Action Alternative and Proposed Action (Environmental Consequences).

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<sup>20</sup> MDA and DAF procedures for implementing NEPA do not define category-specific criteria for determining the level of impacts.

The level of detail of analysis for each environmental category is commensurate with the degree to which issues have been raised during scoping as well as the anticipated level of impacts, and varies accordingly among the categories.

The Environmental Consequences sections consider both direct and indirect impacts. Direct impacts are those that are caused by the action and occur at the same time and place (see 40 CFR § 1508.8(a)). Indirect impacts are those that are caused by the action and are later in time or farther removed in distance, but still reasonably foreseeable (see 40 CFR § 1508.8(b)). In most cases, impacts that result from implementing the TFRs during the interim phase, if needed, are considered to be short-term, whereas impacts that result from continuous LRDR operation, establishing the proposed Restricted Areas and airway(s), and amending airways and instrument flight procedures are considered to be permanent.

Cumulative impacts are addressed in **Section 3.15**. Mitigation is addressed in **Section 3.16**. Pertinent laws, regulations, policy, and guidance for each environmental category that are relevant to the Proposed Action are described in **Appendix D**.

### **3.1 Airspace Management**

#### **3.1.1 Definition of the Environmental Category**

FAA created the National Airspace System to protect persons and property on the ground, and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The National Airspace System is made up of a network of air navigation facilities, ATC facilities, airports, technology, and appropriate rules and regulations needed to operate the system.

**Airspace Management** is the coordination, integration, and regulation of the use of airspace. Airspace management procedures assist in preventing potential conflicts or accidents associated with aircraft using designated airspace in the U.S., including restricted areas. The objective of managing airspace for military purposes is to meet operational requirements through the safe and efficient use of available navigable airspace in a peacetime environment, while minimizing the impacts on other aviation users and the public. Control of air traffic along routes is typically maintained by an FAA ARTCC. Airports may use radar and non-radar capabilities to provide control services to aircraft arriving, departing, or transiting airspace controlled by that facility.

Flight operations are generally discussed in terms of where they occur vertically within the airspace:

- **Surface** refers to ground level, or 0 feet AGL (see definition below).
- **AGL** refers to absolute altitude and is the vertical distance of the aircraft above the ground surface directly below the aircraft. The distance, or height, above ground can be accurately determined using a GPS or an onboard radar altimeter, or estimated using a topographical map and a standard altimeter adjusted for local atmospheric pressure.
- **MSL** refers to indicated altitude when the altimeter is set to the measured atmospheric pressure adjusted to mean sea level (i.e., 0 feet MSL).
- **Flight Level (FL)** is the aircraft's altitude at standard air pressure expressed in terms of hundreds of feet. For example, FL 180 would be approximately 18,000 feet MSL.

Flight operations may be flown following visual flight rules (VFR) or instrument flight rules (IFR):

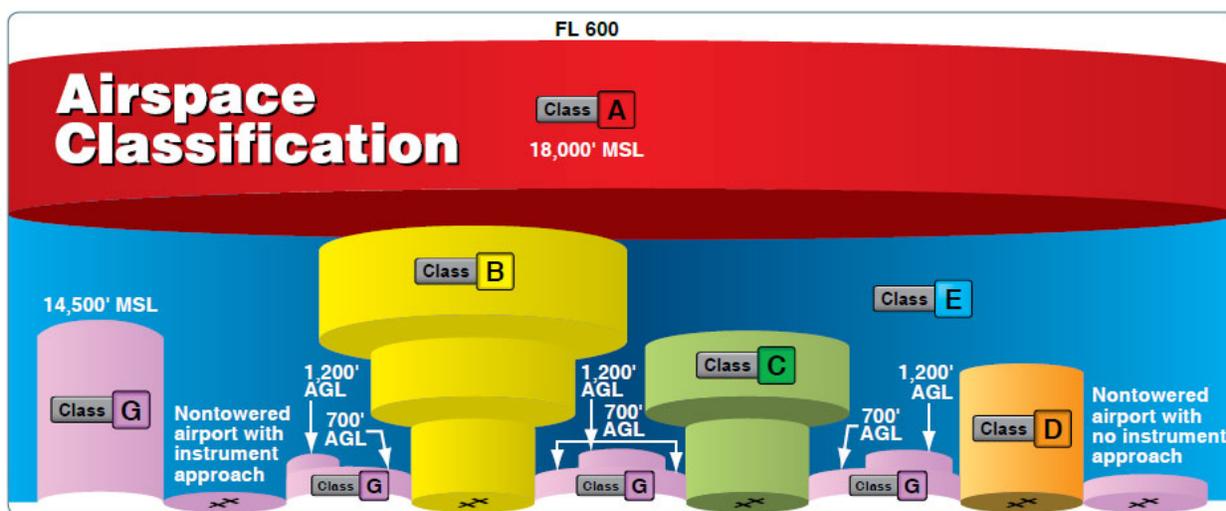
- **VFRs** are a set of regulations under which a pilot operates an aircraft in visual meteorological conditions generally described as airspace that is clear enough to allow the pilot to see where the aircraft is going while maintaining visual separation from terrain and other aircraft.

- **IFRs** are a set of regulations under which a pilot operates under instrument meteorological conditions (typically in which flight by outside visual reference is not safe). IFR flight depends on flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals, or as directed by ATC or approach control and/or the appropriate ARTCC; and separation from other aircraft is maintained by ATC.

FAA has designated four categories of U.S. airspace: controlled, uncontrolled, special use, and other (FAA 2020c). The categories of airspace are dictated by the complexity or density of aircraft movements, the nature of the operations conducted within the airspace, the level of safety requirements, and national and public interest in the airspace. The airspaces within and proximate to the Proposed Action are defined below.

**Controlled Airspace** is a generic term that represents areas where ATC service is provided to flights using instrument and visual navigation systems. There are five different classifications of controlled airspace: Classes A, B, C, D, and E (see **Figure 3.1-1**), each with specific operating rules.

**Figure 3.1-1. Relationship of Airspace Classes**



Source: FAA 2016

All military and civilian aircraft are subject to federal aviation regulations in controlled airspace. The following list, in order from most restrictive to least restrictive (FAA 2020c and the *Pilot's Handbook of Aeronautical Knowledge*, FAA H-8083-23B [FAA 2016]), defines the controlled airspace classes:

- **Class A** airspace includes airspace from 18,000 feet MSL up to and including FL 600 (approximately 60,000 feet MSL).
- **Class B** airspace typically extends from the surface up to 10,000 feet MSL and is often associated with major airport complexes.
- **Class C** airspace generally extends from the surface up to 4,000 AGL. It is designed to provide additional ATC into and out of primary (i.e., commercial service airports with more than 10,000 passengers who board airplanes each year) and military airports where aircraft operations are periodically at high-density levels. The only airport potentially affected by the Proposed Action with this airspace designation is Ted Stevens Anchorage International Airport (per FAA Order JO 7400.11E, *Airspace Designations and Reporting Points*; effective September 15, 2020). All air traffic in Class C airspace must maintain radio communication and operate a Mode C transponder (and encoding altimeter).

- **Class D** airspace is generally from the surface to 2,500 AGL. All traffic must maintain radio communication or have prior arrangements for operating within Class D airspace. The only public airport near the project area with this airspace designation is Fairbanks International Airport.
- **Class E** airspace, in most areas of the U.S., is that which is not designated as Class A, B, C, or D. Class E airspace extends from 1,200 feet AGL up to, but not including, 18,000 feet MSL. There are areas where Class E airspace begins at either the ground surface or at 700 feet AGL; these areas are used to transition between the terminal and en route environments (e.g., typically around non-towered airports). These areas are designated on sectional charts. Most airspace in the U.S. is Class E. The airspace above FL 600 is also Class E. Generally, if the airspace is not designated A, B, C, or D, and is controlled, it is Class E.

**Uncontrolled Airspace.** Uncontrolled (Class G) airspace is the portion of airspace that has not been designated as Class A, B, C, D, or E airspace and is therefore not subject to all of the restrictions that apply to controlled airspace. Class G airspace extends from the surface to the floor altitude of the overlying Class E airspace (see **Figure 3.1-1**). The floor altitude is dependent on the degree of airports and en routes and other airways in the area. ATC does not have responsibility or control over aircraft in Class G airspace; however, most regulations affecting pilots and aircraft still apply, including VFR and IFR.

**Special Use Airspace (SUA).** SUA consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. SUAs are established in a coordinated effort with FAA to maintain safety by separating military and civilian flights and other hazardous activities. FAA Order JO 7400.10B, *Special Use Airspace* (effective February 14, 2020), provides a compiled list and definition of each designated SUA within the U.S. SUAs in the vicinity of the Proposed Action include Restricted Areas (noted on aeronautical charts with “R-” designator) and military operations areas (MOAs):

- **Restricted (R-) Areas** are established when determined necessary to confine or segregate activities considered hazardous to nonparticipating aircraft<sup>21</sup> and cannot be entered by private, commercial, or military aircraft without permission from the controlling agency when that airspace area is active. Restricted areas may be scheduled as active at other times by issuing NOTAM or by notice from the controlling agency at least 24 hours in advance (per FAA Order JO 7400.10B).
- **MOAs** are established areas in which there may be a high density of military aircraft conducting nonhazardous operations. Private and commercial aircraft may also use this airspace with permission from the controlling agency. Pilots operating aircraft under VFR are not denied access to MOAs, but should exercise extreme caution while flying within a MOA when military activity is being conducted.

**Other Airspace.** Military missions may also use airspace that is not categorized as SUA, but where limitations may still be imposed on nonparticipating aircraft. These may include military training routes and Air Traffic Control Assigned Airspace.

- **Military Training Routes** are slightly less restrictive than SUAs; however, their purpose is also to minimize negative interactions between a military mission and nonparticipating aircraft. They are designated by FAA for low-altitude military operations (below 10,000 feet MSL) at airspeeds in excess of 250 knots, and are individually operated through the local military installation

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<sup>21</sup> An aircraft, civil or military, which is not a part of the activities being conducted within a SUA area (FAA JO 7400.2M).

responsible for scheduling the routes. Routes commonly used include visual, instrument, and slow-speed, low-altitude routes (VRs, IRs, and SRs, respectively).

- **VRs** are airspace routes that are flown in accordance with VFR, except that flight visibility must be 5 miles or more, and flights must not be conducted below a ceiling of less than 3,000 feet AGL. Pilots use visual cues to see and avoid obstacles. These routes are generally at lower altitudes than IRs.
- **IRs** are those routes that must be flown following IFR in which pilots must use onboard navigation systems and coordination with air traffic controllers to avoid obstacles in the airspace.
- **SRs** are those routes that are flown VFR, at altitudes below 1,500 feet AGL at 250 knots or less, without prior notice.

**En Route Flight.** The en route phase of flight is defined as that segment of flight from the termination point of a departure procedure to the origination point of an arrival procedure. En route airways in the U.S. have airway widths of protected airspace 4 NM on each side of the airway centerline, are at three strata within the airspace, and are defined as follows:

- **Victor Routes** (designated with “V-”) are low-altitude, en route airways. They encompass the first stratum in the en route airway airspace at altitudes ranging from approximately 1,200 feet AGL up to, but not including, 18,000 feet MSL. Aircraft following victor routes are reliant upon the navigational aids and intersections specified for those routes.
- **Jet Routes** (designated with “J-”) are high-altitude, en route airways consisting of direct courses for navigating aircraft. Where designated, jet routes encompass the second stratum of en route airway airspace at altitudes from 18,000 feet MSL up to 45,000 feet MSL (FL 450), inclusive, between the navigation aids and intersections specified for that route.
- **Highest En Route Airways.** The third stratum of en route airways exists above FL 450. This stratum supports random flight operations that are not associated with particular flight paths.

**Area Navigation (RNAV) Routes** (designated with “T-” or “Q-”) are low- to mid-altitude routes that can be used only by aircraft equipped with an RNAV system (i.e., navigation computer that allows the real-time continuous tracking of the aircraft along a prescribed flight path). As with en route airways, an RNAV route has protected airspace out to a width of 4 NM on each side of its centerline.

Aircraft in Alaska equipped with GPS can operate on specified Global Navigation Satellite System (GNSS) Q-routes (i.e., routes navigable by GPS or other satellite systems) while the aircraft remains in ATC radar surveillance. Aircraft equipped with GPS/Wide Area Augmentation Systems, which do not require ATC radar surveillance, may operate only on GNSS T-routes.

**Waypoint.** Waypoints are specified geographical positions used for navigation. They may be simple named points or associated with existing navigational aids, intersections, or fixes. Waypoints often indicate a change in direction, speed, or altitude along the desired path. For the purposes of this EIS, the term waypoint is used to refer to navigation points associated with routes, instrument procedures, and airports.

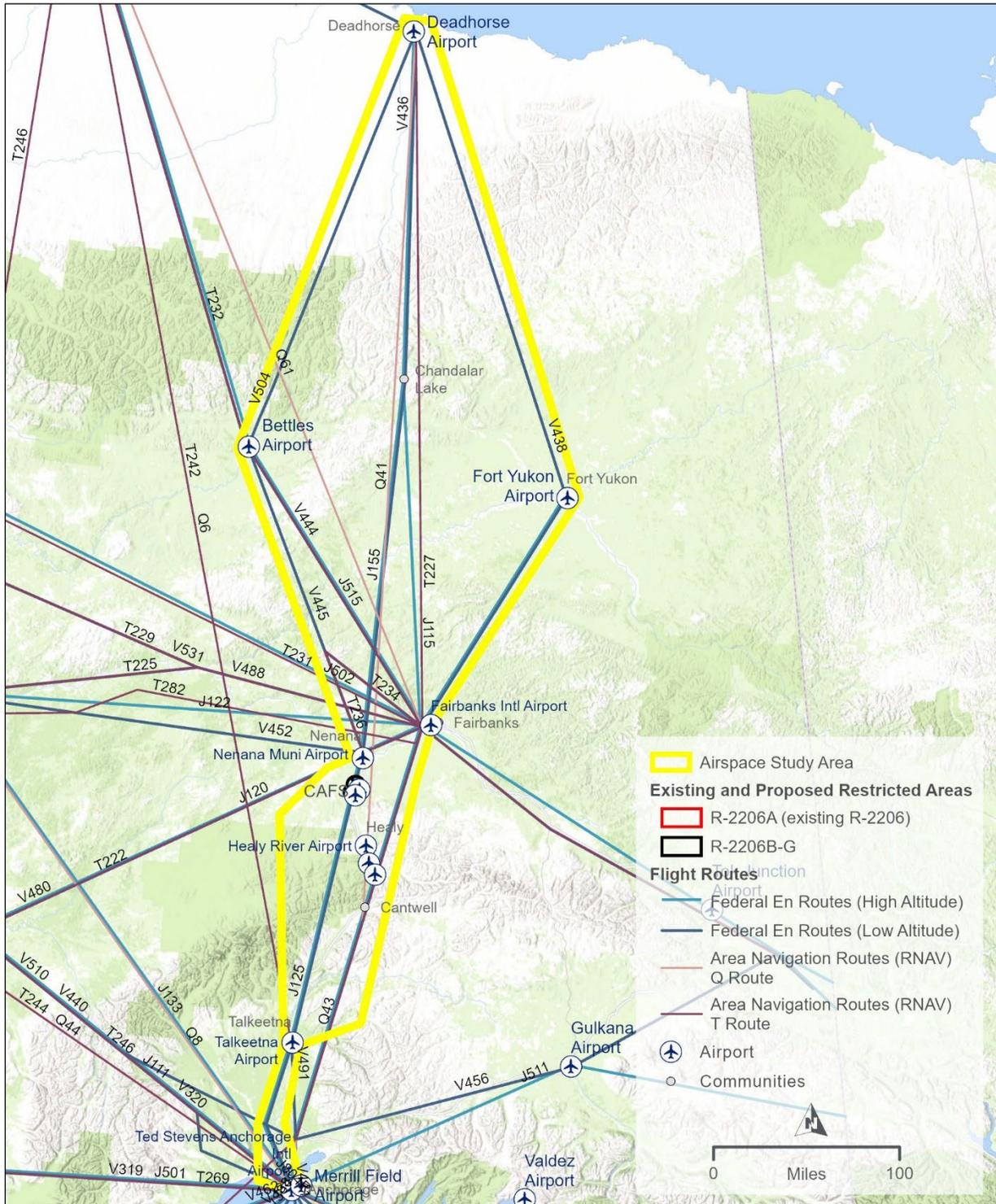
### 3.1.2 Affected Environment

#### 3.1.2.1 Study Area

The study area for this airspace analysis includes portions of the airspace of Alaska over the following administrative areas: North Slope Borough, Yukon-Koyukuk Census Area, Fairbanks North Star Borough (FNSB), Denali Borough, Matanuska-Susitna Borough, and Municipality of Anchorage. This study area,

shown on **Figure 3.1-2**, covers a 38,106-square-NM area and encompasses existing R-2206 and nearby associated airspaces, air traffic, and airports that would potentially be affected by the Proposed Action (e.g., flight reroutes and detours if there is an interim phase, and procedural and airway changes affecting operations). The study area spans generally from Deadhorse Airport in the North Slope Borough southward to Ted Stevens Anchorage International Airport. The airspace study area includes any SUAs (e.g., MOAs and/or restricted areas), military training routes (e.g., VRs and/or IRs), federal en route airways (e.g., V- and J- airways), RNAV routes and conventional procedures, exclusion zones, and proximally located airports that may require use of these airspaces occurring within the study area. The majority of the changes to airspace and airspace users resulting from the Proposed Action would occur between Fairbanks International Airport and Talkeetna Airport, and the following sections focus primarily on resources within that portion of the study area.

Figure 3.1-2. Airspace Study Area



### 3.1.2.2 Airspace Users

Very limited military flight operations occur directly over CAFS. CAFS does not include an airfield, but has a helipad. A designated Restricted Area (R-2206, shown on **Figure 1.2-1** and **Figure 1.2-2**) encompasses a large portion of CAFS from the surface up to 8,800 feet MSL and is associated with operation of the existing radar array. Currently, aeronautical charts for this region indicate “Possible damage and/or interference to airborne radio due to high level radio energy vicinity R-2206.” Aeronautical charts also caution that there is a high volume of military and civilian air traffic in the region near existing R-2206 (FAA 2020d). For 16 hours a day, flight within airspace areas proposed for permanent restriction under the Proposed Action (i.e., R-2206B through R-2206G) will be prohibited under TFRs issued by FAA pursuant to 14 CFR § 99.7 for LRDR performance testing beginning in fall 2020.

Generally, air traffic in Alaska is controlled by Anchorage ARTCC or a Terminal Radar Approach Control in Fairbanks or Anchorage. Flight operations out of nearby military installations, in SUAs, and along military training routes (e.g., VRs and IRs) involve pilot coordination with the associated installation’s ATC or approach control and/or the appropriate ARTCC. If the overlying airspace is designated as Class A, B, C, D, or E, or is designated SUA, flight operations out of nearby public and private civilian airports would similarly involve coordination among the pilots, airfield ATC (if towered), and/or the appropriate ARTCC. In areas where the overlying airspace is designated as Class G, coordination with the ARTCC for takeoff and landing would not be required.

Commercial air traffic follows instrument flight procedures at higher altitudes while under the positive control of the ATC system; general aviation aircraft typically operate under VFR procedures at lower altitudes (below 10,000 feet MSL) while visually maintaining a safe distance from terrain, obstructions, and other aircraft. In Alaska, VFR aircraft approaching or flying near an airport with no control tower are encouraged to use the Local Airport Advisory Service provided on the Common Traffic Advisory Frequency (CTAF) communication system. The purpose of this system is to have all aircraft flying within an airport’s communications area broadcasting their locations and flight path intentions on the published radio frequency. Pilot communication on this system is intended to support deconfliction of air traffic and increase pilot awareness of other nearby aircraft within each broadcast area. The CTAFs for untowered airports are published in FAA’s Chart Supplement Alaska, Sectional Aeronautical Charts, and *Alaska Terminal Procedures Publication* (FAA 2020e). Procedures for CTAF use are available in the FAA *Aeronautical Information Manual: Official Guide to Basic Flight Information and ATC Procedures* (FAA 2020c).

Airspace users in the study area include military flight and training operations associated with nearby installations and range complexes (e.g., Joint Base Elmendorf-Richardson [JBER], Joint Pacific Alaska Range Complex [JPARC], Eielson Air Force Base [AFB], U.S. Army Garrisons Fort Wainwright and Fort Greely), and the CAP Glider Academy that operates out of Clear Airport (for 1 week, annually, typically during May). The study area also includes multiple public and private airports, heliports, and seaplane bases with varied flight volumes and provision of services. Aviation activities throughout the region include commercial airlines, air taxi, emergency search and rescue, medical transport and evacuation, cargo transport, mail delivery, general local aviation (including recreational), law enforcement, fire surveillance and suppression, and charter flights for activities such as air tours, glider tow or support activities, hunting trips, subsistence support, and pilot training. Air traffic to Deadhorse Airport also includes oil and gas industry support services.

Most of the VFR civil aviation aircraft within the study area operate from the areas immediately near Fairbanks International Airport (located approximately 45 NM northeast of CAFS) and Ted Stevens Anchorage International Airport (approximately 180 NM south of CAFS), with the majority of this airport traffic (approximately 68 percent at Fairbanks International Airport and approximately 61 percent at Ted

Stevens Anchorage International Airport) comprised of general aviation/air taxi VFR air traffic (AirNav 2020). Windy Pass, between Anchorage and Fairbanks, provides an important connection for VFR air traffic between Interior Alaska and Southcentral Alaska. VFR flights also rely on linear features on the ground for navigation, such as the Nenana River and the Parks Highway in the study area. The Alaska Highway VFR Corridor, Birch VFR Corridor, and Richardson Highway VFR Corridor are commonly used by VFR aircraft flying between Fairbanks and various destinations east and northeast of the airspace study area.

**Table 3.1-1** summarizes the IFR and VFR flight operations in the airspace study area in the vicinity of CAFS. **Appendix C** details the data and methods used to determine the numbers of baseline and projected flight operations through the airspace study area.

**Table 3.1-1. Summary of Existing Daily and Annual VFR and IFR Flight Operations in the Vicinity of CAFS within the Airspace Study Area**

Type of Operation	Daily Flight Operations	Annual Flight Operations
<b>IFR Flights</b>	70 daily (winter) 90 daily (summer) <sup>(1)</sup>	30,450 <sup>(2)</sup>
<b>VFR Flights</b>	72 <sup>(3)</sup>	26,280

Source: FAA 2020f

<sup>(1)</sup> Daily flight operations estimated by FAA using best available IFR flight operations data (FAA 2020f). Winter months are assumed to be November through February, and summer months are assumed to be June through August.

<sup>(2)</sup> Annualized total for the study area was estimated using 90 daily IFR flights for March through October and 70 daily IFR flights for November through February.

<sup>(3)</sup> VFR flight operations totals estimated by MDA using best available data from FAA for July 1–31, 2018. Numbers indicate VFR flights within the vicinity of CAFS.

### 3.1.2.3 Airspace

This section discusses the various airspaces, airways, and RNAV routes used by aircraft operating within the airspace study area, focusing on those components that would be modified or otherwise impacted by the Proposed Action.

#### 3.1.2.3.1 *Special Use Airspace*

The airspace study area currently encompasses only one Restricted Area, R-2206, which overlies CAFS (**Figure 3.1-3**). No other SUAs are located within the area. Many MOAs are located outside the study area along the east and west boundaries between Anchorage and Fairbanks.

#### 3.1.2.3.2 *Military Training Routes*

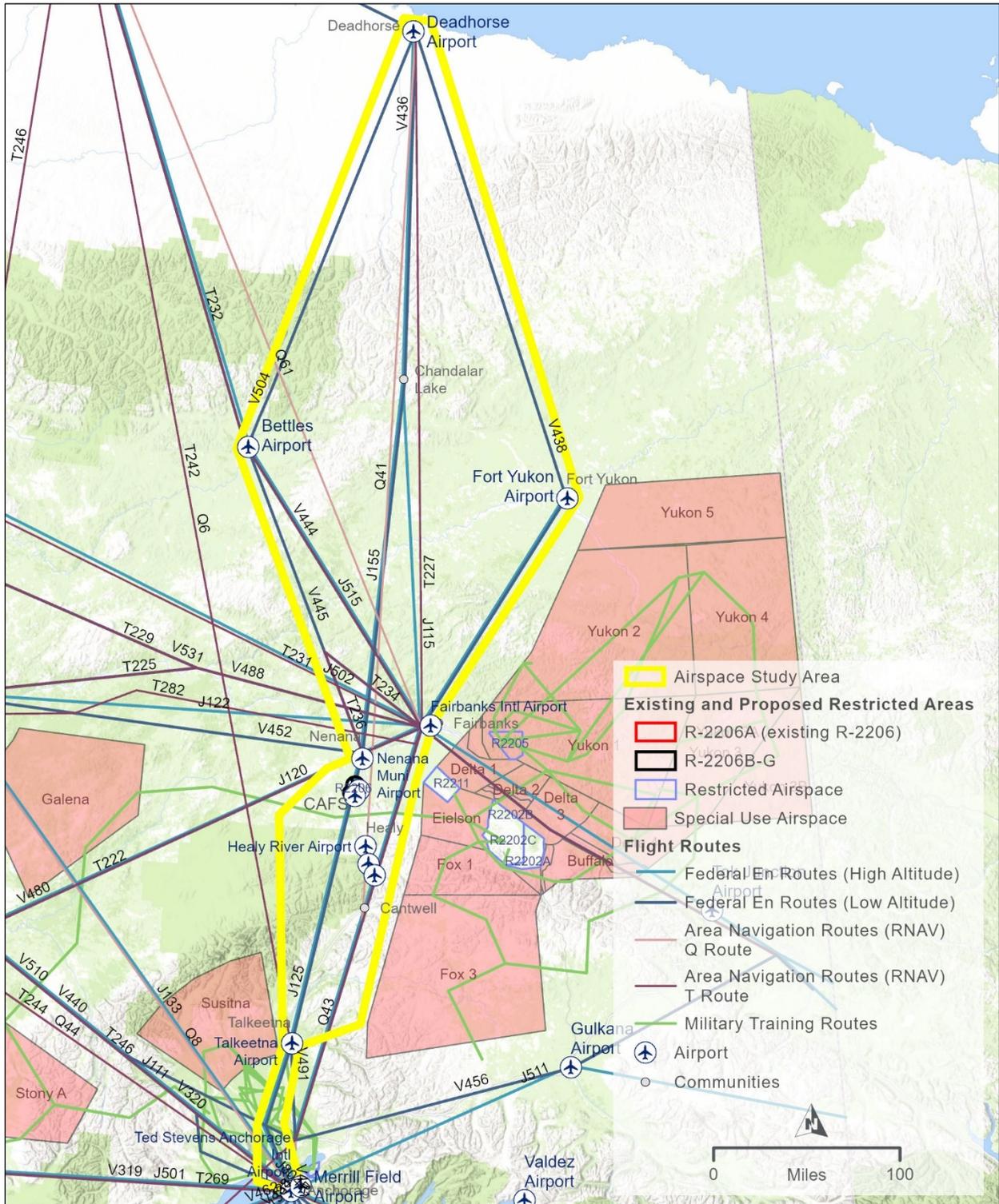
**Figure 3.1-3** shows the two co-located IRs and VRs transecting airspace near (directly south of) CAFS and existing R-2206. A network of six slow routes (designated with SR-) also cross through the airspace study area in and north of Anchorage; these are not shown on **Figure 3.1-3**.

Military aircraft operating along these routes must coordinate with the appropriate ATC facility (i.e., military installation controllers, Fairbanks Terminal Radar Approach Control, or Anchorage ARTCC) for airspace deconfliction, entry and exit points, and approved flight altitudes along this route. Also, this and other routes in the region are subject to special operating procedures that include coordination with various airport and/or military installations approach controllers, and may be subject to annual flight

restrictions (or modified ATC procedures) associated with migratory bird pathways in the region between April 10 and May 20, and between August 1 and November 1 (DoD 2016c).

- **IR-900** is a westbound route that is co-located with **IR-916** (eastbound). These routes, both of which are 5 NM wide on the centerline, transect airspace between CAFS and Healy within an altitude range of 100 feet AGL up to 10,800 feet MSL. The scheduling agency for these routes is the 354 Operations Support Squadron at Eielson AFB, and the controlling agency for these routes is Anchorage ARTCC.
- **VR-1900** is a continuously operated westbound route that is co-located with VR-1916 (eastbound). Terrain-following flight is authorized along the entire route, which coincides with **IR-900/IR-916**. The VR width is 5 NM on the centerline and may be flown within the altitude range of 100 feet AGL up to 1,500 feet AGL (DoD 2016c). The scheduling agency for this route is Eielson AFB, and the controlling agency for this route is Anchorage ARTCC.
- Ten slow routes associated with JBER (**SR-1001, SR-1002, SR-1003, SR-1004, SR-1005, SR-1006, SR-1007, SR-1008, SR-1009, and SR-1010**) cross through Anchorage in the southern portion of the study area.

**Figure 3.1-3. Special Use Airspace and Military Training Routes**



### 3.1.2.3.3 Airways and RNAV Routes

Several high-altitude J and low-altitude V airways cross through the study area (see **Figure 3.1-2**). Numbers of existing daily operations are unavailable for most of these airways; FAA indicated that a low volume of existing traffic is supported on these airways.

- **V-436/J-125** – V-436 transects airspace between Anchorage and Deadhorse through airspace with typical assigned altitudes from 10,000 feet MSL up to 18,000 feet MSL overlying the existing R-2206 airspace above CAFS (FAA 2020g). J-125 (FL 180 up to FL 450) directly transits airspace between Anchorage and Nenana (southwest of Fairbanks).
- **V-480/J-120** – These airways cross through the middle of the study area in a northeast trajectory toward Fairbanks.
- **V-438/J-115** – These airways cross through the eastern portion of the study area from Anchorage to Fairbanks. V-438 continues north to Deadhorse through Fort Yukon, and J-115 continues north to Deadhorse through Chandalar Lake.
- **V-320, V-510, V-491; J-133; and V-319/J-501** – These airways cross through the southern portion of the study area.

Similarly, the following high-altitude GNSS Q routes and low-altitude GNSS T routes transect the study area:

- **Q-41** – This route follows a northeast trajectory to Deadhorse.
- **T-222** – This route crosses through the central portion of the study area.
- **T-242/Q-6** – These routes begin at and cross through the western boundary of the study area northwest of Talkeetna.
- **T-227/Q-43** – These routes cross through the eastern portion of the study area.

In addition to aircraft using these airways, direct flights cross through the study area. These flights are not on a particular airway or route, but are cleared by ATC for a direct flight path to their destination. Flights departing from Ted Stevens Anchorage International Airport are infrequently vectored directly through airspace over CAFS to Deadhorse Airport.

### 3.1.2.4 Airports and Airport Operations

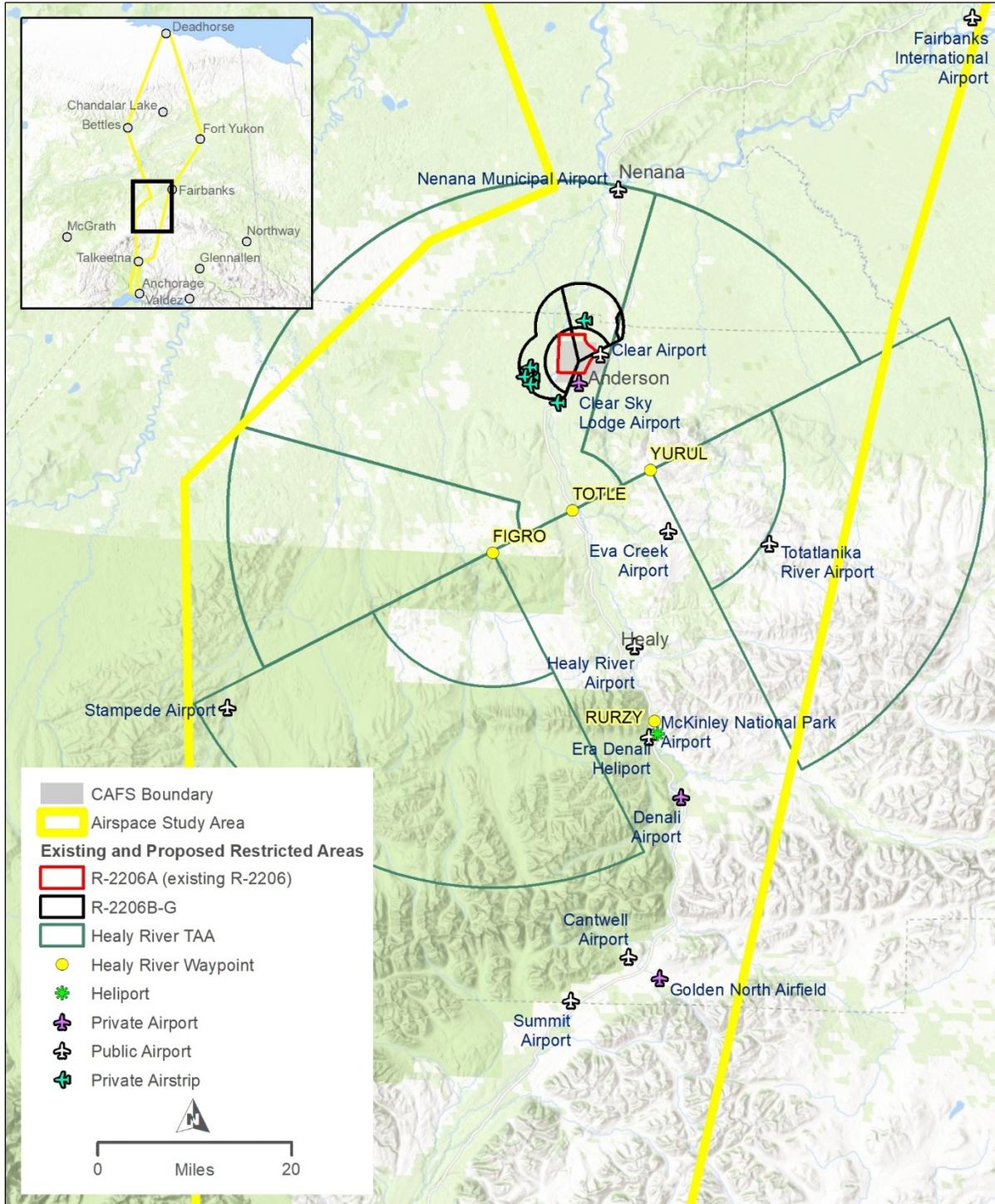
The study area includes two large international airports, Fairbanks International Airport and Ted Stevens Anchorage International Airport, and many smaller airports and airstrips serving smaller communities and remote areas. The Proposed Action would not impact airport operations, or the volume of air traffic into or out of any airport north of Fairbanks. The study area south of Fairbanks International Airport encompasses 35 airports (21 private and 14 public) including chartered airports, heliports, and seaplane bases. Table 2-1 of **Appendix C** presents information on the annual operations supported by each of these airports, including airspace class designations, based aircraft, runways, information on published IFR arrival and departure procedures, and types of services provided, and airport exclusion zones (if applicable).

**Figure 3.1-4** shows private and public airports in the vicinity of CAFS as well as the Healy River Airport Terminal Arrival Area (TAA). The objective of the TAA is to provide a seamless transition area for IFR aircraft to safely leave the en route structure (i.e., the airway or route on which they are flying) and enter the airport terminal environment. Within the Healy River Airport TAA, aircraft follow the specified terminal arrival procedures (described in Section 5.2 of **Appendix C**) to land at the airport.

**Figure 3.1-4** also shows six identified privately owned airstrips located near CAFS that are not associated with an airport and are accessible only by, and/or with, permission from the landowner. Five of these airstrips underlie the proposed Restricted Areas. Scoping comments identified the presence of private

airstrips and the locations shown in **Figure 3.1-4** were confirmed during a review of Google Earth visual imagery of the land areas surrounding CAFS that would be overlain by the proposed Restricted Areas. Flight data are not available for the uncharted private airstrips.

**Figure 3.1-4. Airports nearest to CAFS within the Airspace Study Area**



### 3.1.2.5 Instrument Flight Procedures

Arrival and departure procedures are intended to connect the airport environment to the existing en route structure via waypoints (e.g., the PUYVO waypoint). As such, the design of a procedure should, to the extent practicable, include a waypoint on the en route structure to permit a continuous defined route. The instrument arrival and departure procedures within the study area are published in the *Alaska Terminal Procedures Publication* (FAA 2020e).

Six arrival and departure procedures would be affected by the Proposed Action. These procedures are listed below by associated airport. Section 5.0 of **Appendix C** provides details and charted locations for these procedures.

- Fairbanks International Airport
  - MCKINLEY TWO DEPARTURE – SID Procedure
  - PUYVO THREE DEPARTURE (RNAV) – SID Procedure
- Healy River Airport
  - HEALY ONE DEPARTURE (Obstacle) (RNAV) – Obstacle Departure Procedure
  - RNAV (GPS) RWY 15 – Instrument Approach Procedure
  - RNAV (GPS)-A – Instrument Approach Procedure
- Ted Stevens Anchorage International Airport
  - TAGER EIGHT ARRIVAL – STAR Procedure

Aircraft departures from Fairbanks International Airport toward Anchorage use either the MCKINLEY TWO DEPARTURE or the PUYVO THREE DEPARTURE SID procedure. On average, these departure routes support 45 daily IFR flights during winter months and 55 daily IFR flights during summer months.

Healy River Airport supports predominantly VFR air traffic. The airport supports an average of only five IFR flights per year with the three instrument flight procedures listed above, which currently require use of the PUYVO waypoint. The five IFR flights per year is less than 1 percent of the reported annual total of 1,300 operations at Healy Airport.

Air traffic flying southbound along V-436 currently flies directly through the area that would be encompassed by the proposed Restricted Areas in transit toward the initial approach to Ted Stevens Anchorage International Airport. Aircraft out of Nenana Municipal Airport and Talkeetna Airport commonly use this airway to access the TAGER EIGHT ARRIVAL entry point into Anchorage (see Figure 5-7 of **Appendix C**). Respectively, the Nenana and Talkeetna transitions (ENN.TAGER8 and TKA.TAGER8) to the TAGER EIGHT ARRIVAL procedure currently begin at the ENN and TKA NAVAIDS. FAA indicated that the TAGER EIGHT ARRIVAL procedure supports seven daily IFR flights during winter months and nine daily flights during summer months.

## 3.1.3 **Environmental Consequences**

### 3.1.3.1 Evaluation Criteria

To evaluate impacts on airspace and airspace management, MDA considered if implementation of the Proposed Action would substantially increase risks associated with flying activities, safety of personnel, contractors, military personnel, or the local community; hinder the ability to respond to an emergency; or introduce a new health or safety risk for which MDA or the surrounding community is not prepared or does not have adequate management and response plans in place.

### 3.1.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in a manner that would contain HIRF within existing R-2206, except during a national security crisis. FAA would not take any new actions to limit aircraft outside of existing R-2206, except as necessary. Conditions for airspace management, airspace usage, and status of flight operations throughout the region's airports would continue unchanged under the No Action Alternative, except during a national security crisis.

### 3.1.3.3 Proposed Action

This section presents the analysis of impacts on airspace, airspace management, and airspace users anticipated from the proposed LRDR operational changes and FAA actions related to restricting the flight of aircraft.

#### 3.1.3.3.1 *LRDR Operational Changes*

The change to continuous LRDR operations would create a hazard in areas of the National Airspace System where the HIRF would exceed FAA certification standards for aircraft electrical and electronic systems. As a result, FAA would take actions to restrict the flight of aircraft in this airspace. The impacts of these actions on airspace management are described in **Section 3.1.3.3.2**. Details regarding HIRF and its hazards are addressed in **Section 3.10, Safety**.

#### 3.1.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

FAA would take the following actions to restrict the flight of aircraft in the areas of increased HIRF: (1) establish six new Restricted Areas; (2) if necessary, implement TFRs until those Restricted Areas are in effect; and (3) make changes to federal airways and instrument flight procedures to accommodate the new Restricted Areas.

### **Restricted Areas**

As described in **Section 2.1.2.1**, FAA would establish six new Restricted Areas (R-2206B through R-2206G) that would work in concert with existing R-2206 (which would be slightly modified and renamed R-2206A) to prevent aircraft from being exposed to LRDR-generated HIRF at levels exceeding FAA certification standards for aircraft electrical and electronic systems. The addition of these Restricted Areas would expand the current restricted airspace at CAFS from 9.7 to approximately 61 square NM. Civil flight would be restricted in R-2206A, R-2206B, R-2206C, and R-2206G for continuous (i.e., 24 hours per day) LRDR operation, and in R-2206D, R-2206E, and R-2206F every Tuesday, Thursday, and Saturday for 2 hours from 2:00 a.m. to 4:00 a.m. local Alaska time, and other times by NOTAM.

It is conservatively estimated that up to 5 daily (1,825 annual) IFR flights and 10 daily (3,650 annual) VFR flights that currently use this airspace would be directly affected. These daily flight projections take into account the potential for aviation growth in the region, and are higher than what would be projected using growth rates developed by the Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) and FAA (Alaska DOT&PF 2012, FAA 2019). **Appendix C** provides the methods that were used to determine these numbers of potentially affected flights. The IFR flights could still continue, but they would be using routes that avoid the Restricted Areas, which in some cases would be longer. The changes to federal airways and procedures that would be necessitated to accommodate the establishment of the proposed Restricted Areas and the associated impacts on aircraft and airspace are described below in the sections titled **Amendment/Establishment of Airways** and **Amendment of Procedures**, respectively.

Aircraft operating under VFR would be required to detour to avoid the proposed Restricted Areas. Up to 10 daily (3,650 annual) VFR flights would detour between 0.7 and 1.3 NM, representing about 30

seconds of additional flight time on average. Given the low volume of affected VFR flights and the anticipated range of added flight distances and durations, impacts due to VFR flight detours from establishment of the proposed Restricted Areas would be permanent and negligible to minor. Large portions of the proposed Restricted Areas would not extend below 1,000 feet AGL (1,600 feet MSL) or 1,500 feet AGL (2,100 feet MSL), and airspace above the Parks Highway would be unrestricted below 2,600 feet AGL (3,200 MSL) for all but 6 hours per week (and other times by NOTAM). Therefore, some VFR aircraft would likely continue to transit the area at altitudes below the restricted airspace floor instead of detouring east or west around the Restricted Areas. VFR pilots would fly at their own risk, but would be notified of the active airspace restrictions and associated HIRF hazards on aeronautical charts and other times via NOTAM.

Pilots would still be able to use Windy Pass for transiting between Interior Alaska and Southcentral Alaska. Mountainous terrain, defined as terrain at or higher than 900 feet elevation, is located approximately 4 NM south and southwest of CAFS, approximately 2.8 NM south of the proposed Restricted Areas. Aircraft that currently detour to avoid existing R-2206 fly over this terrain; most of the distances flown by VFR aircraft transiting the area during July 2018 were at altitudes ranging between 2,000 feet and 5,000 feet AGL (see Section 4.2.3 of **Appendix C**). Given the low numbers of VFR aircraft that would detour around the proposed Restricted Areas daily, it is unlikely that air traffic would become congested enough to require pilots to make greater than typical altitude shifts to safely avoid other aircraft, fly over mountainous terrain, or avoid the proposed Restricted Areas. Any altitude transitions by pilots flying south into, or north out of, the mountainous terrain south of the proposed Restricted Areas and towards Windy Pass would not appreciably affect the projected 1.3-NM detour distance.

The Nenana River and the Parks Highway could still be used as a navigational aids for aircraft using VFR. The Restricted Areas would cross a 0.8-mile segment of the Parks Highway. However, except for 6 hours per week during the middle of the night and other times by NOTAM, aircraft would be able to fly directly over the Parks Highway as long as they stay below an altitude of 2,600 feet AGL (3,200 feet MSL). Airspace above an approximately 9-mile-long segment of the Nenana River would be restricted from aircraft, but VFR aircraft flying below an altitude of 1,000 feet AGL (1,600 MSL) could stay within a mile or less of the river while avoiding the Restricted Areas (see Section 4.2.4 of **Appendix C**).

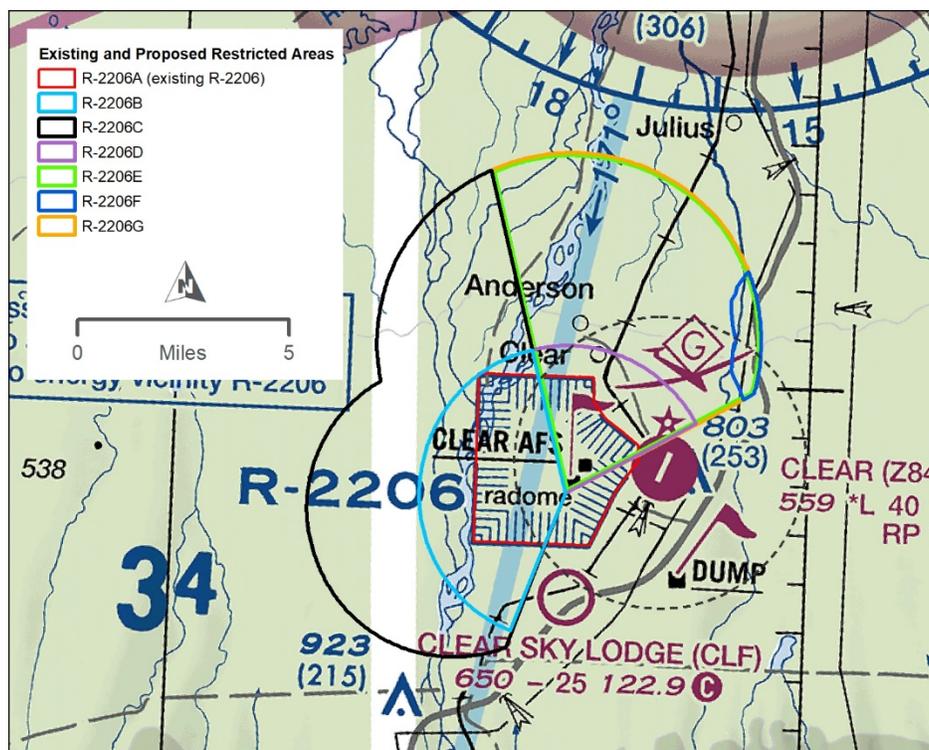
**Figure 3.1-5** shows an overhead depiction of the proposed Restricted Areas superimposed on the Fairbanks Sectional Aeronautical Chart. Also indicated is the 1,500-foot, 3-NM-radius exclusion zone for Clear Airport (shown as a grey dotted line), which would be partially overlapped by the proposed Restricted Areas. The untowered and unattended Clear Airport does not currently have any published instrument procedures and is a VFR airport. During the times when R-2206D, R-2206E, and R-2206F are active, the required 1,500-foot exclusion zone out to 3 NM<sup>22</sup> could not be maintained around the airport. Access to the Clear Airport would be limited every Tuesday, Thursday, and Saturday from 2:00 a.m. to 4:00 a.m. local Alaska time and other times by NOTAM. MDA, CAFS, DAF, and FAA would coordinate with Clear Airport and emergency service providers on a process that would enable aircraft to safely land and depart the airport in an emergency when R-2206D, R-2206E, and R-2206F are active. The process would entail temporarily modifying LRDR operations and would be outlined in a Letter of Procedure to accompany the establishment of R-2206B through R-2206G, and the modification of R-2206A. The closure of Clear Airport for approximately 6 hours per week in the middle of the night and other times by NOTAM would have permanent, negligible, direct impacts on air traffic because of the low volume of

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<sup>22</sup> FAA Order JO 7400.2M, paragraph 23-1-4(c) requires that restricted areas exclude the airspace 1,500 feet AGL and below within a 3NM radius of airports available for public use.

annual flight operations (averaging one flight every few days over the course of a year) and because provisions would be made for emergencies.

**Figure 3.1-5. Proposed Restricted Areas Superimposed on Fairbanks Sectional Chart**



Source: Base map taken from FAA Fairbanks Sectional Aeronautical Chart, May 2020

During scoping, a commenter expressed concerns that the proposed Restricted Areas would limit the growth of Clear Airport and any opportunity to establish instrument flight procedures, which are vital for reliable medical evacuation services. However, Alaska DOT&PF has indicated that there are no plans involving upgrades at Clear Airport (Alaska DOT&PF 2020). As discussed in **Section 3.10, Safety**, medical evacuation services would not be affected by the Proposed Action.

VFR traffic associated with the CAP Glider Academy operations at Clear Airport would have to relocate because the proposed Restricted Areas would limit the altitude and maneuverability of glider operations. **Section 3.11, Socioeconomics and Environmental Justice**, describes the impacts associated with the CAP Glider Academy relocation.

At the private airstrips near the proposed Restricted Areas (**Figure 3.1-4**), permanent negligible to minor direct impacts would occur because access and flight operations at these locations would be limited by the airspace floors of the continuously active R-2206B, R-2206C, and R-2206G. Aircraft would still be able to use and access the private airstrips as long as pilots remain at an altitude below the R-2206C and R-2206G airspace floors of 1,000 feet and 1,500 feet AGL (1,600 feet and 2,100 feet MSL), respectively. Access to and from the private airstrips would also be limited by the 400-foot AGL (1,000-foot MSL) floor of the continuously active R-2206B; however, the majority of this new restricted airspace would overlap existing R-2206, which begins at the ground surface, so there would be little change from these existing restrictions. Access to and use of the private airstrips would not be affected by activation of the R-2206D, R-2206E, and R-2206F airspaces because of their locations and because activation would be limited to

Tuesdays, Thursdays, and Saturdays between 2:00 and 4:00 a.m. local Alaska time (and other times by NOTAM).

In order to avoid the proposed Restricted Areas, aircraft using the private airstrips near CAFS may need to adjust flight patterns. On departure, the aircraft would need to fly at an altitude under the floor of the overlying Restricted Area until they are clear of it, and then ascend to the desired altitude. When on approach for a landing at the airstrip, the aircraft may need to descend earlier in the airspace, compared to existing conditions, to be able to fly under the floor of the Restricted Area and land on the private airstrip.

During the 6 hours per week (and other times by NOTAM) when R-2206D, R-2206E, and R-2206F are active, they would overlap airspace required to access the privately owned, publicly accessible Clear Sky Lodge Airport. However, published information for this airfield indicates that the runway is heavily rutted and is unsafe to support aircraft operations. No annual operations are reported for this facility (see Table 2-1 of **Appendix C**). Due to the low-altitude restrictions relative to this airfield, MDA would coordinate with the airport owner and FAA to determine any appropriate access to this airport by aircraft. If this airport is upgraded and becomes operational, impacts on flights into and departing from this airport would be similar to those described for Clear Airport.

Establishment of the proposed Restricted Areas would have permanent, negligible to minor adverse impacts on VFR air traffic, Clear Airport, and private airstrips. Emergency and medical evacuation flights would not be adversely impacted.

#### **Interim Phase: Potential TFR Implementation**

If continuous LRDR operations were to begin before the proposed Restricted Areas were established, FAA would temporarily restrict flight in the approximately 61 square NM of airspace that would be encompassed by the proposed Restricted Areas (R-2206B through R-2206G). Legal descriptions of the proposed TFRs are provided in Section 1.2 of **Appendix C**. VFR and IFR flights would be restricted from transiting the airspace defined by the TFRs. FAA, through the Anchorage ARTCC, would manually reroute IFR flights around the boundaries of the affected airspace until the proposed Restricted Areas were established and the revised airways and instrument flight procedures were published and available for use. The changes to airspace and airspace management that would apply to the interim phase are described in **Section 2.1.2.2**.

During the interim phase, up to 5 daily (1,825 annual) IFR flights on J-125 or V-436 or flying direct from Anchorage to Deadhorse would be rerouted around the TFRs. Flights on J-125 would be rerouted to the West Reroute shown on **Figure 2.1-3**. V-436 flights would either be rerouted onto V-438, which has a higher altitude floor (i.e., 11,000 feet MSL) than V-436 and would require supplemental oxygen, or to the West Reroute shown on **Figure 2.1-3**. The V-438 reroute assumes that aircraft would be routed onto V-438 from Anchorage (ANC NAVAID) to Fairbanks (FAI NAVAID), and then would transition west on V-480 to Nenana (ENN NAVAID), where they would continue to their intended destinations. Because the current traffic volumes on V-438 and V-480 are low, both airways could accommodate the flights rerouted from V-436. Flights cleared for direct flight from Anchorage to Deadhorse would be radar vectored to avoid the TFRs; this is consistent with how ATC currently clears such flights and would not constitute a material change from current conditions. The estimated increased flight time to these direct flights would range between 30 seconds and 2 minutes.

Aircraft rerouted to the identified reroutes during the interim phase would experience additional flying time and require additional fuel (see **Section 3.8.3** for additional fuel requirements). **Table 3.1-2** presents the added flight distances and durations for the IFR flight operations that would be rerouted during the interim

phase (see Table 3-1 of **Appendix C** for detailed description of identified reroutes). For the purposes of this analysis, the flight times in **Table 3.1-2** do not account for takeoff or landing time and assume flight paths between the waypoints or navigational aids associated with the airports.

**Table 3.1-2. Interim Phase IFR Flight Reroutes and Added Distances**

Baseline			Reroutes					
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM) and Duration <sup>(2)</sup>	Reroute	Airway	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Reroute Distance (NM)	Total Added Distance (NM) and Duration <sup>(2)</sup>
J-125	Anchorage – Deadhorse	551.5 (103 minutes) <sup>(3)</sup>	West Reroute	J-125	Anchorage – AILEE WP	152.3	553.0	1.5 (17 seconds)
				West Reroute		62.3		
				J-155	Nenana – Chandalar Lake	176.0		
				J-115	Chandalar Lake – Deadhorse	162.4		
V-436	Anchorage – Nenana	213.1 (40 minutes)	West Reroute	V-436	Anchorage – AILEE WP	152.3	214.6	1.5 (17 seconds)
				West Reroute	AILEE WP – Nenana	62.3		
			V-438/ V-480	V-438	Anchorage – Fairbanks	225.5	255.6	42.5 (8 minutes)
				V-480	Fairbanks – Nenana	30.1		
Direct North Slope Flights	Anchorage – Deadhorse	544.4 (102 minutes)	Vectored direct				547.1 to 555.4	2.7 to 11 (30 seconds to 2 minutes)

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Assumes J-125 to Nenana, J-155 to Chandalar Lake, and J-115 to Deadhorse.

FAA would issue individual NOTAMs providing notice of the unavailability of segments of V-436 and J-125, the changes to availability of procedures, and the TFRs. These restrictions would increase the effort required for management and control of airspace and daily flight operations within the study area for the duration of the interim phase. Anchorage ARTCC would have to coordinate rerouting for, and individually vector the estimated three to five daily IFR aircraft that would be affected. Overall, the direct impacts on airspace management and IFR aircraft would be short term and negligible to minor, given the low volume of affected IFR air traffic through the area.

Although the protected airspace for the RNAV GNSS route Q-41 would be partially overlapped, the route would not be reconfigured and no procedures would be impacted. Anchorage ARTCC would control aircraft to avoid the TFRs and maintain unimpeded flight operations along that route. This would be documented in the Letter of Agreement between MDA, CAFS, DAF, and FAA.

Aircraft operating under VFR would be required to detour to avoid the TFRs. The impacts on these airspace users would be the same as described above in the section titled **Restricted Areas**, but would be short term rather than permanent. VFR pilots would fly at their own risk, but would be notified of the

active airspace restrictions and associated HIRF hazards during the interim phase via NOTAM issuance of the TFRs.

### Amendment/Establishment of Airways

Under the Proposed Action, FAA would amend the two federal airways (V-436 and J-125) that currently intersect the airspace defined by the proposed Restricted Areas and establish a new federal airway (T-399). These changes are described in **Section 2.1.2.3.1** and summarized below. Additional details supporting the analysis of impacts from these amendments is provided in Section 3.2.3.2 of **Appendix C**. Waypoints along the affected airways that are associated with airports within the study area are noted in parentheses at first mention in the following discussion. **Figure 3.1-6**, **Figure 3.1-7**, **Figure 3.1-8**, and **Figure 3.1-9** show the locations of all discussed airports and waypoints.

- The segment of the existing J-125 airway between Anchorage (ANC NAVAID) and Nenana (ENN NAVAID) overlies the proposed Restricted Areas and would be cancelled (see **Figure 3.1-6** and **Figure 3.1-7**). The segment of J-125 extending from ANC southward to Kodiak (ODK NAVAID) would be unaffected.
- The segment of the existing V-436 airway between the AILEE waypoint and ENN overlies the proposed Restricted Areas and would be cancelled and replaced by a new segment (referred to as the “V-436 dogleg” in this EIS) from the AILEE waypoint to Fairbanks (FAI NAVAID) (see **Figure 3.1-8** and **Figure 3.1-9**). The segment of V-436 from ENN to Deadhorse (SCC NAVAID) would also be cancelled as it would become redundant with other airways that provide routes between Fairbanks and Deadhorse. The segment of V-436 from ANC to the AILEE waypoint would be unaffected.
- A new low-altitude airway T-399 will be established at Talkeetna (TKA NAVAID) and would overlap the existing V-436 airway to the AILEE waypoint, at which point it would transit airspace west around the proposed Restricted Areas to ENN.

It is conservatively estimated that the establishment of the proposed Restricted Areas would affect up to five daily (1,825 annual) IFR flights, made up of one to two flights daily for each of the following: J-125, V-436, and direct vectors from the Ted Stevens Anchorage International Airport to the Deadhorse Airport. Following the proposed amendment and establishment of airways, flights that would have used the segments of J-125 and V-436 to be cancelled would be assigned to other airways as appropriate for their destination. For the purposes of analyzing impacts to these flights, FAA identified potential alternate routes for flights that would have used J-125 and V-436. Alternate routes from Anchorage to Deadhorse were identified for flights that would have used J-125. Alternate routes from Anchorage to Nenana and Anchorage to Deadhorse were identified for flights that would have used V-436. All flights affected by the Proposed Action may not originate or end at these locations, but this analysis makes simplifying assumptions to illustrate and provide context for the level of impacts. The potential alternate routes are summarized below.

Direct flights between Anchorage and Deadhorse that are currently radar vectored would continue to be radar vectored with a small adjustment to avoid the proposed Restricted Areas; this is consistent with how ATC currently clears such flights and would not constitute a material change from current conditions. The increased flight time to these direct flights would range between 30 seconds and 2 minutes.

*J-125.* The existing J-125 airway terminates at Nenana Municipal Airport (ENN); however, the airport does not have runways that are capable of being accessed from high altitude and it is assumed that flights currently using J-125 between Anchorage and Nenana continue on to Deadhorse Airport (SCC) via J-155 and J-115. After J-125 is cancelled between ANC and ENN, those flights would instead use either (1) J-115 from ANC to SCC or (2) J-115 from ANC to the CAWIN waypoint, and the Q-41 from the

CAWIN waypoint to SCC (see **Figure 3.1-6** and **Figure 3.1-7**). J-115 and Q-41 would gain the flights that currently use J-125 and J-155.

V-436. The existing V-436 airway connects Anchorage and Deadhorse between ANC, ENN, CQR (at Chandalar Lake Airport), and SCC NAVAIDS. After V-436 is cancelled between the AILEE waypoint and SCC, flights that currently use V-436 between ANC and ENN would be routed onto the new V-436 dogleg east of CAFS, V-438, or T-399 (see **Figure 3.1-8**):

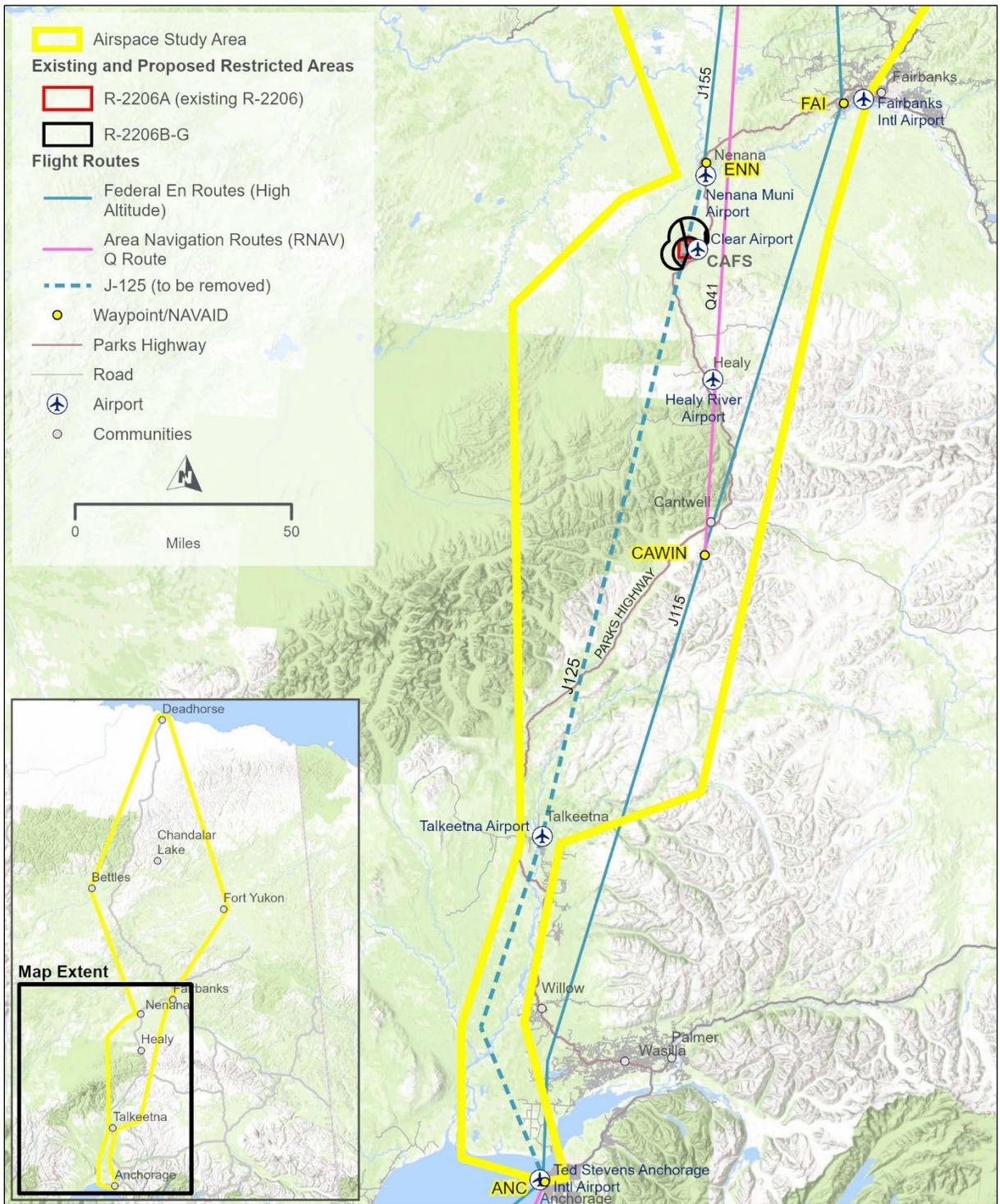
- Flights using the new V-436 dogleg from the AILEE waypoint to FAI or V-438 from ANC to FAI would return west to ENN on V-480.
- Flights using T-399 would use V-436 between ANC and TKA, and then would be routed onto the new T-399 west around the proposed Restricted Areas to ENN.

Flights that currently use V-436 between ANC and Deadhorse Airport either could be vectored direct to Deadhorse Airport, or may transit from Anchorage to Fairbanks where they would be routed onto T-227, V-438, or V-444/V-504 to Deadhorse (see **Figure 3.1-9**):

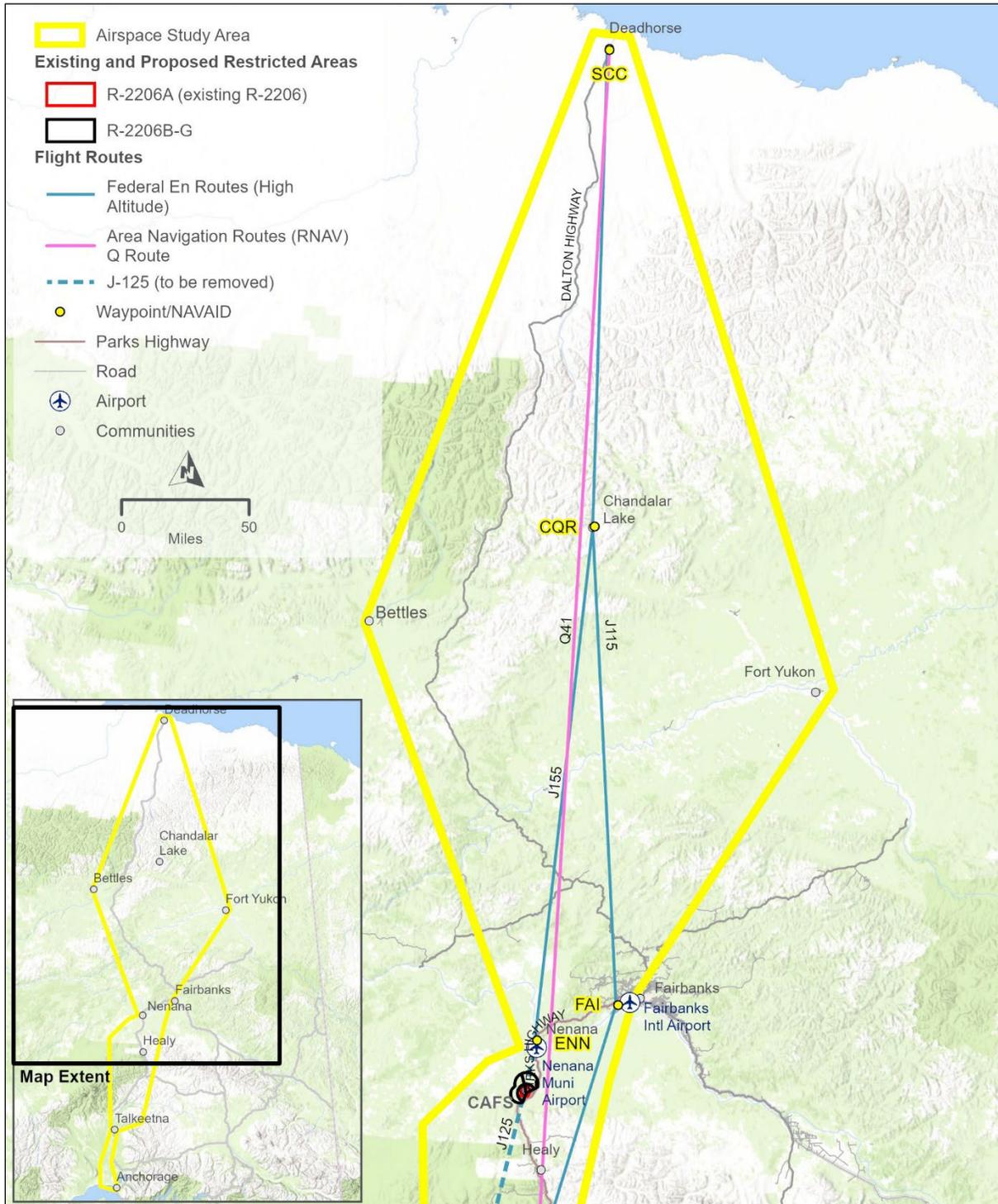
- Flights using T-227 would be routed on that airway from FAI to SCC.
- Flights using V-438 would be routed on that airway from FAI to Fort Yukon (FYU) and on to SCC.
- Flights using V-444/V-504 would use V-444 to Bettles (BTT) and continue on V-504 to SCC.

Flights that currently use V-436 would be moved to these alternate routes. Because the route assigned to an aircraft would depend on its ultimate destination and other airspace management considerations, the exact distribution of flights among these other airways cannot be determined.

**Figure 3.1-6. Airway Changes Associated with Existing J-125, Anchorage to Fairbanks**



**Figure 3.1-7. Airway Changes Associated with Existing J-125, Fairbanks to Deadhorse**



**Figure 3.1-8. Airway Changes Associated with Existing V-436, Anchorage to Fairbanks**

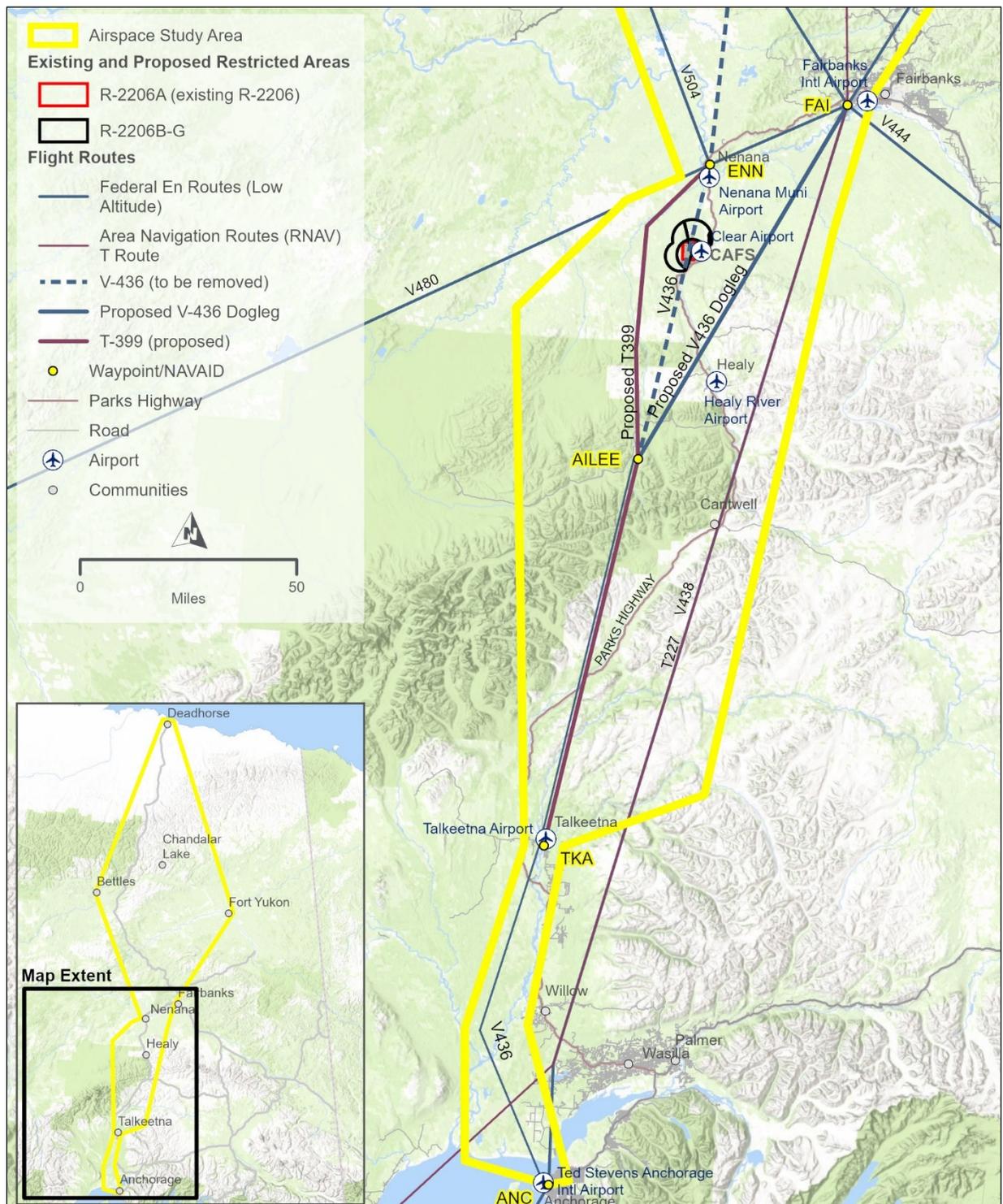
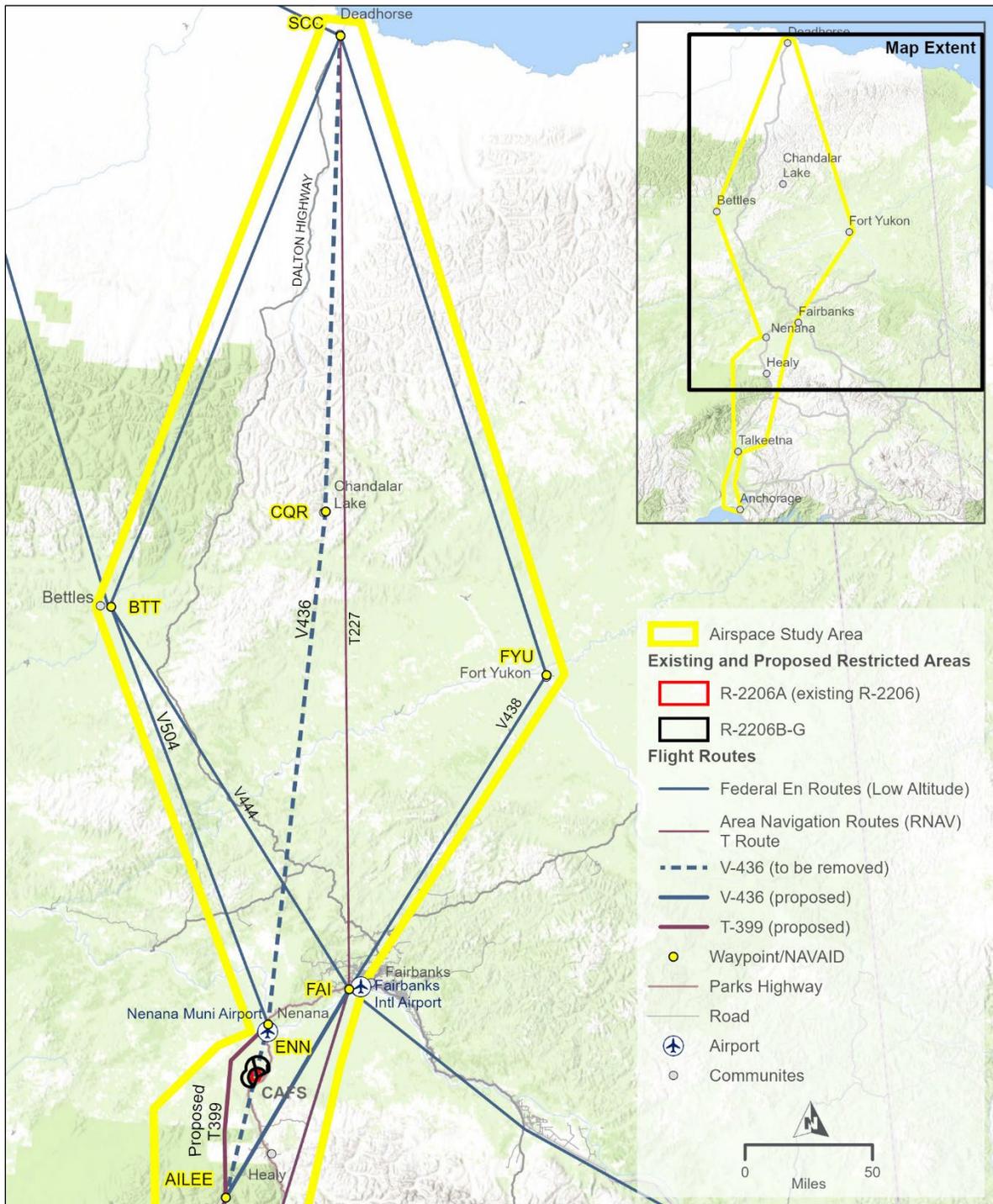


Figure 3.1-9. Airway Changes Associated with Existing V-436, Fairbanks to Deadhorse



Most aircraft using the identified alternate routes would experience additional flying time and require additional fuel compared to current conditions (see **Section 3.8.3** for additional fuel requirements). **Table 3.1-3** provides details of the identified alternate routes for the impacted airways and the distances and durations that would be added to flights (see Table 3-2 of **Appendix C** for detailed descriptions of identified alternate routes). For the purposes of this analysis, the flight times in **Table 3.1-3** do not account for takeoff or landing time and assume that flight paths begin and end at the airports.

**Table 3.1-3. Alternate Routes for IFR Flights Impacted by Proposed Airway Changes and Added Distances**

Baseline			Alternate Routes					
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM) and Duration <sup>(2)</sup>	Route	Airway	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Route Distance (NM)	Total Added Distance (NM) and Duration <sup>(2)</sup>
J-125	Anchorage – Deadhorse	551.5 (103 minutes) <sup>(3)</sup>	J-115	J-115	Anchorage – Deadhorse	550.7	550.7	-0.8 (-0.1 minute)
			J-115/ Q-41	J-115	Anchorage – CAWIN WP	130.9	547.7	-3.8 (-0.7 minute)
				Q-41	CAWIN WP – Deadhorse	416.8		
V-436	Anchorage – Nenana	213.1 (40 minutes)	V-438/ V-480	V-438	Anchorage – Fairbanks	225.5	255.6	42.5 (8 minutes)
				V-480	Fairbanks – Nenana	30.1		
			V-436/ V-436 dogleg/ V-480	V-436	Anchorage – AILEE WP	152.3	264.9	51.8 (10 minutes)
				V-436 dogleg	AILEE WP – Fairbanks	82.5		
				V-480	Fairbanks – Nenana	30.1		
			V-436/ Proposed T-399	V-436	Anchorage – Talkeetna	72.6	216.8	3.7 (43 seconds)
				Proposed T-399	Talkeetna – Nenana	144.2		
V-436	Anchorage – Deadhorse	551.1 (103 minutes)	V-436/ V-436 dogleg/ V-438	V-436	Anchorage – AILEE WP	152.3	590.1	39.0 (7 minutes)
				V-436 dogleg	AILEE WP – Fairbanks	82.5		
				V-438	Fairbanks – Deadhorse	355.3		

Baseline			Alternate Routes					
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM) and Duration <sup>(2)</sup>	Route	Airway	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Route Distance (NM)	Total Added Distance (NM) and Duration <sup>(2)</sup>
V-436	Anchorage – Deadhorse	551.1 (103 minutes)	V-436/ V-436 dogleg/ T-227	V-436	Anchorage – AILEE WP	152.3	559.8	8.7 (2 minutes)
				V-436 dogleg	AILEE WP – Fairbanks	82.5		
				T-227	Fairbanks – Deadhorse	325.0		
V-436	Anchorage – Deadhorse	551.1 (103 minutes)	V-436/ V-436 dogleg/ V-444/ V-504	V-436	Anchorage – AILEE WP	152.3	597.7	46.6 (9 minutes)
				V-436 dogleg	AILEE WP – Fairbanks	82.5		
				V-444	Fairbanks – Bettles	153.6		
				V-504	Bettles – Deadhorse	209.3		
Direct North Slope Flights	Anchorage – Deadhorse	544.4 (102 minutes)	Vectored direct				547.1 to 555.4	2.7 to 11 (30 seconds to 2 minutes)

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Assumes J-125 to Nenana, J-155 to Chandalar Lake, and J-115 to Deadhorse.

Although the protected airspace for the RNAV GNSS route Q-41 would be partially overlapped by the proposed Restricted Areas, the route would not be reconfigured and no procedures would be impacted. Anchorage ARTCC would control aircraft to avoid the restricted airspace and maintain unimpeded flight operations along that route. This would be documented in the Letter of Procedure between MDA, CAFS, DAF, and FAA.

Adverse impacts from the changes to V-436 would be negligible to minor depending upon the route required to reach the intended destination. Flights using the new V-436 dogleg to fly to Nenana would incur the largest increase in flight distance. Impacts from the changes to J-125 would be slightly beneficial to pilots, as using J-115 or J-115 and Q-41 to fly from Anchorage to Deadhorse would result in a shorter flight distance and duration compared to J-125. The changes to direct Anchorage to Deadhorse flights

would result in negligible adverse impacts on airspace management. The overall impacts on airspace users from making these airway amendments would be both adverse and beneficial, permanent, and negligible to minor. Once the permanent changes to the airways have been established, there would be no impacts on ATC operations because flights would not need to be manually flown, as required during the interim phase.

### **Amendment of Procedures**

To accommodate the proposed Restricted Areas, FAA would amend six instrument flight procedures. These procedures and the proposed amendments are described and depicted in **Section 2.1.2.3.2** and detailed in Section 5.0 of **Appendix C**. The changes in flight distance and duration resulting from the amended procedures would be negligible. Anticipated impacts of the instrument flight procedure amendments would include:

- At Fairbanks International Airport, approximately 45 aircraft per day in winter and 55 aircraft per day in summer use the MCKINLEY TWO DEPARTURE and PUYVO THREE DEPARTURE procedures. FAA would amend these procedures by adding “RADAR REQUIRED.” No noticeable impacts on air traffic would result because the distances and paths flown would remain the same.
- At Healy River Airport, the three instrument flight procedures (two arrivals and one departure) would be amended to avoid conflict with the proposed Restricted Areas. The amendments to the procedures would increase flight distances required by between 1.4 and 10.9 NM. Approximately five IFR flights per year would be affected by these changes. With amendment of the procedures, the Letter of Agreement described for the interim phase to allow safe access, landing, and departure for IFR flights would no longer be necessary. The amendments to the Healy River Airport procedures would result in permanent, minor, direct impacts on the five IFR flights using the airport annually. The overall direct impacts on airspace management would be negligible due to the small number of flights per year. The anticipated procedural amendments at Healy River Airport, detailed in Section 5.2 of **Appendix C**, are summarized in **Section 2.1.2.3.2**.
- Flights out of Nenana Municipal Airport would no longer be able to use V-436 to access the Nenana transition (ENN.TAGER8) to the TAGER EIGHT ARRIVAL procedure to Ted Stevens Anchorage International Airport. FAA would shorten the segment currently between ENN and the TAGER waypoint to begin at the PUYVO waypoint. The amended transition would be renamed PUYVO.TAGER9, and the procedure would be renamed TAGER NINE ARRIVAL. South of the TAGER waypoint, the procedure for landing at the airport would remain the same. All other segments and portions of the procedure would remain unchanged, except that all transitions would be up-numbered to TAGER9. Approximately seven flights per day in winter and nine flights per day in summer would be affected by the change. This procedure amendment would result in permanent, negligible direct impacts on those IFR flights.

#### **3.1.3.3.3 Summary of Impacts to Airspace Management**

Establishment of the proposed Restricted Areas would have permanent, negligible to minor adverse impacts on VFR air traffic, private airstrips, Clear Airport, and Healy River Airport. Emergency and medical evacuation flights would not be adversely impacted.

During the interim phase, if necessary, adverse impacts on airspace management, VFR and IFR aircraft, private airstrips, and airports would be short term and negligible to minor. Emergency and medical evacuation flights would not be adversely impacted.

Once the amended procedures and redesigned airways are established, ATC would cease to manually reroute IFR flights through the area. The procedure and airway changes would result in permanent,

negligible adverse impacts on airspace management, and negligible to minor adverse impacts on air traffic and airspace users.

## 3.2 Air Quality

### 3.2.1 Definition of the Environmental Category

#### 3.2.1.1 Ambient Air Quality

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. Under the Clean Air Act (CAA; 42 U.S.C. §§ 7401-7671q), the six pollutants used to characterize air quality, called “criteria pollutants,” include carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM<sub>10</sub>] and less than or equal to 2.5 microns in diameter [PM<sub>2.5</sub>]), and lead. CO, SO<sub>2</sub>, and some particulates are emitted directly into the atmosphere from emissions sources, principally the combustion of fossil fuels. NO<sub>2</sub>, O<sub>3</sub>, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) emissions are used to represent O<sub>3</sub> generation because they are precursors of O<sub>3</sub>. Lead emissions are not included in this air quality analysis because they are negligible for the types of emission sources under the Proposed Action.

The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants (USEPA 2020a). The State of Alaska has also established ambient air quality standards referred to as Alaska Ambient Air Quality Standards (AAAQS; ADEC 2020a). These standards are listed in Table 2-1 of **Appendix D**.

The CAA defines an air quality control region (AQCR) as a designated contiguous area where air quality, and air pollution, is relatively uniform. Each AQCR is treated as a unit for the purposes of pollution reduction and achieving compliance with the NAAQS. Areas that are and have historically been in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The maintenance designation can be removed from an area if the area demonstrates to USEPA that it can consistently remain below NAAQS for more than 20 years.

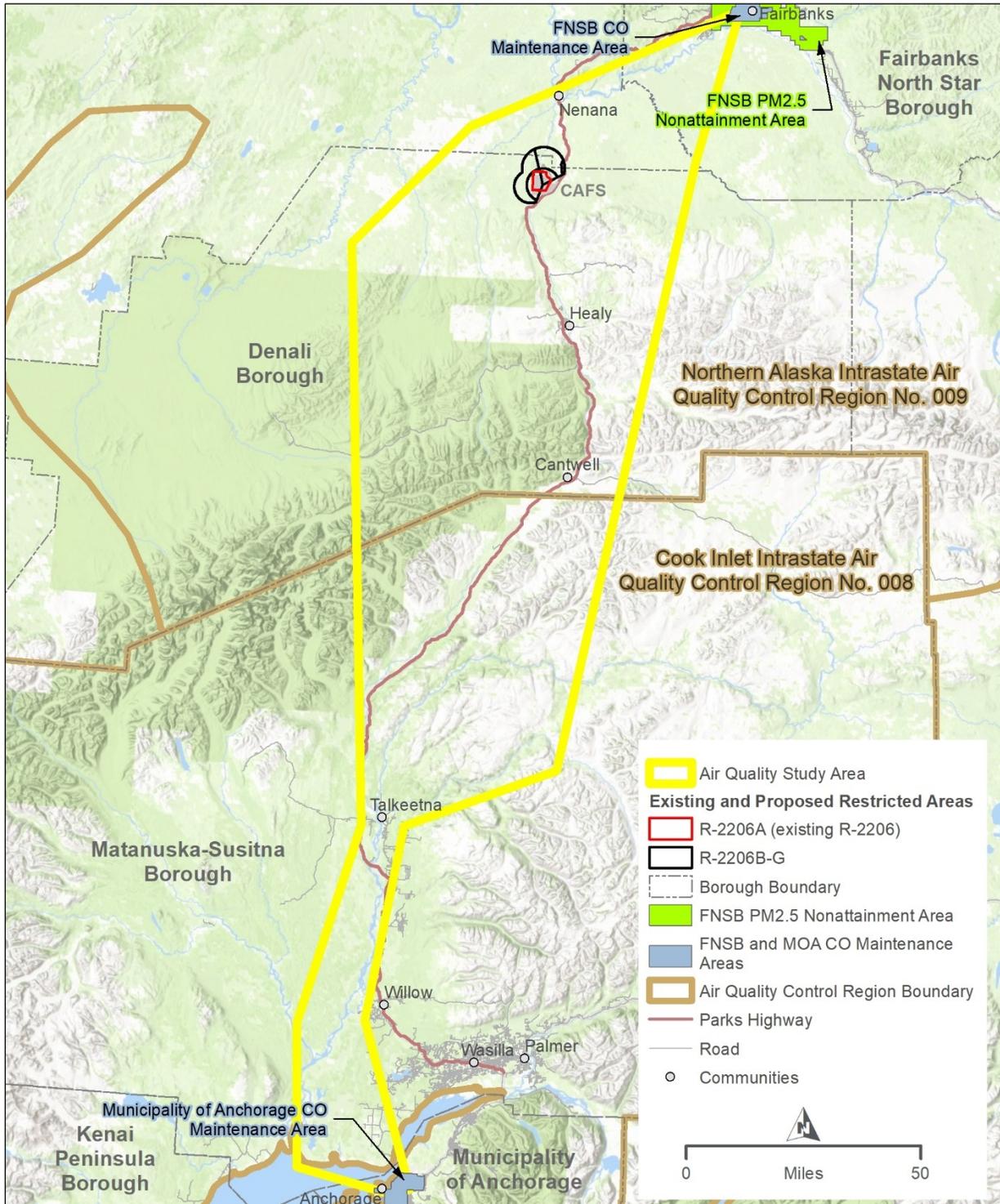
#### 3.2.1.2 Conformity

USEPA General Conformity regulations (40 CFR Parts 51 and 93) are intended to prevent the air quality impacts of federal actions from causing or contributing to a violation of the NAAQS. The General Conformity regulations apply to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed the specified *de minimis* thresholds defined at 40 CFR § 93.153. Exceedance of any applicable *de minimis* threshold requires a conformity determination.

### 3.2.2 Affected Environment

The air quality study area includes the area in which changes to aircraft flight patterns that could impact ambient air quality would occur. The study area includes portions of the following administrative areas: Denali Borough, FNSB, Yukon-Koyukuk Census Area, Matanuska-Susitna Borough, and Municipality of Anchorage. The air quality study area is shown in **Figure 3.2-1**. The area north of Fairbanks is not included in the air quality study area because changes in air traffic would be at altitudes higher than 3,000 feet AGL (see further explanation below).

Figure 3.2-1. Air Quality Study Area



The study area spans the Northern Alaska Intrastate AQCR 009 and the Cook Inlet Intrastate AQCR 008. CAFS is located in the Denali Borough, which is within the Northern Alaska Intrastate AQCR. As of January 8, 2020, the Denali Borough has been designated as in attainment or unclassifiable by USEPA and the Alaska Department of Environmental Conservation (ADEC) for all criteria pollutants (40 CFR § 81.302; 18 Alaska Administrative Code § 50.015).

The study area overlaps the FNSB PM<sub>2.5</sub> nonattainment area, the FNSB CO maintenance area, and the Municipality of Anchorage CO maintenance area. The FNSB PM<sub>2.5</sub> nonattainment area includes the urban portions of the FNSB centered on the City of Fairbanks, approximately 56 miles northeast of CAFS. Local emissions from wood stoves, burning distillate oil, industrial sources, and mobile emissions contribute to high levels of particulate pollution in Fairbanks, and this area was designated serious nonattainment for 24-hour PM<sub>2.5</sub> in December 2009. The Fairbanks urban area was also formerly designated as nonattainment for CO but was redesignated by USEPA as a limited maintenance area for CO on August 9, 2013. The Municipality of Anchorage CO maintenance area includes the urban area of Anchorage, more than 200 miles south of CAFS. This area was first designated as nonattainment in 1978 and was approved as a limited maintenance area in 2002. The FNSB and Municipality of Anchorage CO maintenance areas are under maintenance plans to monitor and ensure that compliance with the CO air quality standards in these areas can be maintained through the plans' control strategies.

The air quality monitoring site closest to CAFS is approximately 40 miles south within Denali National Park. Denali National Park is a USEPA Class 1 protected area, and its northern boundary is approximately 15 miles south of CAFS. The Denali National Park monitoring site, located near the park headquarters, includes an Interagency Monitoring of Protected Visual Environment (IMPROVE) monitor and a Clean Air Status and Trends Network (CASTNET) monitor (DoD 2016b). The pollutants monitored by the IMPROVE site include 24-hour and annual PM<sub>2.5</sub> and 24-hour PM<sub>10</sub>. The CASTNET site provides hourly concentrations of O<sub>3</sub>. The monitors within Denali National Park represent the expected air quality at CAFS, considering that CAFS is a rural site similar to Denali National Park.

The next-closest air quality monitor site to CAFS is a multi-pollutant monitoring site in Fairbanks operated by the FNSB. Fairbanks has a higher population and more industrial and commercial air emissions sources in comparison to CAFS and its surroundings or to Denali National Park. The emissions sources in Fairbanks contribute to its nonattainment status with the 24-hour PM<sub>2.5</sub> NAAQS. Because the Denali National Park IMPROVE and CASTNET monitors do not routinely monitor concentrations of NO<sub>2</sub>, SO<sub>2</sub>, or CO, the data for these three pollutants from Fairbanks are used as conservatively high bounds for concentrations of those pollutants at CAFS.

**Table 3.2-1** provides the average air quality values derived from the air quality monitoring data from Denali National Park and Fairbanks. All air quality background values are lower than the NAAQS and AAAQS shown in Table 2-1 of **Appendix D**.

**Table 3.2-1. Background Air Quality Monitoring Data**

Pollutant	Averaging Period	Monitoring Location	3-Year Average Value
PM <sub>2.5</sub> <sup>(1)</sup>	24 hour	Denali National Park	6.2 µg/m <sup>3</sup>
	Annual	Denali National Park	1.3 µg/m <sup>3</sup>
PM <sub>10</sub> <sup>(1)</sup>	24 hour	Denali National Park	15.4 µg/m <sup>3</sup>
CO <sup>(2)</sup>	1 hour	Fairbanks	3.4 ppm
	8 hour	Fairbanks	2 ppm

Pollutant	Averaging Period	Monitoring Location	3-Year Average Value
SO <sub>2</sub> <sup>(2)</sup>	1 hour	Fairbanks	36 ppb
	3 hour	Fairbanks	37.4 ppb
NO <sub>2</sub> <sup>(2)</sup>	1 hour	Fairbanks	55 ppb
	Annual	Fairbanks	12.54 ppb
O <sub>3</sub> <sup>(2)</sup>	8 hour	Denali National Park	0.042 ppb

Notes:  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion

<sup>(1)</sup> Data are for the 3-year period 2012-2014. Source: DoD 2016b

<sup>(2)</sup> Data are for the 3-year period 2016-2018. Source: USEPA 2020b

The existing air quality near CAFS is influenced by anthropogenic (from human activities) and non-anthropogenic sources. Combustion sources near CAFS include those from stationary point sources (e.g., power plants, manufacturing, and residential stoves, predominately wood fired units), on-road vehicles, aviation sources, and construction sources, including the recently completed LRDR complex at CAFS. Sources of fugitive dust particulate matter (i.e., PM<sub>10</sub> and PM<sub>2.5</sub>) near CAFS include dirt roads and traffic, exposed riverbeds, unpaved airfields, and gravel pits and stockpiles. Wildfires in Alaska and air pollution transported from international sources also influence the air quality near CAFS.

CAFS holds a Title V air operating permit for various stationary emissions sources. An estimate of annual stationary air emissions, in tons per year (tpy), produced and reported from operations at CAFS is provided in **Table 3.2-2** (ADEC 2017).

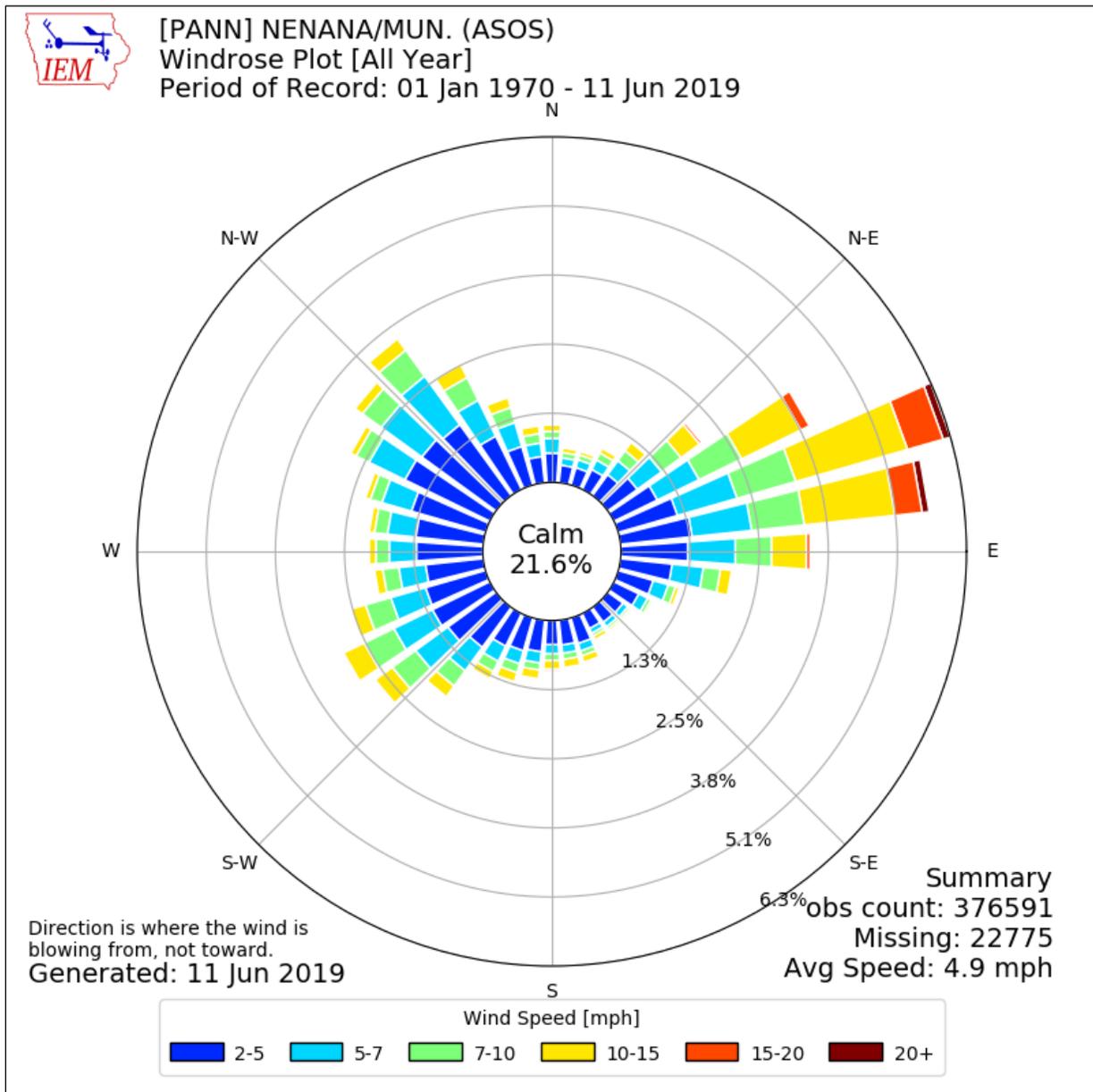
**Table 3.2-2. Annual Stationary Source Air Emissions from CAFS, 2017**

Reported Emissions (tpy)					
NO <sub>x</sub>	VOCs	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
7.97	0.39	2.92	0.07	0.37	0.31

The types of civilian aircraft that typically fly within the study area and that could be affected by the Proposed Action are small private (e.g., Cessna type) and commercial airplanes (up to the size of a Boeing 737). These aircraft produce air emissions from fuel combustion, but they are considered by USEPA to affect air quality only when operating at or below 3,000 feet AGL. This is because 3,000 feet AGL is the default mixing height, above which pollutant chemical reactions do not occur, and thus pollutants emitted above 3,000 feet AGL do not appreciably contribute to ambient air quality below this altitude (40 CFR § 93.153(c)(2)(xxii)).

Wind direction and speed can influence the transport and dispersion of some air pollutants. The long-term wind data collection site closest to CAFS is at the Nenana Municipal Airport, approximately 20 miles north. The predominant wind directions in the region are influenced primarily by nearby mountainous terrain and the Nenana River Valley. The predominant wind directions in Nenana are from the east-northeast, southwest, and northwest (IEM 2020; **Figure 3.2-2**). Wind data recorded at Nenana are assumed to be representative of conditions at CAFS. CAFS is at a similar elevation and is also adjacent to the Nenana River, and the predominant wind directions at CAFS over the long term would likely be similar to the wind directions at Nenana (DoD 2016b). The meteorological and topographic conditions in the CAFS area are unlikely to cause unusual or hindering effects on the dispersion of pollutants.

**Figure 3.2-2. Annual Wind Rose for Nenana Regional Airport**



Source: IEM 2020

### 3.2.3 Environmental Consequences

#### 3.2.3.1 Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed federal action are determined based on the increases in regulated pollutant emissions relative to ambient air quality. The current federal and Alaska ambient air quality standards are listed in Table 2-1 of **Appendix D**. FAA's 1050.1F Desk Reference (FAA 2020b) directs that the analysis of air quality impacts considers whether a proposed action would cause pollutant concentrations to exceed one or more NAAQS for any of the time periods analyzed.

For this analysis, the General Conformity *de minimis* thresholds (**Table 3.2-3**) are used as an indicator of whether an increase in air emissions may result in an exceedance of one or more NAAQS. The *de minimis* thresholds are more restrictive for areas designated as nonattainment for any of the criteria pollutants, such as the FNSB PM<sub>2.5</sub> nonattainment area. Emissions in exceedance of the *de minimis* thresholds would not necessarily result in an exceedance of any NAAQS, but would provide a benchmark to trigger a second tier of analysis. The second-tier analysis would apply the percent increase in regional emissions as a result of the Proposed Action to a corresponding percent increase in recent ambient concentrations. These theoretical ambient concentrations under the Proposed Action would be compared to the NAAQS to estimate whether an exceedance of any standard would potentially occur. Exceedance of the NAAQS would indicate that mitigation measures are needed to reduce emissions.

**Table 3.2-3. General Conformity De Minimis Thresholds**

	Emissions (tpy)					
	NO <sub>x</sub>	VOCs	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
General Conformity <i>De Minimis</i> Thresholds <sup>(1)</sup>	100	100	100	100	100	100
FNSB PM <sub>2.5</sub> Nonattainment Area General Conformity <i>De Minimis</i> Thresholds	70	70	100	70	100	70

<sup>(1)</sup> Least restrictive *de minimis* thresholds for maintenance and moderate nonattainment areas from 40 CFR § 93.153(b).

### 3.2.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace. Emissions from aircraft operations would likely increase gradually over time as a result of expected growth in air traffic volume, assuming that no new changes in technology occur to reduce emissions.

### 3.2.3.3 Proposed Action

#### 3.2.3.3.1 *LRDR Operational Changes*

The LRDR operational changes would not add or modify any stationary sources of air emissions and would not result in any increase in air emissions. The LRDR operational changes would not impact air quality.

#### 3.2.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

FAA's actions under the Proposed Action would result in slightly increased aircraft flight times that would generate a minimal increase in emissions of criteria pollutants from increased fuel use. The following sections quantify the increases in aircraft emissions expected from both detoured VFR flights and rerouted IFR flights during the interim period when the TFRs are active and after the Restricted Areas are established and airways are amended and established.

To provide the most conservative estimate of increased air emissions, this analysis assumes that all affected VFR flights would detour the maximum projected flight distance to avoid the TFRs or Restricted Areas, and that all affected IFR flights would be rerouted to those airways with minimum en route

altitudes below 3,000 feet AGL.<sup>23</sup> The estimated numbers of flights that would contribute to air quality impacts were calculated using the estimated percentage of the existing VFR and IFR operations in the airspace study area that are below 3,000 feet AGL, based on data provided by FAA (FAA 2018). Direct flights from Anchorage to Deadhorse that would be affected by the Proposed Action and flights that would be moved from V-436 to T-227, V-438, or V-444/V-504 between Fairbanks and Deadhorse following amendment of that airway would remain at altitudes above 3,000 feet AGL and are not included in this analysis.

The change in flight distances for the procedures that would be amended is not included in this analysis. The amendments to the procedures at Healy River Airport would require approximately five IFR flights per year to fly between 1.4 and 10.9 additional NM; this additional flight distance would result in a negligible increase in air emissions. The amendment to the TAGER EIGHT ARRIVAL procedure at Ted Stevens Anchorage International Airport would not require increased flight distance.

The increase in aircraft emissions was calculated by using fuel use engine emission factors for the aircraft climbout mode from a Cessna 208 aircraft for VFR flights and the Boeing 737 aircraft for IFR flights.<sup>24</sup> These models were used because they are the largest aircraft expected to be affected by the Proposed Action. The fuel use engine emission factors were obtained from the *Air Force Air Emissions Guide for Air Force Mobile Sources* (AFCEC 2018), which also includes commercial aircraft data. Averaged aircraft flight speed data in climbout mode were used to convert flight distance to flight time. These data were obtained from a document containing aircraft performance summary tables for various types of aircraft (EOSAR 1998).

Detailed calculations of increased air emissions are provided in **Appendix E**. Greenhouse gas emissions are discussed in **Section 3.4.3**.

### Restricted Areas

Establishment of the proposed Restricted Areas would require VFR flights to detour around the restricted airspace. The increases in annual air emissions from detoured VFR flights are addressed below in the section titled **Changes to Federal Airways and Instrument Flight Procedures**. Although VFR flights would not be affected by changes in federal airways and instrument flight procedures, they are combined with IFR flights for purposes of the air quality analysis.

### Interim Phase: Potential TFR Implementation

If the interim phase is needed, implementation of TFRs would require existing commercial and recreational aircraft flights to reroute or detour around the TFRs. Up to 10 VFR flights daily would be required to detour around the TFRs in the vicinity of CAFS. Up to five IFR flights daily on airways V-436 or J-125 or flying direct from Anchorage to Deadhorse would be rerouted around the TFRs, as described in

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<sup>23</sup> In actuality, the IFR flights that would be impacted by the Proposed Action would be rerouted to a combination of airways as described in **Section 3.1.3.3.2**, most of which have minimum en route altitudes above 3,000 feet AGL, and thus aircraft on those routes would not contribute to ambient air quality.

<sup>24</sup> The Cessna 421 was utilized as a surrogate for flight speed because no speed performance data were available for the Cessna 208. The Cessna 172P was utilized as a surrogate for engine emission factors because emission factors were not available for the Cessna 208, and the Cessna 172P is similar in size to the Cessna 208. A CFM56-7B27 engine for the Boeing 737 aircraft was conservatively assumed because it has the highest emission factors for all possible engines used in this aircraft.

**Section 3.1.3.3.2.** Because J-routes have a minimum en route altitude of 18,000 feet MSL, IFR flights rerouted from J-125 to the West Reroute and from V-436 to V-438 would remain well above 3,000 feet AGL. Similarly, direct flights from Anchorage to Deadhorse transit at altitudes up to 360 FL. This analysis conservatively assumes that all impacted IFR flights would be rerouted from airway V-436 to the West Reroute, which has a minimum en route altitude of 2,900 feet MSL for the segment near CAFS, where ground elevation is approximately 600 feet above sea level.

**Table 3.2-4** summarizes the data from the flight detour/reroute analysis described in **Section 3.1, Airspace Management**, that were used to calculate the potential increased air emissions during the interim phase.

**Table 3.2-4. Aircraft Detoured and Rerouted during the Interim Phase that would Contribute to Air Quality Impacts**

	Number of Flights Impacted Annually	Flights below 3,000 AGL <sup>(1)</sup>	Number of Impacted Flights Contributing to Increased Emissions Annually	Increased Flight Distance per Flight
VFR Flight Detoured	3,650	41%	1,497	1.3 NM
IFR Flights Rerouted to the West Reroute	1,825	3%	55	1.5 NM

<sup>(1)</sup> Derived from FAA 2018

**Table 3.2-5** summarizes the estimated annual increase in air emissions from rerouted and detoured aircraft flights for the interim phase. The interim phase would be expected to last approximately 6 months; thus, emissions would be less than shown in **Table 3.2-5**.

**Table 3.2-5. Annual Air Emissions Increases from Aircraft Detours and Reroutes during the Interim Phase**

Estimated Emissions (tpy)					
NO <sub>x</sub>	VOCs	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
0.06	0.02	0.46	<0.01	<0.01	<0.01

**Changes to Federal Airways and Instrument Flight Procedures**

Air quality impacts associated with changes to federal airways would be similar to those described above for the interim phase. Up to 10 VFR flights daily would be required to detour around the Restricted Areas after they are established. However, there are differences in the identified alternate routes that IFR flights would use to avoid the proposed Restricted Areas, and these differences would affect impacts associated with flight times. Up to five IFR flights daily that would have used the portions of airways V-436 and J-125 that would be affected, or flying direct from Anchorage to Deadhorse, would be routed to alternate routes, as described in **Section 3.1.3.3.2**. IFR flights on most of the identified alternate routes would remain well above 3,000 feet AGL. Similarly, direct flights from Anchorage to Deadhorse transit at altitudes up to 360 FL. This analysis conservatively assumes that all impacted IFR flights would use the new T-399, which has a minimum en route altitude of 2,900 feet MSL for the segment nearest CAFS, where ground elevation is approximately 600 feet above sea level.

The amended procedures associated with Ted Stevens Anchorage International Airport and Fairbanks International Airport would not result in longer flight paths. The amended procedures associated with Healy River Airport would add from approximately 1 to 10 NM to flight paths; however, only about five aircraft per year use the procedures. Therefore, changes to air emissions resulting from amendments to instrument flight procedures would be negligible, and air emissions were not calculated.

**Table 3.2-6** summarizes the data from the analysis of flight path changes described in **Section 3.1.3.3.2** that were used to calculate the potential increased air emissions following establishment of the Restricted Areas and changes to airways.

**Table 3.2-6. Permanent Flight Path Changes That would Contribute to Air Quality Impacts**

	Number of Flights Impacted Annually	Flights below 3,000 AGL <sup>(1)</sup>	Number of Impacted Flights Contributing to Increased Emissions Annually	Increased Flight Distance per Flight
VFR Flight Detoured	3,650	41%	1,497	1.3 NM
IFR Flights Using T-399	1,825	3%	55	3.7 NM

<sup>(1)</sup> Derived from FAA 2018

**Table 3.2-7** summarizes the estimated annual increase in air emissions following the airspace changes.

**Table 3.2-7. Annual Air Emissions Increases from VFR Aircraft Detours and IFR Flight Alternate Routes**

Estimated Emissions (tpy)					
NO <sub>x</sub>	VOCs	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
0.12	0.02	0.46	0.01	<0.01	<0.01

**3.2.3.3.3 Summary of Air Quality Impacts**

The Proposed Action would not add or modify any stationary sources of air pollutants and would not adversely impact the Class 1 area at Denali National Park based on the low level of emissions increases.

The Proposed Action is not governed by General Conformity regulations because the potential air quality impacts would occur entirely within the Denali Borough, which is an attainment area for all criteria pollutants (i.e., the area immediately around CAFS within the Denali Borough). Aircraft detours and reroutes that would contribute to air quality impacts would occur in the vicinity of the TFRs and Restricted Areas, on the West Reroute, or on the proposed T-399 airway. Although the study area includes portions of the FNSB PM<sub>2.5</sub> nonattainment area and the FNSB and Municipality of Anchorage CO maintenance areas, no net change in flight distances within the FNSB and the Municipality of Anchorage is expected, and no net change in corresponding aircraft emissions would occur. The area surrounding CAFS where changes in flight paths would occur is sufficiently distant from Fairbanks (more than 50 miles to the northeast) and Anchorage (more than 200 miles to the south) that any increase in emissions would not affect these nonattainment and maintenance areas.

Although the General Conformity Rule does not apply to the Proposed Action, for purposes of evaluating air quality impacts, the estimated annual air emissions from the Proposed Action can be compared to the General Conformity *de minimis* thresholds. Annual emissions increases of all criteria pollutants would be

well below the 100-tpy thresholds shown in **Table 3.2-3**. In addition, the estimated annual emissions increases are well below the more restrictive *de minimis* thresholds that apply to the FNSB PM<sub>2.5</sub> serious nonattainment area per 40 CFR § 93.153(b)(1). Because emissions from the Proposed Action would not exceed the *de minimis* thresholds, the Proposed Action would not result in an exceedance of any NAAQS or AAAQS and would not result in a level of air emissions requiring mitigation.

In conclusion, the Proposed Action would have short-term, negligible adverse impacts on air quality during the interim phase, and permanent, negligible adverse impacts after the proposed Restricted Areas are established.

### **3.3 Biological Resources**

#### **3.3.1 Definition of the Environmental Category**

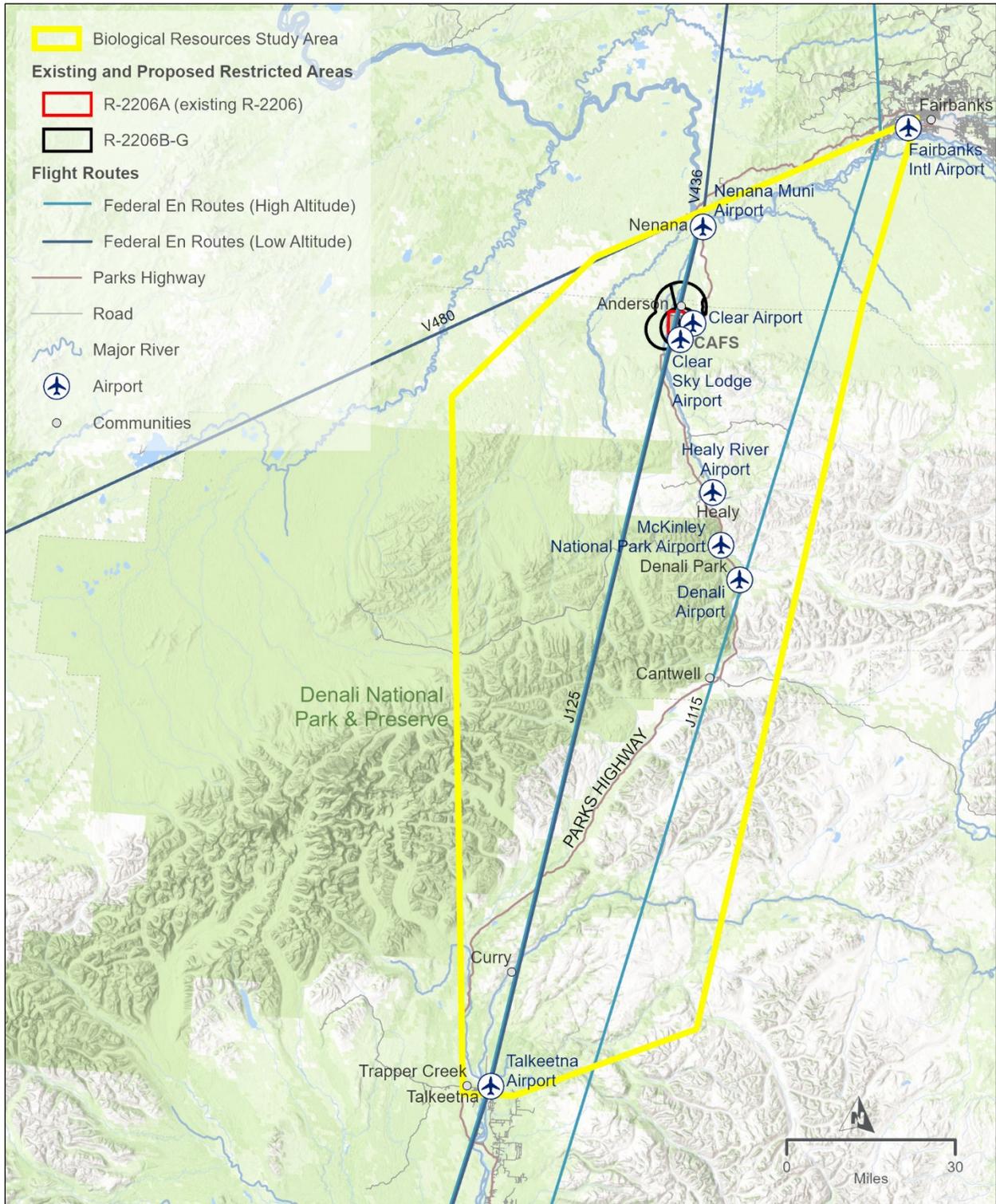
Biological resources include native or naturalized vegetation and wildlife and the habitats in which they occur. Habitat is defined as the biotic and abiotic conditions that support plant or animal species. Protected and sensitive biological resources include species listed as threatened or endangered under the federal Endangered Species Act, species protected under Alaska's endangered species regulations, and species proposed for protection under those regulations. In addition, migratory birds are protected species under the Migratory Bird Treaty Act. Sensitive habitats include those areas designated or proposed by the U.S. Fish and Wildlife Service (USFWS) as critical habitat protected by the Endangered Species Act, and sensitive ecological areas designated by the Alaska Department of Fish and Game (ADF&G) 2015 *Alaska Wildlife Action Plan* (ADF&G 2015). Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

The Proposed Action would not involve ground disturbance and would not affect vegetation, wildlife habitat, or fish; these resources are not evaluated in this EIS. Discussion of biological resources in this EIS is limited to terrestrial mammals, bats, and birds.

#### **3.3.2 Affected Environment**

The study area for biological resources encompasses the area in which most changes to restricted airspace and aircraft flight paths would occur under the Proposed Action (**Figure 3.3-1**). This study area includes the airspace above the ground for the analysis of birds and bats. Individual birds and bats may transit through the radar beam during proposed LRDR operations. Wildlife in the air or on the ground could experience increased noise associated with changing flight patterns.

Figure 3.3-1. Study Area for Biological Resources



### 3.3.2.1 Existing Conditions

#### 3.3.2.1.1 Wildlife

Wildlife species that have been documented in the study area are species that are common in the relatively undisturbed and remote areas of Interior Alaska. There are no designated wildlife refuges, critical habitats, or sanctuaries within the study area.

#### Terrestrial Mammals

Terrestrial mammals that are known to occur near CAFS and are present throughout the study area include red fox (*Vulpes vulpes*), grizzly bear (*Ursus arctos horribilis*), American black bear (*Ursus americanus*), moose (*Alces americanus*), snowshoe hare (*Lepus americanus*), red squirrel (*Tamiasciurus hudsonicus*), porcupine (*Erethizon dorsatum*), gray wolf (*Canis lupus*), lynx (*Lynx canadensis*), and beaver (*Castor canadensis*) (Carlson and Gotthardt 2009, USAF 2019a). Hunting for bear, moose, and small game is permitted on some areas of CAFS (Carlson and Gotthardt 2009).

Other furbearers and mammals likely present in the study area include mink (*Neovison vison*), American marten (*Martes americana*), muskrat (*Ondatra zibethicus*), river otter (*Lutra canadensis*), caribou (*Rangifer tarandus granti*), coyote (*Canis latrans*), wolverine (*Gulo gulo*), Dall sheep (*Ovis dalli dalli*), northern red-backed vole (*Myodes rutilus*), meadow vole (*Microtus pennsylvanicus*), collared pika (*Ochotona collaris*), hoary marmot (*Marmota caligata*), and ermine (*Mustela erminea*) (ADF&G 2006, ADF&G 2020a, USAF 2019a). The northern flying squirrel (*Glaucomys sabrinus yukonensis*) is also likely present in the study area (ADF&G 2020b). This mammal is incapable of true flight like birds and bats, but instead glides from trees; therefore, it is included with terrestrial mammals in this analysis.

#### Bats

The little brown bat, likely present in the study area, is the only bat species found in Interior and Southcentral Alaska (ADF&G 2020c, Woodford 2010).

#### Birds

Many resident and migratory birds can be found near CAFS and throughout the study area during the breeding season, including waterfowl, raptors, shorebirds, seabirds, and numerous landbird species (LaGory et al. 1996 as cited in Carlson and Gotthardt 2009). Annual spring migration to the area typically occurs from mid-April to late May, and most species nest between May 1 and July 15. Fall migration from the study area to wintering grounds generally occurs in September and October.

Thirteen species of year-round residents, 33 migratory species, and 28 species of spring and fall transients have been recorded at CAFS (USAF 2019a). A 2007 avian survey recorded a total of 53 bird species present at CAFS, including 36 species of landbirds, 5 species of raptors, 2 species of shorebirds, 4 species of waterfowl, 3 loons and grebes, and 5 seabirds (Carlson and Gotthardt 2009). In addition to the documented species, the Alaska Natural Heritage Program has identified one subspecies of peregrine falcon (*Falco peregrinus anatum*) and the Harlequin duck (*Histrionicus histrionicus*) as species that could be present within the study area, particularly along the Nenana River (MDA 2012).

Bird species of conservation concern that have the potential to occur within the study area are listed in **Table 3.3-1**. Five of these species were observed at CAFS during the 2007 survey. Since 2007 the gray-cheeked thrush, osprey, and white-winged crossbill have been removed from several federal and state conservation watch lists but their state conservation ranks remain at levels below S5 (Secure). No other species documented at CAFS during the 2007 survey have since been added to conservation

lists. The bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are also present in the study area; these species are protected by the Bald and Golden Eagle Protection Act (USFWS 2020a).

**Table 3.3-1. Bird Species of Conservation Concern in the Study Area**

Species	Global Rank <sup>(1)</sup>	State Rank <sup>(2)</sup>	Federal <sup>(3)</sup>	State <sup>(4)</sup>	Other State <sup>(5)</sup>	Other National <sup>(6)</sup>
American golden-plover ( <i>Pluvialis dominica</i> )	G5	S5B	BLM WATCH, USFWS BCC	SGCN	Audubon Red	-
<b>Bald eagle (<i>Haliaeetus leucocephalus</i>)</b>	G5	S5	-	SGCN	-	-
<b>Blackpoll warbler (<i>Setophaga striata</i>)</b>	G5	S4B	BLM WATCH	-	Audubon Red, BPIF PSOC	NALCP
Golden eagle ( <i>Aquila chrysaetos</i> )	G5	S4B, S3N	BLM WATCH	SGCN	-	-
<b>Gray-cheeked thrush (<i>Catharus minimus</i>)</b>	G5	S4S5B	-	-	BPIF PSOC	-
Hudsonian godwit ( <i>Limosa haemastica</i> )	G4	S2S3B	BLM SENS, USFWS BCC	SGCN	Audubon Yellow	-
Lesser yellowlegs ( <i>Tringa flavipes</i> )	G5	S5B	USFWS BCC	SGCN	Audubon Red	-
Olive-sided flycatcher ( <i>Contopus cooperi</i> )	G4	S4S5B	BLM SENS, USFWS BCC	SGCN	Audubon Red, BPIF PSOC	NALCP
<b>Osprey (<i>Pandion haliaetus</i>)</b>	G5	S3S4B	-	-	-	-
<b>Rusty blackbird (<i>Euphagus carolinus</i>)</b>	G4	S4B, S3N	BLM SENS, USFWS BCC	SGCN	Audubon Watch, BPIF PSOC	NALCP
Semipalmated sandpiper ( <i>Calidris pusilla</i> )	G5	S4S5B	USFWS BCC	SGCN	-	-
Short-billed dowitcher ( <i>Limnodromus griseus</i> )	G5	S4S5B	BLM WATCH, USFWS BCC	SGCN	Audubon Yellow	-
Whimbrel ( <i>Numenius phaeopus</i> )	G5	S3S4B	BLM SENS, USFWS BCC	SGCN	Audubon Yellow	-
<b>White-winged crossbill (<i>Loxia leucoptera</i>)</b>	G5	S5	-	SGCN	BPIF PSOC	-

Source: Carlson and Gotthardt 2009, USFWS 2020a.

Note: Species in bold were documented at CAFS in 2007 (Carlson and Gotthardt 2009).

(1) *Global Rank: G4 = Apparently secure but uncommon; some cause for long-term concern because of declines or other factors. G5 = Secure; common, widespread, and abundant (NatureServe 2020).*

(2) *State Rank: S2 = Imperiled within the state; at high risk of extirpation because of few occurrences, declining populations, limited range, and/or habitat. S3 = Rare within the state; at moderate risk of extirpation because of restricted range, narrow habitat specificity, recent population decline, small population sizes, and moderate number of occurrences. S4 = Apparently secure but uncommon within the state; may be a long-term conservation concern. S5 = Secure and widespread within the state; not at risk for extirpation because of widespread abundance. B = Breeding. N = Nonbreeding (NatureServe 2020).*

(3) *BLM SENS = Bureau of Land Management Sensitive Species List; BLM WATCH = Bureau of Land Management Watch List Species (BLM 2019); USFWS BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern (USFWS 2020a).*

(4) *SGCN = State of Alaska Species of Greatest Conservation Need (within the Central and Southcentral bioregions) (ADF&G 2015).*

(5) *Audubon Red = Audubon Alaska Red List (Audubon Alaska 2017a); Audubon Yellow = Audubon Alaska Yellow List (Audubon Alaska 2017b); Audubon Watch = Audubon Alaska Watchlist (Audubon Alaska 2017c); BPIF PSOC = Boreal Partners in Flight Priority Species (within the Central biogeographic region) (Boreal Partners in Flight 1999).*

(6) *NALCP = North American Landbird Conservation Plan Species of Continental Importance (Pacific Birds Habitat List) (Rosenberg et al. 2016).*

### 3.3.2.1.2 Threatened and Endangered Species

Information from the USFWS's IPaC (Information, Planning, and Conservation System) Resource List (USFWS 2020a) indicates that no federally listed threatened or endangered species have been recorded in the study area (see Appendix F). No threatened or endangered species listed by the USFWS or the State of Alaska have been recorded near CAFS during field surveys (LaGory et. al 1996 as cited in Carlson and Gotthardt 2009). There are no resources under National Oceanic and Atmospheric Administration National Marine Fisheries Service jurisdiction in the study area (NOAA 2020).

## 3.3.3 Environmental Consequences

### 3.3.3.1 Evaluation Criteria

The evaluation of potential impacts to biological resources is based on (1) the importance of the resource (i.e., threatened or endangered species; critical habitats; recreationally, commercially, ecologically, culturally, or scientifically important species); (2) the sensitivity of the resource to proposed activities; (3) the proportion of the resource that would be affected relative to its occurrence in the region; and (4) the duration of ecological ramifications.

FAA's 1050.1F Desk Reference (FAA 2020b) directs that the analysis of impacts to biological resources consider if a proposed action or alternative would be likely to jeopardize the continued existence of a federally or State of Alaska-listed threatened or endangered species, or would result in reductions in the population size or distribution of a species, or would result in the destruction or adverse modification of federally designated critical habitat. This analysis of impacts to terrestrial wildlife, bats, and birds evaluates whether species of concern would be substantially affected over relatively large areas, or disturbances would result in reductions in the population size or distribution that might limit the ability of a local or regional population to sustain itself.

### 3.3.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. The occurrence of birds, bats, and terrestrial wildlife in the study area would generally stay the same but could be affected by future changes in their habitats and the

environment that are unrelated to the Proposed Action, such as new development, introduction of invasive species, or climate change.

### 3.3.3.3 Proposed Action

#### 3.3.3.3.1 *LRDR Operational Changes*

Birds and bats may transit through the radar beam produced by the LRDR. To evaluate potential impacts on wildlife, it is assumed that the operation of the LRDR would consist of high frequency S-band radio waves with frequencies ranging between 2 and 4 gigahertz (GHz) in a directional beam that is sent out in short pulses rather than continuous energy.

Living organisms may experience thermal effects from exposure to radar as radiation penetrates living tissues and causes the temperature of tissues to increase. This heating of tissues may result in behavioral changes (e.g., avoidance of the area) in animals, and/or in damage to living tissues. The amount of heat absorbed by an organism depends on many factors, including the electromagnetic frequency, the size of the organism relative to the wavelength of the radiation, the orientation of the organism relative to the radiation, the length of time of exposure, and the surface properties and conductivity of the organism's tissues. In general, the depth that radiation can penetrate (and potentially damage) biological tissues through heating decreases with increases in wavelength frequency. Thus, the higher the frequency, the shallower the penetration and lower the potential warming effects for organisms. S-band radio waves with frequencies from 2 to 4 GHz might penetrate up to 2.0 centimeters (0.8 inch) into muscle tissue (MDA 2007).

The potential effects of radar on birds and bats have been analyzed in previous studies. MDA analyzed potential impacts from all Ballistic Missile Defense Systems radars on birds (and by extension, bats) in Appendix N of the Ballistic Missile Defense System Programmatic EIS (MDA 2007). This EIS considered the conditions under which a radar beam could be sufficiently powerful to cause thermal heating or interference with the navigational ability of migratory birds. This study evaluated the most powerful type of radar operating in each of five different wavebands (UHF, L, S, C, and X bands). The analysis, which was reviewed by both USEPA and USFWS, concluded that that none of the radars are likely to pose a threat to migrating birds under most conditions, such as when operating in surveillance mode with the direction of the radar beam changing between pulses. This analysis applied to bird flights perpendicular to or in the direction of stationary beams, as well as beams in surveillance mode. Birds would be at greater risk when flying parallel to, and within the elevation of, a radar beam, and less at risk when flying perpendicular to (across) or at an angle to the radar beam.

The 1993 Ground-Based Radar Family of Radars EA analyzed impacts to birds and other wildlife that could fly through the radar beams (USASMDS 1993 as cited in DoD 2016b). The study concluded that it would be extremely unlikely for a bird, bat, or other flying animal to remain within the most intense area of the beam for any considerable length of time before flying out of this area (USASMDS 1993 as cited in DoD 2016b). A more recent study of the effects of radar on flying animals was conducted for the Terminal High-Altitude Area Defense radar operations on Guam (decibel Research 2015). This study also concluded that overexposure of flying animals would be a rare occurrence, since any flying animal would have to coincide with the radar beam for long durations to experience overexposure.

Few studies have been conducted to determine the potential effects of radar on bats specifically. University of Aberdeen researchers observed that bat activity was significantly reduced in areas exposed to a high electromagnetic field strength (greater than 2 volts per meter) compared to sites with no radar exposure (Nicholls and Racey 2007). This observation raised the possibility that electromagnetic radiation was either causing overheating/hyperthermia or interfering with echolocation and producing an aversive behavioral response (i.e., avoidance) in foraging bats (Nicholls and Racey 2007, Sorrells 2018). The

intent of this research was to find a way to use radar as a deterrent at wind turbine locations associated with large numbers of bat collisions and mortality (Nicholls and Racey 2007, Nicholls and Racey 2009).

Radar units normally operate in search/surveillance mode, except when tracking a target or being calibrated. In search/surveillance mode, the main beam of the radar is not aimed at any area in space for more than a small fraction of a second (less than 0.02 second). Based on these considerations, it is unlikely that birds or bats flying in front of the radar unit would be exposed to the radar beam for a sufficient length of time to be harmed, because the beam is narrow and pulses rapidly.

Short-term, intermittent, negligible adverse impacts on bird and bat species from exposure to radiation would be expected from operation of the LRDR at CAFS. It is unlikely that birds or bats flying in front of the radar unit would be exposed to the radar beam for a sufficient length of time to be harmed because that beam is narrow and pulses rapidly. Additionally, birds and bats are often moving, and even birds that soar such as raptors and would not remain in the radar beam for an extended period of time; therefore, it would be extremely unlikely that tissue damage would occur during a short exposure period. In the rare event that a bird or bat is close enough to the radar unit and it is being operated in tracking mode, tissue damage could occur. The risk of harm to bats and migratory birds is further reduced because those animals hibernate or migrate during winter and generally would only be at risk from about late April or May to early September (ADF&G 2020c).

Terrestrial or boreal wildlife on the ground or in trees, such as the northern flying squirrel, would not be at risk during operation of the LRDR, because the immediate area surrounding the radar has been cleared of vegetation and the unit would be aimed upward above the tree canopy beyond the cleared area. The health and behavior of wildlife would not be affected by LRDR operation because the main beam of each radar face would be directed above the horizon and above the tree canopy; therefore, wildlife on the ground and in trees would not be within or near the radar beam. These wildlife would not likely be exposed to hazardous areas with average power densities above the thermal effect threshold because a radio frequency (RF) safety hazard zone would be established to limit access to an area on the ground approximately 400 meters in front of the radar (see **Section 3.10.3.3.1**). The RF safety hazard zone would be a fenced area wholly within CAFS. Therefore, tissue damage to these species is not likely.

#### *3.3.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft*

##### **Restricted Areas**

The Proposed Action would not increase the number of flights within the study area, but would change the paths of IFR flights within the study area and change VFR air traffic in the vicinity of the proposed Restricted Areas. These changes could expose wildlife to aircraft noise and the visual presence of aircraft following establishment of the Restricted Areas. Wildlife behavioral responses to aircraft may be based on both noise and visual presence. Changes in aircraft flight paths resulting from the proposed Restricted Areas would not likely impact wildlife on the ground because the changes to noise and visual presence of aircraft would be negligible compared to current conditions. There are no sensitive wildlife areas that would be introduced to new disturbance from low-flying aircraft as a result of detours of VFR aircraft around the proposed Restricted Areas.

Wildlife responses to aircraft overflights are largely behavioral and short-term, with responses diminishing with increased altitude of the overhead aircraft. Wildlife behavioral responses to overhead flights above 500 feet AGL are generally characterized as minor (U.S. Army and USAF 2013). Bird behavioral responses to aircraft are generally short-term, although individuals are typically more sensitive to

disturbance during nesting. Most of the affected IFR flights would remain above 10,000 feet MSL<sup>25</sup> and would not be likely to impact wildlife. VFR traffic may detour around the proposed Restricted Areas at altitudes below 1,500 feet AGL; however, small aircraft frequently transit this area at similar altitudes under current conditions, and wildlife in the area are likely habituated to the presence of aircraft and would not be impacted by these changes in VFR traffic.

The change in aircraft flight paths resulting from the Proposed Action following establishment of the Restricted Areas would increase the distance traveled by some flights and therefore could result in a slightly increased risk for aircraft to strike birds and bats in the air along the new flight paths. Approximately one-third of commercial civil aircraft bird strikes occur during take-off or landing, and more than 90 percent of strikes occur at or below 3,500 feet AGL (FAA 2020h). Changed aircraft flight paths are not likely to result in an increased risk of bird or bat strikes because the aircraft would mostly remain above 10,000 feet MSL. Within the study area, the AGL altitude corresponding to 10,000 feet MSL varies depending on ground surface elevation but is at least 4,000 feet AGL where flight paths would change.<sup>26</sup> This is above the altitude that most birds, including migratory birds, and bats fly. Birds fly at higher altitudes during migration, and although there is significant variation in flight altitudes between species groups, most birds migrate at altitudes below 7,000 feet AGL (ADF&G 1986). A visual and radar study of birds in the Tanana River Valley found that the majority of birds in all observed species groups flew at altitudes below 1,000 feet AGL during migration flights (Cooper and Ritchie 1995). Bat strikes by aircraft are less common than bird strikes. The maximum flight altitude of the little brown bat has not been established; however, bats do not fly as high as many of the bird species that occur in the study area.

Increased VFR flight distances in the vicinity of the proposed Restricted Areas may result in a slight increase in risk of bird strikes. These increased flight distances would be unlikely to result in increased risks to bats, which are most active at night when there are few flights. A review of 10 years of data on reported bat strikes in the United States found that more than 80 percent of strikes occurred between 11:00 p.m. and 9:00 a.m. (Peurach et al. 2009). Although aircraft strikes to individual birds or bats would be lethal, permanent adverse impacts to populations would be negligible due to the slight increased risk of aircraft strikes. Overall, establishment of the Restricted Areas would have negligible adverse impacts to wildlife.

### **Interim Phase: Potential TFR Implementation**

During the interim phase, if it is needed, the impacts on birds and bats would be the same as described above for Restricted Areas, except the impacts to populations would be short term, lasting as long as the TFRs are in place. Changes in aircraft flight paths due to the TFRs would not likely impact wildlife on the ground because the changes to noise and visual presence of aircraft would be negligible compared to current conditions.

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<sup>25</sup> Within the study area, the AGL altitude corresponding to 10,000 feet MSL varies depending on ground surface elevation but is at least 4,000 feet AGL where flight paths would change.

<sup>26</sup> Where the affected airways cross the Alaska Range, the elevations of peaks and ridges range from 2,000 to 5,000 feet above sea level. Where the affected airways cross the Brooks Range, the elevations of peaks and ridges range from 2,000 to 6,000 feet above sea level.

## Changes to Federal Airways and Instrument Flight Procedures

Impacts on birds and bats from changes to airways and instrument flight procedures would be the same as described above for the proposed Restricted Areas. Wildlife on the ground would not likely be affected because the changes to noise and visual presence of aircraft would be negligible compared to current conditions. There are no sensitive wildlife areas that would be introduced to new disturbance from low-flying aircraft as a result of the amendments to instrument flight procedures.

### 3.3.3.3 Summary of Biological Resources Impacts

Operation of the LRDR would not affect terrestrial wildlife and would have negligible impact on birds or bats that may transit through the radar beam.

FAA's actions related to the flight of aircraft would have negligible effects on wildlife because most of the changes to aircraft flights would be above 500 feet AGL, and the numbers of aircraft would not increase. There are no sensitive wildlife areas that would be introduced to new disturbance from low-flying aircraft as a result of changes in instrument flight procedures or detours of VFR aircraft around TFRs or the proposed Restricted Areas. Increases in flight paths would pose a slightly increased risk of bird strikes. No threatened or endangered species occur within the study area. Other than the slightly increased risk of bird strikes by aircraft, the Proposed Action would not adversely impact any special status species, including bald and golden eagles, and migratory birds. In conclusion, the Proposed Action would have short-term, negligible adverse impacts on biological resources during the interim phase and permanent, negligible adverse impacts after the proposed Restricted Areas are established.

## 3.4 Climate

### 3.4.1 Definition of the Environmental Category

The National Weather Service describes climate as the most recent 30-year averages of meteorological parameters, such as temperature, precipitation, humidity, and winds. Global climate change refers to long-term fluctuations in these and other elements of Earth's climate system. Ways in which the Earth's climate system may be influenced by changes in the concentration of various gases in the atmosphere have been discussed worldwide. Of particular interest, greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities, including combustion of fuels and landfilling of organic materials. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions.

GHGs consist of carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, and fluorinated gases. CO<sub>2</sub> comprises more than 75 percent of global annual GHG emissions (USEPA 2020c). GHG emissions are commonly reported in CO<sub>2</sub> equivalents (CO<sub>2</sub>e), which presents the metric tons of GHGs as the metric tons of CO<sub>2</sub> emissions with the same global warming potential.

### 3.4.2 Affected Environment

For climate and GHG emissions, the study area is the global atmosphere.

CAFS is located in Interior Alaska, which has a continental subarctic climate characterized by long, cold winters; short, mild summers; and significant changes in daily weather throughout the year. The closest meteorological station to CAFS with at least 30 years of data is at the Nenana Municipal Airport, 20 miles north of CAFS. Temperatures in Nenana range from an average of -6.1 degrees Fahrenheit (°F) in January to an average of 60.9°F in July (for the 30-year period from 1981 to 2010; NCDC 2020). A weather station was installed at Clear Sky Lodge Airport in 2009; temperature averages recorded between 2009 and 2019 are similar to the data for Nenana (WRCC 2020). Mean annual precipitation at

Nenana is 12.05 inches, with the majority occurring from June through September (for the 30-year period from 1981 to 2010; NCDC 2020). Snowfall data are not available for the Nenana Municipal Airport beyond 2000. Snowfall at Clear Sky Lodge Airport averages 67.80 inches per year, primarily from October through March (recorded 2009 through 2020; WRCC 2020).

Over the past 60 years average annual air temperatures in Alaska have increased by 3°F, and average winter temperatures have increased by 6°F (Chapin et al. 2014). Projected global climate change has the potential to further increase average temperatures, reduce ice extent in the Arctic Ocean during summer, increase precipitation, increase sea levels, and increase ground temperatures in Alaska. Some studies predict that average annual temperatures in Alaska will rise an additional 2 to 4°F by 2050 (Chapin et al. 2014). These effects would exacerbate flooding, accelerate erosion, lead to loss of terrestrial habitat, cause infrastructure damage, and may require some community relocations.

### 3.4.3 Environmental Consequences

#### 3.4.3.1 Evaluation Criteria

Potential impacts on climate, and specifically climate change, are typically evaluated by determining the volume of GHG emissions that would result from a proposed action and alternatives. There are no established evaluation criteria for GHG emissions relevant to the Proposed Action given the scale of the project and the absence of a stationary source of air emissions. For reference, USEPA requires reporting of GHG emissions from stationary sources that exceed 25,000 metric tpy CO<sub>2e</sub>.

#### 3.4.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace. GHG emissions from aircraft operations within the study area would be consistent with existing levels and would likely increase gradually over time as a result of expected growth in air traffic volume, assuming no new changes in technology occur to reduce GHG emissions.

#### 3.4.3.3 Proposed Action

##### 3.4.3.3.1 *LRDR Operational Changes*

The LRDR operational changes would not add or modify any stationary sources of air emissions and would not result in any increase in GHG emissions.

##### 3.4.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

FAA's actions under the Proposed Action would result in slightly increased flight times that would generate a minor increase in GHG emissions from increased fuel use. The increased GHG emissions (in metric tpy of CO<sub>2e</sub>) were calculated using the estimated numbers of IFR and VFR flights at all altitudes that would be detoured annually, both during the interim phase when the TFRs are active and after the Restricted Areas are established and airways are amended and established (see **Section 3.1, Airspace Management**). The estimated GHG emissions calculated assumes the average and maximum reroute lengths for IFR flights; all estimates assume that VFR flights would be detoured 1.3 NM. The method used to calculate aircraft emissions increases is further described in **Section 3.2, Air Quality**, and **Appendix E** contains a detailed spreadsheet providing the calculations.

The change in flight distances for the procedures that would be amended is not included in this analysis. The amendments to the procedures at Healy River Airport would require approximately five IFR flights per year to fly between 1.4 and 10.9 additional NM; this additional flight distance would result in a negligible

increase in GHG emissions. The amendment to the TAGER EIGHT ARRIVAL procedure at Ted Stevens Anchorage International Airport would not require increased flight distance.

### **Restricted Areas**

Establishment of the proposed Restricted Areas would require VFR flights to detour around the restricted airspace. The increases in annual GHG emissions from VFR and IFR aircraft after the Restricted Areas are established and the airways are amended and established are addressed below under **Changes to Federal Airways**. Although VFR flights would not be affected by changes in federal airways and instrument flight procedures, they are combined with IFR flights for purposes of the GHG analysis.

### **Interim Phase: Potential TFR Implementation**

If the interim phase is needed, implementation of TFRs would require existing commercial and recreational aircraft flights to reroute or detour around the TFRs. Up to 10 VFR flights daily would be required to detour around the TFRs in the vicinity of CAFS. Up to 5 IFR flights daily on airways V-436 or J-125 or flying direct from Anchorage to Deadhorse would be rerouted around the TFRs, as described in **Section 3.1.3.3.2**. The average increased flight distance for all rerouted IFR flights during the interim phase would be 11.8 NM, and the maximum increased flight distance required would be 42.5 NM (see **Table 3.1-2**). The average estimated annual increase in GHG emissions from rerouted and detoured aircraft flights during the interim phase would be 1,623.1 metric tpy CO<sub>2</sub>e, and the maximum estimated annual increase would be 5,825.1 metric tpy CO<sub>2</sub>e. The interim phase would be expected to last less than one year, thus emissions would be lower than these estimates.

### **Changes to Federal Airways**

Up to 10 VFR flights daily would be required to detour around the Restricted Areas after they are established. Up to 5 IFR flights daily that would have used the portions of airways V-436 and J-125 that would be affected, or flying direct from Anchorage to Deadhorse would be routed to alternate routes, as described in **Section 3.1.3.3.2**. The average increased flight distance for all IFR flights following the amendment of federal airways would be 20.1 NM, and the maximum increased flight distance required would be 51.8 NM (see **Table 3.1-3**). The average estimated annual increase in GHG emissions from the changed flight routes following establishment of the Restricted Areas and changes to airways would be 2,755.1 metric tpy CO<sub>2</sub>e, and the maximum estimated annual increase would be 7,099.5 metric tpy CO<sub>2</sub>e.

#### **3.4.3.3.3 Summary of Climate Impacts**

The Proposed Action would result in a maximum increase of approximately 7,100 metric tpy CO<sub>2</sub>e annually. For comparison purposes, this is equivalent to the energy used by roughly 820 homes for 1 year (USEPA 2020d), and is approximately 0.00011 percent of the total 6,456.72 million metric tons of CO<sub>2</sub>e emissions reported for the U.S. in 2017 (USEPA 2017).

Ongoing changes to climate patterns in Alaska are described in **Section 3.4.2**. These climate changes are unlikely to affect MDA's ability to implement the Proposed Action, and the Proposed Action would not contribute appreciably to the regional (i.e., Alaska) impacts of global climate change because of the minor increase in CO<sub>2</sub>e emissions.

The Proposed Action would have short-term, negligible adverse impacts on climate change during the interim phase, and permanent, negligible adverse impacts after the proposed Restricted Areas are established.

## **3.5 Hazardous Materials, Solid Waste, and Pollution Prevention**

### **3.5.1 Definition of the Environmental Category**

For this analysis, “hazardous materials” and “hazardous wastes” include those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. § 9601(14)), the Resource Conservation and Recovery Act (42 U.S.C. § 6921), and the Toxic Substances Control Act (15 U.S.C. § 53). In general, they include substances that have the potential to harm humans, animals, or the environment because of their physical, chemical, or toxic characteristics. Products containing hazardous materials that could result in the generation of hazardous waste include fuel, adhesives, sealants, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, and cleaners. A hazardous material or waste can be a solid, liquid, gas, or combination with toxic, flammable, reactive, or corrosive properties. Properties that are environmentally affected by releases of hazardous substances are referred to as “contaminated sites.”

### **3.5.2 Affected Environment**

The study area for this environmental category is the footprint of the LRDR facilities described in the 2016 EA (DoD 2016b).

#### **3.5.2.1 Hazardous Materials**

A *Hazardous Waste Management Plan* (HWMP) prepared for CAFS in 2015 and revised in 2019 outlines the management of hazardous materials, including hazardous waste. The HWMP describes waste minimization and spill prevention measures and outlines the roles and responsibilities of CAFS personnel and other organizations responsible for the HWMP at CAFS. The HWMP allows hazardous waste to accumulate at satellite collection points around the installation to a volume not greater than 55 gallons and for no longer than 5 working days (USAF 2019b). Once materials are categorized as hazardous, they are containerized in point-of-use storage locations around the facility and then transported to the designated hazardous storage facility once the containers are full (DoD 2016b).

CAFS is considered a large-quantity generator of hazardous waste and is therefore allowed to accumulate hazardous waste for a period of up to 90 days. As a large-quantity generator, CAFS must submit hazardous waste reports every 2 years. Types of hazardous waste generated at CAFS include lead-based paint, mercury and methyl ethyl ketone, solvents, batteries, oil containing lead, sulfide, cadmium and chromium, and spill residuals.

Storage areas for hazardous waste at CAFS include base supply, the paint shop, vehicle maintenance, the new fire station construction area, and the LRDR construction area. If reuse or recycling of hazardous waste is deemed unfeasible, it is managed and disposed of in accordance with the HWMP and 40 CFR Part 265. The Resource Conservation and Recovery Act requires that uncharacterized waste be managed as hazardous waste, pending determination (USAF 2019b). Hazardous waste generated at CAFS is transported to permitted facilities in the lower 48 states, because no such facilities exist in Alaska.

Aboveground storage tanks at CAFS range in size from 50 to 30,000 gallons. They serve primarily as petroleum storage for heating and vehicle fuel. The LRDR facilities described in the 2016 EA (DoD 2016b) also include three 50,000-gallon, double-walled, welded steel tanks with epoxy-coated interiors placed in concrete vaults below grade. These tanks will be used to store diesel fuel for the backup generators at the LRDR power plant. Based on calculations of potential fuel requirements in the future, a fourth 50,000-gallon diesel fuel storage tank has been added at the LRDR power plant.

According to ADEC's Division of Spill Prevention and Response database (ADEC 2020b), there are no active or closed contaminated sites within the study area (i.e., the LRDR facilities footprint).

### 3.5.2.2 Solid Waste

Waste generated at CAFS must be handled as hazardous until a determination is made regarding whether the waste is hazardous or not. If waste generated is determined not to be hazardous, it is collected in trash receptacles and metal bins placed throughout the installation. Solid waste generated at CAFS is then collected and delivered to the Denali Borough Landfill (DoD 2016b), located east of the Parks Highway, about 1 mile south of the road leading to CAFS from the highway.

### 3.5.2.3 Pollution Prevention

The Spill Management Plan for CAFS addresses training, identification, labeling, storage, reporting, and management procedures in the event of a hazardous material spill at CAFS. Materials covered under this plan include products such as solvents, paints, cleaners, motor oils, gasoline, coolants, and hydraulic fluids. The CAFS Fire Department is designated as the primary responder to spills and maintains all applicable spill response equipment. The Spill Management Plan also identifies other responders and contractors who are equipped to manage spills based on type and quantity of the spill (USAF 2018a).

Additionally, CAFS has developed a Pollution Prevention Plan that aims to reduce or eliminate hazardous substances, pollutants, and contaminants at the installation (USAF 2000). Recycling capabilities in Alaska are limited, especially in remote areas such as CAFS. A waste minimization program is also in place at CAFS that guides personnel to evaluate, minimize, and recycle waste when allowable and possible.

## 3.5.3 Environmental Consequences

### 3.5.3.1 Evaluation Criteria

Analysis of potential impacts from hazardous materials and wastes is dependent on the resource impacted (e.g., water resource, critical habitats, or listed or protected species), the sensitivity of the resource, the extent of the impact on the resource, and the duration of the impact. According to FAA's 1050.1F Desk Reference (FAA 2020b), factors to consider include the potential of a proposed action or alternative to:

- Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- Involve a contaminated site;
- Produce an appreciably different quantity or type of hazardous waste;
- Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or
- Adversely affect human health and the environment.

### 3.5.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. The current practices associated with the generation, use, storage, and disposal of hazardous materials and solid waste would continue.

### 3.5.3.3 Proposed Action

#### 3.5.3.3.1 *LRDR Operational Changes*

The Proposed Action could result in a small increase of maintenance materials (e.g., oily rags, oil/fuel filters, batteries) that would require disposal. Because the existing Pollution Prevention Plan and waste

minimization program would apply to the Proposed Action, the LRDR operational changes would have a negligible, permanent adverse impact on the management of hazardous materials and solid waste at CAFS.

### 3.5.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft

#### Restricted Areas

Establishment of the proposed Restricted Areas would not result in a change to the generation, use, storage, or disposal of hazardous materials or solid waste.

#### Interim Phase: Potential TFR Implementation

If needed, implementation of TFRs and the resulting detours and rerouting of aircraft would not change the generation, use, storage, or disposal of hazardous materials or solid waste.

#### Changes to Federal Airways and Instrument Flight Procedures

Changes to federal airways and instrument flight procedures would not change the generation, use, storage, or disposal of hazardous materials or solid waste.

### 3.5.3.3.3 Summary of Impacts on Hazardous Materials, Solid Waste, and Pollution Prevention

The Proposed Action would have permanent, negligible adverse impacts on hazardous materials, solid waste, and pollution prevention.

## 3.6 Historical, Architectural, Archaeological, and Other Cultural Resources

### 3.6.1 Definition of the Environmental Category

Historical, architectural, archaeological, and other cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions. Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archaeological sites, structures, objects, and districts, which are considered important to a culture or community. Historical, architectural, archaeological, and cultural resources may also include aspects of the physical environment—namely, natural features and biota—that are a part of traditional ways of life and practices and are associated with community values and institutions.

**Cultural resources** is a term that commonly refers to archaeological, historical, and architectural resources; structures; travel corridors; and places of religious, spiritual, or cultural significance to tribes, including Traditional Cultural Properties (TCP), sacred sites, traditional use areas, cultural landscapes, and geographic features.

**Traditional Cultural Properties** are properties that are eligible for inclusion on the National Register of Historic Places (NRHP) based on their association with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. AFMAN 32-7003, *Environmental Conservation*, defines Traditional Cultural Properties as follows:

Sites, districts, buildings, structures, or objects associated with cultural practices or beliefs of a living community that are rooted in the history of the community, and are important in maintaining the continuing cultural identity of the community. Section 106 consultation with tribes is required to identify traditional cultural properties and to determine if any meet National Register eligibility criteria of 36 CFR § 60.4. may be

determined eligible for the NRHP, and as such, are considered under the Section 110 process as traditional cultural properties. Examples of traditional cultural properties include: 1) locations where Native American or other groups traditionally gather wild foods or medicines; 2) ethnic neighborhoods whose cultural character is important to those who live in them; 3) rural landscapes reflecting traditional patterns of agriculture or social interaction; and 4) landforms associated with Native American traditions and religious practices (USAF 2020).

Subsistence resources and practices are discussed in **Section 3.12, Subsistence**.

**National Historic Landmarks** (NHLs) are historic places that have significance on a national level. They are designated as exceptional due to their ability to illustrate an important theme in U.S. heritage. NHL recognition under the NRHP is an official designation by the federal government of the national significance of historic properties. NHLs are the nation's most significant historic places and include "buildings, sites, districts, structures, and objects [that] possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archeology, engineering, and culture" (NPS 1999).

**Archaeological resources** comprise areas where human activity has measurably altered the earth or where deposits of physical remains are found (e.g., projectile points and bottles), but standing structures do not remain.

**Architectural resources** include standing buildings, structures (such as bridges and dams), landscapes, and districts composed of one or more of those resource types. Generally, architectural resources must be more than 50 years old to warrant consideration for the NRHP; resources constructed more recently may meet the criteria for designation if they are of exceptional importance or have the potential to gain significance in the future.

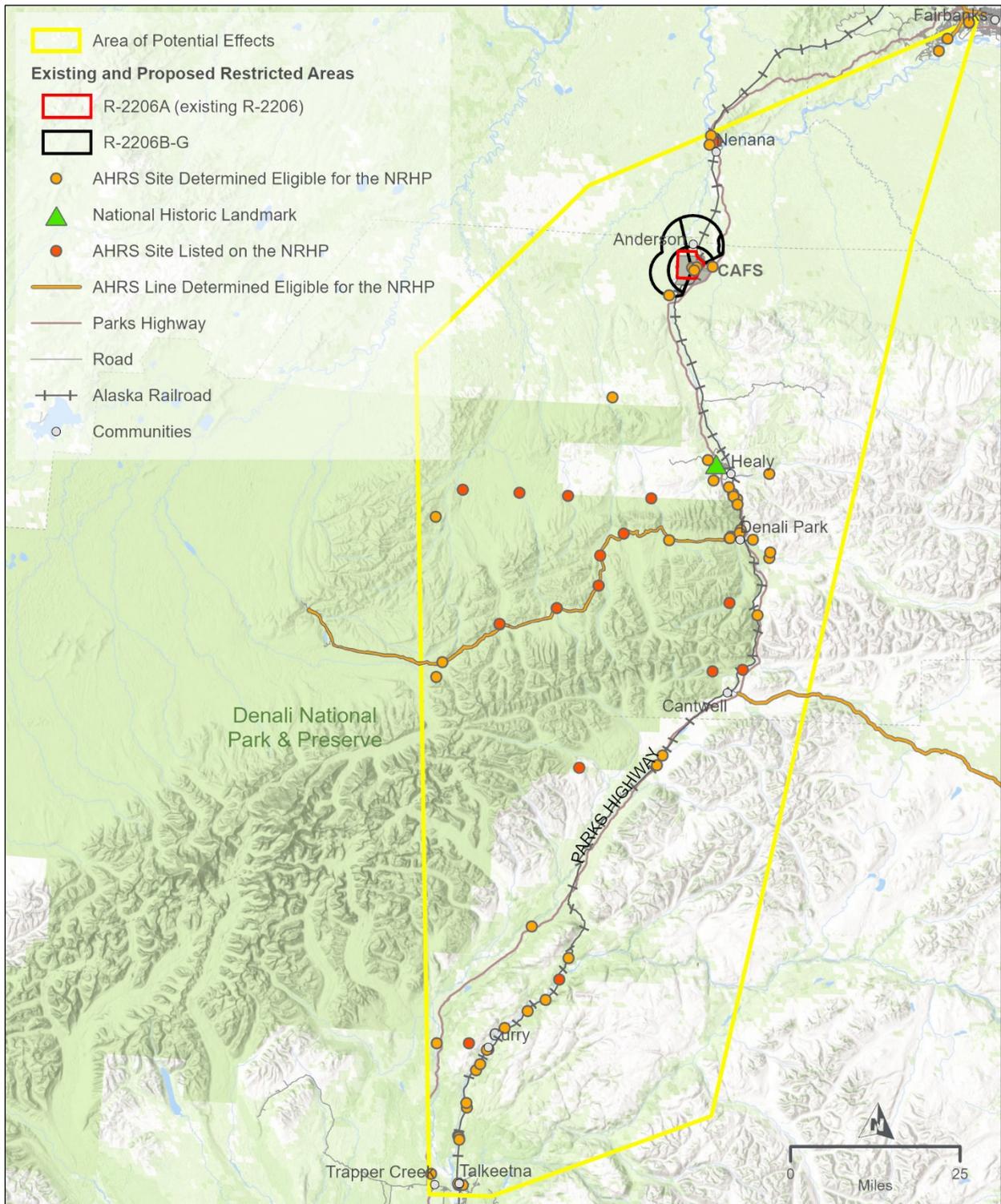
### **3.6.2 Affected Environment**

Potential impacts on cultural resources from construction and operation of the LRDR were analyzed in the 2016 EA (DoD 2016b). The analysis in the 2016 EA focused on the types of activities that would occur, their locations, and the significance of the resource in that location. The 2016 EA reviewed the CAFS Integrated Cultural Resources Management Plan (ICRMP) and existing data (including archaeological surveys, maps, and previous environmental documents) to determine the location and significance of any cultural resources. The 2016 EA included a review of a study on the inventory of Cold War properties conducted in 1995 for information on the NRHP eligibility of the properties and their locations in relation to the Proposed Action. The proposed construction sites were compared to locations of potential cultural resources in the area. Based on this analysis, the 2016 EA concluded that there would be no substantive impacts to cultural resources due to project construction or operation (DoD 2016b).

#### **3.6.2.1 Area of Potential Effects**

Section 106 of the NHPA requires identification and analysis of an Area of Potential Effects (APE), defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist" (36 CFR § 800.16(d)). The APE for the current undertaking is defined as a polygon that encompasses the area within which most changes to restricted airspace and aircraft flight paths would occur under the Proposed Action (**Figure 3.6-1**). The APE does not extend north of Fairbanks because noise screening indicates there would be no reportable noise increases (see **Section 3.9.3**). The APE is the study area for cultural resources.

**Figure 3.6-1. Area of Potential Effects**



**3.6.2.2 Cultural Resources and Historic Properties**

The APE encompasses the Nenana Valley, an area that has been inhabited by humans for thousands of years. The region has an archaeologically rich history evidenced by hundreds of documented

archaeological sites, some dating to more than 12,000 years ago (Goebel et al. 1991). The APE is within the traditional territory of the Nenana-Toklat band of Lower Tanana Athabascans (USAF 2019c). The area's long history of occupation by Alaska Native cultures, combined with historic-era development in the immediate vicinity, including gold rushes, the Alaska Railroad, and military development, has resulted in a region with a rich and culturally diverse history that is manifest both on the landscape and in the people who currently occupy the area.

#### *3.6.2.2.1 Alaska Heritage Resources Survey Sites within APE*

The data for this cultural resource analysis are compiled from the NRHP, the Alaska Heritage Resources Survey (AHRs) database (ADNR 2020a), the Alaska Department of Natural Resources (ADNR) Division of Mining, Land and Water Revised Statute (RS) 2477 trails database (ADNR Undated), and the CAFS ICRMP (USAF 2019c). All cultural resources listed within the National Park Service (NPS) NRHP Database and the CAFS ICRMP are included within the AHRs database. Therefore, in an effort to simplify the discussion and avoid redundant information, only the AHRs database is included in the following discussion.

The AHRs database<sup>27</sup> identifies 907 documented cultural resources within the APE (Table 1 of **Appendix G**). Of these, 468 sites are historic in age, along with 373 prehistoric-era sites, 20 historic/modern sites, 14 modern sites, 4 prehistoric/historic sites, 3 protohistoric sites, 1 prehistoric/modern site, and 24 sites attributed to an unidentified period. Additionally, 4 paleontological sites have been identified within the APE. These resources are excluded from further discussion because paleontological sites are not cultural resources. The majority of the AHRs documented resources (649 sites) have not been evaluated for their NRHP eligibility potential, another 150 have been determined not eligible, and 1 site had its NRHP nomination closed. Of the documented sites, 21 have been listed in the NRHP (including 1 NHL), and 86 have either been determined eligible for listing on the NRHP or are contributing properties to an eligible historic district.

#### *3.6.2.2.2 Historic Districts within APE*

There is one documented historic district within the APE: Denali Park Road Historic District (HEA-00517/MMK-00195). The road corridor historic district consists of a 3,360-acre, 300-foot-wide swath of land extending 150 feet on either side of the centerline of the Denali Park Road. Construction of the road began in 1922. The Denali Park Road served as the backbone of the park's circulation system. The road is significant for its association with the period of scenic road development in national parks in the 1920s and 1930s and with the Mission 66 park development program in the 1950s and 1960s. The road is also a rustic example of landscape engineering that combines NPS aesthetic road design principles with the Alaska Road Commission's experience of constructing roads in harsh environments (NPS 2013). This historic district has been determined eligible for listing on the NRHP, but does not have an NRHP nomination.

#### *3.6.2.2.3 Properties Listed on the National Register of Historic Places within APE*

Table 2 in **Appendix G** lists the historic properties within the APE that are listed on the NRHP (also shown on **Figure 3.6-1**). The site types that have been determined eligible for listing on the NRHP include buildings and structures within CAFS associated with the Cold War, Alaska Railroad bridges, archaeological sites, mining camps and features, and transportation trails/roads. Most NRHP-eligible sites are located within Denali National Park or CAFS, or are associated with the Alaska Railroad. This does not mean that other potentially eligible sites are not located within the APE, but that the majority of

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<sup>27</sup> AHRs database reviewed February 2020.

evaluations on site eligibility has occurred on these lands or been conducted on projects associated with these agencies.

#### 3.6.2.2.4 *National Historic Landmarks within APE*

There is one NHL located within the APE: the Dry Creek Archaeological Site (HEA-00005) (see **Figure 3.6-1**). This is a multi-component archaeological site located on a bluff overlooking Dry Creek, approximately 30 miles south of CAFS near the community of Healy (see **Figure 3.6-1**). The site is an NHL under Criterion D, Informational Potential, and is one of the oldest archaeological sites in Alaska. The cultural materials closely resemble those of the Diuktai culture of the Aldan River Valley in Siberia (18,000 Before Present [BP] to 10,000 BP). Some of the later artifacts at Dry Creek are very similar to Akmak (11,000 BP) and Denali Complex (10,500 BP to 8,000 BP) assemblages, which, although more recent than Diuktai, still bear resemblance to Siberian culture. There are few examples of this period in Alaskan prehistory, as most Interior Alaska sites of this age have eroded or have been buried by shifting rivers. This makes Dry Creek especially important to the understanding of the cultures of the late Pleistocene and early Holocene (AHRs Site Card).

#### 3.6.2.2.5 *Sacred Sites, Traditional Cultural Properties within APE*

There are currently no Alaska Native sacred sites, TCPs, or cultural landscapes identified within the APE. No properties of tribal or cultural significance have been identified at CAFS (USAF 2019c). MDA and DAF are continuing to consult with potentially affected Tribes in the area.

Although TCPs and ethnographic resources or landscapes have not been identified within the APE, there is potential for them to exist due to the long habitation of the area and the proximity of federally recognized Tribes. In the event that previously unknown cultural resources are identified during project activities or through consultation, MDA, as the lead federal agency, will follow the procedures outlined in 36 CFR Part 800 and established in AFMAN 32-7003 and Department of Defense Instruction (DoDI) 4715.16.

The ICRMP (USAF 2019c) provides cultural resource protection procedures for CAFS. CAFS and the Nenana Native Council entered into a Comprehensive Agreement in 2009 that requires CAFS to provide timely notification of proposed activities or projects that have the potential to affect tribal resources, tribal rights, or Indian lands. In accordance with the requirements of the Comprehensive Agreement, CAFS will provide the Nenana Native Council notifications and the opportunities to review NEPA documentation (USAF 2019c).

In addition to the Nenana Native Council, additional tribal entities and Alaska Native corporations have been identified in scoping and outreach efforts, including Doyon, Limited; Manley Traditional Council; Tanana Tribal Council; Minto Village Council; Rampart Village Council; Stevens Village IRA Council; Dinyee Corporation; Seth-de-ya-ha Corporation; Tozitna Limited; and Baan O Yeel Kon Corporation (see **Appendix A**). Continued consultation with these entities may lead to the identification of TCPs or cultural landscapes within the APE. If TCPs are identified as part of these efforts, impacts to these properties under NEPA and Section 106 will need to be considered.

#### 3.6.2.2.6 *Revised Statute 2477 Trails that Cross APE*

In addition to AHRs sites, RS 2477 trails (RST) are also included in this analysis since this type of resource may meet the age requirements and NRHP criteria necessary to be considered a historic property, as many trails are important on both local and state levels. For example, RST 346 (Nenana-Kantishna Trail, FAI-02366) was determined eligible for the NRHP due to its association with the development of the Alaska Road Commission road system and for its role in transporting people and goods to the Kantishna Mining District (FAI-02366 AHRs Site Card). Examples of RS 2477 trails include

pack trails, sled dog trails, and wagon roads. RS 2477 trails within the APE (ADNR Undated) are listed in Table 3 of **Appendix G**.

### 3.6.2.3 Regional History

The CAFS ICRMP (USAF 2019c) and 2016 EA (DoD 2016b) each provide detailed descriptions of the physical setting, prehistory, history, and prior cultural resource investigations within and near CAFS. A brief summary of these descriptions is provided below.

Archaeological evidence indicates that the region has been occupied for at least 12,000 years. Interpretation of the cultural chronology of this area stems largely from research at the Dry Creek Archaeological Site. While no archaeological sites have been located within CAFS, nearby sites are characterized by projectile points, cores, and other lithic tools. The Nenana River was used by prehistoric people for fishing, and prehistoric fish camps may be buried along the modern or past courses of the river (USAF 2019c, DoD 2016b).

The APE falls within the traditional territory of the Nenana-Toklat band of Lower Tanana Athabascans, an area that extended from the Nenana River southward into the Alaska Range (Bowers et al. 1995). Traditional land use of the area was mainly for fall moose and other small mammal hunting (USAF 2019c). While no recorded villages or seasonal settlements are located within the APE, it is likely that such properties once existed at unrecorded locations due to usage of the area for hunting, trapping, and seasonal movements along trails and frozen rivers (Bowers et al. 1995). By the end of the nineteenth century, the community of Nenana had been established, reflecting the local population's increased interest in the fur trade and employment related to steamboat travel along the Tanana River (Bowers et al. 1995).

The Alaska Railroad was built between 1915 and 1923 and connected Seward to Fairbanks. It parallels the Nenana River from Healy to Nenana. Construction camps were located at intervals along the route, including at Nenana and Clear. CAFS was named after Clear Site, a railroad construction camp. Due to frequent flooding and washing out of the track, the track was moved in 1920 to its current location outside the flood zone. Clear served as a service point for this section of the railroad, and railroad workers and their families were housed there (USAF 2019c).

More than 34,600 acres of land at Clear were withdrawn for a military reservation in 1947. In 1949, the site was designated by the Alaskan Air Command as Clear Air Force Auxiliary Field and was used as a gunnery range. The site was then transferred to the Interior Department in the 1950s (USAF 2019c). In 1958, USAF reacquired the lands at Clear as one of three sites for the newly conceived BMEWS to provide early warning from a Soviet Inter-Continental Ballistic Missile attack over the North Pole. The three sites (Clear; Thule, Greenland; and Fylingdales, Great Britain) were intended to work cooperatively to integrate radar defenses across the Arctic. Clear was chosen due to its favorable access, foundation materials, horizon clearances, and lack of conflicting communication or other electronic interference (USAF 2019c). The microwave radar facilities were constructed beginning in 1958, and the station became operational in 1961 (DoD 2016b).

### 3.6.2.4 Previous Cultural Resource Surveys

Prior cultural resource surveys and identification efforts within CAFS focused on the identification and documentation of cultural resources while complying with regulatory requirements for mitigation of adverse effects to cultural resources to support mission requirements. As stated in the ICRMP, all of the lands and buildings on CAFS were previously inventoried for cultural resources. For archaeological sites, this was accomplished through surface reconnaissance surveys (Goebel and Bigelow 1991, Bowers et al. 1995). USAF has evaluated buildings on CAFS for historical significance in relation to the Cold War era.

To date, no evidence of prehistoric activity on CAFS has been documented. Additionally, no historic resources dating to a time period before 1961 have been identified.

Two cultural resource surveys have occurred at CAFS: a 1991 survey that investigated undeveloped portions of CAFS through sampling and subsurface testing in areas considered high potential for archaeological sites (Goebel and Bigelow 1991), and a 1994 survey that expanded on the prior survey to include sampling of additional undisturbed lands (Bowers et al. 1995). Neither survey resulted in the identification of prehistoric archaeological sites. Two sites associated with the Alaska Railroad (a railroad camp and a portion of the original Alaska Railroad bed) were identified, but were determined not eligible for listing on the NRHP (DoD 2016b).

Cultural resources surveys within the APE outside the boundaries of CAFS have been ongoing for many decades. These included surveys completed on behalf of NPS within Denali National Park, Parks Highway corridor surveys sponsored by the Alaska DOT&PF, Bureau of Indian Affairs surveys, and surveys sponsored by the Alaska Liquefied Natural Gas and Alaska Gas Development Corporation entities. Combined, these surveys have contributed to the identification and documentation of the 907 AHRS sites located within the APE.

### **3.6.3 Environmental Consequences**

#### **3.6.3.1 Evaluation Criteria**

Under Section 106 of the NHPA and its implementing regulations (36 CFR Part 800), an adverse effect is found when an undertaking (or action) may alter, directly or indirectly, any of the characteristics of a historic property that qualify it for NRHP eligibility in a manner that would diminish the property's historic integrity of location, setting, feeling, association, design, materials, or workmanship. Impacts on cultural resources include potential effects on buildings, sites, structures, districts, and objects eligible for or included in the NRHP; cultural items as defined in the Native American Graves Protection and Repatriation Act; archaeological resources as defined by the Archaeological Resources Protection Act of 1979; and archaeological artifact collections and associated records as defined by 36 CFR Part 79. Impacts on cultural practices occur when an action alters how a culture or group engages in their practices or beliefs, such as changes in access to places or resources.

The extent of a potential impact on cultural resources or practices can vary from no effect, to minor or moderate effect, to one that is considered major. A major impact would involve substantial changes to cultural resources or practices. The action would alter one or more character-defining features of a cultural resource to the extent that the resource is no longer eligible for listing in the NRHP. The action would block or greatly affect access to resources or affect cultural practices to the extent that those practices and/or associated beliefs may not survive.

Adverse effects on historic properties can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance. Ethnographic resources such as TCPs and ethnographic landscapes for which the feeling or setting of the property contributes to its significance and/or integrity, may be adversely impacted by changes in visual, auditory, or atmospheric levels of the existing landscape. Viewshed and noise analyses can help to determine whether the undertaking would potentially be heard and/or seen from the historic property and would result in an adverse effect to the historic property.

### 3.6.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. Cultural resources, including archaeological sites, historic properties, and ethnographic resources, would remain unaffected by LRDR operations.

### 3.6.3.3 Proposed Action

#### 3.6.3.3.1 *LRDR Operational Changes*

Archaeological sites would not be impacted by continuous LRDR operations since there would be no ground disturbance or other on-the-ground activities. Additionally, historic-era sites identified within the APE, including the NRHP-listed resources described above (also see Table 2 in **Appendix G**) and architectural resources associated with the Cold War-era installation at CAFS, would not be impacted because the operational changes would not result in changes to the environmental setting that would affect the properties' setting or integrity. No ethnographic resources such as TCPs and ethnographic landscapes have been identified within the APE for which the feeling or setting of the property contributes to its significance and/or integrity. The State Historic Preservation Office concurred that a finding of no historic properties affected is appropriate for the proposed undertaking (see **Appendix A**).

#### 3.6.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

##### **Restricted Areas**

Establishment of the proposed Restricted Areas would not impact archaeological sites because there would be no ground disturbance or other on-the-ground activities. Changes to VFR traffic patterns resulting from the proposed Restricted Areas would not affect other cultural resources, including the NRHP-listed resources described above (also see Table 2 in **Appendix G**), because they would not result in changes to the environmental setting (i.e., reportable increase in noise) that would affect the properties' setting or integrity.

##### **Interim Phase: Potential TFR Implementation**

Similar to what is described above for the proposed Restricted Areas, no impacts to historical, architectural, archaeological, or other cultural resources would occur from the implementation of TFRs, if the interim phase is needed. As described in **Section 3.9, Noise and Compatible Land Use**, results of the noise screening show that detours of VFR flights and rerouting of IFR flights during the interim phase would not result in significant or reportable noise increases. Similarly, as described in **Section 3.13, Visual Effects**, implementation of the TFRs would have negligible impacts on the visual environment. Furthermore, there are no cultural resources identified within the APE at this time for which the feeling or setting of the property contributes to their significance and/or integrity.

##### **Changes to Federal Airways and Instrument Flight Procedures**

For the same reasons described above for the interim phase, changes to federal airways and instrument flight procedures would not impact historical, architectural, archaeological or other cultural resources.

### 3.6.3.3.3 *Summary of Impacts on Historical, Architectural, Archaeological, and Other Cultural Resources*

The Proposed Action would have no impacts on historical, architectural, archaeological or other cultural resources. Although a change in the visual or auditory setting of the existing landscape may alter the setting or feeling of a historic property (including ethnographic resources such as TCPs and ethnographic landscapes), there are none currently identified within the area affected by the Proposed Action for which the feeling or setting of the property contributes to its significance and/or integrity.

While ethnographic resources or landscapes have not been identified within the APE, there is potential for them to exist due to the long habitation of the area and the proximity of federally recognized Tribes. Consultation with the State Historic Preservation Office and federally recognized Tribes is ongoing. In the event that previously unknown cultural resources are identified through project activities and/or consultation, the lead federal agency should follow the procedures outlined in 36 CFR Part 800 to determine if the cultural resource is a historic property for which adverse effects to such properties would need to be determined.

## 3.7 Land Use

### 3.7.1 Definition of the Environmental Category

The land use topic typically covers land ownership patterns in a defined area, the uses planned for those lands by governing bodies through land use plans and zoning regulations, and—if different—the actual uses of the land. The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in master planning and local zoning laws. Land use planning ensures orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential impacts on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, and the duration of a proposed activity and its permanence.

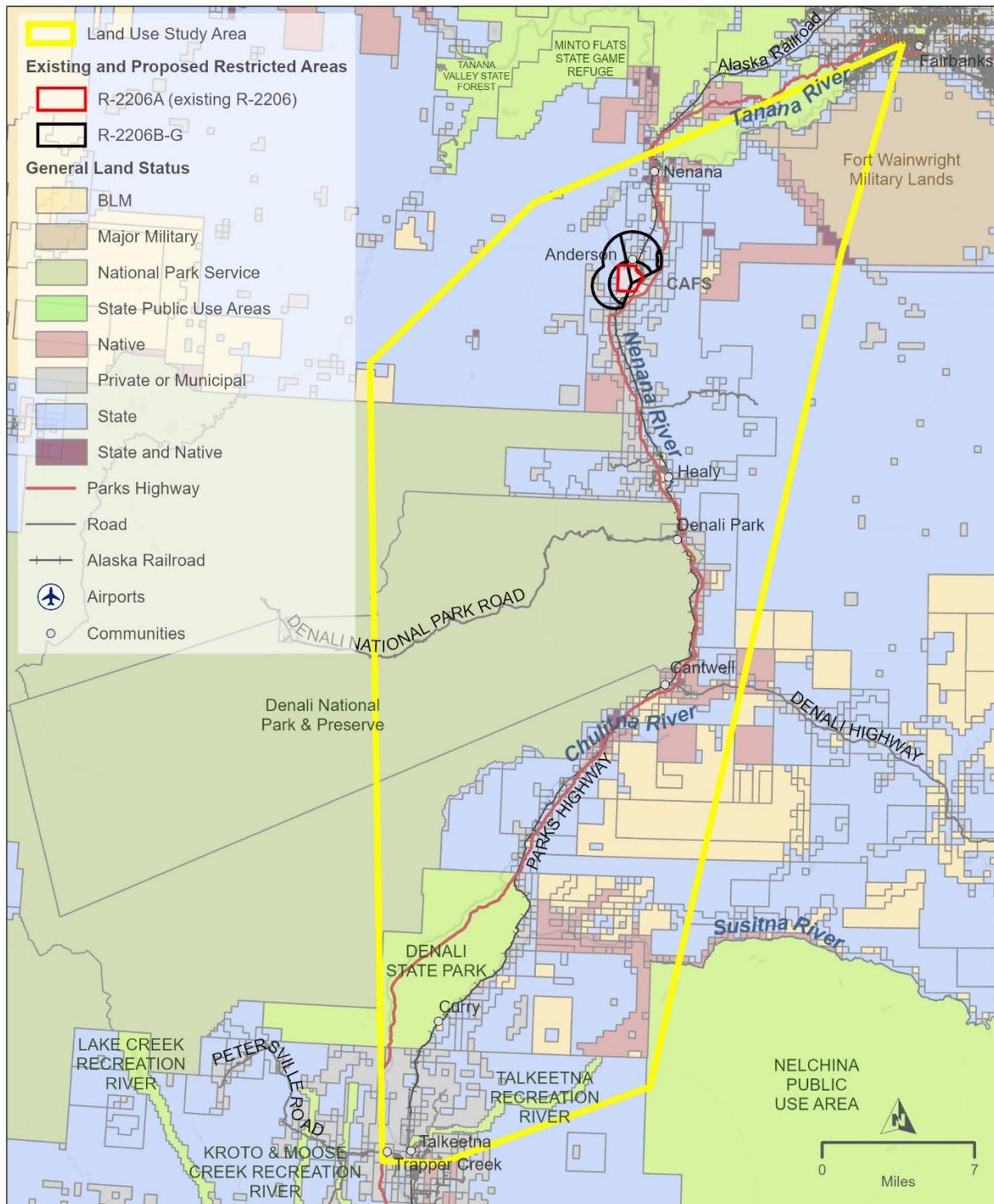
A key consideration of land use is recreation, especially when it is designated for public use. Recreation refers to natural and human-made lands designated by planning entities to offer visitors and residents diverse opportunities to enjoy leisure activities. Recreational resources are places or amenities set aside as parklands, beaches, trails, recreational fields, sport or recreational venues, open spaces, open waters, and aesthetically pleasing landscapes along with a variety of other uses. Other less-structured activities (e.g., cultural experiences, hunting, gathering, and fishing) are performed in broad, less-defined locales.

Noise-compatible land use is addressed in **Section 3.9, Noise and Compatible Land Use**.

### 3.7.2 Affected Environment

The study area for land use encompasses the area within which most changes to restricted airspace and aircraft flight paths would occur under the Proposed Action (**Figure 3.7-1**). The study area comprises portions of the FNSB, Yukon-Koyukuk Census Area, Denali Borough, and Matanuska-Susitna Borough.

**Figure 3.7-1. Study Area for Land Use with Land Ownership**



### 3.7.2.1 Land Governance

Each borough in Alaska is a local government, the equivalent of a county in other states. Each of the three boroughs within the study area has a land use or comprehensive plan. The portions of the state outside the organized boroughs are within the Unorganized Borough, which is divided into Census Areas that do not have a central governing body. Within each borough are several large state or federal government land tracts. Many of these have their own land use plans. Major plans and other potentially relevant plans for the largest land areas in the study area are listed in **Table 3.7-1**.

The Alaska Native Claims Settlement Act created Alaska Native regional corporations and village corporations across the state and granted rights to select and take ownership of large tracts of federal lands. Alaska Native corporation lands occur in the study area. The corporations are privately held by Alaska Native shareholders and do not typically have published or publicly available land use plans.

**Table 3.7-1. Land Use Planning Documents**

Jurisdiction	Plan Title	Plan Date
Fairbanks North Star Borough	Fairbanks North Star Borough Regional Comprehensive Plan	2005
U.S. Army	U.S. Army Garrison Fort Wainwright Integrated Natural Resources Management Plan (Tanana Flats Training Area)	2013
Denali Borough	Denali Borough Comprehensive Plan	Revision 3, 2015
Matanuska-Susitna Borough	Matanuska-Susitna Borough Comprehensive Development Plan–2005 Update	2005
State of Alaska	Susitna Area Plan for State Lands	1985
	Susitna Matanuska Area Plan for State Lands	2011
	Tanana Basin Area Plan	1991, amended 2009
	Susitna Basin State Recreation Rivers Management Plan	1991
	Denali State Park Management Plan	2006
	Minto Flats State Game Refuge Management Plan	1992
U.S. Department of Interior Bureau of Land Management	Resource Management Plan for the Central Yukon Planning Area	1986
U.S. Department of Interior National Park Service	Consolidated General Management Plan for Denali National Park	2006
U.S. Air Force	U.S. Air Force Integrated Natural Resources Management Plan, Clear Air Force Station	2019

Areas of concentrated population include the communities listed in **Table 3.7-2**. Except for Fairbanks, the communities (even those that own lands, such as Anderson) do not have their own individual land use plans.

**Table 3.7-2. Communities in the Land Use Study Area**

Borough	Community	Population <sup>(1)</sup>	Description
Fairbanks North Star Borough	City of Fairbanks	31,677 (FNSB 97,585)	The study area overlaps the Fairbanks metropolitan area, including Fairbanks International Airport
Unorganized Borough – Yukon-Koyukuk Census Area	City of Nenana	383	At the junction of the Nenana and Tanana rivers
Denali Borough	City of Anderson	137	Just north of CAFS
	Healy	1,022	Census Designated Place (CDP)
	Denali Park (Formerly McKinley Park)	856	CDP, includes “Glitter Gulch” commercial area near the entrance to Denali National Park
	Cantwell	183	CDP, at the intersection of Parks Highway and Denali Highway
Matanuska-Susitna Borough	Trapper Creek	382	CDP, at the junction of Parks Highway and Petersville Road
	Talkeetna	965	CDP, at the confluence of the Talkeetna, Susitna, and Chulitna rivers

<sup>(1)</sup> 2018 population, from U.S. Census Bureau (USCB) 2020a

**3.1.1.1 Land Ownership and Use**

A broad outline of land ownership in the study area is provided in **Table 3.7-3**, based primarily on State of Alaska mapping of land ownership (ADNR 2019). Lands are generally presented from north to south.

**Figure 3.7-1** illustrates the general land ownership in the study area.

**Table 3.7-3. Land Ownership**

Area	Ownership	Description
Fairbanks North Star Borough and Yukon-Koyukuk Census Area	Federal	Fort Wainwright military reservation south of Fairbanks
	State	Broad areas of state lands, including large areas of Tanana Valley State Forest, north and west of the Tanana River

Area	Ownership	Description
Fairbanks North Star Borough and Yukon-Koyukuk Census Area (cont'd.)	Alaska Native Corporation	Lands near Nenana
	Private and Municipal/Borough	Lands in and around Fairbanks, along portions of the Parks Highway and other roads and rivers, at Nenana, and at other scattered sites
Denali Borough	Federal	<ul style="list-style-type: none"> <li>• Denali National Park, encompassing the entirety of the Alaska Range west of the Parks Highway in the study area</li> <li>• CAFS, immediately south of Anderson and east of the Nenana River</li> <li>• Small areas of Bureau of Land Management (BLM)-managed federal lands east of Anderson</li> </ul>
	State	Broad areas of state lands between the Denali Borough boundary (near Anderson/Clear) and the Denali National Park boundary, and east of the Parks Highway southward through the Alaska Range
	Alaska Native Corporation	Lands east of Anderson (Doyon, Limited) and near Healy (Cook Inlet Region, Inc.)
	Private and Borough	Lands in a narrow band along the Parks Highway and near Anderson, Healy, Denali Park, and Cantwell
Matanuska-Susitna Borough	Federal	<ul style="list-style-type: none"> <li>• The southern edge of Denali National Park, extending to the southern edge of the Alaska Range</li> <li>• Large areas of BLM-managed lands east of the Parks Highway, mostly east and south of Cantwell, and east of Curry/north of the Susitna River</li> </ul>
	State	<ul style="list-style-type: none"> <li>• Large areas of state land along the Parks Highway east of Denali National Park, including Denali State Park</li> <li>• Large areas of state land in the Susitna Valley, interspersed with borough and private lands, but including several designated State Recreation Rivers and other park and recreation areas</li> </ul>
	Alaska Native Corporation	Lands near Cantwell (Ahtna, Inc.), and the upper Susitna River area and near Talkeetna (Cook Inlet Region, Inc.)
	Private and Borough	Lands that form a nearly continuous block of lands in the area north of Talkeetna, associated primarily with the Susitna River, Parks Highway, and Alaska Railroad, and with small communities (e.g., Talkeetna, Trapper Creek)

Residential and commercial lands are well represented throughout the study area, especially at communities, but also at lower density along most of the length of the Parks Highway and Alaska Railroad. These are on private lands shown on **Figure 3.7-1**. In addition to named communities, a commercial concentration occurs at Denali Park/"Glitter Gulch" (near the McKinley National Park Airport, as shown on **Figure 3.7-1**). Glitter Gulch is a major tourist service area for Denali National Park, with dense lodging, gift shops, restaurants, and tour companies. Smaller nodes of commercial land uses occur in small communities and at key service locations along transportation routes such as the Parks Highway.

The corridor between Fairbanks and Talkeetna includes large areas of vacant and undeveloped land, with several substantial areas of protected conservation lands, including Denali National Park, Denali State Park, Talkeetna Recreation River (state designation), and Tanana State Forest. Two million acres of Denali National Park are designated wilderness, which is managed to preserve natural quiet to the greatest extent possible. Denali National Park includes similar naturally quiet, undeveloped areas that may be designated for park, recreation, or wildlife refuge purposes, but not specifically for wilderness characteristics. Users of park and recreation lands may be sensitive to aircraft noise. Such lands are shown on **Figure 3.7-1**. Most federal, state, and Alaska Native corporation lands are principally undeveloped. Many private and borough parcels are undeveloped but are in areas open to residential, commercial, and industrial uses.

Industrial lands are relatively scarce in the study area. Fairbanks International Airport, other smaller airports, and the LRDR site at CAFS are industrial. The Alaska Railroad connects Fairbanks and Anchorage, paralleling the Parks Highway and a transmission line intertie, and is a narrow area of transportation/industrial use. Fairbanks includes substantial industrial uses in specific areas, some of them around the airport. Some mining occurs in the study area, including Usibelli Coal Mine at Healy.

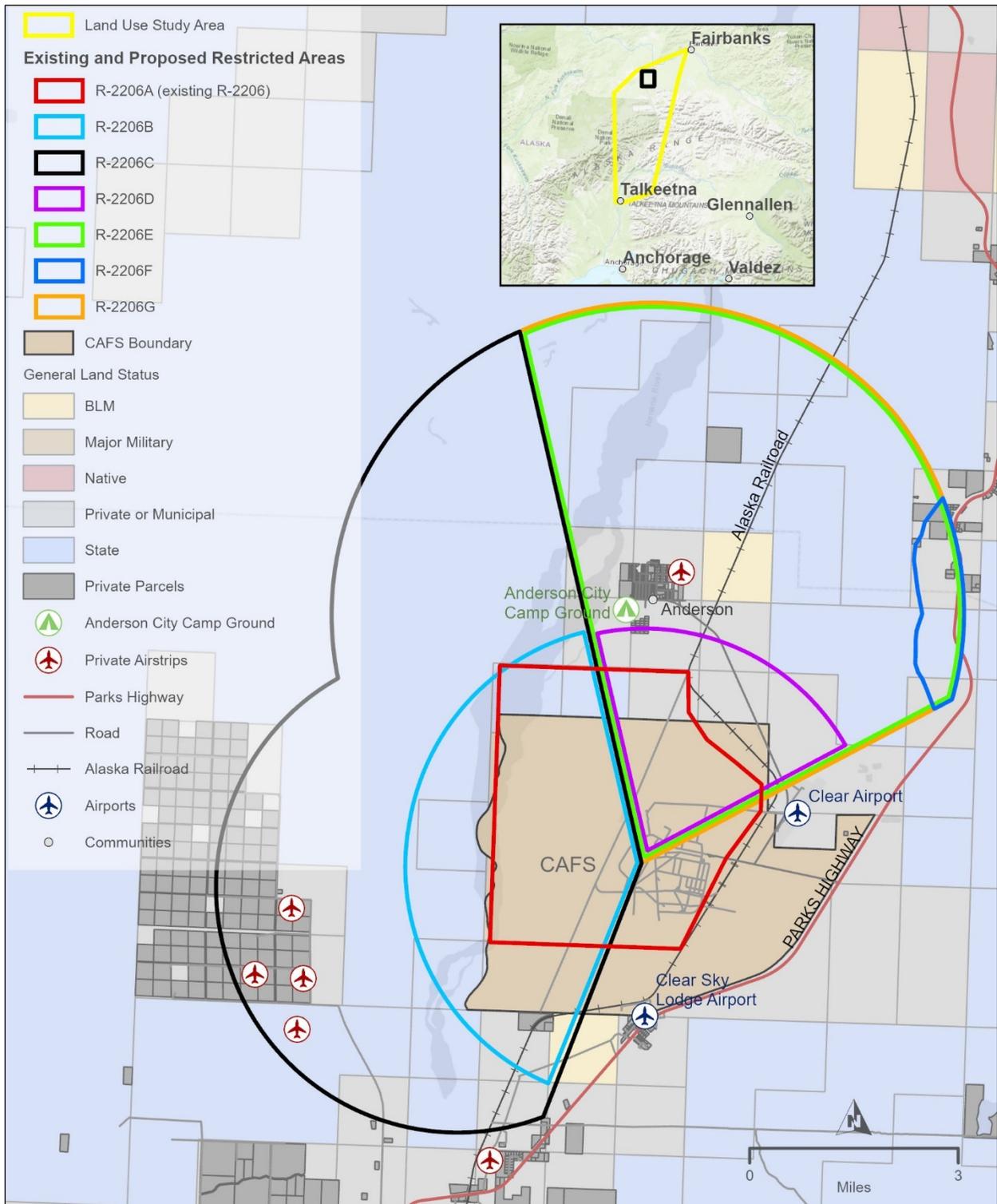
Farm lands make up a small amount of lands in the study area and are scattered among private parcels; no agricultural lands designated prime or unique by the Natural Resources Conservation Service occur in Alaska.

Some minor parcels have institutional land uses, particularly within Fairbanks, where there are university campuses, hospitals, and other similar services near but outside the study area.

**Figure 3.7-2** illustrates land ownership in the CAFS area. The Parks Highway corridor forms part of the eastern border of CAFS, and the State of Alaska Clear Airport lies immediately northeast of CAFS. Along the northern border of CAFS is Denali Borough and City of Anderson land, including a city camper park (public land) and residential areas (private land), and a small area of Bureau of Land Management (BLM)-managed federal land. Along the southern CAFS border is the unincorporated area of Clear, including borough and private lands, and commercial development along the Parks Highway (e.g., Clear Sky Lodge), and a tract of BLM-managed federal land. The western border is the Nenana River. Across the river are general lands of the State of Alaska and a densely subdivided set of private parcels. Land beneath the proposed Restricted Areas consists of other borough and private lands along the Parks Highway to the north and south and a portion of the densely subdivided area across the river to the west.

The *Tanana Basin Area Plan* (ADNR 2009) divides state lands in the greater CAFS area into multiple subunits. While there are differences in planned land use and management intent for the various subunits, in general the lands are managed for a mix of settlement, public recreation, wildlife habitat, and forestry. None of the areas are managed as critical habitat, as park units, or as any other kind of legislative designation.

Figure 3.7-2. Land Ownership and Parks near CAFS



There are eight known low-use airports/airstrips in the immediate CAFS area (**Figure 3.7-2**). Five private airstrips are located beneath the proposed Restricted Areas. One private airstrip, the state-owned Clear

Airport, and Clear Sky Lodge (a private airstrip not currently in use) are located outside the proposed Restricted Areas. The status and use levels of the private airstrips are not known, but they are visible on aerial photos and are likely used for access to rural homes.

In the CAFS area (beneath the proposed Restricted Areas), there are no lakes that appear sufficient for floatplane operations, but sufficient flat water may occur on the Nenana River for floatplane operation, and some gravel bars in the braided river likely are accessible by pilots using small, wheeled aircraft. Ski-equipped aircraft may land and take off from the river or other treeless flat areas that are sufficiently frozen and snow-covered. The extent of aircraft operations on the river, gravel bars, and snow in this area is assumed to be small. However, opportunistic operations of aircraft in the backcountry for recreation and for subsistence and sport hunting and fishing are common in Alaska.

### 3.7.3 Environmental Consequences

#### 3.7.3.1 Evaluation Criteria

Impacts related to land use are typically addressed as compatibility or non-compatibility of a project with existing land uses and land use plans. Sections 1502.16(c) and 1506.2(d) of the CEQ regulations require the discussion of environmental impacts, including possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned. According to FAA's 1050.1F Desk Reference (FAA 2020b), factors to consider in evaluating impacts to land use include determining if a proposed action or alternative would:

- Be inconsistent or not in compliance with existing land use plans, policies or controls;
- Preclude the viability of existing land use or the continued use or occupation of an area;
- Be incompatible with adjacent land use to the extent that public health or safety is threatened; or
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

#### 3.7.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. Changes to land use could occur over time in response to increases in population and development.

#### 3.7.3.3 Proposed Action

##### 3.7.3.3.1 *LRDR Operational Changes*

The 2016 EA (DoD 2016b) addressed land use on CAFS and found no substantial effect on land use related to the physical construction and intended operation of the LRDR and associated facilities. While there has been no substantive change to the plan for the physical infrastructure under construction at CAFS, a new ground-based RF safety hazard zone would be established (see **Section 3.10.3.3.1**). This is the area where HIRF would exceed permissible levels, and in which personnel would not be permitted. Establishment of the ground-based RF safety hazard zone would represent a change in use for that portion of CAFS, but the land use category of "major military" would not change. No other land use changes would be necessary at CAFS as a result of changes in LRDR operations compared to the scenario assessed in the 2016 EA (DoD 2016b).

Operation of the LRDR would not impact land use in the area outside CAFS because no ground-based RF hazards would exist that could preclude recreational activities, such as hunting, hiking, fishing, rafting, or snow machining, or other activities including home building or maintenance and functions of daily life. All ground-based restrictions and subsequent hazards would be confined to CAFS. The radar fan (i.e., the area shaped like an arc in front of the radar face) would not fall low enough to impact the public outside of the installation boundary, including recreational users of the Nenana River.

#### **3.7.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft**

The Proposed Action does not involve any land acquisition, so there would be no change in land ownership. However, aircraft flight paths would be affected. A change in air traffic patterns has potential to affect noise on the ground. Land uses in the corridor that generally would be least compatible with substantial increases in aircraft noise are:

- Residential land uses;
- Some institutional land uses, such as hospitals; and
- Park and recreation land uses, including areas specifically designated to preserve natural conditions, such as designated wilderness within Denali National Park.

#### **Restricted Areas**

The expanded Restricted Areas could reduce opportunistic use of the land in the area for recreation, hunting, and fishing because of pilot concerns regarding flying near or around the restricted airspace. However, the proposed Restricted Areas would not prevent pilots or the general public from accessing the underlying land, including the private airstrips, as long as they navigate around or below the floors of the restricted airspace (see **Section 3.1.3.3.2**)

The CAP annual Glider Academy is a specific use of the land (and airspace) at Clear Airport that would be affected by the Proposed Action. The Glider Academy would no longer be able to conduct its glider instruction at Clear Airport. Details regarding impacts on the CAP Glider Academy are provided in **Section 3.11, Socioeconomics and Environmental Justice**.

#### **Interim Phase: Potential TFR Implementation**

During the interim phase, if it is needed, TFRs would be in place and some procedures and portions of existing airways in the study area would be unavailable as described in **Section 2.1.2.2. Section 3.9, Noise and Compatible Land Use**, addresses changes in aircraft noise associated with the detouring and rerouting of aircraft and effects on noise-compatible land use.

The three to five daily IFR aircraft currently using J-125 and V-436, or directly vectored to Deadhorse, already cross designated wilderness in Denali National Park at altitudes above 10,000 feet MSL. The West Reroute would shift these aircraft approximately 5.6 NM to the west over portions of Denali National Park (roughly moving the aircraft alignment from over the Sanctuary River to over the Teklanika River). The length of park area crossed would essentially remain the same, and the altitudes of aircraft on these airways would remain above 10,000 feet MSL. The ground surface elevations of peaks and ridges of mountains in this area range between about 3,000 feet and 4,000 feet above sea level. The rerouted flights could be more or less noticeable to some backcountry hikers on ridges in the wilderness area, depending on the hikers' locations relative to the current flight path versus the West Reroute. Use of V-438 would shift flights east and reduce the length of park area crossed.

## Changes to Federal Airways and Instrument Flight Procedures

FAA's actions to establish and amend airways and to amend instrument flight procedures would have the same general impacts to land use as described above for the interim phase except that some of the new flight paths for IFR aircraft would be different than the reroutes during the interim phase.

### 3.7.3.3.3 Summary of Land Use Impacts

Operation of the LRDR would require establishment of a ground-based RF safety hazard zone at CAFS, which would represent a change in use at the installation, but not a change in land use category. Operation of the LRDR would not impact land use outside CAFS. The change in aircraft use patterns as a result of establishing the proposed Restricted Areas would not change land uses on the ground in a way contrary to land use plans, and no land use categories would change at CAFS or elsewhere. Access to the private airstrips beneath the proposed Restricted Areas would not be affected. Some access to and use of the land under the Restricted Areas by general aviation pilots could be reduced. IFR aircraft rerouted due to TFRs during the interim phase, or following new or amended airways, could be either more or less noticeable to some landowners or backcountry travelers, depending on their locations. These changes would be minor and would affect relatively few people. The Proposed Action would not be incompatible with existing and planned land uses outside of CAFS, with the exception that the CAP Glider Academy would no longer be able to operate at Clear Airport and would be relocated (see **Section 3.11, Socioeconomics and Environmental Justice**).

The Proposed Action would have short-term, negligible adverse impacts on residential land uses and park areas during the interim phase and permanent, negligible adverse impacts on residential land uses and park areas after the proposed Restricted Areas are established.

## 3.8 Natural Resources and Energy Supply

### 3.8.1 Definition of the Environmental Category

The term "natural resources" refers to the materials or substances such as minerals, forests, water, and land that occur in nature. This section provides an evaluation of the Proposed Action's consumption of natural or depletable resources such as water, and use of energy supplies such as electricity, natural gas, and fuels.

### 3.8.2 Affected Environment

The main study area for the analysis of the Proposed Action's use of natural or depletable resources and energy supplies is the footprint of the proposed Restricted Areas and CAFS, as depicted on **Figure 3.8-1**. The analysis also addresses aviation-fuel-related impacts within the larger study area for airspace impacts (**Figure 3.1-2**).

This description of the current supply and use of natural resources and energy at CAFS includes the operational requirements for the LRDR facilities as described and evaluated under the 2016 EA (DoD 2016b). Relevant information regarding existing non-LRDR facilities is also provided. **Figure 3.8-2** depicts facilities at CAFS.

**Figure 3.8-1. Study Area for Natural Resources and Energy Supply**

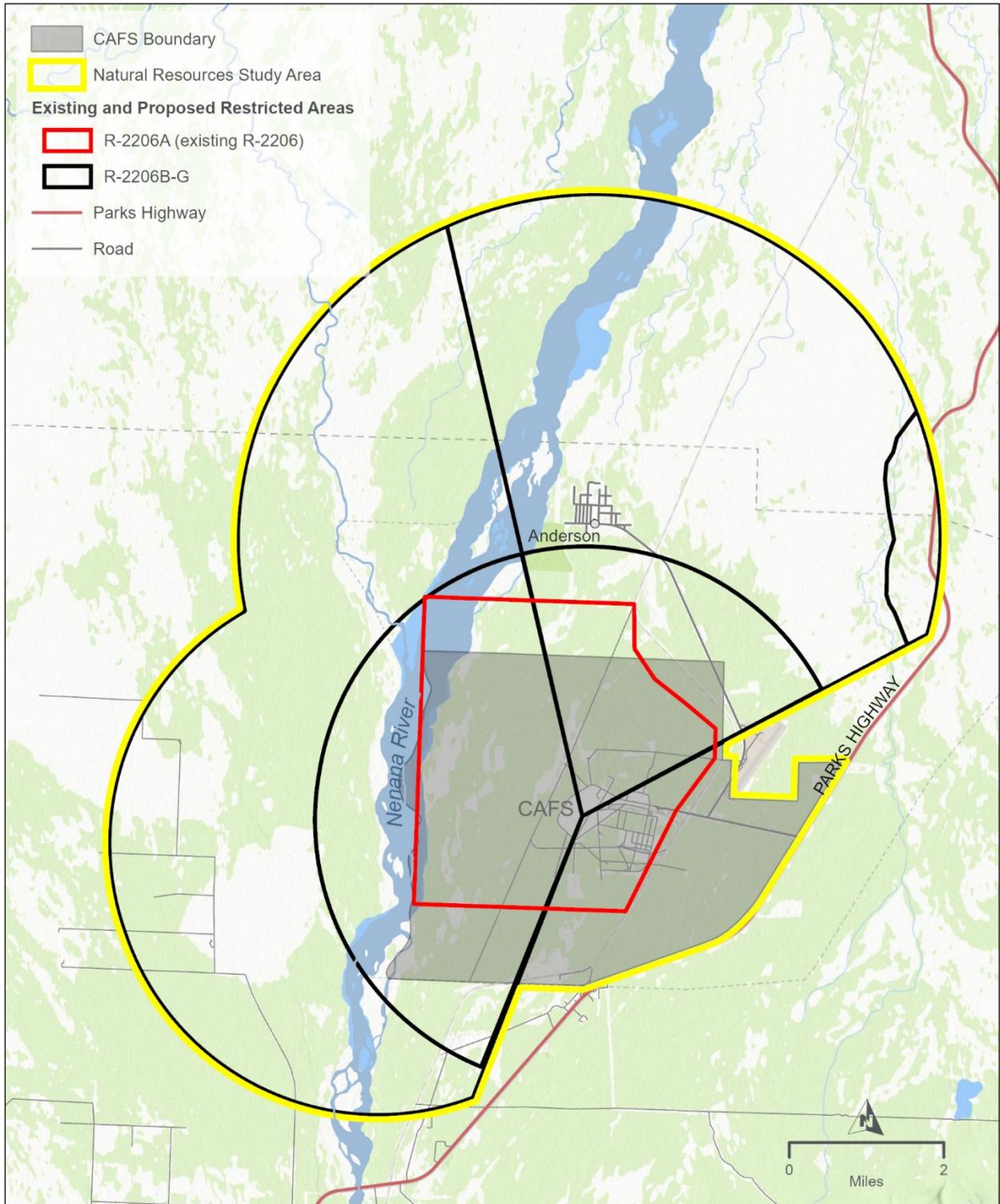
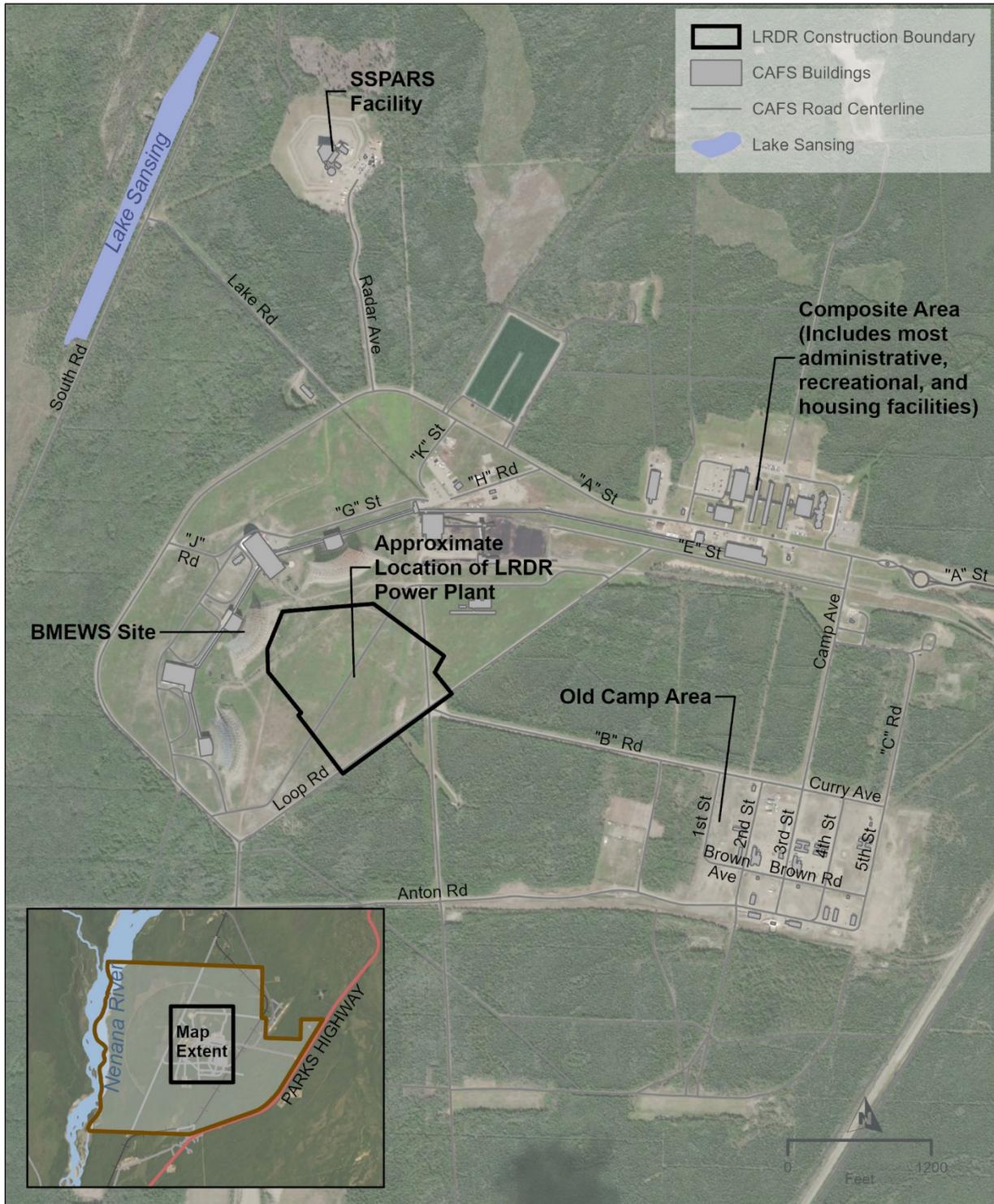


Figure 3.8-2. Map of CAFS Facilities



Since January 2016, CAFS has operated using electrical power supplied commercially by Golden Valley Electric Association (GVEA). The primary power for the LRDR facilities will be the commercial power grid.

The electrical needs of the LRDR facilities, as described in the 2016 EA (DoD 2016b), were taken into account during design of the current commercial electrical distribution system at CAFS.

GVEA serves the communities of Fairbanks, Delta Junction, Nenana, Healy, and Cantwell. The cooperative owns eight electrical power-generating facilities that are powered by diesel, naphtha (oil), coal, hydroelectric energy, and solar energy. It also purchases electricity generated by facilities owned by others. The GVEA is connected to several other electric associations, Anchorage's Municipal Light & Power, and the City of Seward's electrical system (GVEA 2020). GVEA's sources of power are detailed in **Table 3.8-1**.

**Table 3.8-1. Golden Valley Electric Association Sources of Power**

Source	Energy Type	Available Power (megawatts)	Percent of Total Power
Zehnder Power Plant	Diesel	41	8.8%
Aurora Energy	Coal	25 <sup>(1)</sup>	5.3%
North Pole Expansion Power Plant	Naphtha	60	12.8%
North Pole Power Plant	Diesel	120	25.6%
Healy Power Plant, Units 1 and 2	Coal	78	16.7%
Delta Junction (Alaska Environmental Power)	Wind	2 <sup>(1)</sup>	0.4%
Delta Power Plant	Diesel	27	5.8%
Railbelt Utilities in Southcentral Alaska	Natural Gas	70 <sup>(1)</sup>	14.9%
Bradley Lake Hydroelectric	Hydropower	20	4.3%
Eva Creek	Wind	25	5.3%
Solar Farm	Solar	0.6	0.1%
Total Power Available		468.6	

Source: GVEA 2020

<sup>(1)</sup> GVEA purchases up to this amount of power.

Backup power for the primary non-LRDR facilities at CAFS is provided by one 1.25-megawatt (MW) and three 3-MW diesel-powered generators. Backup power for LRDR facilities will be provided by a power plant designed to generate approximately 30 MW of power (DoD 2016b). The power plant was originally designed with eight 3.6-MW diesel-powered backup generators. However, after completing the 2016 EA (DoD 2016b), MDA determined that only seven generators were needed. Therefore the LRDR power plant now features one fewer generator than was considered in the 2016 EA.

Most of the heating needs for CAFS are met by a system of diesel-fired boilers, including a steam heating plant for the LRDR dormitory. Boilers installed within the Mission Control Facility will provide heat to the LRDR-related facilities. The Solid State Phased Array Radar Site (SSPARS) facility is heated electrically.

Potable and non-potable (cooling and fire protection) water required for the non-LRDR facilities at CAFS is supplied by groundwater from deep wells distributed throughout the installation. The groundwater is treated on-site by chlorination and with orthophosphate for corrosion control to provide potable water for approximately 350 non-LRDR personnel. The average cooling-water use rate for non-LRDR facilities is 933 gallons per minute (DoD 2016b).

The LRDR facilities include dedicated wells, water treatment, and distribution systems to provide potable, cooling, and fire protection water similar to the non-LRDR facilities. Potable water is required for approximately 67 LRDR personnel. Total cooling water demand for the LRDR as described in the 2016 EA will range between 4,000 and 8,000 gallons per minute (DoD 2016b). The 2016 EA concluded that the area groundwater supply is adequate for this use.

### **3.8.3 Environmental Consequences**

#### **3.8.3.1 Evaluation Criteria**

Impacts to natural resources and energy supply are evaluated by considering whether a proposed action or alternative would have the potential to cause demand to exceed available or future supplies of these resources.

#### **3.8.3.2 No Action Alternative**

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No additional energy would be required at CAFS to operate the LRDR. No new actions would be taken to limit use of affected airspace. The use of aviation fuel would increase over time as a result of growth in air traffic unless counterbalanced by use of new fuel-efficient technologies.

#### **3.8.3.3 Proposed Action**

##### **3.8.3.3.1 *LRDR Operational Changes***

This analysis uses as a baseline the natural resources and energy requirements of the LRDR facilities as they were described in the 2016 EA and discussed in **Section 3.8.2**, against which the requirements of the Proposed Action are compared.

The Proposed Action would require one additional worker to operate the LRDR compared to the 67 workers required for operation of the LRDR described in the 2016 EA. No changes to the water wells, water treatment systems, or heating system installed for the LRDR facilities as described in the 2016 EA would be necessary. Cooling water use would not be affected.

The expected maximum load at the LRDR facility under the Proposed Action would be approximately 23 MW of electricity (Black & Veatch 2017). This is less than the 30 MW for which the backup power plant was designed (DoD 2016b). GVEA performed a Dynamic Impact Study for the proposed LRDR facility, which evaluated the operational impact of the LRDR load, in addition to power flow analysis, fault current calculation, and analysis of transient stability impacts. The system performance was found to be acceptable for all scenarios studied, including peak load operation for 24 hours per day, 7 days per week (Black & Veatch 2017). According to the GVEA Interconnection Agreement with CAFS (GVEA 2018), the ramp rate must not exceed 4 MW per minute. Furthermore, if the facility were to cause any reduction in the quality of service being provided to other GVEA customers or members, it would be isolated from the GVEA system until the problem was resolved.

Based on the percentage of renewable energy in the commercial electric power supplied to CAFS (see **Table 3.8-1**), approximately 94 percent of the power used by the LRDR would be from non-renewable

resources. The LRDR operational changes would not require aggregate resources or preclude development and use of aggregate resources.

**3.8.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft**

The Proposed Action would result in changes to the flight paths of some existing air traffic as described in **Section 2.1.2**. Where these changes lead to longer flight paths, additional aviation fuel would be required to complete the flights. Additional fuel requirements per detoured or rerouted flight were calculated based on the increased flight time and the average fuel burn rate of the assumed aircraft: approximately 5,000 pounds, or 750 gallons, per hour for a Boeing 737 (USA Today 2014), and 415 pounds, or 62 gallons, per hour for a Cessna 208 (AOPA 2020). FAA’s actions to restrict flights would not affect any other aspects of natural resources and energy supply.

**Restricted Areas**

An estimated 10 daily VFR flights would detour to avoid the Restricted Areas. These detours would require additional consumption of aviation fuel. Each VFR flight detour to avoid the Restricted Areas would be an estimated 0.7 NM to 1.3 NM long, resulting in an increased flight duration of 30 seconds and approximately 0.5 gallon of additional fuel burned. These increased flight times would incrementally increase aviation fuel consumption by an average of 5 gallons per day total (0.5 gallon for each of 10 flights per day). Changes to IFR flights and subsequent impacts on fuel consumption are addressed in the following sections.

**Interim Phase: Potential TFR Implementation**

If the Interim Phase is needed, the numbers and lengths of VFR flight detours to avoid the TFRs, and additional fuel required, would be the same as described above for the Restricted Areas.

Up to 5 IFR flights daily on airways V-436 or J-125 or flying direct from Anchorage to Deadhorse would be rerouted around the TFRs, as described in **Section 3.1.3.3.2**. The additional fuel requirements for each reroute are presented in **Table 3.8-2**. Daily aviation fuel consumption for all rerouted IFR flights would increase by approximately 137 gallons on average, and 494 gallons at a maximum. The change in flight distances resulting from the unavailability of procedures affected by the TFRs is assumed to be negligible and therefore the change in fuel consumption is not included in this analysis.

**Table 3.8-2. Additional Fuel Requirements per Affected IFR Flight, Interim Phase**

Impacted Airway	Impacted Route	Reroute	Additional Distance (NM) and Duration per Reroute	Additional Fuel Requirement per Reroute (gallons)
J-125	Anchorage – Deadhorse	West Reroute	1.5 (17 seconds)	3.5
V-436	Anchorage – Nenana	West Reroute	1.5 (17 seconds)	3.5
		V-438/V-480	42.5 (8 minutes)	98.8
North Slope Direct Flights	Anchorage – Deadhorse	Vectored direct	2.7 (30 seconds)	6.3
			11.0 (2 minutes)	25.0

**Changes to Federal Airways and Instrument Flight Procedures**

Up to 5 IFR flights daily that would have used the portions of airways V-436 and J-125 that would be affected, or flying direct from Anchorage to Deadhorse would be routed to alternate routes, as described in **Section 3.1.3.3.2**. The additional fuel requirements for each reroute are presented in **Table 3.8-3**. Daily aviation fuel consumption for all affected IFR flights would increase by approximately 235 gallons on average, and 606 gallons at a maximum. The change in flight distance for the instrument flight procedures that would be amended is assumed to be negligible and therefore the change in fuel consumption is not included in this analysis.

**Table 3.8-3. Additional Fuel Requirements per Affected IFR Flight, Changes to Federal Airways**

Impacted Airway	Impacted Route	Reroute	Additional Distance (NM) and Duration per Reroute	Additional Fuel Requirement per Reroute (gallons)
J-125	Anchorage – Deadhorse	J-115	-0.8 (-9 seconds)	-0.1
		J-115/Q-41	-3.8 (-43 seconds)	-8.8
V-436	Anchorage – Nenana	V-438/V-480	42.5 (8 minutes)	98.8
		V-436/V-436 dogleg/V-480	51.8 (10 minutes)	121.3
		V-436/Proposed T-399	3.7 (43 seconds)	9.0
	Anchorage – Deadhorse	V-436/V-436 dogleg/T-227	8.7 (2 minutes)	20.0
		V-436/ V-436 dogleg/V-438	39.0 (7 minutes)	91.3
		V-436/V-436 dogleg/V-444/V-504	46.6 (9 minutes)	108.8
North Slope Direct Flights	Anchorage – Deadhorse	Vectored direct	2.7 (30 seconds)	6.3
			11.0 (2 minutes)	25.0

**3.8.3.3.3 Summary of Impacts on Natural Resources and Energy Supply**

The change to continuous LRDR operations would not cause demand for natural resources and energy to exceed available or future supplies of these resources. Both during the interim phase and after the proposed Restricted Areas are established, the increased daily aviation fuel demand from changes to flight paths would represent a small volume compared to the overall consumption of fuel by air traffic passing through the study area. Additionally, no new aviation fuel storage tanks or changes to existing tanks would be required to supply new demand induced by the flight path changes. The additional fuel usage associated with FAA’s actions would not result in a noticeable increase in regional aviation fuel demand. The Proposed Action would have permanent, negligible adverse impacts on natural resources and energy use.

### 3.9 Noise and Compatible Land Use

#### 3.9.1 Definition of the Environmental Category

Noise is often the public's predominant aviation environmental concern. There are also special noise sensitivities with respect to certain resources, such as national parks (FAA 2020b). The compatibility of land uses with proposed aviation actions is typically determined in relation to the level of aircraft noise. Federal guidelines have been established for the compatibility of a variety of land uses with aircraft noise.<sup>28</sup>

The terms "noise" and "sound" are often used interchangeably; however, noise is generally considered to be unwanted sound. Sound is made up of tiny fluctuations in air pressure. Sound is characterized by its amplitude (how loud it is), frequency (or pitch), and duration. Sound within the range of human hearing can vary in amplitude by more than 1 million units. Therefore, a logarithmic scale, known as the decibel (dB) scale, is used to quantify sound intensity and to compress the scale to a more manageable range.

The human ear does not hear all frequencies equally. In fact, the human hearing organs of the inner ear deemphasize low and very high frequencies. The most common weighting scale used to reflect this selective sensitivity of human hearing is the A-weighted sound level (dBA), which emphasizes and deemphasizes (or applies more or less "weight") frequencies of sound in a manner relative to how the average human hearing organs perceive them. The range of human hearing extends from approximately 3 dBA to around 140 dBA.<sup>29</sup>

Sounds encountered in daily life and their approximate sound levels are provided in **Table 3.9-1**.

**Table 3.9-1. Common Activities and Their Sound Levels**

Activity or Setting	Sound Level (dBA)
Impact pile driver at 50 feet, rock band	100
Gasoline lawnmower at 3 feet	90
Downtown (large city), garbage disposal	80
Heavy traffic at 150 feet, vacuum cleaner at 10 feet	70
Normal conversation	60
Quiet urban daytime	50
Quiet urban nighttime, rural residential	40
Average residence without stereo playing	30
Average whisper	20
Rustle of leaves in wind	10
Human breathing	5

Source: Adapted from USEPA 1971 and U.S. Department of Housing and Urban Development 2020

<sup>28</sup> 14 CFR Part 150, Appendix A, Table 1, *Land Use Compatibility with Yearly Day-Night Average Sound*.

<sup>29</sup> All sound pressure levels in this document are relative to 20 micropascals, which is the standard reference sound pressure and the smallest sound pressure a human ear can hear.

The sound pressure level noise metric describes steady noise levels. Noise metrics that describe noise that is not constant include the following:

**Equivalent Sound Level** – Equivalent sound level is the average sound level in dB of a given event or period of time.

**Day-night Sound Level (DNL)** – DNL is the 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of 10 decibels to sound levels for the periods between midnight and 7 a.m., and between 10 p.m., and midnight, local time.

### 3.9.2 Affected Environment

The study area for noise is the three-dimensional geographic area with the potential to be impacted by noise from the proposed project (FAA 2020b). The study area used to evaluate noise consists of the area within 4 NM on either side of the centerlines of affected airways.

A range of land uses occurs in the study area, including vacant and undeveloped, conservation, residential, commercial, and industrial lands as described in detail in **Section 3.7.2**. The noise study area includes large areas of vacant and undeveloped land, with several substantial areas of protected federal and state conservation lands. Most federal, state, and Alaska Native corporation lands within the study area are principally undeveloped, and may be considered open space. Many private and borough parcels are undeveloped, but are in areas open to residential, commercial, and industrial uses. FAA considers areas with wilderness characteristics to be noise-sensitive areas. Parts of the following special status areas are within the noise study area and may meet the definition of noise-sensitive areas.

- Denali National Park and Preserve
- Gates of the Arctic National Park and Preserve
- Arctic National Wildlife Refuge
- Kanuti National Wildlife Refuge
- Yukon Flats National Wildlife Refuge
- White Mountains National Recreation Area
- Beaver Creek Wild and Scenic River
- Ivishak Wild and Scenic River
- North Fork Koyukuk Wild and Scenic River
- Tinayguk Wild and Scenic River
- Wind Wild and Scenic River
- Denali State Park
- Tanana Valley State Forest
- Creamer's Field Migratory Waterfowl Refuge
- Minto Flats State Game Refuge
- Susitna Flats State Game Refuges
- Goldstream Public Use Area
- Kroto and Moose Creek Recreation River
- Little Susitna Recreation River
- Talkeetna Recreation River

The primary noise-sensitive land use in the vicinity of proposed Restricted Areas includes residential parcels in the towns of Clear and Anderson, Alaska, lands on-site at CAFS, and residential lands west of CAFS. The majority of land use in the vicinity of the proposed Restricted Areas is undeveloped, rural, or wooded. The portions of the study area immediately adjacent to the proposed Restricted Areas and off-site of the CAFS are largely undeveloped forest lands along the Nenana River. The ambient acoustic

environment near the proposed Restricted Areas includes sounds from natural noise sources found in forested areas and river basins. The acoustic environment also includes sounds from human sources and activities, including noise from traffic on the Parks Highway, common community noise in the towns of Clear and Anderson, noise from equipment and activities at CAFS, and occasional aviation noise from IFR and VFR aircraft overflights. North-south IFR aircraft currently traverse this area using airways V-436 and J-125, which cross the proposed Restricted Areas. VFR aircraft also fly throughout the general area and do not follow delineated routes. Supersonic planes and commercial spaceport flights are not known to fly in this area. Aircraft noise within the study area is mainly from small aircraft flying at low altitudes. **Section 3.1.1** provides a more detailed discussion of existing aircraft operations in the study area.

Due to the remoteness of this area, the sparse population density, and the modest amount of daily aviation activity, existing outdoor noise levels are generally low, particularly at night. It is reasonable to characterize the ambient soundscape as a rural noise environment, and land use is dominated by rural or undeveloped lands. Existing noise levels in the study area would vary widely based on the presence or absence of anthropogenic noise.

### **3.9.3 Environmental Consequences**

#### **3.9.3.1 Evaluation Criteria**

As described in Section 9.0 of **Appendix D**, none of the local jurisdictions in the noise study area have noise ordinances that would be applicable to the Proposed Action.

FAA defines a “significant” noise increase as an increase in DNL of 1.5 dB or more in a noise-sensitive area that is exposed to noise at or above DNL 65 dB, or that would be exposed at or above DNL 65 dB due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe (FAA 2015). In certain noise-sensitive areas where the FAA’s land use compatibility guidelines in 14 CFR Part 150 are not relevant to the value, significance, and enjoyment of the area (for example, an area within a national park or national wildlife and waterfowl refuges where other noise is very low and a quiet setting is a generally recognized purpose and attribute), additional evaluation of potential noise impacts may be warranted if there would be a “reportable” noise increase. The FAA defines a reportable noise increase as a DNL increase of: (1) 3 dB or more at DNL 60 to less than 65 dB, or (2) 5 dB or more at DNL 45 to less than 60 dB (FAA 2015).

FAA has approved several noise “screening” tools that can be used to determine the potential for a proposed air traffic action to cause a significant or reportable increase in aircraft noise (FAA 2020b). Aircraft noise screening may rule out the need for a more detailed noise analysis (FAA 2015).

#### **3.9.3.2 No Action Alternative**

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. Therefore, the soundscape relative to aircraft operations would remain largely unchanged.

#### **3.9.3.3 Proposed Action**

##### **3.9.3.3.1 *LRDR Operational Changes***

Because the change to continuous LRDR operations would not introduce major noise sources, no impacts to noise levels are anticipated.

### 3.9.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft

As described in Appendix C, it is conservatively estimated that up to five IFR flights per day and up to 10 VFR flights per day would be affected by the establishment of the proposed Restricted Areas and, if necessary, the proposed TFRs. Given the low number of affected flights, the FAA conducted aircraft noise screening to determine whether a detailed noise analysis was warranted.<sup>30</sup> The noise screening was conducted using FAA-approved tools for evaluating when proposed air traffic procedure actions may warrant additional review for potential noise impacts (MITRE 2012, FAA 2020a).

#### **Restricted Areas**

There would be no flights within the proposed Restricted Areas. Therefore, the only potential noise impacts from establishing the proposed Restricted Areas would be from changes to IFR and VFR flight paths.

The potential for noise impacts associated with permanent changes to IFR flight paths is discussed below under **Changes to Federal Airways and Instrument Flight Procedures**. The potential for noise impacts associated with IFR flights during the interim phase, if necessary, is discussed below under **Interim Phase: Potential TFR Implementation**.

Because VFR flights regularly transit the area surrounding the proposed Restricted Areas, VFR flights avoiding the proposed Restricted Areas would not introduce a new type of noise source, but could result in a slight increase in the number of daily VFR flights heard at a given location. Likewise, a slight decrease in the amount of noise from VFR traffic would be experienced in the area directly underlying the proposed Restricted Areas.

#### **Interim Phase: Potential TFR Implementation**

Implementation of the TFRs would result in a westward shift of traffic from the V-436 and J-125 airways, which, combined, extend vertically from 10,000 to 45,000 feet MSL. As shown on **Figure 2.1-3**, both the existing V-436/J-125 routes and the proposed West Reroute traverse Denali National Park. Because a portion of the V-436 flights would be rerouted east to V-438, and away from Denali National Park, the potential exposure of Denali National Park to noise from IFR flights below 18,000 feet AGL would be less than the current exposure to the Park within the study area. Thus, implementation of the TFRs would have the potential to reduce the total number of IFR flights over this portion of Denali National Park, resulting in a net reduction of aviation noise. As described in Airspace Management **Section 3.1.3.3.2**, some IFR flight paths would change during the interim phase due to changes in the availability of a portion of one instrument flight arrival procedure at Ted Stevens Anchorage International Airport. The change in flight paths associated with unavailability of the TAGER EIGHT ARRIVAL procedure would occur north of Talkeetna rather than over Nenana. The existing IFR arrival and departure procedures at Healy River Airport would be available through processes defined in the Letter of Agreement. Therefore,

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<sup>30</sup> Only IFR flights that would be rerouted under the Proposed Action were included in the noise screening. Assigning VFR flights to any specific detour paths (including within the estimated potential flight lanes described in Appendix C) for the purpose of noise analysis would be speculative because it is unknown how many pilots might choose to fly a particular path or a specific altitude. VFR pilots typically do not interact with air traffic controllers unless they are flying in controlled airspace (Classes A, B, C, and D) or request radar flight following. VFR pilots are not required to file a flight plan, so it is difficult to determine their numbers or where they fly. Route of flight is at the pilot's discretion under VFR.

noise impacts from the changes in flight paths associated with the Healy River Airport and TAGER EIGHT ARRIVAL instrument flight procedures would be negligible.

Noise screening was conducted using the FAA-approved Traffic (TRAF) test, which is used to determine if the number of operations on a proposed route or procedure would be high enough to generate noise levels that exceed specified thresholds that would indicate potential for a significant or reportable noise increase (MITRE 2012). The TRAF test considers aircraft types, percent of operations during nighttime (the time period of 10:00 p.m. to 7:00 a.m.), and the lowest typical altitudes flown. The data inputs used for the screening reflect the following conservative assumptions that would overestimate the noise impact: (1) all aircraft were assumed to be the largest type that typically flies in the area (large jets); (2) the assumed number of daily operations (five) reflects an annual growth rate over 20 years (see Section 3.1 of **Appendix C**); and (3) minimum en route altitudes, which are the lowest possible altitudes an aircraft can fly along an airway/procedure that will provide terrain clearance and adequate radio reception, were used to define the typical minimum altitudes actually flown. Based on the results of the noise screening, the TFRs, if necessary, would not have the potential to cause a significant or reportable increase in aircraft noise. Therefore, a more detailed noise analysis is not warranted.

The TFRs would be expected to have no to negligible direct impacts on flights using Clear Airport, Clear Sky Lodge Airport, Healy River Airport, and the private airstrips in the region. As a result, no changes to airfield noise timing or intensity would result from the TFRs.

If the interim phase is needed, noise impacts associated with changes to VFR flights would be the same as described above under **Restricted Areas**; however, these impacts would be considered short-term (i.e., lasting as long as the interim phase) rather than permanent.

### **Changes to Federal Airways and Instrument Flight Procedures**

Noise impacts associated with establishment or amendment of the airways and amendment of instrument flight procedures to accommodate the proposed Restricted Areas, as detailed in Airspace Management **Section 3.1.3.3.2**, would be similar to those described above for the interim phase, except that the impacts would be permanent and some of the IFR flight paths would be different.

#### *Changes to Federal Airways*

Noise screening of the proposed changes to federal airways was conducted using the TRAF test. The noise screening included specific screening of the segments of the proposed T-399 that overlie Denali National Park. The data inputs used reflect the following conservative assumptions that would overestimate the noise impact: (1) all aircraft were assumed to be the largest type that typically flies in the area (large jets); (2) the assumed number of total daily operations (five) reflects the application of an annual growth rate over 20 years; and (3) it was assumed that two flights per day would use each of the potential reroutes described in Table 3.1-3, even though additively this assumed more flights than are estimated to be affected by the proposed establishment of the Restricted Areas.

Based on the results of the noise screening, the proposed changes to federal airways to accommodate the proposed Restricted Areas would not have the potential to result in a significant or reportable increase in aircraft noise. Therefore, a detailed noise analysis is not warranted.

#### *Changes to Instrument Flight Procedures*

Noise screening of the proposed amendments to instrument flight procedures at Healy River Airport was conducted using the FAA-approved Operations (OPS) test, which involves comparing the combination of annual propeller and jet operations at an airport with identified thresholds below which noise analysis is

not required (MITRE 2012).<sup>31</sup> The results of the OPS test show that the levels of propeller and jet operations at the airport are far below levels that would require noise analysis.

Noise screening of the proposed amendment to the TAGER EIGHT ARRIVAL procedure at Ted Stevens Anchorage International Airport was conducted using the TRAF test. Based on the results of the noise screening, the proposed changes to the TAGER EIGHT ARRIVAL to accommodate the proposed Restricted Areas would not have the potential to result in a significant or reportable increase in aircraft noise. Therefore, a detailed noise analysis is not warranted.

The proposed amendments of the MCKINLEY TWO and PUYVO THREE procedures at Fairbanks International Airport would not result in any change in aircraft operations that would affect noise. Therefore, no noise analysis of these amendments is warranted.

#### **3.9.3.3 Summary of Noise Impacts**

Based on the noise screening and analysis above, adverse noise impacts from the Proposed Action would be negligible. Impacts would be short-term during the interim phase, and permanent after the Restricted Areas are established and amendments to the airways and instrument flight procedures are published. The Proposed Action would not impact noise-compatible land use.

### **3.10 Safety**

#### **3.10.1 Definition of the Environmental Category**

Safety, for the purposes of this EIS, includes consideration of electromagnetic field (EMF) exposure and subsequent impacts to the well-being, safety, or health of personnel at CAFS and the general population outside the boundaries of CAFS, as well as emergency aircraft for firefighting and medical emergencies. In general, a safe environment is one in which the potential for death, serious bodily injury, illness, or property damage is reduced to the maximum extent practicable.

#### **3.10.2 Affected Environment**

The study area for potential impacts on safety is the proposed Restricted Areas and nearby airports and private airstrips.

##### **3.10.2.1 Radio Frequency Radiation Considerations**

Radar systems operate by transmitting RF energy into the environment and processing energy that is reflected back to the radar. RF energy is a type of EMF that is characterized by long wavelengths and low frequencies. RF fields are referred to in this document as radio frequency radiation (RFR). RFR does not carry enough energy to break chemical bonds and is therefore known as “non-ionizing” radiation.

LRDR operates by transmitting high levels of RFR, which are known as HIRF. HIRF may result in electromagnetic interference with radio, television, or cellular communications. Interference may interrupt, obstruct, or otherwise degrade the effective performance of electrical circuits resulting in a degradation of data or complete loss of data. Additional airspace restrictions at CAFS are necessary to ensure that

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<sup>31</sup> The OPS test is based on the following provision in FAA Order 1050.1F, Appendix B, paragraph B-1: “No noise analysis is needed for projects involving Design Group I and II airplanes (wingspan less than 79 feet) in Approach Categories A through D (landing speed less than 166 knots) operating at airports whose forecast operations in the period covered by the NEPA document do not exceed 90,000 annual propeller operations (247 average daily operations) or 700 annual jet operations (2 average daily operations).”

aircraft would not encounter HIRF from LRDR that exceed FAA's HIRF certification standards for aircraft electrical and electronic systems.<sup>32</sup>

The existing restricted airspace, R-2206, was established in 1961 to support the original BMEWS. The restriction applies continuously at altitudes from the ground surface to 8,800 feet MSL, with the Commander, 13th SWS, assigned as the designated user. The restriction boundary encompasses most of CAFS. The aeronautical chart (FAA 2020d) contains this note: "Caution: Possible damage and/or interference to airborne radio due to high level radio energy vicinity R-2206." Existing safety policies are in place to minimize risk from current operations at CAFS.

As described in the 2016 EA (DoD 2016b), the LRDR will use a frequency of RFR in the range of 2 to 4 GHz. This frequency is commonly used for S-band radar systems. Examples of S-band radar systems include airport air traffic control radars, weather radars, and surface ship radars.

Human exposure to RFR can result in adverse health effects. RFR in the frequency range transmitted by the LRDR transmits non-ionizing radiation that penetrates exposed tissues and produces heating due to energy absorption. The depth of penetration depends on the frequency of the RFR and is greater for lower frequencies. Studies have suggested that adverse health effects may occur in humans subjected to whole-body or localized exposure to levels of RFR high enough to increase tissue temperatures by more than 1 degree Celsius. As body temperatures increase due to exposure to relatively high levels of RFR, opacity of the lenses of the eyes (cataracts) and other physiological responses are known to result. Other studies have indicated adverse reproductive outcomes and behavioral changes.

The World Health Organization has published Fact Sheet No. 226 on EMF, titled *Electromagnetic Fields and Public Health: Radars and Human Health*. The fact sheet states that, to produce any adverse health effect, RFR exposure must be above a threshold level. The known threshold level is the exposure needed to increase tissue temperature by at least 1 degree Celsius. No studies have found evidence that multiple exposures to RFR below this threshold level cause adverse health effects, or that tissue damage results from repeated low-level exposure to RFR (WHO 2020). The World Health Organization has concluded that although further studies are needed, the scientific information available does not indicate that exposure to RFR causes or promotes cancer, or that it shortens human life spans (WHO 2020).

Additionally, HIRF may result in electromagnetic interference with electronic devices, including aircraft systems, radio, television, and cellular communications. FAA Advisory Circular 20/158A, *The Certification of Aircraft Electrical and Electronic Systems for Operation in the High Intensity Radiated Fields (HIRF) Environment*, explains that concern for the protection of aircraft electrical and electronic systems operating in and near HIRF environments has increased substantially in recent years for the following reasons:

1. Greater dependence on electrical and electronic systems performing functions required for continued safe flight and landing of an aircraft;
2. Reduced electromagnetic shielding afforded by some composite materials used in aircraft designs;
3. Increased susceptibility of electrical and electronic systems to HIRF because of increased data bus and processor operating speeds, higher density integrated circuits and cards, and greater sensitivities of electronic equipment;

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<sup>32</sup> HIRF certification requirements for aircraft electrical and electronic systems are outlined in 14 CFR Part 23, Appendix J; 14 CFR Part 25, Appendix L; 14 CFR Part 27, Appendix D; and 14 CFR Part 29, Appendix E.

4. Expanded frequency usage, especially above 1 GHz;
5. Increased severity of the HIRF environment because of an increase in the number and radiated power of RF transmitters; and
6. Adverse effects experienced by some aircraft when exposed to HIRF.

### 3.10.2.2 Medical Evacuation Flights

Because of the remote and rugged nature of Interior Alaska, many communities rely on aviation for transportation, especially in emergencies. In the vicinity of the Proposed Action, Clear Airport and Healy River Airport are sometimes used for medical evacuations. Clear Airport and Healy River Airport are served by two private air ambulance companies, Guardian Flight Alaska and LifeMed Alaska (Alaska DOT&PF 2020b). The local volunteer fire department, Tri-Valley Volunteer Fire Department, calls Guardian Flight Alaska and LifeMed Alaska when a need for a medical evacuation flight is identified (Tri-Valley Volunteer Fire Department 2020). During 2018 and 2019, there were a total of seven medical evacuation flights from Clear Airport and Healy River Airport combined. The requesting facilities were CAFS and Canyon Clinic (Guardian Flight Alaska 2020).

## 3.10.3 Environmental Consequences

### 3.10.3.1 Evaluation Criteria

The analysis of potential safety impacts includes consideration of the types of activities, the introduction of new health or safety risks, the location of hazardous operations and activities with respect to sensitive receptors and the general public, and the adequacy of safety-related planning and procedures in place. An adverse impact would occur if the Proposed Action were to increase health and safety risks for workers, aircraft, or the general public from the HIRF generated by LRDR operation. Factors evaluated included whether:

- The action would be in violation of DoD or applicable armed services regulations;
- Workers or members of the public would be put in imminent danger;
- Safety risks in the project area during operational activities would be substantially heightened;
- RFR levels would result in short- or long-term health impacts;
- HIRF levels would cause excessive interference to local communication systems and other radar systems, preventing or reducing their ability to operate effectively; or
- Emergency and medical evacuation flights or access to medical supplies would be hindered by the Proposed Action.

FAA has identified a factor to consider when evaluating the context and intensity of potential environmental impacts for children's environmental health and safety (see Exhibit 4-1 of FAA Order 1050.1F). This factor includes, but is not limited to, situations in which a proposed action or alternative would have the potential to lead to a disproportionate health or safety risk to children. The topic of children's health and safety is addressed in **Section 3.11, Socioeconomics and Environmental Justice**.

### 3.10.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace. No new safety hazard from LRDR operations or airspace operations would be introduced.

### 3.10.3.3 Proposed Action

#### 3.10.3.3.1 *LRDR Operational Changes*

Under the Proposed Action, MDA would adapt the existing LRDR operational system requirements and procedures to reflect continuous operations. The frequency of the RFR (2 to 4 GHz) would be the same as described in the 2016 EA. Operation of the evolved LRDR system as proposed would result in increased RFR hazards compared to those described in the 2016 EA because the LRDR would be operating continuously. The proposed Restricted Areas would alleviate consequences of the increased radiation hazard by preventing aircraft from encountering HIRF levels that exceed FAA's HIRF certification standards and that may cause interference or damage to safety-of-life electronic systems.

Electromagnetic interference of radio, television, or cellular communications may occur as a result of LRDR operations. However, the heights of most telecommunications facilities outside of CAFS are well below the floor of the radar fan, and no cellular towers exist in the study area. Therefore, interference with local electrical and electronic systems would not prevent or reduce effective telecommunications outside of the Restricted Areas. Additionally, MDA will be testing S-band capabilities to make sure the LRDR is compatible with other radar systems in the area.

#### **Worker Safety**

In 2017, MDA prepared a Health Hazard Assessment Report for the LRDR (Lockheed Martin RMS 2017). The report provides information on non-ionizing RFR hazards and the results of a radiation hazard analysis performed to determine the safe separation distance and appropriate precautions to ensure that personnel are not exposed to RFR exceeding established safe limits. Based on American National Standards Institute/Institute of Electrical and Electronics Engineers (IEEE) Standard C95.1-2005, the report lists Permissible Exposure Levels at the LRDR operating frequency. For S-band (the LRDR frequency band), the Maximum Permissible Exposure level for a controlled environment is 100 watts per square meter averaged over any contiguous 6-minute period. The LRDR RF safety software is designed to fully support the CAFS RF safety plan and prevent personnel exposure to RFR that exceeds allowable levels. This is standard operating procedure for DoD land-based radars, and the LRDR would be in full compliance with all applicable RFR safety standards. A ground-based RF safety hazard zone would be established to prevent human access to any area that would exceed the Maximum Permissible Exposure limit for HIRF. The RF safety hazard zone boundary is an arc that is approximately 400 meters in front of the radar faces and would be identified by fencing and signage. The RF safety hazard zone would be clearly marked and contained entirely within the CAFS boundary.

In addition to the analysis defined above, safety standards for personnel subjected to HIRF and EMF exposure are established in DoDI 6055.1 and additional safety guidelines and standards for non-ionizing EMF are outlined in the comprehensive IEEE Standard C95.1, which addresses consideration of potential hazards of EMF to all personnel in unrestricted exposure environments, including aircraft pilots. This standard is consistent with the Maximum Permissible Exposure limits set in Air Force Instruction (AFI) 48-109. This standard specifies two levels: controlled and uncontrolled environments. Controlled environments are areas where exposure to above-average levels of electromagnetic energy may be incurred by personnel who are aware of the potential for such exposure (i.e., radar facilities and military aircraft). Uncontrolled environments are areas where there is no expectation that higher electromagnetic environments should be encountered, such as in public areas and living quarters. To implement responsibilities related to RFR safety, CAFS has an established program, CAFS Radiation Safety Program Instruction (CAFS 2007), that assigns radiation safety responsibilities to ensure that all personnel, including escorted and unescorted visitors, do not encroach RF safety hazard zones. Safety policies, including those in the CAFS Radiation Safety Program, would be regularly evaluated and

updated to minimize health hazards from HIRF exposure to personnel and the general public. MDA would update these safety policies to account for the increased performance and operational concept of LRDR. The LRDR operational changes would comply with all applicable DoD and armed services regulations.

### **Safety of the General Population**

CAFS is not open to members of the general public, and all ground-based restrictions and subsequent hazards would be confined to CAFS. No areas outside of CAFS would exceed the Maximum Permissible Exposure limit for HIRF. The radar fan (i.e., the area shaped like an arc in front of the radar face) would not fall low enough to impact the public outside of the installation boundaries, including recreational or subsistence users of the Nenana River. People working on the roof of a home or climbing a tree would not be close to the floor of the proposed Restricted Areas, because the floor of the Restricted Areas would be at least 400 feet AGL (i.e., hundreds of feet overhead).

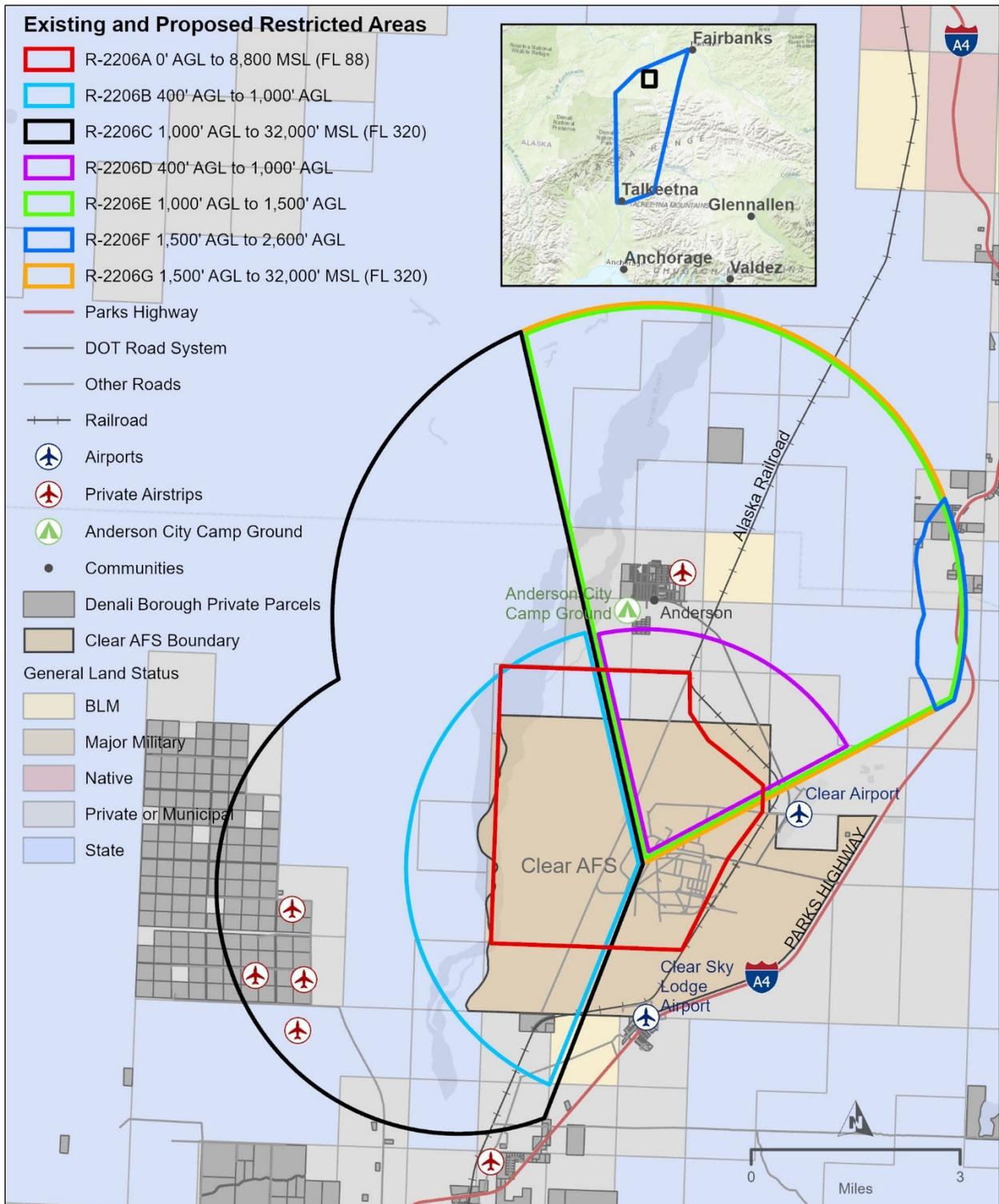
#### *3.10.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft*

### **Restricted Areas**

The Proposed Action introduces six new Restricted Areas that would complement the existing R-2206 and provide HIRF protection for aircraft in all LRDR operating modes. The boundaries of the proposed Restricted Areas are described in **Section 2.1.2.1**.

Some private airstrips are present west of CAFS on land underneath proposed R-2206C and north of CAFS on land underneath proposed R-2206G, as shown on **Figure 3.10-1**. These airstrips have been established by local residents and enable them to have access to the outside community. Because the local roads that connect the airstrips with the Parks Highway are not publicly maintained and may not be traversable year-round, these airstrips may be residents' only means for accessing supplies or medical care. Pilots would continue to be able to use and access the private airstrips as long as they account for the proposed Restricted Areas (see **Section 3.1.3.3.2**). By avoiding the new Restricted Areas, aircraft using private airstrips would not encounter new HIRF safety risks.

**Figure 3.10-1. Private Airstrips beneath Existing and Proposed Restricted Areas**



MDA received feedback from the Alaskan aviation community, Alaskan civil defense and first responders, and the Alaskan general public that stressed the importance of minimizing impact of the proposed

Restricted Areas on air operations at Clear Airport. The proposed Restricted Area design and LRDR operational concept maintains navigable airspace around Clear Airport (1,500 feet AGL within 3 NM) in compliance with FAA Order JO 7400.2M for the vast majority of the time. Exceptions would be a few scheduled periods during the week for routine system maintenance; these times have been negotiated with FAA and would be set for off hours to minimize impact to air traffic. Clear Airport would have limited access for a 2-hour period between 2:00 and 4:00 a.m., three times per week and other times by NOTAM.

A process is being developed by FAA and MDA that would allow flexibility in operation of the proposed Restricted Areas under very limited, specific, and extraordinary conditions if needed for emergencies. Examples include an in-flight emergency or medical evacuation or a wildland fire that would require an aircraft to transit the proposed Restricted Areas. If the proposed Restricted Areas are established, MDA would allow access by emergency aircraft and medical evacuation flights into and out of Clear Airport during the 6 hours per week of prescheduled limited access and other times when access is limited by NOTAM. The emergency access process would be defined in a Letter of Procedure between MDA, CAFS, DAF, and FAA that would accompany the establishment of the proposed Restricted Areas. The Letter of Procedure would define the process for how MDA/CAFS would modify HIRF-generating activities when FAA notifies them of an emergency.

The purpose of the Restricted Areas is to exclude aircraft. MDA and FAA have incorporated these Restricted Areas into the Proposed Action to prevent aircraft from entering areas where HIRF levels would exceed FAA certification standards for aircraft electrical and electronic systems. Because aircraft would not be permitted within the Restricted Areas (except for emergency situations described above), the Proposed Action would not result in adverse safety effects to the general public.

#### **Interim Phase: Potential TFR Implementation**

During the interim phase, if it is needed, the impacts related to HIRF would be the same as during the permanent establishment of Restricted Areas. FAA would implement TFRs and VFR aircraft would detour to avoid the area where HIRF would exceed FAA certification standards for aircraft electrical and electronic systems. IFR aircraft would be rerouted by ATC to avoid the areas with elevated HIRF.

Clear Airport access would be limited for 6 hours per week. MDA, CAFS, DAF, and FAA would allow access by emergency aircraft and medical evacuation flights into and out of Clear Airport and Healy River Airport under emergency conditions as described above. The emergency access process and existing IFR arrival and departure procedures at Healy River Airport would be available as defined in a Letter of Agreement between MDA, CAFS, DAF, and FAA. The Letter of Agreement would define procedures for how MDA/CAFS would modify HIRF-generating activities when notified by FAA of an emergency.

#### **Changes to Federal Airways and Instrument Flight Procedures**

The amended instrument flight procedures and airways and the new T-399 airway would allow IFR aircraft to avoid the Restricted Areas. Emergency aircraft and medical evacuation flights would continue to have full access to Healy River Airport using the amended procedures, and the emergency procedures allowing for IFR access into Healy River Airport in the Letter of Agreement during the interim phase (if the interim phase is needed) would no longer be necessary.

##### **3.10.3.3.3 Summary of Safety Impacts**

Health and safety procedures at the CAFS would be updated for the LRDR and would be followed during operation of the Proposed Action. A ground-based RF safety hazard zone would be established to prevent human access to any area that would exceed the Maximum Permissible Exposure limit for HIRF.

The proposed Restricted Areas and interim TFRs (if necessary) were designed to prevent aircraft from entering areas where HIRF would exceed permissible levels. Emergency and medical evacuation flights would be able to access Clear Airport during times the airport access is limited using the emergency access process defined in a Letter of Agreement during the interim phase, if needed, and in a Letter of Procedure after the proposed Restricted Areas are established. The existing IFR arrival and departure procedures at Healy River Airport would be available to emergency and medical evacuation flights during the interim phase (if needed) as defined in the Letter of Agreement. Emergency and medical evacuation flights would access Healy River Airport through amended IFR arrival and departure procedures once they have been established. Local electrical and electronic systems outside of the Restricted Areas would not be affected by the LRDR. For these reasons, the Proposed Action would have short-term, negligible adverse impacts on health and safety during the interim phase, and permanent, negligible adverse impacts after the Restricted Areas are established.

### **3.11 Socioeconomics and Environmental Justice**

#### **3.11.1 Definition of the Environmental Category**

##### **3.11.1.1 Socioeconomics**

Socioeconomics includes the social and economic attributes of the human environment, generally including factors associated with regional demographics and economic activity. Demographics can be described by the number, distribution, and composition of population and households. Economic activity encompasses a region's major industries, employment, and income characteristics. Direct impacts on either of these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as altered housing availability, demand for public services, and local and regional trends in economy and industry. A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, community infrastructure and public services might be affected by the proposed action and alternative(s).

**Population.** Population size and demographics identify the population levels and changes to population levels of a region. Demographics data might also identify a region's characteristics in terms of race, ethnicity, poverty status, and other broad indicators. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Data on employment might identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" impacts of jobs created or lost as a result of a project.

**Economic Activity.** Economic activity is the production, distribution, and sale of goods and services at all levels of society. Data on employment, personal income, and growth of economic sectors provide baseline and trendline information about the economic health of a region. Socioeconomic data represented in this analysis are presented at state, borough, census area, city, and census designated place (CDP) levels to characterize baseline economic conditions in the context of regional and state trends. Analysis for this section uses data collected from previously published documents issued by federal, state, and local agencies, and from state and national databases.

##### **3.11.1.2 Environmental Justice**

According to USEPA, Environmental Justice is 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. USEPA defines fair treatment to mean that no group of people should bear a disproportionate share of the negative

environmental consequences resulting from industrial, governmental, and commercial operations or policies. Meaningful involvement means that:

- Potentially affected populations have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health;
- The public's contribution can influence the regulatory agency's decision;
- The concerns of all participants will be considered in the decision-making process; and
- The rule-writers and decision-makers seek out and facilitate the involvement of those potentially affected.

### 3.11.2 Affected Environment

#### 3.11.2.1 Socioeconomics

Unlike most of the other environmental categories, the analysis of socioeconomic impacts does not have a distinct geographical study area. The socioeconomic area of impact is defined as the area where the majority of the socioeconomic impacts resulting from the Proposed Action would occur, which would be spread across communities and economic sectors. This socioeconomic impact analysis focuses on the communities and aviation related businesses that would receive any potential direct and indirect, adverse and beneficial, economic impacts from the Proposed Action due to residency distribution of employees, commuting distances and times, and the location of businesses providing goods and services related to the action(s).

Communities potentially affected by the Proposed Action include the City of Anderson and the military and civilian population residing in group quarters at CAFS. Data for the City of Anderson are divided based on ZIP Code Tabulation Areas (ZCTA) where ZCTA 99744 includes the off-base civilian community of Anderson and ZCTA 99704 includes the population at CAFS. ZCTAs are generalized areal representations of U.S. Postal Service ZIP Code service areas.

Healy CDP<sup>33</sup>, Ferry CDP, and the City of Nenana are also included in the socioeconomic analysis because the communities use Clear Airport as an alternate airport when bad weather closes their primary airports (Namowitz 2019). One or more flight procedures would be affected each at Ted Stevens Anchorage International Airport and Fairbanks International Airport, so the Municipality of Anchorage and the City of Fairbanks are also included in the analysis. Communities north of Fairbanks are not considered potentially affected by the Proposed Action because impacts to air traffic between Fairbanks and Deadhorse would be negligible (see **Section 3.1, Airspace Management** for detailed discussion). The potentially impacted communities are shown on **Figure 3.11-1**.

The Proposed Action would affect access to the navigable airspace around CAFS, which, in turn, could affect regional and local aviation traffic, both commercial and non-commercial. Consequently, a focus of the socioeconomic impact analysis is the potential economic impact of the Proposed Action on Alaska's aviation industry. This industry includes businesses that provide aircraft for transportation and other services as well as private pilots who use aircraft for personal or recreational purposes not associated with a business or profession. Commercial entities that directly support the industry include aircraft repair and maintenance firms, fuelers, flight-training schools, and aviation suppliers (Fried and Windisch-Cole 1996).

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<sup>33</sup> CDPs are used by the U.S. Census Bureau for statistical purposes only and are not legally incorporated by laws of the state (USCB 2020).

In addition, airspace-related changes resulting from the Proposed Action have the potential to impact the access to communities in the vicinity of CAFS. Air transportation is a critical component of the economic and social welfare of many of Alaska's communities (Northern Economics, Inc., and CDM Smith 2019). In particular, small communities in the state's remote rural areas depend on the aviation industry. Aircraft are an efficient means for moving people, goods, and materials into and out of these communities and improve their quality of life.

Figure 3.11-1. Potentially Impacted Communities



### 3.11.2.1.1 Potentially Affected Aviation Industry

The following sections describe the aircraft operations and airports potentially affected by the Proposed Action, as they relate to socioeconomic factors.

#### **Aircraft**

There are many classes of aircraft that use the airspace around CAFS, ranging from commercial airliners to single-engine recreational aircraft. There are four primary types of aviation activity within the socioeconomic area of impact: commercial operations, private or recreational aviation, government aviation, and Civil Air Patrol.

##### *Commercial Operations*

Alaska's commercial cargo and passenger aircraft vary widely in size, speed, and capabilities. Most trans-Pacific airliners that transit Interior Alaska are well above the vertical height of the proposed Restricted Areas and would not be affected. The companies providing service in Alaska can include jet operators with service between major hub cities or small companies that provide air taxi and mail service to rural Alaska communities. There are also several dedicated air-ambulance providers in Alaska that offer transportation for emergency medical evacuations. From July 2018 through July 2019 private companies provided two medical evacuation flights for CAFS from Clear Airport and five for Canyon Clinic from Healy River Airport (Guardian Flight Alaska 2020).

##### *Private or Recreational Aviation*

Private or recreational aviation involves the use of an aircraft for purposes not associated with a business or profession. In Alaska, this could include individuals who fly for leisure or use aircraft to reach remote hunting, fishing, camping, sightseeing, or backpacking destinations. Many recreational aircraft are fixed-wing, single-engine planes with traditional landing gear, floats, or snow skis.

##### *Government Aviation*

In Alaska, government aviation will include military aircraft, but federal and state agencies also use aircraft to support rural law enforcement, conduct aerial land and wildlife surveying, and provide wildfire suppression.

##### *Civil Air Patrol*

The USAF Auxiliary CAP is a congressionally chartered, federally supported non-profit corporation that serves as the official civilian auxiliary of USAF. The CAP supports its three primary missions through units at locations statewide which provide emergency services support, cadet programs, and aerospace education in their communities. Each year, CAP's Glider Academy uses Clear Airport to provide students with glider flight instruction. The annual cost of the 10-day Glider Academy is about \$1,500 per student, although the cost to each student is around \$800, after scholarships and other support. Two tow planes and three gliders are brought to Clear Airport each year for the academy (Kelly 2020). The academy does not have a permanent presence at Clear Airport at other times of the year. In 2019, 10 young people, ages 14 to 16, traveled from Tok, Delta-Junction, Valdez, Eielson Air Force Base, Anchorage, and Texas to enroll in the Glider Academy (KTVF11 2019). This was less than the 20 to 40 cadets that typically attend each year. The academy was canceled in 2020 due to the COVID-19 pandemic.

During the academy, cadets have slept in the Anderson School gymnasium, stayed in CAFS dorms, or camped. Meals have been provided at the CAFS dining facility, with special cadet meal pricing. The academy does not use space other than the airstrip and participants do not use lodging accommodations or other services in Anderson. Classroom instruction generally takes place at the cadets' home stations.

## Airports

Airports relevant to the analysis of socioeconomic impacts include Clear Airport, Healy River Airport, Nenana Municipal Airport, Ted Stevens Anchorage International Airport, and Fairbanks International Airport. These are briefly described below, and more detailed information is provided in Table 2-1 of **Appendix C**.

Clear Airport is a state-owned, public-use airport located 4 miles south of Anderson along an access road from the Parks Highway and approximately 1.5 miles east of CAFS. Its primary users are private pilots flying single-engine passenger aircraft. The airport is also used by CAFS for airlift and air transport. In addition, Clear Airport is used as a staging area for CAP glider training and as an alternate for the Healy River Airport and Nenana Municipal Airport in bad weather.

Healy River Airport is a state-owned, public-use airport serving Healy. Nenana Municipal Airport has a lighted asphalt and gravel runway that is also used as a ski strip during the winter.

Ted Stevens Anchorage International Airport is the second-busiest cargo airport in America, following Memphis International Airport which is the base of operations for Federal Express (Northern Economics and CDM Smith 2019). Anchorage’s airport also serves as Alaska’s base of operations for several commercial passenger airlines.

Fairbanks International Airport provides critical air service to more than 80 communities and remote locations in the Interior Region and Northern Alaska that rely upon air freight, mail, and commuter services (Alaska DOT&PF 2020c).

### 3.11.2.1.2 Potentially Affected Communities

The potentially affected communities are described in terms of their current population, housing, and economic characteristics using American Community Survey 5-year estimates. The table comparisons also include each corresponding community’s borough (or Census Area for communities within the Unorganized Borough) for comparison, along with the state of Alaska and the U.S.

## Population Trends

**Table 3.11-1** shows population trends in the potentially affected communities and in their corresponding boroughs. Population change since 2010 varies widely among the communities, showing steep declines in Anderson, which includes both the civilian community of Anderson (ZCTA 99704) and CAFS (ZCTA 99744).

**Table 3.11-1. Population Trends in Potentially Affected Communities**

Geography	Population			Percent Change	
	2010	2015	2018	2010–2018	2015–2018
United States	308,745,538	316,515,021	322,903,030	4.6	2.0
Alaska	710,231	733,375	738,516	4.0	0.7
<b>Municipality of Anchorage</b>	<b>291,826</b>	<b>299,107</b>	<b>296,112</b>	<b>1.5</b>	<b>-1.0</b>
<b>Fairbanks North Star Borough</b>	<b>97,581</b>	<b>99,705</b>	<b>99,653</b>	<b>2.1</b>	<b>-0.1</b>
<i>City of Fairbanks</i>	<i>31,535</i>	<i>32,193</i>	<i>31,677</i>	<i>0.5</i>	<i>-1.6</i>
<b>Yukon-Koyukuk Census Area</b>	<b>5,588</b>	<b>5,644</b>	<b>5,415</b>	<b>-3.1</b>	<b>-4.1</b>

Geography	Population			Percent Change	
	2010	2015	2018	2010–2018	2015–2018
<i>City of Nenana</i>	378	406	383	1.3	-5.7
<b>Denali Borough</b>	<b>1,826</b>	<b>2,060</b>	<b>2,232</b>	<b>22.2</b>	<b>8.3</b>
<i>City of Anderson</i>	246	201	137	-44.3	-31.8
<i>Civilian Community of Anderson (ZCTA 99744)</i>	–	160	98	N/A	-38.8
<i>Clear Air Force Station (ZCTA 99704)</i>	–	41	39	N/A	-4.9
<i>Ferry CDP</i>	33	6	16	-51.5	166.7
<i>Healy CDP</i>	1,021	1,120	1,022	0.1	-8.8

Note: Missing or unreported data are indicated by “–”

N/A = Not applicable calculation when initial population is zero or unknown.

Source: USCB 2020a

### Housing

**Table 3.11-2** shows housing characteristics for the potentially affected communities including housing counts, value, and rent. Home values and rents are unreported for the community of Ferry. More than 65 percent of all housing units in Anderson are vacant.

Nearly one-third of all residents in Anderson, which includes both the civilian community of Anderson (ZCTA 99704) and CAFS (ZCTA 99744), live in CAFS group quarters (ADCCED 2020). Housing data exclude group housing quarters, which are the only housing facilities available on CAFS, so **Table 3.11-2** shows that there is not housing on CAFS (ZCTA 99704).

**Table 3.11-2. Housing Characteristics in Potentially Affected Communities**

Geography	Housing Units					Median Home Value (\$)	Median Rent (\$)
	Total	Vacant	Occupied	Owner-occupied	Renter-occupied		
United States	136,384,292	16,654,164	119,730,128	76,444,810	43,285,318	204,900	1,023
Alaska	315,386	61,924	253,462	162,172	91,290	265,200	1,231
<b>Municipality of Anchorage</b>	<b>116,493</b>	<b>9,969</b>	<b>106,524</b>	<b>64,827</b>	<b>41,697</b>	<b>308,000</b>	<b>1,306</b>
<b>Fairbanks North Star Borough</b>	<b>44,059</b>	<b>7,546</b>	<b>36,513</b>	<b>21,363</b>	<b>15,150</b>	<b>236,800</b>	<b>1,296</b>
<i>City of Fairbanks</i>	13,009	1,984	11,025	3,998	7,027	201,100	1,372
<b>Yukon-Koyukuk Census Area</b>	<b>4,087</b>	<b>2,181</b>	<b>1,906</b>	<b>1,366</b>	<b>540</b>	<b>77,700</b>	<b>683</b>
<i>City of Nenana</i>	226	81	145	100	45	89,200	725
<b>Denali Borough</b>	<b>1,627</b>	<b>988</b>	<b>639</b>	<b>499</b>	<b>140</b>	<b>203,500</b>	<b>814</b>

Geography	Housing Units					Median Home Value (\$)	Median Rent (\$)
	Total	Vacant	Occupied	Owner-occupied	Renter-occupied		
Civilian Community of Anderson (ZCTA 99744)	147	97	50	42	8	115,600	900
Clear Air Force Station (ZCTA 99704)	0	0	0	0	0	–	–
Ferry CDP	33	27	6	6	0	–	–
Healy CDP	736	359	377	295	82	232,700	596

Note: Missing or unreported data are indicated by “–”

Source: USCB 2020b

### Economy

Most of Anderson’s residents are military personnel or civilian employees of CAFS and their families (ADCCED 2020). Civilian employees of the Anderson work primarily in the public service, educational service, and health care service industries, with a lesser number of workers in the transportation and warehousing, construction, professional services, information, and trade industries (see **Table 3.11-3**). Workers in these industries could include both federal and state employees working on CAFS.

Healy was originally established as the home of the Usibelli Coal Mine. The mine continues to dominate the local economy; however, Healy also has significant economic activity associated with tourism in the summer months (ADCCED 2020). Tourism supports a variety of industries through businesses including lodges, bed and breakfasts, restaurants, and tour operators. Healy River Airport, McKinley National Park Airport, Denali Airport, and Talkeetna Airport are used by flightseeing companies as departure points for air excursions of Denali National Park.

**Table 3.11-3. Workers by Industry in Potentially Affected Communities**

Industry	Alaska	Municipality of Anchorage	City of Fairbanks	City of Anderson	Ferry CDP	Healy CDP	Nenana CDP
Not in labor force	175,175	63,000	6,774	30	12	314	116
Armed Forces	17,134	8,246	4,084	39	0	4	0
Employed	351,152	150,201	12,677	47	4	518	147
Agriculture, forestry, fishing and hunting, and mining	16,957	4,172	379	0	0	65	7
Construction	24,492	8,455	765	5	0	40	13
Manufacturing	12,792	3,038	205	1	0	4	4
Wholesale trade	6,093	3,188	123	2	0	5	1
Retail trade	38,382	16,521	2,387	0	4	40	12

Industry	Alaska	Municipality of Anchorage	City of Fairbanks	City of Anderson	Ferry CDP	Healy CDP	Nenana CDP
Transportation and warehousing, and utilities	29,209	13,102	846	7	0	59	5
Information	7,766	3,821	273	1	0	5	2
Finance and insurance, and real estate and rental and leasing	12,200	6,505	370	0	0	15	0
Professional, scientific, and management, and administrative and waste management services	28,755	16,048	1,058	5	0	23	7
Educational services, and health care and social assistance	84,410	35,924	2,758	10	0	44	54
Arts, entertainment, and recreation, and accommodation and food services	32,505	16,330	1,202	0	0	152	15
Other services, except public administration	15,317	7,076	496	4	0	11	9
Public administration	42,274	16,021	1,815	12	0	55	18

Source: USCB 2020c

**Table 3.11-4** shows the unemployment rate and median household income of the potentially affected communities. The civilian community of Anderson (ZCTA 99744) and Nenana have unemployment rates that are higher than the average for the state of Alaska. Unemployment at CAFS is zero because all residents are employed. The civilian community of Anderson has the highest median household income of any of the affected communities or their respective boroughs, which is higher than the state average.

**Table 3.11-4. Unemployment and Income Characteristics of Potentially Affected Communities**

Geography	Median Household Income (\$)	Unemployed (%)
United States	60,293	3.7
Alaska	76,715	4.9
<b>Municipality of Anchorage</b>	<b>83,280</b>	<b>3.9</b>
<b>Fairbanks North Star Borough</b>	<b>77,095</b>	<b>5.0</b>

<b>Geography</b>	<b>Median Household Income (\$)</b>	<b>Unemployed (%)</b>
<i>City of Fairbanks</i>	61,665	4.6
<b>Yukon-Koyukuk Census Area</b>	<b>40,000</b>	<b>12.0</b>
<i>City of Nenana</i>	46,250	7.7
<b>Denali Borough</b>	<b>84,196</b>	<b>2.2</b>
<i>Civilian Community of Anderson (ZCTA 99744)</i>	104,167	9.4
<i>Clear Air Force Station (ZCTA 99704)</i>	–	0.0
<i>Ferry CDP</i>	–	0.0
<i>Healy CDP</i>	87,760	2.5

Note: Missing or unreported data are indicated by “–”

Source: USCB 2020c

### **Community Infrastructure and Services**

This description of public infrastructure and services in the potentially affected communities focuses on infrastructure and services that could potentially be affected by changes in the access to the navigable airspace around CAFS resulting from the Proposed Action. Specifically, the analysis focuses on medical services, law enforcement service, and fire protection services.

#### *Medical Services*

Health clinics offer primary care to residents of the potentially affected communities. Siddall Medical provides primary care and emergency medical services to the residents of CAFS and surrounding communities, including Anderson. The privately owned medical clinic offers a full spectrum of family practice, urgent care, emergency, and occupational medicine (Siddall Medical Services, Inc. 2020). In Healy, primary care is provided by the Healy Clinic in the Tri-Valley Community Center, while the Nenana Clinic provides primary care to Nenana residents. Auxiliary health care is offered in Anderson, Healy, and Nenana by local volunteer fire departments.

Trauma cases and serious illness cases that occur in these communities must be sent to hospitals. Transport in emergency situations is usually by airplane or helicopter. The closest urban center to the potentially affected communities with a hospital that provides air medical services is Fairbanks. (Northern Economics, Inc. and CDM Smith 2019).

#### *Law Enforcement Services*

Law enforcement in the potentially affected communities is primarily the responsibility of Alaska State Troopers. The nearest law enforcement facilities for Anderson are the Alaska State Trooper posts at Nenana and Healy. Both posts are part of Detachment D, headquartered in Fairbanks.

Given the remoteness of many rural communities in Alaska, Alaska State Troopers are dependent on aircraft to conduct their work. Routine law enforcement in the potentially affected communities would use ground transportation, but Detachment D of the Alaska State Troopers uses a Fairbanks-based Trooper pilot, Airbus AStar helicopter, and Cessna 206 and 208 aircraft to support rural communities (Alaska Department of Public Safety 2020).

### *Fire Protection Services*

Potentially affected communities, including Healy, Anderson, and Nenana, maintain fire departments staffed with volunteers. The CAFS fire department is staffed with professional firefighters. Generally, each fire department is responsible for all structural firefighting within its jurisdictional boundaries.

Wildland fire management in Alaska is an interagency effort involving the BLM, Alaska Fire Service; ADNR, Division of Forestry; and the U.S. Forest Service. The Alaska Interagency Coordination Center (AICC), located near Fairbanks at Fort Wainwright, serves as the focal point for initial attack resource coordination, logistics support, and predictive services for all state and federal agencies involved in wildland fire management and suppression in Alaska. In addition, the AICC provides coordination and support for all-hazard emergency response activities for federal landholding agencies in Alaska (AICC 2020).

Much of the land protected by agency members of the AICC is remote and inaccessible by land, requiring the use of a combination of air tankers, helicopters, and miscellaneous fixed-wing aircraft. These aviation resources are used for a wide range of fire protection activities, including delivering initial attack resources to a fire, providing reconnaissance for an existing fire, searching for new fires, training flight crews and other personnel for these types of missions, and repositioning initial attack forces (AICC 2018).

#### 3.11.2.2 Environmental Justice

The combination of study areas for other impact categories represents the affected environment for environmental justice because environmental justice impacts are realized in conjunction with impacts to other impact categories. With respect to the Proposed Action, the primary factors that may result in disproportionately high and adverse effects on minority and low-income populations include changes in socioeconomic conditions and changes in resources that could affect human health and safety, including air quality, visual, and noise resources.

Following 1997 CEQ guidelines for environmental justice analyses, this analysis identified a community within the affected environment as an area of potential environmental justice concern if (1) the minority population exceeds 50 percent or (2) the minority or low-income population percentage is meaningfully greater than the minority or low-income population percentage in a reference population. For the purposes of this analysis, the reference population is the population of Alaska. The decision threshold when there is a “meaningfully greater” percentage of minority or low-income individuals than in the reference population is based on the following calculation:

$$\frac{(Community\ minority\ or\ low\ income\ population) / (Community\ total\ population)}{(Alaska\ minority\ or\ low\ income\ population) / (Alaska\ total\ population)}$$

If the calculation results in a number greater than 1, there is a greater proportion of minority or low-income individuals residing in the community than in Alaska as a whole.

The definition of minority as defined by the CEQ guidelines is Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and multi-race that includes one of these races; and Hispanic or Latino. The CEQ guidelines also state, “a minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds” (CEQ 1997). Low-income populations are identified in this analysis using the U.S. Census Bureau’s statistical poverty threshold, which is based on income and family size. All data used to identify potentially affected populations are derived from American Community Survey 5-year estimates.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency “(a) shall make it a high priority to identify and assess environmental health risks and

safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” Specifically, the EO requires an evaluation as to whether a Proposed Action would have disproportionate environmental health and safety effects on children. For the purposes of this analysis, children are defined as people 17 years of age and under. The affected environment for children’s environmental health and safety includes the study areas identified for other impact categories that have the potential to impact children’s environmental health and safety.

**Table 3.11-5** presents race, ethnicity, and poverty data for the potentially affected communities. The meaningfully greater analysis compares the percentage minority population and percentage of individuals below the poverty level for the state of Alaska to each of the potentially affected communities. Areas of potential environmental justice concern, together with the minority and low-income metric upon which the area identifications were based, are shaded in gray in the table.

The analysis identifies the Municipality of Anchorage, City of Nenana, and the Yukon-Koyukuk Census Area as communities with meaningfully greater minority populations. The entire Denali Borough and Yukon-Koyukuk Census Area and the City of Fairbanks have poverty rates which are meaningfully greater than the state of Alaska rate.

**Table 3.11-5. Minority and Low-Income Populations in Potentially Affected Communities**

Geography	Minority Population Metrics				Low-Income Population Metrics		
	Total Population	Hispanic or Latino	White Alone (%)	Minority (%)	Unemployment Rate (%)	Median Household Income	Individuals Below Poverty Level (%)
Alaska	738,516	51,186	64.8	35.2	4.9	76,715	10.8
<b>Municipality of Anchorage</b>	<b>296,112</b>	<b>26,847</b>	<b>63.0</b>	<b>37.0</b>	<b>3.9</b>	<b>83,280</b>	<b>9.2</b>
<b>Fairbanks North Star Borough</b>	<b>99,653</b>	<b>7,951</b>	<b>75.5</b>	<b>24.5</b>	<b>4.5</b>	<b>77,095</b>	<b>8.1</b>
<i>City of Fairbanks</i>	<i>31,677</i>	<i>3,678</i>	<i>65.7</i>	<i>34.3</i>	<i>4.6</i>	<i>61,665</i>	<i>11.5</i>
<b>Yukon-Koyukuk Census Area</b>	<b>5,415</b>	<b>131</b>	<b>22.7</b>	<b>77.3</b>	<b>12.0</b>	<b>40,000</b>	<b>25.1</b>
<i>City of Nenana</i>	<i>383</i>	<i>4</i>	<i>50.4</i>	<i>49.6</i>	<i>7.7</i>	<i>46,250</i>	<i>10.7</i>
<b>Denali Borough</b>	<b>2,232</b>	<b>9</b>	<b>81.1</b>	<b>18.9</b>	<b>2.2</b>	<b>84,196</b>	<b>16.9</b>
<i>Civilian Community of Anderson (ZCTA 99744)</i>	<i>98</i>	<i>0</i>	<i>85.7</i>	<i>14.3</i>	<i>9.4</i>	<i>104,167</i>	<i>3.1</i>
<i>Clear Air Force Station (ZCTA 99704)</i>	<i>39</i>	<i>0</i>	<i>92.3</i>	<i>7.7</i>	<i>0.0</i>	<i>-</i>	<i>-</i>
<i>Ferry CDP</i>	<i>16</i>	<i>0</i>	<i>100</i>	<i>0.0</i>	<i>0.0</i>	<i>-</i>	<i>0.0</i>
<i>Healy CDP</i>	<i>1,022</i>	<i>0</i>	<i>75.4</i>	<i>24.6</i>	<i>2.5</i>	<i>87,760</i>	<i>10.2</i>

Sources: USCB 2020a, USCB 2020c

Note: Gray-shaded cells indicate the area has a higher minority or low-income population than the state of Alaska as a whole.

American Community Survey 5-year estimates were used to identify the percentage of the population that is under 18 years of age (**Table 3.11-6**). There are generally no children present on CAFS since the only available housing is dormitory-style group housing quarters.

**Table 3.11-6. Children Population in Potentially Affected Communities**

Geographic Area Name	Population	Percentage of the Population Less than 18 Years of Age
United States	322,903,030	22.8
Alaska	738,516	25.2
<b>Municipality of Anchorage</b>	<b>296,112</b>	<b>24.7</b>
<b>Fairbanks North Star Borough</b>	<b>99,653</b>	<b>24.2</b>
<i>City of Fairbanks</i>	<i>31,677</i>	<i>23.8</i>
<b>Yukon-Koyukuk Census Area</b>	<b>5,415</b>	<b>27.7</b>
<i>City of Nenana</i>	<i>383</i>	<i>29.2</i>
<b>Denali Borough</b>	<b>2,232</b>	<b>11.5</b>
<b>Civilian Community of Anderson (ZCTA 99744)</b>	<b>98</b>	<b>15.3</b>
<i>Clear Air Force Station (ZCTA 99704)</i>	<i>39</i>	<i>0</i>
<i>Ferry CDP</i>	<i>16</i>	<i>0</i>
<i>Healy CDP</i>	<i>1,022</i>	<i>19.3</i>

Source: USCB 2020a

Note: Gray-shaded cells indicate that the area has a higher population of children than the state of Alaska as a whole.

In addition to determining the number of children in potentially affected communities, sensitive receptors in which a large number of children may gather at some point during an average week were identified. Specifically, **Table 3.11-7** identifies the public schools in potentially affected communities, together with the student enrollment in these schools. Anderson School and the Tri-Valley School are part of the Denali Borough School District, which also operates a statewide correspondence school called Denali Peak. Nenana City School and the statewide correspondence school called CyberLynx Correspondence Program are operated by the Nenana City School District. In total, there were 299 students enrolled in the three schools.

**Table 3.11-7. Public School Enrollment near CAFS, October 2018**

School Name	Area	Distance from CAFS Main Gate (road miles)	Grade			Total Enrollment
			Pre-K-6	7-8	9-12	
Anderson School	City of Anderson	5.5	14	4	9	27
Tri-Valley School	Healy CDP	36.5	106	25	51	182
Nenana City School	City of Nenana	23.0	64	16	110	190

Source: Alaska Department of Education & Early Development 2020

### 3.11.3 Environmental Consequences

#### 3.11.3.1 Socioeconomics

##### 3.11.3.1.1 *Evaluation Criteria*

FAA has identified factors to consider when evaluating the context and intensity of potential socioeconomic impacts to determine if they would be significant (FAA 2020b). These factors include, but are not limited to, situations in which a proposed action or alternative would have the potential to:

- Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area);
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement housing is unavailable;
- Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- Produce a substantial change in the community tax base.

##### 3.11.3.1.2 *No Action Alternative*

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. The Glider Academy would continue to be held at Clear Airport. Therefore, there would be no airspace-related changes to socioeconomic resources, including the aviation industry and community access to air services.

##### 3.11.3.1.3 *Proposed Action*

#### **LRDR Operational Changes**

The LRDR operational changes would not affect the communities analyzed. Because the Proposed Action would require only one additional worker at CAFS, impacts on population, housing, employment, poverty levels, or public services would not occur. The operational changes would not impact availability of electricity or other natural resources in the region, as discussed in **Section 3.8, Natural Resources and Energy Supply**.

#### **FAA Actions Related to Restricting the Flight of Aircraft**

FAA's actions under the Proposed Action would result in slightly increased aircraft flight times. These increased flight times would result in additional costs to impacted flights from increased fuel use and aircraft operation time. These costs would be spread across the entire potentially affected aviation industry in Alaska.

The following sections quantify the potential economic impacts expected from both detoured VFR flights and rerouted IFR flights during the interim period when the TFRs are active and after the Restricted Areas are established and airways are amended and established.

The potential increased cost per impacted flight would depend on the route used and aircraft type, among other factors. This analysis assumes the most conservative conditions to estimate potential economic impacts. The increased cost per route was calculated using the estimated additional flight durations and

corresponding operational costs. The additional flight durations were calculated using engine factors for the aircraft climbout mode from a Cessna 208 aircraft for VFR flights and a Boeing 737 aircraft for IFR flights, which are the largest aircraft expected to be affected by the Proposed Action. The analysis of costs resulting from increased flight durations assumes the 2019 reported hourly operational cost of \$8,425 for a Boeing 737, and a conservative estimated hourly operational cost of \$949 for a Cessna 208 (ACC 2020a, ACC 2020b). Operational costs include fuel costs, maintenance costs, and the value of aircraft ownership, but do not account for the value of travel time for pilots or passengers.<sup>34</sup>

The operational costs used in this analysis account for fuel costs. Additional fuel requirements per detoured or rerouted flight were also calculated based on the average fuel burn rate of the assumed aircraft: approximately 5,000 pounds, or 750 gallons, per hour for a Boeing 737 (USA Today 2014), and 415 pounds, or 62 gallons, per hour for a Cessna 208 (AOPA 2020). These fuel requirements are presented for comparison purposes and are not included in the additional cost calculations.

This analysis compares the potential increased costs to detoured and rerouted flights between Anchorage and Nenana, and between Anchorage and Deadhorse. All flights affected by the Proposed Action may not originate or end at these locations, and therefore the analysis excludes time for takeoff and landing, but this analysis makes simplifying assumptions to illustrate and provide context for the level of impacts.

There are no data to describe the use of government aircraft near CAFS or how the Proposed Action would affect government agencies. Consequently, the economic impact of the airspace restrictions on government air transportation under the Proposed Action could not be determined and is not included in the analysis.

#### *Restricted Areas*

The establishment of the proposed Restricted Areas would result in changes to air traffic patterns that would affect several socioeconomic factors. Up to 10 VFR flights daily would be required to detour around the Restricted Areas. The increased cost to affected VFR flights would be \$7.91 per flight, which represents less than 1 percent of the baseline cost of typical flights between Anchorage and Nenana or Anchorage and Fairbanks. The estimated annualized cost to all 3,650 affected VFR flights would be \$28,853.25 (see **Table 3.11-8**).

The CAP Glider Academy would not be able to conduct its annual glider instruction at Clear Airport under the Proposed Action. It is likely that CAP would negotiate to relocate the CAP Glider Academy to Ladd Army Airfield (Fort Wainwright) or Fort Greely. These locations have good soaring conditions, and moving operations to one of these airfields could be beneficial to the program due to the long runways available (Kelly 2019). Gliders, instructors, and cadets would travel to the new location instead of Clear Airport. Since participants come from across Alaska and outside the state, it is assumed that there would be no net change to participants' travel costs. The CAP would need to establish an agreement with the new airfield manager to address lodging and dining needs for cadets. A long-term arrangement to ensure the Academy's ability to operate at the new airfield and maintain the same level of cost to participants would minimize the effect of the location change. At this time, arrangements for relocating the Academy have not been completed. Without information required to determine the potential costs associated with moving

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<sup>34</sup> Operational costs include fixed costs (e.g., aircraft insurance, hangar fees, and loans, as applicable), overhaul costs (e.g., overhaul maintenance of propeller, airframe, and engine), and direct costs (e.g., fuel, labor, and routine maintenance, based on 450 hours flown per year).

the program, it is conservatively assumed that the Proposed Action would have moderate adverse impacts on the CAP Glider Academy.

*Interim Phase: Potential TFR Implementation*

If the interim phase is needed, implementation of TFRs would require existing commercial and recreational aircraft flights to reroute or detour around the TFRs. Up to 10 VFR flights daily would be required to detour around the TFRs in the vicinity of CAFS. Up to 5 IFR flights daily on airways V-436 or J-125 or flying direct from Anchorage to Deadhorse would be rerouted around the TFRs, as described in **Section 3.1.3.3.2. Table 3.11-8** provides estimates of potential economic impacts due to the rerouting and detouring of flights around the TFRs.

**Table 3.11-8. Estimated Economic Impact to Affected IFR and VFR Flights, Interim Phase**

Baseline Route Requirements				Reroute	Projected Additional Requirements per Flight Rerouted/Detoured			Total Operational Cost per Flight Rerouted/Detoured	Cost Increase above Baseline
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM) and Duration <sup>(2)</sup>	Total Operational Cost <sup>(3)</sup>		Distance (NM) and Duration <sup>(2)</sup>	Fuel Requirement (gal) <sup>(4)</sup>	Operational Cost <sup>(3)</sup>		
<b>IFR Flights</b>									
J-125	Anchorage – Deadhorse	551.5 (103 minutes)	\$14,463.26	West Reroute	1.5 (17 seconds)	3.5	\$39.79	\$14,503.05	0.3%
V-436	Anchorage – Nenana	213.1 (40 minutes)	\$5,616.80	West Reroute	1.5 (17 seconds)	3.5	\$39.79	\$5,656.59	0.7%
				V-438/V-480	42.5 (8 minutes)	98.8	\$1,109.32	\$6,726.12	19.8%
North Slope Direct Flights	Anchorage – Deadhorse	548.5 (102 minutes)	\$14,364.97	Vectored direct	2.7 (30 seconds)	6.3	\$70.21	\$14,435.18	0.5%
					11 (2 minutes)	25.0	\$280.84	\$14,645.81	2.0%
<b>VFR Flights</b>									
Detour	Anchorage – Fairbanks	225 (87 minutes)	\$1,375.47	Detour around TFRs	0.7 to 1.3 (30 seconds)	0.5	\$7.91	\$1,383.38	0.6%
	Anchorage – Nenana	207 (80 minutes)	\$1,264.80					\$1,272.71	0.6%

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Operational costs are based on hourly cost of operation for a Boeing 737 for IFR flights and a Cessna 208 for VFR flights, and include fuel costs, maintenance costs, and the value of aircraft ownership. Source: ACC 2020a, 2020b.

<sup>(4)</sup> Additional fuel requirements calculated separately from additional operational costs. Source: USA Today 2014, AOPA 2020.

The increased cost to affected VFR flights during the interim phase would be \$7.91 per flight, which represents less than 1 percent of the baseline cost of typical flights between Anchorage and Nenana or Anchorage and Fairbanks. The estimated annualized cost to all 3,650 affected VFR flights would be \$28,853.25.

The increased cost to affected IFR flights on V-436 between Anchorage and Nenana would vary significantly, from \$39.79 per flight on the West Reroute to \$1,109.32 per flight on the V-438/V-480 reroute. The increased cost to affected flights on J-125 would be \$39.79 on the West Reroute. The increased cost to the affected direct Anchorage to Deadhorse flights would range from \$70.21 to \$280.84 per flight.

The CAP Glider Academy would be not be able to operate at Clear Airport during the interim phase as described above in **Restricted Areas**.

#### *Changes to Federal Airways and Instrument Flight Procedures*

Socioeconomic impacts associated with changes to airways would be similar to those described above for the interim phase. However, there are differences in the identified alternate routes that IFR flights would use to avoid the proposed Restricted Areas, and these differences would affect impacts associated with flight times and aviation fuel costs. It is conservatively estimated that up to 5 IFR flights daily that would have used the portions of airways V-436 and J-125 would be affected, or flying direct from Anchorage to Deadhorse, would be routed to alternate routes as described in **Section 3.1.3.3.2. Table 3.11-9** provides estimates of potential economic impacts of the identified alternate routes.

**Table 3.11-9. Estimated Economic Impact to Affected IFR Flights, Changes to Federal Airways**

Baseline Route Requirements				Alternate Route	Projected Additional Requirements per Flight Using Alternate Route			Total Operational Cost per Flight Using Alternate Route	Cost Increase above Baseline
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM) and Duration <sup>(2)</sup>	Total Operational Cost <sup>(3)</sup>		Distance (NM) and Duration <sup>(2)</sup>	Fuel Requirement (gal) <sup>(4)</sup>	Operational Cost <sup>(3)</sup>		
J-125	Anchorage – Deadhorse	551.5 (103 minutes)	\$14,463.26	J-115	-0.8 (-9 seconds)	-0.1	-\$14.04	\$14,449.22	-0.1%
				J-115/Q-41	-3.8 (-43 seconds)	-8.8	-\$98.29	\$14,364.97	-0.7%
V-436	Anchorage – Nenana	213.1 (40 minutes)	\$5,616.80	V-438/V-480	42.5 (8 minutes)	98.8	\$1,109.32	\$6,726.12	19.8%
				V-436 dogleg/ V-480	51.8 (10 minutes)	121.3	\$1,362.07	\$6,978.87	24.3%
				T-399	3.7 (43 seconds)	9.0	\$100.63	\$5,717.43	1.8%
V-436	Anchorage – Deadhorse	551.1 (103 minutes)	\$14,463.26	T-227	8.7 (2 minutes)	20.0	\$224.67	\$14,687.93	1.6%
				V-438	39.0 (7 minutes)	91.3	\$1,025.07	\$15,488.33	7.1%
				V-444/V-504	46.6 (9 minutes)	108.8	\$1,221.65	\$15,684.91	8.4%
North Slope Direct Flights	Anchorage – Deadhorse	548.5 (102 minutes)	\$14,364.97	Vectored direct	2.7 (30 seconds)	6.3	\$70.21	\$14,435.18	0.5%
					11 (2 minutes)	25.0	\$280.84	\$14,645.81	2.0%

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Operational costs are based on hourly cost of operation for a Boeing 737, and include fuel costs, maintenance costs, and the value of aircraft ownership. Source: ACC 2020a, 2020b.

<sup>(4)</sup> Additional fuel requirements calculated separately from additional operational costs. Source: USA Today 2014.

The increased cost to affected IFR flights would vary significantly depending on the alternate route used. Flights that would have used J-125 between Anchorage and Deadhorse would experience cost savings on either J-115 or J-115/Q-41. Increased costs to flights that would have used V-436 between Anchorage and Nenana would range from \$100.63 per flight on T-399 to \$1,362.07 on the V-436 dogleg/V-480. Increased costs to flights that would have used V-436 between Anchorage and Deadhorse would range from \$224.67 on T-227 to \$1,221.65 on V-444/V-504. The increased cost to affected direct Anchorage to Deadhorse flights would range from \$70.21 to \$280.84 per flight, consistent with impacts described for the Interim Phase above.

The amendments to the procedures at Healy River Airport would require approximately five IFR flights per year to fly between 1.4 and 10.9 additional NM. These additional flight distances would result in an increase in cost ranging from \$42.13 to \$280.84 per flight. The amendments to the PUYVO THREE DEPARTURE and MCKINLEY TWO DEPARTURE procedures at Fairbanks International Airport and the TAGER EIGHT ARRIVAL procedure at Ted Stevens Anchorage International Airport would not require increased flight distances and thus would not result in increased costs.

### **Summary of Socioeconomic Impacts**

LRDR operational changes would have no impact on socioeconomic factors. The direct economic impacts of the Proposed Action, which would result from increased flight distances, would be spread across the entire potentially affected aviation industry in Alaska. The only direct impact of the proposed Restricted Areas and TFRs would be to the CAP Glider Academy, which would need to relocate. FAA's related changes to airways and instrument flight procedures would not affect the provision of public services associated with aviation in the study area communities.

If CAP is able to negotiate a long-term arrangement to allow the CAP Glider Academy to operate at Ladd Army Airfield or Fort Greely and provide participants with no-cost lodging or camping options and discounted meal service, the impacts to the Glider Academy would be minimized. Arrangements for relocating the CAP Glider Academy have not been completed, and costs associated with the new location are not known. Based on the information currently available, the Proposed Action would have short-term, moderate adverse impacts on the CAP Glider Academy during the interim phase, and permanent, moderate adverse impacts after the proposed Restricted Areas are established.

Overall, the Proposed Action would have short-term, negligible to minor adverse impacts on socioeconomic factors during the interim phase, and permanent, negligible to minor adverse impacts on socioeconomic factors after the Restricted Areas are established and federal airways are changed.

#### **3.11.3.2 Environmental Justice**

##### **3.11.3.2.1 *Evaluation Criteria***

CEQ guidance for implementing EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to determine whether a disproportionately high and adverse human health or environmental impact on minority populations, low-income populations, or Indian tribe is likely to result from a proposed action or alternative. FAA's 1050.1F Desk Reference (FAA 2020b) directs that the definition for a "disproportionately high and adverse impact" in DOT Order 5610.2(a) (see Section 11.0 of **Appendix D**) should be used when assessing impacts to environmental justice populations. In addition, the 1050.1F Desk Reference identifies factors to consider when evaluating the context and intensity of potential environmental justice impacts. These factors include, but are not limited to, situations in which the proposed action or alternative(s) would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population) due to:

- Significant impacts in other environmental impact categories; or
- Impacts on the physical or natural environment that affect an environmental justice population in a way that FAA determines is unique to the environmental justice population and significant to that population.

### 3.11.3.2.2 *No Action Alternative*

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and air traffic conditions would continue unchanged, other than expected gradual growth in air traffic volume. Because there would be no changes to socioeconomic, air quality, visual, or noise resources, no disproportionately high and adverse effects on minority, low-income, or children populations would occur.

### 3.11.3.2.3 *Proposed Action*

#### **LRDR Operational Changes**

The LRDR operational changes would not have a disproportionately high and adverse effect on minority and low-income populations.

#### **FAA Actions Related to Restricting the Flight of Aircraft**

FAA would take the following actions related to restricting the flight of aircraft: (1) establish six additional Restricted Areas and make minor changes to the existing R-2206; (2) if necessary, implement TFRs until those Restricted Areas are in effect; and (3) make changes to federal airways and instrument flight procedures to accommodate the new Restricted Areas. None of FAA's actions to restrict or change the flight of aircraft would not have a disproportionately high and adverse effect on minority and low-income populations.

#### **Summary of Environmental Justice Impacts**

As described in the above impact analysis for socioeconomics, and in **Sections 3.2, Air Quality; 3.9, Noise and Compatible Land Use; 3.12, Subsistence; and 3.13, Visual Effects**, the Proposed Action would result in negligible to minor impacts on these environmental categories. Furthermore, while minority and low-income populations have been identified within the communities that would potentially be affected by the Proposed Action, the impacts of the Proposed Action would be spread out across all communities and populations. Therefore, there would be no disproportionately high and adverse effects on minority, low-income, or children populations.

## **3.12 Subsistence**

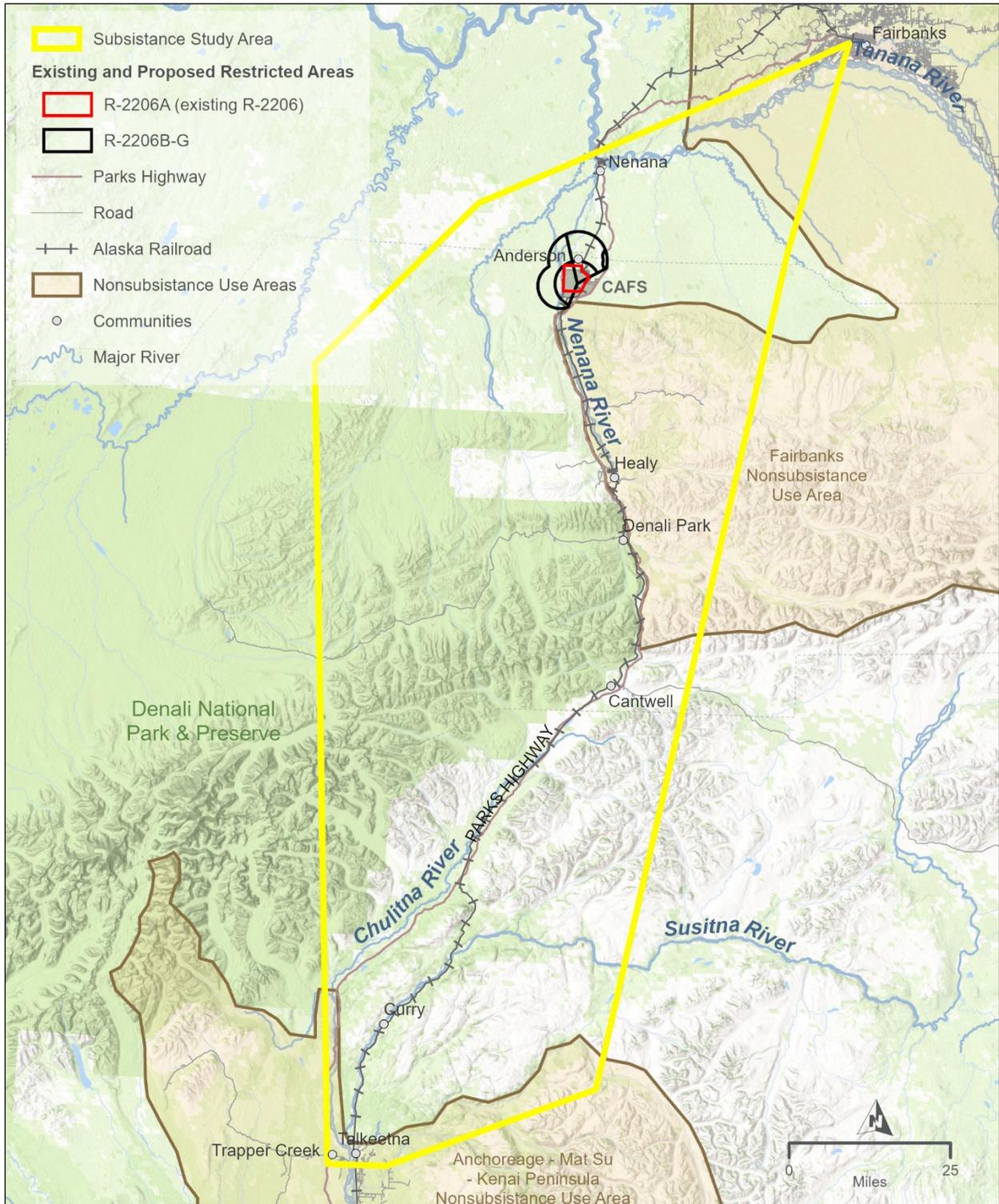
### **3.12.1 Definition of the Environmental Category**

Subsistence hunting, fishing, and gathering is a vital component of many Alaska communities' economic and social systems. Subsistence is defined by Alaska and federal law as the "customary and traditional" uses of wild resources for various uses including food, shelter, fuel, clothing, tools, transportation, handicrafts, sharing, barter, and customary trade. Subsistence is a foundation of the cultural, social, nutritional, and economic well-being of many Alaska communities. Activities associated with subsistence include not only the harvesting of wild plants and animals, but also the processing, sharing, and redistributing of resources. Subsistence activities are often guided by the sharing of Traditional Knowledge and a close connection with the land and its resources.

### **3.12.2 Affected Environment**

The study area for the subsistence environmental category encompasses the area in which most changes to restricted airspace and aircraft flight paths would occur under the Proposed Action (**Figure 3.12-1**). The study area for subsistence is consistent with the study area for subsistence resources (i.e., mammals and birds; see **Section 3.3, Biological Resources**). Details regarding proposed airspace management changes are described in **Section 3.1, Airspace Management**.

Figure 3.12-1. Study Area for Subsistence



Data on subsistence harvests within the study area have been compiled by the ADF&G. Subsistence research is compiled by the ADF&G as part of their core mission to scientifically gather, quantify, evaluate, and report information about customary and traditional uses of Alaska’s fish and wildlife resources (Alaska Statue [AS] 16.05.094). Subsistence research publications and reports prepared by ADF&G are public and provided on their website (ADF&G 2020d).

Data on subsistence harvests within the study area are derived from the reports summarized in **Table 3.12-1**.

**Table 3.12-1. Published ADF&G Subsistence Studies within Study Area**

Title	Year of Publication	Summary of Research	Communities in Research Area that Overlap with Study Area
Fishery Management Report for Recreational Fisheries in the Tanana River Management Area, 2017	2018	This report provides a summary of 2017 information on the management of recreational fisheries within the Tanana Management Area. The report provides not only background information on the fisheries and the regulatory process, but also new data on catch, effort, and harvest; and significant issues or developments for particular fisheries, regulatory actions, and future informational needs.	Anderson, Cantwell, and Healy
Harvest and Use of Subsistence Resources in 4 Communities in the Nenana Basin, 2015	2017	Subsistence research was conducted in 2015 that provides data on the estimate of annual harvests and uses of wild foods in a 12-month study area; mapped locations for hunting, fishing, and gathering; demographic, income, and food security information; trends in wild resource procurement; and Traditional Knowledge observations on wild resources.	Denali Park, Anderson, Nenana

Title	Year of Publication	Summary of Research	Communities in Research Area that Overlap with Study Area
The Harvest and Use of Wild Resources in Cantwell, Chase, Talkeetna, Trapper Creek, Alexander/Susitna, and Skwentna, Alaska, 2012	2014	Report on the harvest of fish, wildlife, and wild plant resources for several Susitna River Basin and Southcentral Alaska communities. ADF&G researchers conducted household surveys within these communities in 2012. The research was conducted as part of a wider effort by the state to assess the feasibility of constructing the Susitna-Watana Hydroelectric Project.	Cantwell, Talkeetna, Trapper Creek

Source: *Holen et al. 2014, Brown and Kostick 2017, Baker 2018.*

The types of resources harvested by these communities include salmon (sockeye, coho, chinook, and pink), non-salmon fish (grayling, northern pike, whitefish), large land mammals (moose, caribou, bison, Dall sheep, bear), small land mammals/furbearers (snowshoe hare, squirrels, muskrat, beaver), birds and eggs (grouse, ptarmigans, ducks, geese), and vegetation (plants, greens, mushrooms).

Typically, the harvesting of subsistence resources in Interior Alaska follows a seasonal round, or a cyclical schedule of activities that is based on weather, ground conditions, and timing of species' movements. While seasonal rounds may fluctuate from year to year and vary among communities, they typically entail harvesting fish and migratory birds in spring before breakup; salmon fishing in summer; fishing for non-salmon fish species in fall, along with harvesting of ducks, geese, and large land mammals; and in winter, harvesting caribou and small game, and fishing under the ice. Small land mammals and furbearers are harvested year-round; vegetation resources are harvested in summer.

For many communities within the study area, harvesting of subsistence resources is occasional due to full- or part-time employment, leaving residents the ability to conduct subsistence activities only on weekends or on their time off from employment (Brown and Kostick 2017). However, a majority of the residents of Nenana participate in a seasonal round of subsistence activities, likely due to the large percentage of Alaska Native residents comprising the community (35 percent at the time the ADF&G study was conducted; Brown and Kostick 2017). No known subsistence-level hunting, fishing, or trapping occurs in the vicinity of CAFS (DoD 2016b).

### 3.12.3 Environmental Consequences

#### 3.12.3.1 Evaluation Criteria

The extent of a potential impact on subsistence resources or practices can vary from no effect, to minor or moderate effect, to one that is considered major. A major impact would involve substantial changes to subsistence resources or practices. The action would block or greatly affect access to resources or affect subsistence practices in either the short or long term.

#### 3.12.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit

use of affected airspace, and air traffic conditions would continue unchanged. Availability of and access to subsistence resources would generally stay the same, but could be affected by future changes in the environment that are unrelated to the Proposed Action such as new development or climate change.

### 3.12.3.3 Proposed Action

#### 3.12.3.3.1 *LRDR Operational Changes*

The Proposed Action does not include any ground disturbance; therefore, it would not result in a direct physical change to vegetation or wildlife habitat that would subsequently affect the subsistence environmental category. With the exception of the RF safety hazard zone within the CAFS boundary, operation of the LRDR would not affect people or animals on the ground. The radar fan (i.e., the area shaped like an arc in front of the radar face) would not fall low enough to impact wildlife or the public outside of the installation boundaries, including subsistence users of the Nenana River.

CAFS is not open to subsistence users or other members of the public, and all ground-based restrictions and subsequent hazards would be confined to CAFS. Access to subsistence use areas by subsistence harvesters using non-aircraft transportation such as trucks, all-terrain vehicles, or boats outside of CAFS would not be restricted.

#### 3.12.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

##### **Restricted Areas**

Subsistence users accessing the area near CAFS via airplane would need to fly around the proposed Restricted Areas. Access to Clear Airport would be limited for a 2-hour period between 2:00 and 4:00 a.m. three times per week and other times by NOTAM. However, these changes would be unlikely to affect subsistence users because the scheduled closures would occur during nighttime hours. The effects of VFR flight detours on subsistence resources would be the same as described for the interim phase below.

##### **Interim Phase: Potential TFR Implementation**

If the interim phase is needed, implementation of TFRs would require detours of VFR aircraft and reroutes of IFR aircraft. Birds used for subsistence within and beneath new flight paths could experience more noise disturbance and risk of collision, whereas birds used for subsistence resources in the prior flight path could experience less noise disturbance and risk of collision. As described in **Section 3.3, Biological Resources**, plants, fish, and wildlife (including those used for subsistence) would not be affected by the Proposed Action. Overall, impacts to subsistence resources during the interim phase would be negligible.

As described above for the proposed Restricted Areas, ground access for subsistence users would not change due to TFRs during the interim phase. However, subsistence users accessing the area near CAFS via airplane would need to fly around the TFRs. As described in **Section 3.1, Airspace Management**, the existing IFR arrival and departure procedures at Healy River Airport would be available through processes defined in a Letter of Agreement between MDA, CAFS, DAF, and FAA. Access to Clear Airport would be limited for a 2-hour period between 2:00 and 4:00 a.m. three times per week. However, the effects on aviation would be unlikely to affect subsistence users.

## Changes to Federal Airways and Instrument Flight Procedures

As described above for the **Interim Phase**, bird species used for subsistence may be affected by the air traffic changes following changes to federal airways and instrument flight procedures subsistence resources would not be affected by the proposed Action. Other subsistence resources would not be affected by the Proposed Action. Amendments to airways and instrument flight procedures would not affect subsistence users, other than those subsistence users accessing the study area via airplane who could need to use amended airways and instrument flight procedures.

### 3.12.3.3 Summary of Subsistence Impacts

The Proposed Action would have short-term, negligible adverse impacts on subsistence during the interim phase, and permanent, negligible adverse impacts after the proposed Restricted Areas are established and amendments to airways and instrument flight procedures have been published.

## 3.13 Visual Effects

### 3.13.1 Definition of the Environmental Category

**Visual Resources and Visual Character.** Visual resources can be defined as the natural and man-made features that constitute the aesthetic qualities of an area. Natural visual resources occur in the landscape typically without human assistance and include native or mostly undisturbed landforms, waterbodies, vegetation, and animals, both wild and domesticated. Cultural visual resources are features installed or constructed by people such as buildings, structures, artifacts, and art. Visual character refers to the overall visual makeup of the existing environment. The patterns formed by the types, placement, juxtaposition, and visual attributes of a landscape's natural and cultural resources compose the landscape's visual character.

Visual resources can be described in terms of viewsheds. A viewshed is defined as the geographical area that is visible from a specific location, and includes all surrounding points that are in the line-of-sight with that location and excludes any points that are beyond the horizon or obstructed by other physical constraints such as terrain, vegetation, structures, and atmospheric conditions. The specific location from which a viewshed is observable is called a Key View.

**Viewers and Viewer Sensitivity.** Viewers are people who have views of an area or viewshed. The visual acuity of a typical viewer determines the extent of a viewshed that is actually observed. The ability of a person to actually see an object in a viewshed, even if it is theoretically visible (i.e., if it is within a person's line of site), depends on the object's distance from the viewer, its size, and its luminosity.

Viewer sensitivity relates to the visual preferences of an individual or community and their tolerance for degrees of change in visual resources, character, or quality.

**Visual Quality.** Visual quality is defined as the impression a particular landscape has on its observers. The importance of visual resources and any changes in the visual character of an area is influenced by social considerations, including the public value placed on the area, public awareness of the area, and community concern for the visual resources in the area.

### 3.13.2 Affected Environment

#### 3.1.1.2 Study Area and Key Views

The study area for visual resources encompasses the area in which most changes to restricted airspace and aircraft flight paths under the Proposed Action would be visible. This area comprises viewsheds between Anchorage and Fairbanks that consist primarily of natural landscapes in the Nenana River

valley, the Alaska Range, and the Susitna River valley. Most of these viewsheds are inaccessible to most viewers because they are remote and removed from the road system. The viewsheds that could be impacted by air traffic changes and that are accessible and frequented by viewers are those on public land or publicly accessible locations in communities, recreation areas, and transportation corridors. This analysis considers the potential impacts to representative viewsheds featuring Denali between Anchorage and Fairbanks.

The dominant visual resource in the study area is Denali (formerly called Mount McKinley), North America's highest mountain peak. Denali can be seen from Anchorage, 135 miles to the south-southeast, and Fairbanks, 155 miles to the northeast. It is also visible to people on the Parks Highway between Anchorage and Fairbanks, the Alaska Railroad, commercial flights into and out of Anchorage and Fairbanks, and airplane sightseeing tours. The 230 mile-segment of the Parks Highway from Denali State Park to Fairbanks is designated as a National Scenic Byway by the Federal Highway Administration and a State Scenic Byway by the Alaska DOT&PF. The Alaska Railroad between Anchorage and Fairbanks is also a designated State Scenic Byway.

Atmospheric conditions, primarily the presence of cloud cover, significantly reduce views of Denali. Time available for daylight observation in Fairbanks extends from less than 4 hours in winter to 22 hours in summer. Clouds are considered to obscure views of Denali at least partially for approximately two-thirds of the time available for observation. Therefore, Denali is entirely visible for an average of approximately 1.3 hours per day in winter and 7.3 hours per day in summer.

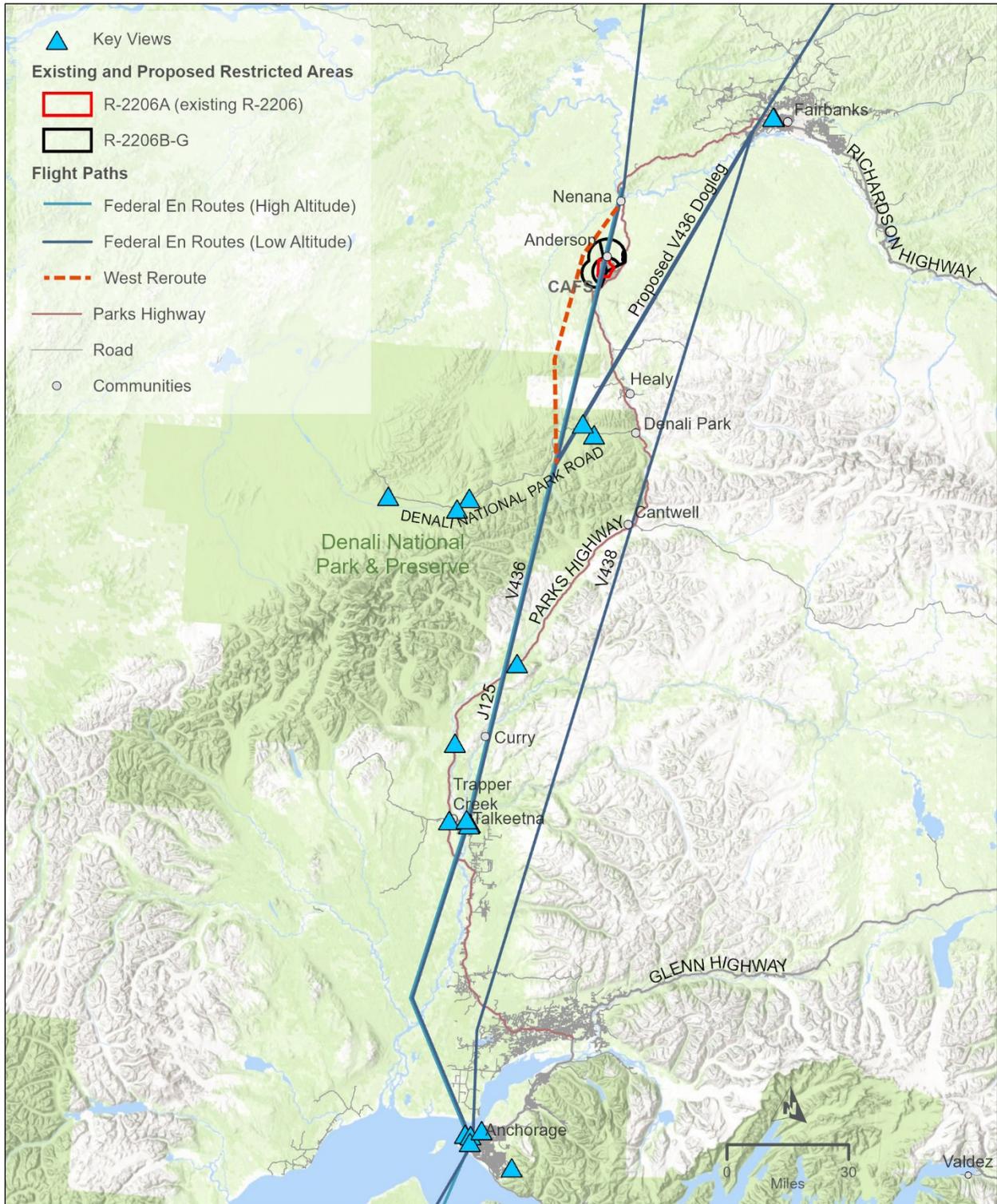
Key Views of Denali from which air traffic changes as a result of the Proposed Action may be visible are listed in **Table 3.13-1** and shown on **Figure 3.13-1**. These are not the only viewpoints of Denali within the study area, but are representative viewsheds that would commonly be accessible to tourists and residents in Southcentral and Interior Alaska. These viewpoints also offer views of the Alaska Range and other natural and cultural features that are consistent with the visual character of the region. Key Views in **Table 3.13-1** are listed roughly from north to south.

**Table 3.13-1. Key Views of Denali**

<b>Area</b>	<b>Location</b>
Fairbanks	Denali and Alaska Range Overlook
	University of Alaska Museum of the North
Denali Park Road	First Denali View (Mile 9)
	Primrose Ridge (Mile 16)
	Stony Hill Overlook (Mile 62)
	Eielson Visitor Center (Mile 66)
	Wonder Lake (Mile 85)
Parks Highway	Denali View North Campground
	Denali View South Campground
	Trapper Creek Museum
Talkeetna	Denali View Pullout
	Talkeetna Riverfront Park
	Talkeetna Alaskan Lodge
Anchorage	Point Woronzof
	Earthquake Park
	The Crow's Nest at Hotel Captain Cook
	Flattop Mountain at Glen Alps
	Ted Stevens Anchorage International Airport

Source: Alaska Channel 2020

Figure 3.13-1. Key Views



In addition to the identified Key Views, historical, architectural, archaeological, and other cultural resources (including ethnographic resources such as TCPs and ethnographic landscapes) may be sensitive to changes in the visual environment. There are no cultural resources currently identified within the area affected by the Proposed Action for which the feeling or setting of the property contributes to its significance and/or integrity (see **Section 3.6, Historical, Architectural, Archaeological, and Cultural Resources** for identified properties).

### 3.13.2.1 Affected Population

The viewer groups whose experiences may be affected by the Proposed Action are both residents whose views of visual resources could be affected, and tourists seeking views of Denali or other visual resources of the natural or cultural environment. Views could be affected by the introduction of new (where not currently present) or additional airplanes or contrails. Increased noise levels might draw viewer attention to changes in flight paths or schedules.

### 3.13.2.2 Existing Visual Quality

Existing visual quality is defined by the visual preferences and expectations of viewer groups, especially those viewer groups that are most sensitive to changes to visual resources. Tourists visiting Alaska, especially Denali National Park, comprise the most sensitive viewer group. They expect to see undisturbed views of wilderness. Typically, they are able to fulfill their expectations, especially if they journey into the wilderness of the national or state park lands. Residents however, are used to seeing aircraft and would likely not consider them a visual intrusion unless additional flights were routed between their location and the visual resources they were viewing, such as views of Denali from the identified Key Views.

Existing air traffic is currently visible from many of the identified Key Views. The Key Views in Fairbanks are located less than 2 miles from Fairbanks International Airport. One of the identified Key Views in Anchorage is at Ted Stevens Anchorage International Airport; Point Woronzof and Earthquake Park are immediately adjacent to the airport.

## 3.13.3 Environmental Consequences

### 3.13.3.1 Evaluation Criteria

Evaluation of impacts to visual quality are determined by physical changes to the natural and cultural resources visible in the affected environment as seen by the affected population. Analysis of visual impacts considers whether a proposed action would substantially alter or remove visual resources that are visually important or have unique characteristics, and how such changes would alter the character and quality of views and the number of locations from which the resource can be viewed.

FAA's 1050.1F Desk Reference (FAA 2020b) identifies the following factors to consider when evaluating the context and intensity of potential environmental impacts for visual effects:

- Light Emissions Effects
  - 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.

- Visual Resources and Visual Character Effects
  - 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.

### 3.13.3.2 No Action Alternative

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace, and the current air traffic patterns would continue unchanged, although air traffic volume is likely to gradually increase. With respect to air traffic, viewsheds and visual quality would remain the same as existing conditions.

### 3.13.3.3 Proposed Action

No visual resource of the natural environment—landform, vegetation, animal, or water resources— or the cultural environment—buildings, infrastructure, structures, historic properties, artifacts, or art—would be physically altered by the Proposed Action. The Proposed Action would not affect the number of viewers or their viewing locations. The only potential adverse impacts to visual resources would be changes to the experience of visual quality caused by the introduction of additional airplanes into desirable scenic views or over historic properties, including TCPs and ethnographic landscapes. The extent of the impact of these changes on the experience of visual quality depends on the locations of the flights relative to the locations of viewers. Routing additional flights between the locations of Key Views and the visual resources they are viewing, such as views of Denali, could potentially adversely affect the viewers' experience of visual quality.

The Proposed Action would not result in any change in light emissions.

#### 3.13.3.3.1 *LRDR Operational Changes*

The change to continuous LRDR operations would not result in any visual impacts.

#### 3.13.3.3.2 *FAA Actions Related to Restricting the Flight of Aircraft*

##### **Restricted Areas**

Establishment of the proposed Restricted Areas would require aircraft to fly around or, in some cases, under the restricted airspace. The changes in flight paths would result in slight changes to the visual environment. The only potential visual impacts from establishing the proposed Restricted Areas are from changes to IFR and VFR flight paths. Permanent impacts associated with IFR flights are addressed below under **Changes to Federal Airways and Instrument Flight Procedures**. Visual impacts associated with IFR flights during the interim phase are described below under **Interim Phase: Potential TFR Implementation**.

VFR aircraft, which do not follow prescribed routes, would detour to avoid the proposed Restricted Areas. It is conservatively estimated that the Proposed Action would result in detours of up to 10 VFR flights per day (see **Section 3.1, Airspace Management**). Figure 4-6 in **Appendix C** depicts the estimated potential area where changes to detour paths would occur. On average, pilots operating under VFR to avoid the

proposed Restricted Areas would be expected to detour between 0.7 and 1.3 NM from current detour lanes (see **Section 3.1, Airspace Management**). These changes in flight paths would likely not be noticeable by a viewer on private or public lands in the Clear/Anderson area, as overflights by small aircraft are common in this area and VFR flight paths tend to be variable rather than following set routes. These flights would also not be visible from the identified Key Views of Denali in Fairbanks, which are too far (approximately 60 miles) away for a viewer to discern a small plane flying at approximately 1,500 feet AGL. All other Key Views are separated from CAFS by the Alaska Range.

### **Interim Phase: Potential TFR Implementation**

Implementation of the TFRs would result in a shift of traffic from the V-436 and J-125 airways to the West Reroute and some of the traffic on V-436 could also shift to V-438. IFR flights rerouted to the West Reroute would not introduce new or additional views of airplanes at any Key Views, as the current V-436 and J-125 airways are already located between Denali and most of the Parks Highway (see **Figure 3.13-1**). The reroute would rejoin the current airways in the vicinity of the Denali Park Road. Tourists and recreational users on Denali Park Road already see airplanes transiting the area at similarly high altitudes. Flights moved to the West Reroute would be infrequent (one to two per day from J-125 and one to two per day from V-436). These flights would not be a constant disturbance to viewers, as viewers that may be able to see the rerouted aircraft would generally have a short view duration as the aircraft moves through the area. Additionally, aircraft on the West Reroute would be higher than the line of sight between the Key Views on Denali Park Road and Denali. One to two daily direct flights between Anchorage and Deadhorse would also be shifted; however, these flights are at high enough altitudes that they would not be noticeable to most viewers.

IFR flights that are rerouted from V-436 to V-438 would be moved east of the Parks Highway over the communities of Denali Park and Cantwell. Aircraft already transit this area at similar altitudes on this flight path, and additional flights would be infrequent. Furthermore, moving air traffic from V-436 could have a slight beneficial effect on viewers' experience of visual quality from Key Views on the Denali Park Road, on the Parks Highway, and in Talkeetna by reducing the number of daily flights between those Key Views and Denali.

If the interim phase is needed, visual impacts associated with changes to VFR flights would be the same as described above under **Restricted Areas**; however, these impacts would be considered short-term (i.e., lasting as long as the interim phase) rather than permanent.

### **Changes to Federal Airways and Instrument Flight Procedures**

Visual impacts associated with establishment or amendment of the airways and amendment of instrument flight procedures detailed in Airspace Management **Section 3.1.3.3.2** would be similar to those described above for the interim phase, except that the impacts would be permanent and some of the IFR flight paths would be different. Impacts of flights shifted from V-436 to V-438 would be similar to those described above for the interim phase. Impacts of flights moved from J-125 to J-115 would have visual impacts similar to those of flights shifted from V-436 to V-438, except at higher altitudes, because J-115 overlies V-438 between Anchorage and Fairbanks. The proposed T-399 follows a flight path similar to the West Reroute that would be used in the interim phase, and visual impacts of flights moved from V-436 to T-399 would be similar to those described for the West Reroute.

The proposed V-436 dogleg would move the airway from the AILEE waypoint to Fairbanks (see **Figure 2.1-7**). This amended airway would move flights from the existing segment of V-436 that passes over the Anderson/Clear area to airspace over undeveloped state land and land within Fort Wainwright's Tanana Flats Training Area. Aircraft on this route would be higher than the line of sight between the Key Views in

Fairbanks and Denali, and flights would be infrequent (up to two per day). These additional flights would not be noticeable to a viewer above the existing levels of air traffic into and out of Fairbanks International Airport, which is visible from the Key Views in Fairbanks.

Because of the high volume of existing air traffic in the Anchorage area, proposed changes to the TAGER EIGHT ARRIVAL procedure for IFR flights would not result in noticeable impacts on Key Views in the Anchorage area. Changes to instrument flight procedures at Healy River Airport would not result in visual impacts on any Key Views.

### 3.13.3.3 Summary of Visual Impacts

The detours in VFR air traffic to avoid TFRs and the proposed Restricted Areas would result in slight changes to the visual environment in the Anderson area. Changes to VFR air traffic and IFR flight paths would not be noticeable from Key Views, and would not impact any identified cultural resources (including ethnographic resources such as TCPs and ethnographic landscapes). Consequently, the Proposed Action would have no direct adverse impacts on existing visual resources or viewers. The Proposed Action would have short-term, negligible adverse impacts on viewers' experience of visual quality during the interim phase, and permanent, negligible adverse impacts after establishment of the Restricted Areas and changes to airways and instrument flight procedures.

## 3.14 Water Resources

### 3.14.1 Definition of the Environmental Category

Water resources include groundwater, surface water, floodplains, wetlands, and their relationship to the area of the Proposed Action. Evaluation of water resources examines the quantity and quality of the resources as well as demands on water resources for various purposes.

### 3.14.2 Affected Environment

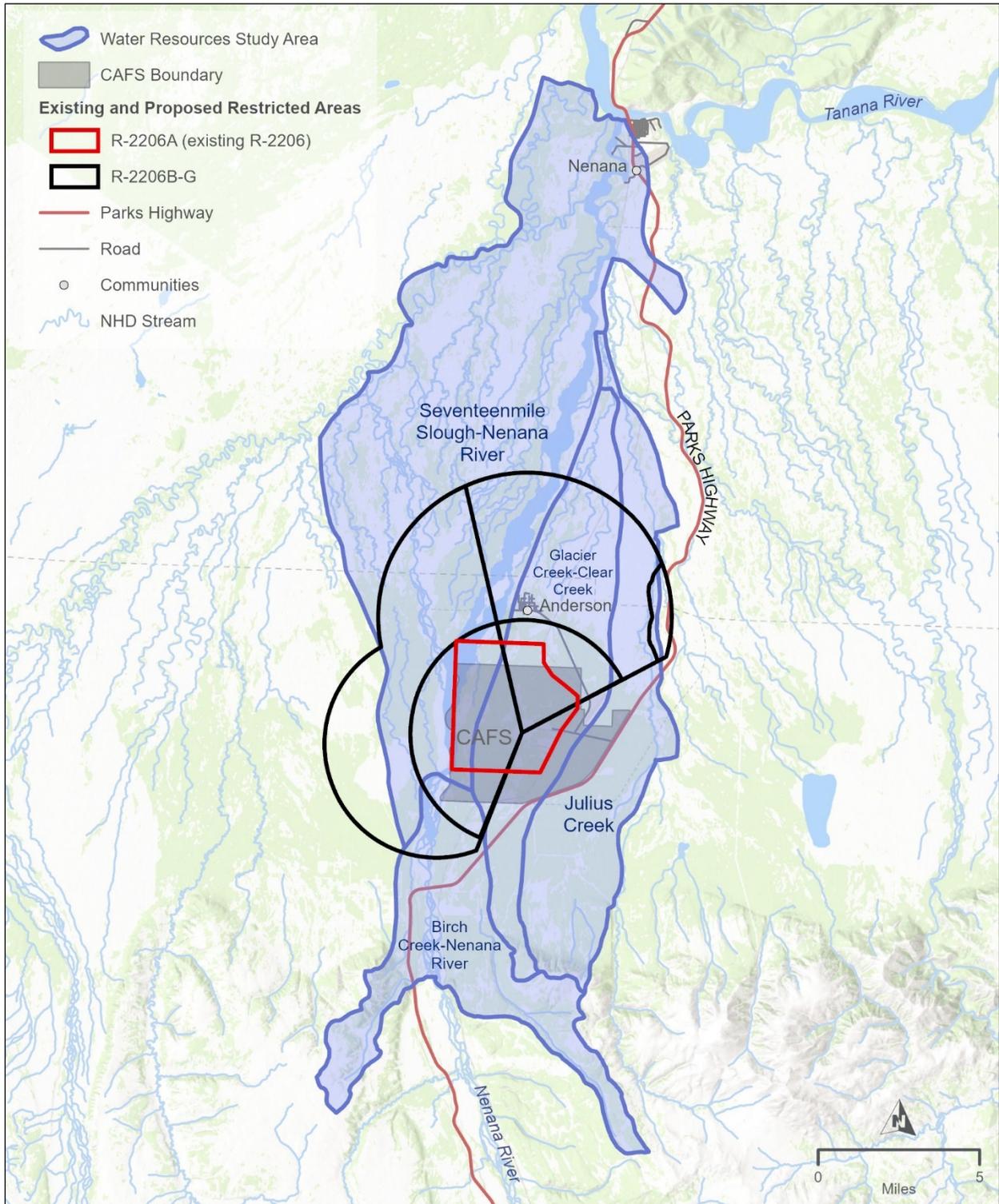
CAFS is within the Nenana River watershed, which is delineated as Hydrologic Unit Code (HUC) 19080308 (Legacy HUC 19040508; U.S. Geological Survey [USGS] 2020a). The study area for water resources encompasses the subwatersheds of the Nenana River watershed that intersect CAFS, as listed in **Table 3.14-1** and shown on **Figure 3.14-1**.

**Table 3.14-1. Subwatersheds Comprising the Study Area**

Subwatershed Name	HUC	Subwatershed Area (square miles)
Birch Creek-Nenana River	190803080909	30.8
Glacier Creek-Clear Creek	190803081303	37.8
Julius Creek	190803081304	36.5
Seventeenmile Slough-Nenana River	190803081307	112.3

Source: USGS 2020

Figure 3.14-1. Study Area for Water Resources



### 3.14.2.1 Groundwater

**Groundwater** is water that collects or flows beneath the earth's surface, filling the porous spaces in soil, sediment, and rocks. An aquifer is a deposit of groundwater that can be tapped by a well for purposes such as potable water consumption, agricultural irrigation, and industrial applications.

In the study area, groundwater is recharged mainly from infiltration of surface waters, such as the Nenana River, and precipitation (USAF 2019a). Permafrost commonly impacts groundwater in the region by limiting infiltration for recharge and reducing functionality of typical wastewater infiltration.

Groundwater used in the CAFS area is contained within unconfined aquifers composed of dense unconsolidated sand and gravel from alluvial and glacial outwash deposition (Golder 2016). The depth to groundwater at CAFS ranges from 20 to 100 feet below the surface in developed areas of the installation (USAF 2003), with average depths ranging from 50 to 70 feet below ground surface (USAF 2005).

Groundwater quality in the CAFS area is considered high, with low mineral and dissolved solids content (USAF 2019a). All potable and non-potable water demand for CAFS is provided by on-site wells and is typically drawn from depths of between 100 and 150 feet below ground surface (DoD 2016b). The minimum yield of the aquifer is estimated at 6 to 10 billion gallons per year (Golder 2016). No water quality issues have been reported or have interrupted water supply at CAFS (DoD 2016b). Only chlorination is used to treat the water used for human consumption (USAF 2003).

ADEC has established Drinking Water Protection Areas in the area of CAFS and Anderson (ADEC 2020c). There are 12 potentially active private wells within 2 miles of CAFS, according to Well Log Tracking System, the ADNR well log database (ADNR 2020c). The well logs indicate that these wells were drilled for domestic use, with the most recent being drilled in 2018.

### 3.14.2.2 Surface Water

**Surface Water** includes natural, modified, and constructed water confinement and conveyance features. Surface water resources include rivers, streams, creeks, lakes, springs, wetlands, natural and artificial impoundments (e.g., ponds), and constructed drainage canals and ditches. Surface water systems are typically defined in terms of watersheds. A watershed is a land area bounded by topography that drains water to a common destination. Watersheds divide the landscape into hydrologically defined areas, and serve to drain, capture, filter, and store water and determine its subsequent release.

The Nenana River forms the western boundary of CAFS. The headwaters are at the Nenana Glacier in the northern Alaska Range, 70.5 miles south of CAFS. The Nenana River also forms the eastern boundary of Denali National Park and Preserve as it flows north out of the Alaska Range. The confluence of the Nenana and Tanana rivers is approximately 20 miles north of CAFS, near the community of Nenana.

Rivers within the study area typically exhibit glacier-fed, snowmelt-driven streamflow, with runoff starting in April and increasing by June and sustained flows through summer (USGS 2000). Winter flows are also typically very low, due to cold temperatures. However, glacier-fed rivers in Interior Alaska, such as the Nenana River, are experiencing increased stream flows throughout the year compared to pre-1977 flows, due to climatic changes that include an increase in air temperature, increase in the amount of precipitation in winter, and warmer temperatures in summer causing glaciers to melt at faster rates (Hodgkins 2009). Ongoing changes to climate in Alaska are described in **Section 3.4.2**.

The Nenana River contains naturally high sediment loads, as is typical of glacial-fed rivers (USGS 2006). Water in the Nenana River is considered silty and turbid with major seasonal water-level fluctuations (DoD 2016b), and water quality can vary significantly temporally and spatially, depending on flow volumes

and sediment loading (USGS 2000). The State of Alaska has not designated any water as impaired in any watershed within the study area (ADEC 2020d).

There are no known private water supply intakes within 15 miles downgradient of CAFS and no municipal intakes on the Nenana or Tanana Rivers within 150 miles of CAFS (ADNR 2020b).

No natural lakes or other surface waterbodies exist at CAFS. Man-made surface drainage features located at CAFS consist of a cooling pond, swales, ditches, culverts, Lake Sansing, and retention and detention ponds. Lake Sansing is a 12-acre former gravel pit excavated in the 1950s to receive industrial wastewater from various operations around CAFS. Lake Sansing has no natural outlet; all water infiltrates into groundwater or evaporates (DoD 2016b). USACE has made a jurisdictional determination that Lake Sansing is not a water of the U.S. (USACE 2014).

Under an Alaska Pollutant Discharge Elimination System (APDES) wastewater permit first issued by ADEC in 2005 (Permit Number 0231DB005), CAFS is authorized to discharge of 13.5 million gallons per day (MGD) of non-domestic wastewater to Lake Sansing. Discharges approved under the permit initially included cooling water from the power plant and BMEWS site. Both of these facilities have since been decommissioned, reducing the wastewater conveyed to Lake Sansing by approximately 6 MGD. The lake level has lowered significantly as a result (USAF 2017b). Once-through, non-contact cooling water for the LRDR will discharge to Lake Sansing under the APDES wastewater permit at an average daily rate of 5.6 MGD and temperature below 59°F (USAF 2017b). This discharge will return Lake Sansing to a water level similar to the level at pre-closure of the power plant and BMEWS (USAF 2017b).

#### 3.14.2.3 Floodplains

**Floodplains** are areas of low-level ground adjacent to rivers, streams, wetlands, or coastal waters. Such lands might be subject to periodic or infrequent inundation during flooding events from rainfall, storm surge, or a combination of both. Risk of flooding depends on local topography, frequency and magnitude of precipitation events, and the size of the watershed. Floodplain functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling.

Within the study area, flood insurance rate mapping is only available for the community of Nenana. The area surrounding and including CAFS has not been mapped by the Federal Emergency Management Agency for flood hazard risk (FEMA 2019). DAF reports that the 100-year floodplain at CAFS is restricted to the westernmost portion of the installation in undeveloped areas (USAF 2019a). Approximately 1,100 acres, or 10 percent of the undeveloped area, at CAFS is within the floodplain of the Nenana River. The LRDR is located approximately 2.5 miles east of the Nenana River floodplain.

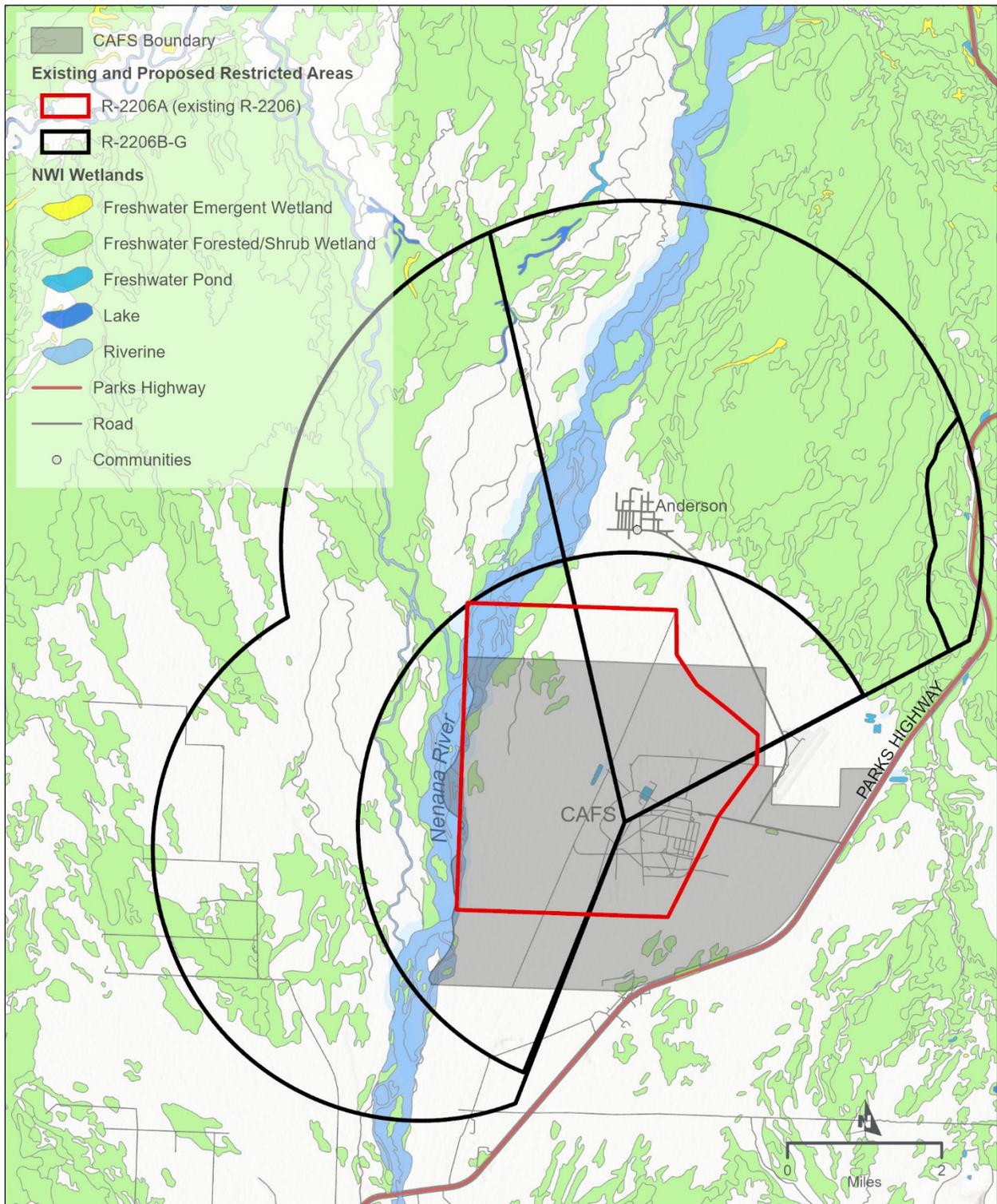
#### 3.14.2.4 Wetlands

**Wetlands** are defined by USACE and USEPA based on the presence of wetland vegetation, hydrology, and hydric soils. The USACE regulatory definition of wetlands are “[t]hose 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” (33 CFR § 3258.3(b)). Due to unique regional differences, USACE publishes regional manuals to improve the accuracy and efficiency of wetlands delineation nationally (USACE 1987). Wetlands in Alaska are delineated using the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region, Version 2.0 (USACE 2007), in combination with the Wetlands Delineation Manual (USACE 1987).

USFWS National Wetlands Inventory mapping is available for the entire study area. As shown on **Figure 3.14-2**, wetlands at CAFS are limited in extent and occur mostly immediately adjacent to the Nenana River along the western edge of the installation, but are also found in the southeast portion of the

installation (USFWS 2020b). The permeability of the glaciofluvial soil underlying CAFS contributes to the lack of naturally occurring lakes, ponds and wetlands in the area (USAF 2005). USACE completed a jurisdictional determination in 2015, finding that no jurisdictional wetlands or other waters of the U.S. regulated under the Clean Water Act were present in the area of the LRDR facilities (USACE 2014).

**Figure 3.14-2. National Wetlands Inventory Mapping**



**3.14.2.5 Wild and Scenic Rivers**

Designated wild and scenic rivers are free-flowing rivers and streams that have outstanding natural, cultural, or recreational values. No rivers present within the water resources study area or the Nena

River watershed are designated as wild and scenic by Congress or the Secretary of the Interior. Portions of five rivers within the larger study area for airspace (see **Section 3.1, Airspace Management**) are designated as wild and scenic: the North Fork Koyukuk, Tinayguk, Ivishak, Wind, and Beaver rivers.

### **3.14.3 Environmental Consequences**

#### **3.14.3.1 Evaluation Criteria**

FAA's 1050.1F Desk Reference (FAA 2020b) identifies a number of factors for evaluating impacts on water resources, which are summarized below.

The primary factor for evaluating impacts on groundwater or surface water resources is whether a proposed action or alternative would exceed any established water quality standards or contaminate a public water supply such that public health may be adversely affected. Additional factors to consider include whether an action would adversely affect natural and beneficial water resource values or quantities to a degree that substantially diminishes or destroys such values, or such that beneficial uses and values are appreciably diminished or can no longer be maintained.

Wetland impacts are evaluated based on whether a proposed action or alternative would adversely affect or alter a wetland's protection of municipal water supplies, hydrology, flood storage functions, or natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources; promote development of secondary activities that would affect or alter these functions; or be inconsistent with applicable state wetland strategies.

Impacts to floodplains are evaluated based on whether a proposed action or alternative would cause notable adverse impacts on natural and beneficial floodplain values.

#### **3.14.3.2 No Action Alternative**

Under the No Action Alternative, MDA would operate the LRDR in such a way that would contain HIRF within the existing R-2206, except during a national security crisis. No new actions would be taken to limit use of affected airspace. Water resources would continue to be abundant in the study area, and with adherence to environmental regulations such as the Clean Water Act, the current quality of surface water and groundwater would be maintained. The current trend of increasing surface water flow due to glacier melt associated with climate change would likely continue.

#### **3.14.3.3 Proposed Action**

As indicated above, there are no Wild and Scenic Rivers present in the study area that could potentially be affected by the Proposed Action.

##### **3.14.3.3.1 LRDR Operational Changes**

Continuous operation of the LRDR would not require additional volumes of groundwater for cooling and subsequent discharge to Lake Sansing beyond what was previously analyzed in the 2016 EA. The LRDR operational changes do not include any ground disturbance or other actions that would cause physical or chemical changes to surface waters or groundwater in the study area. No additional demands would be made on surface water or groundwater resources. The Proposed Action would not disturb or alter wetlands in any way. EO 11988, *Floodplain Management* (see Section 14.0 of **Appendix D**), does not apply because the Proposed Action would not include development within or impact to a floodplain.

### 3.14.3.3.2 FAA Actions Related to Restricting the Flight of Aircraft

#### **Restricted Areas**

Establishment of the proposed Restricted Areas and the resulting changes to IFR and VFR flight paths would not include any ground disturbance or other actions that would cause physical or chemical changes to surface waters or groundwater in the study area. No floodplains or wetlands would be affected.

#### **Interim Phase: Potential TFR Implementation**

If the interim phase is needed, implementation of TFRs and the resulting detours of VFR flight paths and rerouting of IFR air traffic would not affect surface water, groundwater, floodplains, or wetlands for the same reasons described above for the proposed Restricted Areas.

During the interim phase no IFR traffic would be rerouted in the vicinity of any designated wild and scenic rivers.

#### **Changes to Federal Airways and Instrument Flight Procedures**

Changes to federal airways and instrument flight procedures and the resulting rerouting of IFR air traffic would not affect surface water, groundwater, floodplains, or wetlands for the same reasons described above for the proposed Restricted Areas.

Following the changes to federal airways, flights that would have used V-436 to Deadhorse would be routed to other airways, including V-444, V-504 and V-438. These airways traverse over designated wild and scenic rivers. The portion of V-504 between Bettles and Deadhorse traverses over the North Fork Koyukuk and Tinayguk rivers. The portion of V-438 between Fairbanks and Fort Yukon traverses over the Beaver River, and the portion between Fort Yukon and Deadhorse traverses over the Wind and Ivishak rivers. Planes currently overfly these rivers on these airways, and the rivers would not be impacted by the addition of up to two daily flights to the airways.

### 3.14.3.3.3 Summary of Water Resources Impacts

The Proposed Action would have no impacts on surface water, groundwater, floodplains, wetlands, or Wild and Scenic Rivers.

## **3.15 Cumulative Impacts**

CEQ regulations define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (see 40 CFR § 1508.7). Cumulative impacts can be viewed as the impacts on the environment of the proposed action, combined with impacts that overlap in time and space of other known or reasonably foreseeable actions. The analysis should focus on impacts that are truly meaningful to decision-makers. The evaluation criteria for determining the significance of cumulative impacts are the same as described in this chapter for each environmental category.

### **3.15.1 Past, Present, and Reasonably Foreseeable Future Actions**

Cumulative impacts can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions considered in a cumulative impacts analysis must coincide geographically with impacts of the proposed action and can include past, present, and reasonably foreseeable future actions. Past actions are actions that occurred in the past that may have

ongoing impacts relevant to the direct and indirect impacts of the proposed action. Present actions are any other actions that are occurring in the same general time frame as the proposal. Reasonably foreseeable future actions are actions that may affect projected impacts of a proposed action and are not remote or speculative. Past, present, and reasonably foreseeable future actions considered in this analysis are collectively referred to as “cumulative actions.”

MDA, in coordination with DAF and FAA, has identified past, present, and reasonably foreseeable future actions in the region of CAFS, existing R-2206, and the proposed airspace where most changes to aircraft flight patterns would occur as a result of the Proposed Action. **Table 3.15-1** presents the cumulative actions used for this cumulative impacts analysis.

**Table 3.15-1. Past, Present, and Reasonably Foreseeable Future Actions**

Type of Action	Action	Timeframe	Description	Environmental Categories Potentially Affected
<b>Construction of LRDR Facilities at CAFS (DoD 2016b, USAF 2019a)</b>	LRDR Mission Critical Facilities	2017–2022	Construct an LRDR Mission Control Facility, equipment shelter, radar foundation, fencing, power plant, and fuel storage system	Air Quality, Biological Resources, Climate, Safety, Natural Resources and Energy Supply, Socioeconomics
	LRDR Mission Support Facilities	2017–2020	Construct a maintenance facility and near field antennas	
	Non-mission LRDR-specific Support Facilities	2017–2020	Construct a dormitory and steam heating plant, repair and replace a potable water facility, and repair Clear Road entering the installation	
<b>Construction/Removal of Non-LRDR Facilities at CAFS (DoD 2016b, USAF 2019a)</b>	Commercial Electricity Tie-In and Heat Plant	2015–2020	Construct a tie-in to the GVEA power system (including new transmission line), install a heating plant; and demolish the existing coal-fired power plant	Air Quality, Biological Resources, Climate, Safety, Natural Resources and Energy Supply, Socioeconomics
	Lane Addition	2016	Widen the road entering the main gate	
	Modernization of Enterprise Terminals and Enhanced Polar System Construction	2017	Construct Modernization of Enterprise Terminals and Enhanced Polar System to support satellite communications	
	BMEWS Demolition	2017–2020	Demolish the BMEWS facilities; includes demilitarization, asbestos and lead abatement, and disposal of polychlorinated biphenyls and other contaminated construction materials	
	Fire Station in Composite Area	2018–2020	Erect a concrete and steel structure for equipment	

Type of Action	Action	Timeframe	Description	Environmental Categories Potentially Affected
<b>Construction/Removal of Non-LRDR Facilities at CAFS (DoD 2016b, USAF 2019a) (cont'd.)</b>	High-altitude Electromagnetic Pulse Shielding	2019	Construct upgrades to High-altitude Electromagnetic Pulse shielding	Air Quality, Biological Resources, Climate, Safety, Natural Resources and Energy Supply, Socioeconomics
	Consolidation of Structures in Composite Area	2019–2021	Modify approximately 65,000 square feet of existing structures	
	SSPARS Facility Upgrades	2019–2020	Construct upgrades to the SSPARS facility	
	Main Gate Improvements	2020	Improve the main gate by constructing an inspection point, installing barriers, and paving entry lanes	
	Tank Farm Construction	2020	Construct a tank farm needed to operate Building 800 generators	
	Domestic Water Production and Wastewater Disposal System	2020	Refurbish the domestic water production and treatment system and domestic wastewater disposal	
	Removal of Construction Camp Buildings	2021–2022	Remove construction camp buildings	
	New Dormitory	Pending	Construct a new dormitory	
<b>Non-construction DoD Actions at CAFS</b>	LRDR Time-constrained Performance Testing	2020-2021	Conduct time-constrained performance testing of the LRDR capabilities and functions beginning in mid-calendar year 2020 for 12 to 18 months; establish temporary airspace restrictions to protect aircraft from HIRF generated by testing of the LRDR.	Airspace, Air Quality, Biological Resources, Climate, Safety, Natural Resources and Energy Supply, Socioeconomics

Type of Action	Action	Timeframe	Description	Environmental Categories Potentially Affected
<b>DoD Actions Outside of CAFS</b>	F-35 Operational Beddown at Eielson AFB	2016–2020	Beddown two squadrons of F-35A aircraft at Eielson AFB, including infrastructure construction, demolition, renovations, additional personnel, and increases in aircraft operations at the airfield and in the JPARC airspace (USAF 2017c).	Socioeconomics
	North Runway Hill Removal at JBER, Alaska	2017–2018	Excavate soil and materials to reduce the elevation of North Runway Hill at JBER to render glide paths for departures and landings at Elmendorf Airfield safe and optimal. Eliminate the need for flight waivers by establishing a suitable glide path, or angle of approach, to the north of the north-south runway and ensures DAF conformance with the Unified Facilities Criteria 3-260-1 and 14 CFR Part 77 (USACE and USAF 2017).	Unlikely
	Modernization and Enhancement of JPARC; MOAs	2018	Establish the new Paxon MOA, which is contained within the existing Paxon Air Traffic Control Assigned Airspace boundaries; expand the Fox 3 MOA both vertically and laterally; extend the times of use for all established MOAs within the JPARC training area (U.S. Army and USAF 2013, USAF 2017d).	Airspace, Noise, Socioeconomics
	Improve F-22 Operational Efficiency at JBER, Alaska	2018	Redistribute F-22 sorties at JBER across all runways to permit flexible use of JBER runways based on airfield, weather, and air traffic conditions at the time; no changes in the number of aircraft operations (USAF 2018c).	Unlikely
	Modernization and Enhancement of JPARC; Restricted Areas	2019	Establish Battle Area Complex Restricted Area R-2201; expand Restricted Area R-2205, including the digital multi-purpose training range R-2205 (U.S. Army and USAF 2013, USAF 2017d).	Airspace, Socioeconomics
<b>FAA Actions</b>	Deadhorse Airport Project	2020	Proposed relocation of NAVAID (Instrument Landing System Localizer/Distance Measuring Equipment) at Deadhorse Airport. Anticipated publishing date for new procedures is October 2020.	Airspace, Noise

Type of Action	Action	Timeframe	Description	Environmental Categories Potentially Affected
<b>FAA Actions (cont'd.)</b>	Point Hope Airport Procedure Amendments	2021	Procedure amendments are scheduled for 2021 to complete runway work and improve communications with ARTCC.	Airspace
	Hughes Airport Procedure Amendments	2021	Procedure amendments are scheduled for 2021 for Hughes Airport to convert it to an IFR airport. Hughes Airport is 177 NM northwest of Fairbanks.	Airspace, Noise
	Ted Stevens Anchorage International Airport Procedure Amendments	2018	Amendments to Procedure RNAV Required Navigation Performance (RNP) RWY 33 to move the runway threshold by approximately 200 feet. Categorical Exclusion issued March 2018.	Airspace, Noise
		2019	RWY 15 threshold relocation and RWY 33 displaced threshold relocation required procedure amendments and other minor changes. Categorical Exclusion issued February 2019.	Airspace, Noise
		2020	Due to the decommissioning of the Campbell Lake non-directional beacons, FAA canceled certain segments and airways at Ted Stevens Anchorage International Airport. Categorical Exclusion issued March 2020.	Airspace, Noise
	Ted Stevens Anchorage International Airport New Approach Procedures	2018	Alaska Airlines proposed two special RNAV (RNP) M RWY 25R and RNAV (RNP) M RWY 25L approach procedures for Ted Stevens Anchorage International Airport. Categorical Exclusion issued August 2018.	Airspace, Noise
	Ted Stevens Anchorage International Airport Abbreviated Amendment to Procedure	2020	This abbreviated amendment changes only the wording at the end of the Departure Route Description that tells the pilot what to expect from ATC at the end of the procedure. There are no changes to tracks or altitudes to the current NOEND FOUR procedure. Categorical Exclusion issued March 2020.	Unlikely

Type of Action	Action	Timeframe	Description	Environmental Categories Potentially Affected
<b>FAA Actions (cont'd.)</b>	Ted Stevens Anchorage International Airport Procedure Amendment	2018	The ELLAM FIVE arrival procedure is proposed for cancellation because it has been identified as underutilized. The determination was made by reviewing procedure filing, procedure usage and arrival flight counts. Categorical Exclusion issued November 2018.	Airspace, Noise
<b>State and Local Actions</b>	Ted Stevens Anchorage International Airport Cargo Expansion	2020–2022	Five projects to expand cargo operations and warehouses at Anchorage International Airport (ADN 2019).	Airspace, Natural Resources and Energy, Socioeconomics
	Anchorage Liquefied Natural Gas (LNG) Project	2020–2028	Construct and operate gas treatment, mainline (pipeline), and liquefaction facilities for LNG processing and transfer from Point Thomson to the Kenai Peninsula.	Natural Resources and Energy, Socioeconomics
	Fairbanks International Airport Eastside Master Plan	2020–2030	Capital improvement and other projects at the Eastside area of Fairbanks International Airport. Projects include, but are not limited to, resurfacing runways and aprons, extending taxiways, constructing parking, and leasing lots (FIA 2019).	Socioeconomics

### 3.15.2 Cumulative Impact Assessment

The study areas for analysis of cumulative impacts vary depending on the environmental category and are the same as those defined for the Proposed Action's direct and indirect impact analysis in the preceding sections of **Chapter 3.0**.

All actions at CAFS listed in **Table 3.15-1**, including construction and demolition activities as well as LRDR testing, have potential to affect air quality, biological resources, climate, safety, natural resources and energy supply, and socioeconomics. LRDR testing additionally has the potential to affect airspace management. Actions outside of CAFS and within the region of proposed airspace where flight would be limited and/or flight paths would be changed as a result of the Proposed Action have potential to affect one or more of the following environmental categories: airspace management, noise, natural resources and energy, and socioeconomics (see **Table 3.15-1**).

Potential impacts resulting from both the Proposed Action and cumulative actions were not identified in the following areas: hazardous materials, solid waste, and pollution prevention; historic and cultural resources; land use; environmental justice, subsistence, the visual environment; or water resources. Therefore, these environmental categories were not assessed further. Potential cumulative impacts on airspace management, air quality, biological resources, climate, natural resources and energy supply, noise, safety, and socioeconomics are analyzed in the sections below.

#### 3.15.2.1 Airspace Management

Limiting use of airspace during the interim phase and permanent phase of LRDR operation contributes negligible to minor impacts, along with the creation and expansion of the new JPARC MOAs and Restricted Areas, to result in permanent minor cumulative impacts on VFR aircraft transiting the region. Because the airways that would be affected by the Proposed Action differ from those affected by the JPARC MOAs and Restricted Areas, cumulative impacts on existing airways would be unlikely.

Additional, permanent, minor, adverse cumulative impacts on IFR flights and airspace usage would occur from the Proposed Action, JPARC MOAs, and JPARC Restricted Areas as a result of amended instrument flight procedures at waypoints (e.g., TAGER EIGHT ARRIVAL) and changed IFR flight operations on approach to the Ted Stevens Anchorage International Airport from the respective airspace areas. Recent amendments to instrument flight procedures at Ted Stevens Anchorage International Airport could also contribute to these impacts. The proposed cargo expansion at Ted Stevens Anchorage International Airport could generate additional cargo air traffic within regional airspace, which could need to be restricted or rerouted if coming from Nenana Municipal or Talkeetna Airports. Any future proposed Restricted Areas or changes to airspace would be subject to NEPA guidelines.

Due to the distance between future FAA actions in the North Slope Borough and the negligible changes to flight paths north of Fairbanks associated with the Proposed Action, cumulative impacts to airspace in the North Slope Borough would be unlikely.

The Proposed Action combined with other cumulative actions would have permanent, negligible to minor, adverse cumulative impacts on airspace management.

#### 3.15.2.2 Air Quality

Construction activities at CAFS generate air emissions such as emissions from diesel powered construction equipment and fugitive dust. These impacts are generally short-term, lasting for the duration of the construction project. Most of the construction-related cumulative actions listed in **Table 3.15-1** would not overlap in time with the Proposed Action. LRDR performance testing currently underway is resulting in a negligible increase in air emissions from detoured VFR aircraft and rerouted aircraft traveling on longer routes below 3,000 feet AGL. These air emissions are similar to those likely to occur

from the Proposed Action but will be short-term as opposed to permanent and end at the time the Proposed Action is implemented. The air emissions resulting from aircraft detoured and rerouted during LRDR performance testing and the Proposed Action would not impact any nonattainment or maintenance areas. For the Proposed Action, annual emissions increases of all criteria pollutants would be well below the least restrictive General Conformity *de minimis* thresholds of 100 tpy, and the estimated annual emissions increases are below the FNSB and MOA General Conformity *de minimis* thresholds. These thresholds also would not be exceeded if combined with the cumulative actions described in **Table 3.15-1**. Therefore, cumulative adverse impacts on regional air quality from the Proposed Action and cumulative projects would be permanent and negligible.

#### 3.15.2.3 Biological Resources

Bats and birds can be affected by strikes from aircraft associated with a number of the cumulative actions. Cumulative actions that involve construction activities can cause direct and indirect impacts on bat and bird habitat and individuals. The Proposed Action would increase the distance traveled by a small number of flights each day in the study area and result in a slightly increased risk for aircraft to strike birds and bats in the air. This could contribute to permanent, negligible adverse impacts on bats and birds from other cumulative actions. The Proposed Action would not affect other biological resources, and therefore, no other cumulative impacts are anticipated to occur as a result of the Proposed Action.

#### 3.15.2.4 Climate

The detours and changed flight routes associated with the Proposed Action would result in an annual increase in GHG emissions of up to 7,099.5 metric tpy CO<sub>2</sub>e. For comparison purposes, 7,100 metric tons CO<sub>2</sub>e is equivalent to the energy used by roughly 820 homes for 1 year (USEPA 2020d), and is approximately 0.00011 percent of the total 6,456.72 million metric tons of CO<sub>2</sub>e emissions reported for the U.S. in 2017 (USEPA 2017). This increase in CO<sub>2</sub>e would be considered to have a permanent negligible cumulative impact on efforts to reduce global climate change.

#### 3.15.2.5 Natural Resources and Energy

The additional fuel usage from the reroutes and detours associated with the Proposed Action would result in a negligible increase in regional aviation fuel demand. This increased demand for aviation fuel associated with the Proposed Action and similar cumulative actions would represent a small volume compared to the overall consumption of fuel by air traffic passing through the study area. Therefore, the cumulative impacts on available aviation fuel supplies would be permanent and negligible.

#### 3.15.2.6 Noise and Compatible Land Use

The creation and expansion of the new and previously existing JPARC MOAs and Restricted Areas would require flights operating by VFR to detour in airspace between the existing and proposed Restricted Areas at CAFS and JPARC. These flights, combined with detoured VFR flights associated with the Proposed Action, would contribute to an increase in noise levels to the area beneath these flights, resulting in permanent, minor cumulative impacts. However, those impacts would be balanced by permanent, minor beneficial cumulative impacts for areas beneath new Restricted Areas, which would experience a decrease in noise associated with aircraft. Results of the noise screening showed that the rerouting of IFR aircraft would not result in a significant or reportable increase in aircraft noise. The proposed TAGER EIGHT ARRIVAL procedure amendment would not result in changes to patterns of aircraft noise in the vicinity of Anchorage or an increase in noise. Therefore, the amendment would not contribute cumulatively to noise impacts associated with the recent amendments to instrument flight procedures at Ted Stevens Anchorage International Airport described in **Table 3.15-1**. Overall, adverse cumulative impacts related to noise would be permanent and negligible.

### 3.15.2.7 Safety

Short-term cumulative impacts on health and safety could occur from potential accidents during construction of LRDR and non-LRDR facilities at CAFS, and if personnel or aircraft were exposed to HIRF hazards during LRDR performance testing or continuous LRDR operation. However, federal, state, DoD, and DAF health and safety regulations would be followed during construction and operation, and accidents are not expected to occur during construction at CAFS. A ground-based RF safety hazard zone would be established within the CAFS boundaries to protect all personnel on the ground from HIRF hazards associated with LRDR performance testing and continuous operations. The Maximum Permissible Exposure levels for HIRF for the general public outside CAFS (uncontrolled environment) would not be exceeded. The proposed Restricted Areas and TFR would protect aircraft from receiving levels of HIRF that exceed FAA certification standards for aircraft electrical and electronic systems that perform functions whose failure would prevent continued safe flight and landing. The effects on access to private airstrips and emergency and medical evacuation flights from LRDR performance testing and the Proposed Action would be negligible. Overall, adverse cumulative impacts on safety would be short-term to permanent and negligible.

### 3.15.2.8 Socioeconomics

Because the Proposed Action does not include construction activities, it would not contribute cumulatively to construction-related socioeconomic impacts from the cumulative actions in **Table 3.15-1**. The Proposed Action would not result in impacts on housing or community infrastructure.

Additional aircraft operational costs that would result from the Proposed Action would add to the cumulative costs of any reroutes and detours associated with the other actions related to restricted airspace. These economic impacts would be spread across the entire affected aviation industry in Alaska.

The LRDR time-constrained performance testing, described in **Section 3.15.1**, would have similar impacts to the same flights affected by the Proposed Action, causing increased fuel costs and travel time due to temporary aircraft rerouting and detours. The testing would occur before the Proposed Action and be complete before the Proposed Action would begin.

Cumulative socioeconomic impacts would be adverse, short-term to permanent, and minor.

## 3.16 Mitigation

NEPA was enacted to promote efforts that will prevent or eliminate damage to the human environment. Mitigation measures can help to accomplish this goal in several ways. Project proponents include mitigation measures as integral components of a proposed project's design. Agencies also consider additional mitigation measures to avoid or lessen environmental effects of proposed actions when developing an EIS. According to CEQ regulations (Sections 1502.14(f), 1502.16(h), and 1508.14), examples of mitigation measures include actions that would decrease pollution emissions or possible land use controls that could be enacted.

The Proposed Action was designed to minimize impacts on the environment and aviation while protecting the U.S. against long-range missile threats. The Proposed Action would have no impacts on historical, architectural, and archaeological resources; environmental justice; and water resources. The Proposed Action would have negligible or minor adverse impacts on the remaining environmental categories analyzed in this EIS. None of the impacts identified in the environmental analysis would reach a level that would necessitate mitigation under NEPA.

## 4.0 Other NEPA Requirements

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### **4.1 Consistency with Other Federal, State, and Local Plans, Policies, and Regulations**

MDA has sought input from various federal, state, and local agencies with management responsibilities in the affected region so that implementation of the Proposed Action would incorporate measures to address concerns and management priorities of these agencies to minimize conflicts with their plans, policies, or legal requirements. Further description of agency coordination and consultation, as well as the NEPA process for this EIS are provided in **Chapter 1.0** and **Appendix A**; the relevant resource analyses are provided in **Chapter 3.0**.

### **4.2 Unavoidable Adverse Environmental Impacts**

Avoidance, minimization, or mitigation of effects to natural, cultural, and other environmental resources were integrated into the Proposed Action to the greatest extent possible and practicable; however, all impacts may not be completely avoided and/or mitigated. A full discussion of adverse environmental effects is provided in **Chapter 3.0**. The unavoidable impacts on various resource categories resulting from the Proposed Action are summarized here below.

Establishment of the proposed Restricted Areas and modification of the impacted airspace would result in permanent, minor, direct impacts to airspace management and airspace users. FAA would modify six terminal arrival and departure procedures. Civil flight would be restricted in R-2206B, R-2206C, and R-2206G for continuous (i.e., 24 hours per day) LRDR operation, and in R-2206D, R-2206E, and R-2206F every Tuesday, Thursday, and Saturday between 2:00 a.m. and 4:00 a.m. local Alaska time. VFR traffic would shift to avoid the Restricted Areas. Access to the Clear Airport would be limited for approximately 6 hours per week (for 2-hour periods between 2:00 and 4:00 a.m. local Alaska time, on Tuesdays, Thursdays, and Saturdays), and other times by NOTAM. The annual CAP Glider Academy would not be able to conduct its annual glider instruction at Clear Airport. It is likely that CAP would negotiate to relocate the CAP Glider Academy to Ladd Army Airfield (Fort Wainwright) or Fort Greely.

These direct impacts on airspace management and users would result in increased flight times and distances, and would shift air traffic from current routes. These shifts would not introduce aircraft into new areas that do not currently experience overhead air traffic, but may increase the amount of traffic compared to current conditions in some areas, resulting in increased aircraft noise and visual presence in those areas. Adverse noise and visual impacts would be permanent and negligible. Increased emissions from increased fuel use due to increased flight times would result in permanent, negligible impacts on air quality and climate change. The increased flight times also would have permanent, negligible to minor adverse economic impacts due to the increased fuel use and other operational costs.

### **4.3 Relationship between Short-term Uses of Human Environment and the Maintenance and Enhancement of Long-term Productivity**

The Proposed Action does not involve any construction activities or physical alteration of any resources of the human environment. No component of the Proposed Action would require the short-term use of any part of the human environment at the expense of long-term productivity or human health and safety. Negligible to minor impacts to the environment would result from airspace changes and air operations such as localized increase in noise levels, visual presence of aircraft, increased fuel use, and increased

air emissions from individual flights as described in **Chapter 3.0**. Noise and visual effects experienced at discrete locations within the affected region would be transient as aircraft pass through the area, and would not be expected to result in permanent or long-term changes in wildlife habitat use, or long-term changes in underlying land use. Overall, no change to long-term productivity of the human environment is anticipated from the Proposed Action.

#### **4.4 Irreversible or Irretrievable Commitments of Resources**

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. A commitment of resources is related to use or destruction of nonrenewable resources, and the impacts that loss will have on future generations. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that could not be replaced within a reasonable time frame (e.g., fossil fuels, minerals). Irretrievable resource commitments involve the loss in value of an affected resource that could not be restored as a result of the action (e.g., extinction of a threatened or endangered species, disturbance of a cultural resource).

Aircraft operations require consumption of fuel. The changes to airspace and air operations under the Proposed Action would result in consumption of additional fuel due to increased flight distances, but not to a significant degree. Daily aviation fuel consumption for all affected IFR flights would increase by approximately 235 gallons on average to 606 gallons at a maximum, depending on the reroute path. Daily aviation fuel consumption for VFR flights would increase by an average of 0.5 gallon per day per flight, or 5 gallons per day total. This increased demand represents a small volume compared to overall consumption of fuel by air traffic in the region. No irreversible or irretrievable effects are expected to other resources.

## 5.0 Notified Parties

During development of the EIS, MDA provided notifications to and solicited feedback from those agencies, offices, and organizations listed in **Table 5-1**.

**Table 5-1. Notified Parties**

Type of Agency/Office/Organization	Agency/Office/Organization	Contact Name (if applicable)
Federal Government	U.S. Department of Agriculture Natural Resources Conservation Service	N/A
	U.S. Environmental Protection Agency	Jennifer Curtis Rebecca Chu, Acting Chief
	U.S. Fish and Wildlife Service	Charleen Buncic Bob Henszey Amal Ajmi
	U.S. National Park Service	Brooke Merrell Brett Nigus
	Bureau of Land Management	Wes Stark
	U.S. Army Alaska – Fort Wainwright Directorate of Public Works	Jerry Guo Laura Sample
	U.S. Coast Guard	Captain Kevin Riddle
Congressional Delegation	Senator Lisa Murkowski	N/A
	Senator Dan Sullivan	Leslie Hajdukovich
	Representative Don Young	N/A
State Government	Governor Mike Dunleavy	Jim Sackett
	Alaska Department of Transportation and Public Facilities	John R. Binder III, Deputy Commissioner Jennifer Eason, Planner
	Alaska Department of Environmental Conservation	Alice Edwards, Division of Air Quality Director Christina Carpenter, Director of the Division of Environmental Health Lynn Kent, Deputy Commissioner
	State Historic Preservation Officer	Judith Bittner
	Alaska Department of Natural Resources	Jenna Prolux

<b>Type of Agency/Office/ Organization</b>	<b>Agency/Office/Organization</b>	<b>Contact Name (if applicable)</b>
City/Local Government	City of Anderson City Council	William Morris
	City of Anderson	Samantha Thompson, Mayor (2019)
	Denali Borough	Clay Walker, Mayor (2019)
	Fairbanks North Star Borough	Brittany Smart, Special Assistant to the Mayor
	Municipality of Anchorage	N/A
	Municipality of Anchorage Military and Veterans Commission	Christopher Nelson, Vice Chair
	City of Nenana	Josh Werhagen, Mayor
Tribal Government/Entities	Doyon Limited	Communications Director
	Tanana Chiefs Conference	Doreen Deaton
	Tanana Tribal Council	Ada Albert
	Toghotthele Corporation (Nenana Village Corporation)	Temporary Receptionist
	Manley Traditional Council	N/A
	Minto Village Council	Keith Charlie
	Rampart Village Council	Mary Ann Weihl
	Stevens Village IRA Council	N/A
	Dinyee Corporation	N/A
	Seth-de-ya-ha Corporation	N/A
	Tozitna Limited	N/A
Baan O Yeel Kon Corporation	N/A	
Community Groups/Businesses	Community Groups/Businesses: Kantishna Air	Greg LaHaie, Owner
	Alaska Aviation Safety Foundation	Harry Kieling, Chairman
	Fairbanks Economic Development Corporation	Eran Wilken
	Alaska Volunteer Fire Department	John Collura
	USAF Auxiliary Civil Air Patrol Community Groups/Businesses (CAP) Alaska Wing Glider Academy	Jimmy Holder
Community Groups/Businesses	Tri Valley Fire Department	Robert Graham

Type of Agency/Office/ Organization	Agency/Office/Organization	Contact Name (if applicable)
	Fairbanks General Aviation Association	Rod Combellick
	Air Medical Operators Association	N/A
	Aircraft Owners and Pilots Association	Rune Duke
	Alaska Airmen Association	Adam White
	Experimental Aircraft Association	N/A
	ConocoPhillips	Kelly Brown Brendan McCormack
	Oil Search (Alaska), LLC	N/A
	Alaska Air Carriers Association	Jane Dale, Executive Director Matt Atkinson, President
	Helicopter Association International	Zac Noble, Director, Maintenance and Technology Chris Hill, Director, Safety
	Kantishna Air	N/A
	Alaska Aviation Safety Foundation	Harry Kieling, Chairman
	Usibelli Coal Mine	Fred Wallis, Vice President of Engineering
	Wright Air Service	Jim Strickland

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## 6.0 Glossary

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All definitions in this glossary are from the FAA's Pilot's Handbook of Aeronautical Knowledge (FAA 2016) unless otherwise indicated.

### 6.1 Aeronautical Terms

**Above ground level (AGL):** Generally used in reference to the height above the ground of obstacles, but may refer to other flight procedures requirements such as airspace and radar altimeter, which use AGL (*FAA Order 8200.34 - Flight Procedures Inspector's Handbook*).

**Aeronautical chart:** A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports.

**Air route traffic control center (ARTCC):** Provides air traffic control (ATC) service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight.

**Airway:** An airway is based on a centerline that extends from one navigation aid or intersection to another navigation aid (or through several navigation aids or intersections); used to establish a known route for en route procedures between terminal areas.

**Area navigation (RNAV) Routes:** Direct routes, based on area navigation capability, between waypoints defined in terms of latitude/longitude coordinates, degree-distance fixes, or offsets from established routes/airways at a specified distance and direction.

**Clearance:** ATC permission for an aircraft to proceed under specified traffic conditions within controlled airspace, for the purpose of providing separation between known aircraft.

**Controlled airspace:** An airspace of defined dimensions within which ATC service is provided to IFR and VFR flights in accordance with the airspace classification. It includes Class A, Class B, Class C, Class D, and Class E airspace.

**Departure procedure:** Instrument departure procedures are preplanned IFR procedures that provide obstruction clearance from the terminal area to the appropriate en route structure. Primarily, these procedures are designed to provide obstacle protection for departing aircraft. The design of a departure procedure is based on FAA Order 8260.3 (*FAA-H-8083-16B – FAA Instrument Procedures Handbook*).

**Dogleg:** Dogleg airways are normally established for ATC use to divert opposite direction traffic when congestion or extensive climbs and descents occur. Because of ATC separation rules and the need to reduce any delay for the aircraft on the dogleg, these routes are normally established 15 degrees left or right of the primary airway (*FAA Order 8200.34 - Flight Procedures Inspector's Handbook*).

**En route flight:** That segment of flight from the termination point of a departure procedure to the origination point of an arrival procedure (*FAA-H-8083-16B – FAA Instrument Procedures Handbook*).

**Fix:** A geographical position determined by visual reference to the surface, by reference to one or more radio navigational aids, by celestial plotting, or by another navigational device. "Fix" is a generic name for a geographical position and is referred to as a fix, waypoint, intersection, reporting point (*FAA-H-8083-16B – FAA Instrument Procedures Handbook*).

**Flight level (FL):** A measure of altitude (in hundreds of feet) used by aircraft flying above 18,000 feet with the altimeter set at 29.92 inches of mercury (barometric pressure).

**Flight path:** The line, course, or track along which an aircraft is flying or is intended to be flown.

**High-intensity radiated fields (HIRF):** High-intensity radiated fields are caused by the transmission of electromagnetic radio frequency energy from radar, radio, television, and other ground-based, shipborne, or airborne radio frequency transmitters (*FAA Advisory Circular 20-158A – The Certification of Aircraft and Electronic Systems for Operation in the High-Intensity Radiated Fields (HIRF) Environment*).

**Initial approach fix (IAF):** The fix depicted on instrument approach procedure charts where the instrument approach procedure (IAP) begins unless otherwise authorized by ATC.

**Instrument approach procedure:** An instrument approach procedure (IAP) is an approach to an airfield using instrument flight rules. It includes five steps, generally modified to the individual operator: gathering weather information, field conditions, and NOTAM for the airport of intended landing; calculating performance data, approach speeds, and thrust/power settings; flight deck navigation/communication and automation setup; IAP review and IAP flight crew briefing; and operational review and operational flight crew review (*FAA-H-8083-16B – FAA Instrument Flight Procedures Handbook*).

**Instrument flight rules (IFR):** Rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals.

**Jet route:** A route designated to serve flight operations from 18,000 feet MSL up to and including FL 450.

**Mean sea level (MSL):** The expression of elevation, height, or altitude of a point on the earth, a location on an object (normally the top) fixed to the earth, or a level above the surface of the earth measured above the mean level of the sea. MSL is often used following a number expressed in feet (as opposed to AGL for above ground level); for instance, 1,200 feet MSL. A barometric altimeter depicts the MSL altitude when the current barometric pressure is set. Most charted altitudes are MSL (*FAA Order 8200.34 - Flight Procedures Inspector's Handbook*).

**Minimum en route altitude:** The lowest published altitude between radio fixes that ensures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes.

**Missed approach:** A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing.

**National Airspace System:** The common network of United States airspace—air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information; and manpower and material.

**Nautical mile (NM):** A nautical mile is based on the circumference of the earth, and is equal to one minute of latitude. It is slightly more than a statute (land measured) mile (1 nautical mile = 1.1508 statute miles). A nautical mile is the universal unit of measure used for the charting and navigation of water and airspace (*NOAA 2018, [https://oceanservice.noaa.gov/facts/nauticalmile\\_knot.html](https://oceanservice.noaa.gov/facts/nauticalmile_knot.html); Britannica no date*).

**Navigational aids (NAVAIDs):** NAVAIDs are physical devices on the ground that aircraft can detect and fly to. There are many different kinds of NAVAIDs, such as Very High Frequency Omnidirectional Range (VOR)/ Distance Measuring Equipment and the Instrument Landing System (ILS), which is made up of the Glideslope and the Localizer. VOR facilities allow the pilot to follow a designated flight path by using the aircraft's cockpit gauges to indicate their positions. ILS transmits guidance beams to allow the pilot to land safely and efficiently (*FAA Storyboard at <https://www.faa.gov>*).

**Notice to Airmen (NOTAM):** A notice filed with an aviation authority to alert aircraft pilots of any hazards en route or at a specific location. The authority in turn provides means of disseminating relevant NOTAMs to pilots. Pilots are expected to check appropriate NOTAMs during flight planning when conducting flight in an area where a temporary flight restriction is in effect.

**Obstacle departure procedures (ODP):** A preplanned instrument flight rule (IFR) departure procedure printed for pilot use in textual or graphic form to provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ODPs are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (standard instrument departure or radar vector) has been specifically assigned by ATC.

**Radar:** A system that uses electromagnetic waves to identify the range, altitude, direction, or speed of both moving and fixed objects such as aircraft, weather formations, and terrain. The term RADAR was coined in 1941 as an acronym for Radio Detection and Ranging. The term has since entered the English language as a standard word, radar, losing the capitalization in the process.

**Radio frequency (RF):** A term that refers to alternating current (AC) having characteristics such that, if the current is input to antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications.

**Restricted area:** Airspace designated under 14 CFR Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

**Sectional aeronautical charts:** Designed for visual navigation of slow- or medium-speed aircraft. Topographic information on these charts features the portrayal of relief, and a judicious selection of visual check points for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions and related data.

**Special Use Airspace:** Airspace in which flight activities are subject to restrictions that can create limitations on the mixed use of airspace. Consists of prohibited, restricted, warning, military operations, and alert areas.

**Standard Instrument Departure (SID) Procedure:** Published procedure to expedite clearance delivery and to facilitate transition between takeoff and en route operations.

**Standard Terminal Arrival (STAR) Procedure:** An ATC-coded instrument flight rules (IFR) arrival route established for application to arriving IFR aircraft destined for certain airports. Standard terminal arrival procedures simplify clearance delivery procedures, and also facilitate transition between en route and instrument approach procedures.

**Temporary flight restriction (TFR):** Restriction to flight imposed in order to:

- Protect persons and property in the air or on the surface from an existing or imminent flight associated hazard;
- Provide a safe environment for the operation of disaster relief aircraft;
- Prevent an unsafe congestion of sightseeing aircraft above an incident;
- Protect the President, Vice President, or other public figures; and
- Provide a safe environment for space agency operations.

**Terminal arrival area (TAA):** A procedure to provide a new transition method for arriving aircraft equipped with flight management system and/or GPS navigational equipment. The TAA contains a "T" structure that normally provides a No Procedure Turn for aircraft using the approach.

**Transition:** (a) The general term that describes the change from one phase of flight or flight condition to another; e.g., transition from en route flight to the approach or transition from instrument flight to visual flight or (b) a published procedure (departure procedure [DP] Transition) used to connect the basic DP to one of several en route airways/jet routes, or a published procedure (STAR transition) used to connect one of several en route airways to the basic STAR (*FAA Aeronautical Information Manual*).

**Uncontrolled airspace:** Class G airspace that has not been designated as Class A, B, C, D, or E. It is airspace in which air traffic control has no authority or responsibility to control air traffic; however, pilots should remember there are VFR minimums which apply to this airspace.

**Vectoring:** Navigational guidance by assigning headings.

**Victor Routes:** Airways based on a centerline that extends from one VOR or VORTAC navigation aid or intersection, to another navigation aid (or through several navigation aids or intersections); used to establish a known route for en route procedures between terminal areas.

**Visual flight rules (VFR):** Flight rules adopted by the FAA governing aircraft flight using visual references. VFR operations specify the amount of ceiling and the visibility the pilot must have in order to operate according to these rules. When the weather conditions are such that the pilot cannot operate according to VFR, he or she must use instrument flight rules (IFR).

**VORTAC:** A facility consisting of two components, VOR (very-high frequency omnidirectional range) and TACAN (tactical air navigation), which provides three individual services: VOR azimuth, TACAN azimuth, and TACAN distance at one site.

**Waypoint:** A designated geographical location used for route definition or progress-reporting purposes and is defined in terms of latitude/longitude coordinates.

## 6.2 Non-Aeronautical Terms

**Adverse effect:** An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR § 800.5).

**Air quality control region:** A designated contiguous area where air quality, and air pollution, is relatively uniform (*Clean Air Act*, 42 U.S.C. § 7401 et seq.).

**Aquifer:** The geologic layers that store or transmit groundwater to wells, springs, and other water sources (*FAA 1050.1F Desk Reference*).

**Archaeological resources:** Any material remains of past human life or activities which are of archaeological interest, as determined under the Archaeological Resources Protection Act (16 U.S.C § 470). Such regulations containing such determination shall include, but not be limited to: pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items.

**Area of Potential Effects (APE):** The APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR § 800.16(d)).

**Attainment/nonattainment area:** An attainment area is any area that meets the NAAQS; a nonattainment area is any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the NAAQS. Nonattainment areas are required to have a State Implementation Plan to bring pollutant levels to NAAQS (*FAA 1050.1F Desk Reference 2020*).

**Carbon dioxide equivalent (CO<sub>2</sub>e):** The number of metric tons of CO<sub>2</sub> emissions with the same global warming potential as 1 metric ton of another greenhouse gas (40 CFR § 98.6).

**Census Designated Place (CDP):** Statistical geographic entity representing closely settled, unincorporated communities that are locally recognized and identified by name. It is the statistical equivalent of an incorporated place, with the primary differences being the lack of a legally defined boundary and an active, functioning governmental structure chartered by the state and administered by elected officials (83 *Federal Register* 56290).

**Climate:** The expected frequency of specific states of the atmosphere, ocean, and land, including variables such as temperature (land, ocean, and atmosphere), salinity (oceans), soil moisture (land), wind speed and direction (atmosphere), current strength and direction (oceans). Climate encompasses the weather over different periods of time and also relates to mutual interactions between the components of the earth system (*National Weather Service, Climate versus Weather*).

**Compatible/non-compatible land use:** The use of land that is identified under 14 CFR 150 as normally compatible or non-compatible with the outdoor noise environment (or an adequately attenuated noise level reduction for any indoor activities involved) at the location because the yearly day-night average sound level is at or below that identified for that or similar use (14 CFR § 150.7 and Appendix A of same).

**Contaminated site:** Site contaminated by improper handling or disposal of toxic and hazardous materials and wastes; site where toxic materials may have been deposited as a result of natural disasters or acts of terror; site where improper handling or accidents resulted in release of toxic or hazardous materials that are not wastes (*USEPA Report on the Environment: Contaminated Land*). Contaminated sites include, but are not limited to, National Priorities List (NPL) sites and sites in consideration for listing on the NPL, Resource Conservation and Recovery Act Solid Waste Management Units, and contaminated sites regulated under state cleanup laws (*FAA 1050.1F Desk Reference*).

**Criteria air pollutants:** The Clean Air Act requires the USEPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, known as “criteria pollutants.” These pollutants are particulate matter, photochemical oxidants (including ozone), carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The USEPA sets the NAAQS based on the “criteria,” or characterizations of the latest scientific information on the effects of these pollutants on health and welfare (*National Primary and Secondary Ambient Air Quality Standards*, 40 CFR Part 50).

**Cultural resources:** Historic properties, cultural items, archaeological resources, sacred sites, and collections (AFMAN 32-7003, *Environmental Conservation*).

**Cumulative impacts:** The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

**Day-night Sound Level (DNL):** Used to reflect a person's cumulative exposure to sound over a 24-hour period, expressed as the noise level for the average day of the year on the basis of annual aircraft operations. The DNL noise metric provides a mechanism to describe the effects of environmental noise in

a simple and uniform way. DNL is the standard noise metric used for all FAA studies of aviation noise exposure in airport communities (*FAA Fundamentals of Noise and Sound*).

**Direct impact:** An impact that is caused by the action and occurs at the same time and place (40 CFR § 1508.8).

**Disproportionately high and adverse impact:** An adverse effect that:

1. is predominately borne by a minority population and/or a low-income population, or
2. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

(*Department of Transportation Order 5610.2(a), Environmental Justice*)

**Environmental Justice:** The fair treatment and meaningful involvement of all people, regardless of race, ethnicity, income, national origin, or educational level with respect to the development, implementation and enforcement of environmental laws, regulations and policies. For the purpose of this strategy, fair treatment means that no population, due to policy or economic disempowerment, is forced to bear a disproportionate burden of the negative human health and environmental impacts, including social and economic effects, resulting from transportation decisions, programs and policies made, implemented and enforced at the Federal, State, local or tribal level. (*U.S. Department of Transportation Environmental Justice Strategy [November 15, 2016]*).

**Equivalent Sound Level:** The level of continuous sound over a given time period that would deliver the same amount of energy as the actual, varying sound exposure. Measures the average acoustic energy over a period of time to take account of the cumulative effect of multiple noise events. This could, for example, provide a measure of the aggregate sound at a location that has airplane flyovers throughout the day (*FAA Fundamentals of Noise and Sound*).

**Floodplain:** Lowland area adjoining inland and coastal waters that are periodically inundated by flood waters, including flood-prone areas of offshore islands (*FAA 1050.1F Desk Reference*).

**General Conformity Regulations:** Regulations that are intended to prevent the air quality impacts of federal actions from causing or contributing to a violation of the NAAQS (40 CFR 51 and 40 CFR 93). The determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel and congestion estimates as determined by the metropolitan planning organization or other agency authorized to make such estimates (42 U.S.C. § 7506).

**Greenhouse gases:** Gases that trap heat in the atmosphere are called greenhouse gases (*USEPA Overview of Greenhouse Gases*).

**Groundwater:** Subsurface water that occupies the space between sand, clay, and rock formations (*FAA 1050.1F Desk Reference*).

**Habitat:** The location where a particular plant or animal lives and its surroundings, both living and non-living, as well as the environmental conditions surrounding an organism such as air, water, soil, mineral elements, moisture, temperature, and topography (*USFWS Habitat Conservation Plan Handbook, 2016*).

**Hazardous material:** Any substance or material that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce. The term hazardous materials includes both hazardous wastes and hazardous substances, as well as petroleum and natural gas substances and materials (49 CFR § 172.101).

**Hazardous waste:** A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed (42 U.S.C. § 6903).

**Indirect impact:** An impacts that is caused by the action and is later in time or farther removed in distance, but is still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8).

**Key View:** Location that is either critical or representative of the visual character of the environment (*FHWA Environmental Review Toolkit, Visual, Appendix A: Glossary*).

**Maintenance area:** An area that has transitioned from a nonattainment area to an attainment area is called a “maintenance area” because the applicable State Implementation Plan ensures that the ambient concentrations of criteria pollutants will not increase above the NAAQS again (*FAA 1050.1F Desk Reference 2020*).

**Mixing height:** the vertical region of the atmosphere where pollutant mixing occurs. Above this height, pollutants that are released generally do not mix with ground level emissions and do not have an effect on ground level concentrations in the local area. Accordingly, if airplane operations occur above the mixing height, they will have negligible effect on ground level concentrations. Typically, mixing heights can range from a few hundred feet to a few thousand feet depending on the area, season, weather and time of day (*FAA 2000, Consideration of Air Quality Impacts by Airplane Operations at or Above 3000 feet AGL*).

**National Environmental Policy Act (NEPA):** President Nixon signed NEPA into law on January 1, 1970. Congress enacted NEPA to establish a national policy for the environment, provide for the establishment of the Council on Environmental Quality (CEQ), and for other purposes. NEPA requires Federal agencies to assess the environmental effects of proposed major Federal actions prior to making decisions. Specifically, Section 102 of NEPA applies that national policy to proposals for major Federal actions significantly affecting the quality of the human environment by requiring Federal agencies to prepare a detailed statement on (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action. (*A Citizen’s Guide to the NEPA [CEQ 2007]*).

**National Historic Landmark:** Historic property that meets the criteria of the National Register and has been designated by the Secretary of the Interior for its special national importance in the history of the U.S. (AFMAN 32-7003, *Environmental Conservation*).

**No Action Alternative:** Per NEPA, agencies must always describe and analyze a “no action alternative.” The “no action” alternative is simply what would happen if the agency did not act upon the proposal for agency action (*A Citizen’s Guide to the NEPA [CEQ 2007]*).

**Special status species:** State or federally listed threatened or endangered species, marine mammals, or species of concern, such as species proposed for listing or migratory birds (*FAA 1050.1F Desk Reference*).

**Subsistence:** The customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the

making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption, for barter, or sharing for personal or family consumption; and for customary trade (*Alaska National Interest Lands Conservation Act Title VII, Section 803 [federal lands], and AS 16.05.940 [state lands]*).

**Surface waters:** Include streams, rivers, lakes, ponds, estuaries, and oceans (*FAA 1050.1F Desk Reference*).

**Traditional cultural properties:** Sites, districts, buildings, structures, or objects associated with cultural practices or beliefs of a living community that are rooted in the history of the community, and are important in maintaining the continuing cultural identity of the community (*AFMAN 32-7003, Environmental Conservation*).

**Viewshed:** All of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (*FHWA Environmental Review Toolkit, Visual, Appendix A: Glossary*).

**Visual character:** The overall visual makeup of the existing environments where the proposed action and alternative(s) would be located (*FAA 1050.1F Desk Reference*).

**Visual resources:** Includes 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) (*FAA 1050.1F Desk Reference*).

**Wetlands:** Areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (*FAA 1050.1F Desk Reference*).

**Zip Code Tabulation Area (ZCTA):** ZIP Code Tabulation Areas (ZCTAs) are generalized areal representations of United States Postal Service (USPS) ZIP Code service areas. The USPS ZIP Codes identify the individual post office or metropolitan area delivery station associated with mailing addresses. USPS ZIP Codes are not areal features but a collection of mail delivery routes. The term ZCTA was created to differentiate between this entity and true USPS ZIP Codes. ZCTA is a trademark of the U.S. Census Bureau; ZIP Code is a trademark of the U.S. Postal Service (*U.S. Census Bureau, Zip Code Tabulation Areas*).

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# **Appendix A: Agency Consultation and Correspondence**

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**DEPARTMENT OF THE AIR FORCE**  
**13TH SPACE WARNING SQUADRON (USSF)**

31 March 2020

MEMORANDUM FOR Ms. Jessica Shaw  
Nenana Native Council  
PO Box 369  
Nenana, AK 99760

FROM: 13 SWS/CC  
200 A Street Stop 1  
Clear AFS AK 99704-5360

SUBJECT: Notification of Long Range Discrimination Radar Permanent Operation at Clear AFS

Dear Ms. Shaw:

In continued government to government consultation, I would like to update you with regard to the Long Range Discrimination Radar (LRDR) system at Clear Air Force Station (CAFS), Alaska (AK). Consistent with Section 106 of the National Historic Preservation Act of 1966, [36 CFR § Part 800.2(a)(4)], we are providing information for your review and concurrence regarding the Department of Defense, Missile Defense Agency's (MDA) proposal at CAFS (site center (NAD-83): Lat. 64.2971° N, Long. 149.1943° W; UTM: N/A; Within section(s) 20 & 21, T. 7 S., R. 8 W., Fairbanks Meridian) to operate the newly constructed Long-Range Discrimination Radar (LRDR). As we continue with CAFS site construction, we have also made significant progress addressing LRDR permanent operations and planning for phased functionality testing. Review for the area of potential effect (APE) for LRDR testing will be addressed in a separate letter sent to your office.

In June 2016, a determination letter was submitted discussing the EA underway for proposed construction and operation of the LRDR (enclosed). Since that time, operational requirements now require continuous operation of the LRDR. The radar would emit high-intensity radiated fields (HIRF) that exceed Federal Aviation Administration (FAA) certification standards in an area of airspace outside the current restricted area R-2206. As a result, aircraft flight in the immediate effected airspace would be limited. The MDA, in cooperation with the FAA and the U.S. Air Force (USAF), is preparing an Environmental Impact Statement (EIS) to evaluate impacts associated with continuous high-power radar operation expected to begin in the July 2021 timeframe including the potential impacts associated with limiting use of the affected airspace to protect aircraft from excessive HIRF.

The General Project schedule is as follows:

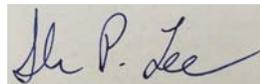
- Winter 2020: MDA sends stakeholders letters describing and inviting comments on the proposed action.

- Spring 2020: Low-power testing begins.
- Summer 2020: Proposed high-power testing would begin and be conducted for approximately 16 hrs/day for approximately 1 year.
- Summer 2020: Draft EIS made available for public review.
- Summer 2021: Final EIS filed and published.
- Summer 2021: LRDR Operation will begin.

The APE will include the affected airspace as shown in the attachment. The APE for this airspace analysis conservatively includes portions of the interior airspace region of Alaska to encompass airspace, airports, and flight operations potentially affected by rerouting flights, changing airport procedures, and charting new airspace required for the proposed undertaking. Even minor potential adjustments to airport flight procedures are included in the APE.

As set out in the Comprehensive Agreement between the Nenana Native Council and the CAFS and in accordance with 36 CFR § 800.3-800.4, we request your help to identify any tribal rights, resources, or interests that may be affected by this Proposed Action. If you believe any of these exist, we invite you to join us as consulting parties in accordance with 36 CFR § 800.2, Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DoD American Indian and Alaskan Native Policy.

If you have any questions or concerns, please contact Bob Tomlinson at (719) 556-6100 or [robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil). If you have no objection to the determination of “No Adverse Effect” from the proposed testing, please provide written confirmation to 13 SWS/CC, 200 A Street, Stop 1, Clear AFS, AK 99704-5360.



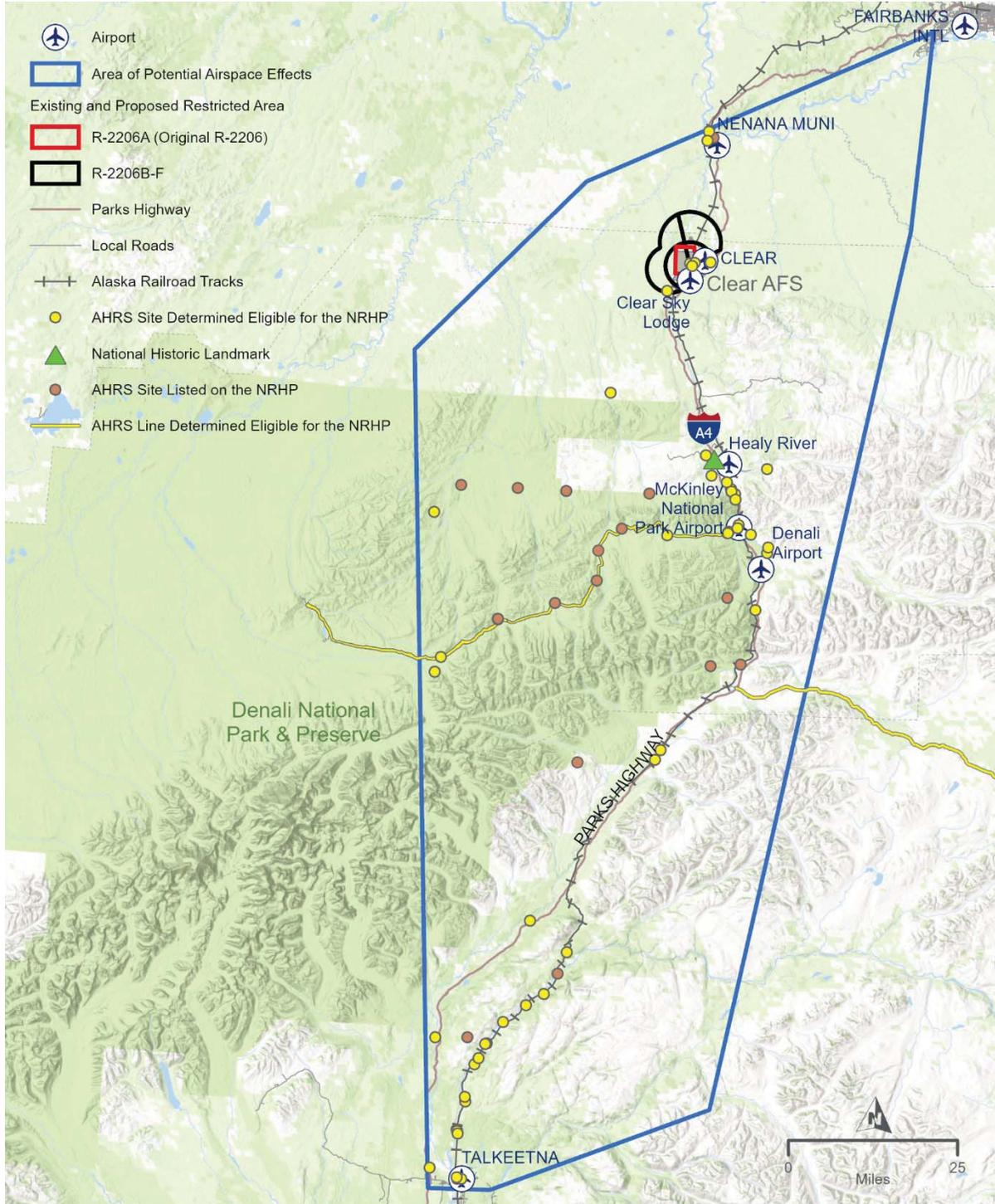
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Commander

Enclosures:

1. APE for LRDR Permanent Operations
2. 2016 Notification of Long-Range Discrimination Radar Construction and Technical Site Demolition at Clear AFS

**Figure: Area of Potential Effect for the Long Range Discrimination Radar Permanent Operation**





**DEPARTMENT OF THE AIR FORCE  
13th SPACE WARNING SQUADRON (AFSPC)  
CLEAR AFS ALASKA**

MEMORANDUM FOR MEMORANDUM FOR NENANA NATIVE COUNCIL  
ATTN: KATHY MORGAN  
PO BOX 369  
Nenana AK 99760

FROM: 13 SWS/CC  
200 A Street, Stop 1  
Clear AFS AK 99704-5360

SUBJECT: Notification of Long Range Discrimination Radar Environmental Assessment and Technical Site Demolition at Clear AFS

This is a continuation of our government to government consultations since our memorandum to you dated 20 January 2016. The Missile Defense Agency (MDA) and Air Force Space Command (AFSPC) have prepared a Proposed Final Environmental Assessment (EA) and Proposed Finding of No Significant Impact (FONSI) to evaluate the potential environmental impacts associated with the deployment of a Long Range Discrimination Radar (LRDR) system at Clear Air Force Station (CAFS), Alaska (AK). The LRDR system would be provided to support defense of the United States.

The Proposed Action would involve the construction and operation of a missile defense radar system complex in the Pacific Region at CAFS which would support a radar, command and control components and other associated facilities. The Proposed Action would include mission and support facilities including the mission control facility, radar equipment shelter and foundation, entry control facility with a secure boundary, back-up power with fuel storage, maintenance facility, new dormitory and associated steam heat addition, and other miscellaneous improvements and infrastructure such as roads, water, sewer and electrical substation.

Alternatives evaluated included two alternatives at CAFS and the No Action Alternative.

Consistent with Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR Part 800, we are consulting on the EA with the Alaska State Historic Preservation Office (SHPO) and have asked for their concurrence with our "No Adverse Effect" determination. A Memorandum of Agreement (MOA) between the Air Force and the SHPO, was previously entered into because the Technical Site buildings and structures were eligible for listing in the National Register of Historic Places. The history of the complex and its significance were detailed through the mitigation measures discussed in the MOA. After all mitigation measures were complete, the MOA was terminated on June 12, 2007 by both the Air Force and SHPO. The LRDR construction is planned for the previously developed area adjacent to the Technical Site. The Proposed Final EA provides details of the LRDR construction project and Technical Site Demolition.

As set out in the Comprehensive Agreement between the Nenana Native Council and the Clear Air Force Station (AFS), there are no identified tribal resources on Clear AFS property and as such we have determined that the projects described in the Proposed Final EA will have "No Adverse Effect" on tribal resources. We base this determination on our prior consultations with you and the previous archaeological surveys completed for Clear AFS, which determined that the built up portion of Clear AFS (where the Technical Site demolition and LRDR construction will occur) has a low potential for discovery of archeological resources. If any such resources are discovered during the demolition of the Technical Site or construction of the LRDR then we will take actions to notify and consult with you as described in the Clear AFS Integrated Cultural Resource Management Plan.

We are seeking your agreement with our ‘No Adverse Effect’ determination and invite your comments on the Proposed Final EA. MDA will accept written comments on the Proposed Final EA and Proposed FONSI during the public comment period, which extends for a period of 30 days from May 2, 2016 through June 2, 2016. The Proposed Final EA and Proposed FONSI are available for review in electronic form on the MDA website at [http://www.mda.mil/news/environmental\\_reports.html](http://www.mda.mil/news/environmental_reports.html). They are also available for review in printed form at the following libraries:

Anderson Village Library  
Reference Section  
First Street  
Anderson, AK 99744

Noel Wien Library  
Reference Section  
1215 Cowles Street  
Fairbanks, AK 99701

Nenana Public Library  
2<sup>nd</sup> and Market Street  
Nenana, AK 99760

If you have any questions or concerns, please contact Bob Tomlinson at (719) 556-8059 or [robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil). Please address all official correspondence to 13 SWS/CC, 200 A Street, Stop 1, Clear, AK 99704-5360.

Comments must be received by June 2, 2016 to ensure they are considered and become part of the official record. For more information, please visit [http://www.mda.mil/news/environmental\\_reports.html](http://www.mda.mil/news/environmental_reports.html) or contact Mr. Chris Johnson, Director, MDA Public Affairs, at 256-450-1599 or by email at [mda.info@mda.mil](mailto:mda.info@mda.mil). Public comments on this proposed final EA and proposed FONSI are requested pursuant to the National Environmental Policy Act, 42 United States Code 4321, et seq. All written comments received during the comment period will be made available to the public and considered during final EA and FONSI preparation. Providing private address information with your comment is voluntary and such personal information will be kept confidential unless release is required by law. However, address information will be used to compile the project mailing list and failure to provide it will result in your name not being included on the mailing list.

**BURCH.JASON.B**  
**.1187343980**  
JASON B. BURCH, Lt Col, USAF  
Commander, 13<sup>th</sup> Space Warning Squadron

Digitally signed by BURCH.JASON.B.1187343980  
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,  
ou=USAF, cn=BURCH.JASON.B.1187343980  
Date: 2016.05.01 15:15:23 -0800



**DEPARTMENT OF THE AIR FORCE**  
13TH SPACE WARNING SQUADRON (USSF)

31 March 2020

MEMORANDUM FOR Ms. Judith Bittner  
State Historic Preservation Officer  
Office of History and Archeology  
550 West 7<sup>th</sup> Avenue, Suite 1310  
Anchorage, AK 99501-3565

FROM: 13 SWS/CC  
200 A Street Stop 1  
Clear AFS AK 99704-5360

SUBJECT: Notification of Long Range Discrimination Radar Permanent Operation at Clear AFS

In compliance with Section 106 of the National Historic Preservation Act of 1966, [36 CFR § Part 800.2(a)(4)], we are providing information for your review and concurrence regarding the Department of Defense, Missile Defense Agency (MDA) proposal at Clear Air Force Station (CAFS), Alaska (site center (NAD-83): Lat. 64.2971° N, Long. 149.1943° W; UTM: N/A; within section(s) 20 & 21, T. 7 S., R. 8 W., Fairbanks Meridian) to operate the newly constructed Long-Range Discrimination Radar (LRDR). As we continue with CAFS site construction, we have also made significant progress addressing LRDR permanent operations and planning for phased functionality testing. Review for the area of potential effect (APE) for LRDR testing will be addressed in a separate letter sent to your office.

In June 2016, your office agreed with our **no adverse effect** determination for the construction and operation of the LRDR (enclosed). Since that time, operational requirements now require continuous operation of the LRDR. The radar would emit high-intensity radiated fields (HIRF) that exceed Federal Aviation Administration (FAA) certification standards in an area of airspace outside the current restricted area R-2206. As a result, aircraft flight in the immediate effected airspace would be limited. The MDA, in cooperation with the FAA and the U.S. Air Force (USAF), is preparing an Environmental Impact Statement (EIS) to evaluate impacts associated with continuous high-power radar operation expected to begin in the July 2021 timeframe including the potential impacts associated with limiting use of the affected airspace to protect aircraft from excessive HIRF. The MDA, FAA, and USAF intend to issue additional notices and requests for public input under Section 106 in coordination with our public involvement under the National Environmental Policy Act (NEPA) process per 36 CFR § 800.8.

The General Project schedule is as follows:

- Winter 2020: MDA sends stakeholders letters describing and inviting comments on the proposed action.
- Spring 2020: Low-power testing begins.

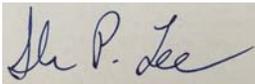
- Summer 2020: Proposed high-power testing would begin and be conducted for approximately 16 hrs/day for approximately 1 year.
- Summer 2020: Draft EIS made available for public review.
- Summer 2021: Final EIS filed and published.
- Summer 2021: LRDR Operation will begin.

Alternatives evaluated in the EIS are the Proposed Action (i.e., the continuous high-power operation of the LRDR and flight limitations and procedure modifications to the affected airspace) and the No Action Alternative. No construction or other ground disturbing activities are planned or part of the proposed action.

The APE will include the affected airspace as shown in the enclosure. The APE for this airspace analysis conservatively includes portions of the interior airspace region of Alaska to encompass airspace, airports, and flight operations potentially affected by rerouting flights, changing airport procedures, and charting new airspace required for the proposed undertaking. Even minor potential adjustments to airport flight procedures are included in the APE.

Properties identified in the APE would not be impacted by construction or changes to the environmental setting that would affect the properties' integrity; therefore, MDA and CAFS have determined that **no historic properties would be affected** by the proposed undertaking. Following 36 CFR § 800.3-800.4, we invite your comments and we seek your concurrence on our determination.

If you have any questions or concerns, please contact Bob Tomlinson at (719) 556-6100 or [robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil). If you have no objection to the determination that no historic properties would be affected from the proposed testing, please provide written confirmation to 13 SWS/CC, 200 A Street, Stop 1, Clear AFS, AK 99704-5360.

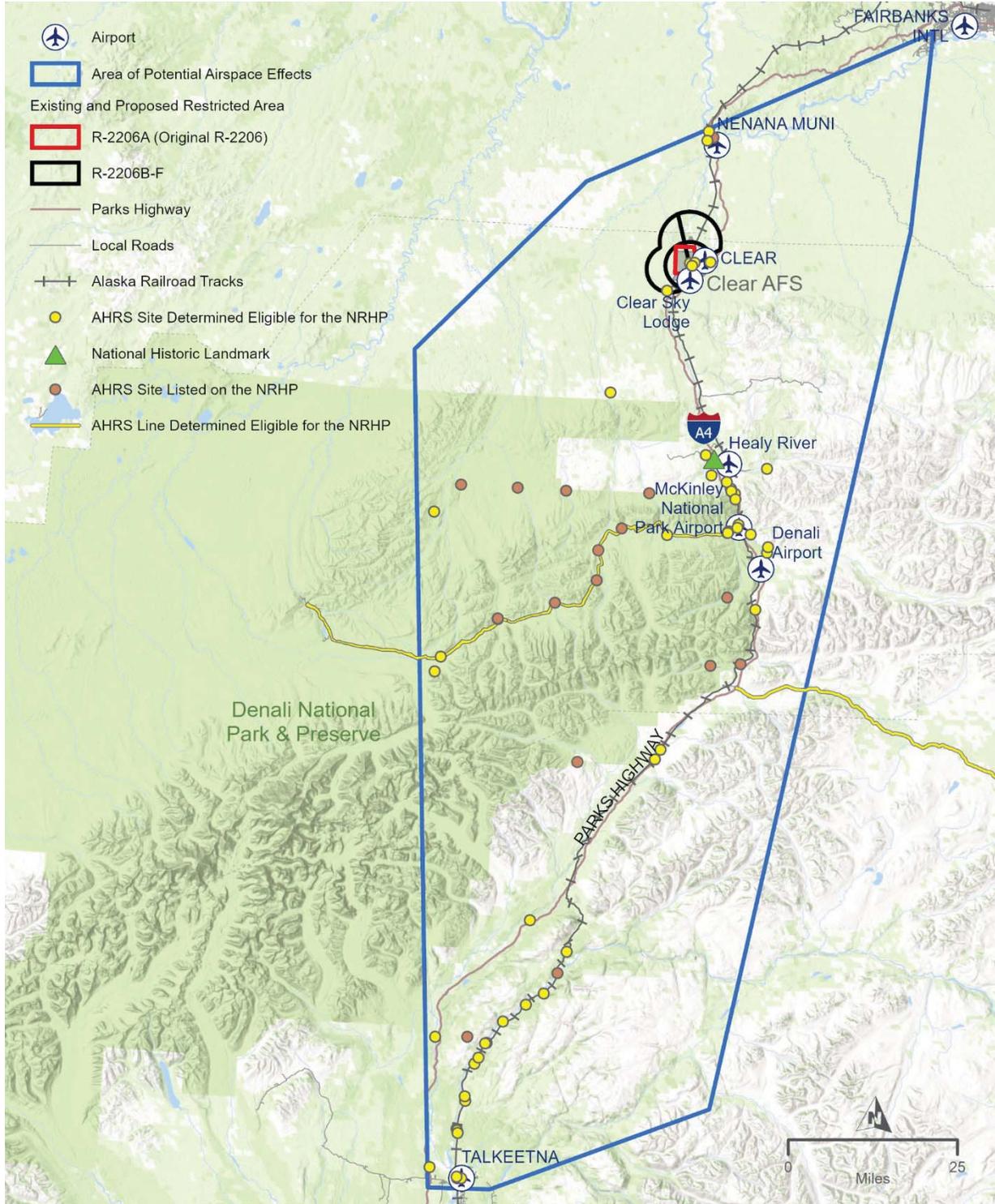
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LEE, SHAWN.P.1087487802  
Date: 2020.03.31 11:24:19  
-08'00'

SHAWN P. LEE, Lt Col, USAF  
Commander

Enclosures:

1. APE for LRDR Permanent Operations
2. 2016 LRDR EA and Technical Site Demolition AKSHPO Memorandum

**Figure: Area of Potential Effect for the Long Range Discrimination Radar Permanent Operation**





THE STATE  
of **ALASKA**  
GOVERNOR BILL WALKER

**Department of Natural Resources**

DIVISION OF PARKS & OUTDOOR RECREATION  
Office of History & Archaeology

550 West 7<sup>th</sup> Ave., Suite 1310  
Anchorage, Alaska 99501-3566  
Main: 907.269.8721  
<http://dnr.alaska.gov/parks/oha>

June 6, 2016

File No.: 3130-1R Air Force

Jason B. Burch, Lt. Col, USAF  
Commander, 13<sup>th</sup> Space Warning Squadron  
Department of the Air Force  
13<sup>th</sup> Space Warning Squadron  
Clear AFS Alaska

Subject: Long Range Discrimination Radar Environmental Assessment and Technical Site Demolition

Dear Commander Burch:

The Alaska State Historic Preservation Office (AK SHPO) received your correspondence (dated May 1, 2016) on May 3, 2016. Please forgive the delay in providing this response.

Following our review of the documentation provided, we note that our records reflect the mutually-agreed termination of the Memorandum of Agreement (MOA) regarding the demolition of BMEWS buildings and radar fans at Clear Air Force Station, Alaska. As the potential effect of the proposed action has been previously mitigated, as stipulated in the MOA, we concur that a finding of **no adverse effect** is appropriate for the alternatives, including the proposed action, addressed in the environmental assessment for the Long Range Discrimination Radar (LRDR) System at Clear Air Force Station. We continue to recommend that the Air Force proceed with proactive inventory of the remaining potential historic properties at Clear Air Force Station (CAFS) in order to more effectively plan for future activities at the site. Additionally, we request that the documentation currently located in the Alaska Heritage Resources Survey (AHRS) database be reviewed and updated, as necessary, to reflect the current condition of the historic properties at CAFS.

Please note that as stipulated in 36 CFR 800.3, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations. Receipt of our comment letter does not end the 30-day review period provided to other consulting parties.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register of Historic Places eligibility criteria (36 CFR 60.4) or Alaska Landmarks Status in consultation with our office.

Thank you for the opportunity to comment. Please contact Shina duVall at 269-8720 or [shina.duvall@alaska.gov](mailto:shina.duvall@alaska.gov) if you have any questions or if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Judith E. Bittner".

JEB  
Judith E. Bittner  
State Historic Preservation Officer  
JEB:sad

**From:** Johnson, McKenzie S (DNR) <mckenzie.johnson@alaska.gov>  
**Sent:** Tuesday, April 28, 2020 4:06 PM  
**To:** TOMLINSON, ROBERT R GS-13 USSF SPOC 21 CES/CEIE <robert.tomlinson@us.af.mil>  
**Subject:** [Non-DoD Source] Clear AFS LRDR Permanent Operation, Integration, and Testing--SHPO Concurrence

File No.:3130-1R AF/ 2020-00437

Dear Mr. Tomlinson:

The Alaska State Historic Preservation Office (AKSHPO) received the correspondence and associated documentation on April 2, 2020. There were two letters included with what was received, one referring to the permanent operation of the LRDR and another referring to integration and testing at the LRDR. For the purposes of our review we are responding to both requests as a single undertaking with this response. Upon review, we concur that a finding of no historic properties affected is appropriate for the proposed undertaking.

As stipulated in *36 CFR § 800.3*, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations.

Thank you for the opportunity to review and comment. Please let me know if we can be of further assistance.

Mckenzie S. Johnson  
Archaeologist I - Review and Compliance  
Alaska State Historic Preservation Office (AKSHPO)/Office of History and Archaeology (OHA)  
550 W. 7th Ave, Suite 1310  
Anchorage, AK 99507  
[mckenzie.johnson@alaska.gov](mailto:mckenzie.johnson@alaska.gov)  
*Currently working out of office, e-mail correspondence is best to reach me.*

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**From:** DNR, Parks OHA Review Compliance (DNR sponsored) <[oha.revcomp@alaska.gov](mailto:oha.revcomp@alaska.gov)>  
**Sent:** Monday, April 6, 2020 11:54 AM  
**To:** [robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil) <[robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil)>  
**Cc:** Johnson, McKenzie S (DNR) <[mckenzie.johnson@alaska.gov](mailto:mckenzie.johnson@alaska.gov)>  
**Subject:** Fw: Clear AFS LRDR

Good morning,

The Office of History and Archaeology/Alaska State Historic Preservation Office received your documentation and its review has been assigned to Mckenzie Johnson as ID No: 2020-00437. We may contact you if we require additional information. Our office ordinarily has 30 calendar days after receipt to complete our review, but our office has entered tolling in response to complications from COVID-19 and our review may be delayed as a result. Please contact the project reviewer or myself by email if you have any questions or concerns.

Best,

**Sarah Meitl**

Review and Compliance Coordinator  
Alaska State Historic Preservation Office  
Office of History and Archaeology

550 West 7<sup>th</sup> Avenue, Suite 1310  
Anchorage, AK 99501-3561  
Office: 907-269-8720

[sarah.meitl@alaska.gov](mailto:sarah.meitl@alaska.gov)

*Teleworking - Email is best method of communication.*

---

**From:** Bittner, Judith E (DNR) <[judy.bittner@alaska.gov](mailto:judy.bittner@alaska.gov)>  
**Sent:** Thursday, April 2, 2020 9:06 AM  
**To:** DNR, Parks OHA Review Compliance (DNR sponsored) <[oha.revcomp@alaska.gov](mailto:oha.revcomp@alaska.gov)>  
**Subject:** FW: Clear AFS LRDR

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**From:** TOMLINSON, ROBERT R GS-13 USSF SPOC 21 CES/CEIE <[robert.tomlinson@us.af.mil](mailto:robert.tomlinson@us.af.mil)>  
**Sent:** Thursday, April 2, 2020 5:27 AM  
**To:** Bittner, Judith E (DNR) <[judy.bittner@alaska.gov](mailto:judy.bittner@alaska.gov)>  
**Cc:** Smith, Christopher S CIV MDA/FDO <[christopher.smith@mda.mil](mailto:christopher.smith@mda.mil)>; Hobbie, Diane S CIV USARMY CEPOA (USA) <[Diane.S.Hobbie@usace.army.mil](mailto:Diane.S.Hobbie@usace.army.mil)>  
**Subject:** Clear AFS LRDR

Ms. Bittner,

Attached you will find two requests for Section 106 consultation for testing and integration, and permanent operations of the new Long Range Discriminating Radar System being installed at Clear AFS. Hard copies of these packages will be sent via mail today.

If you have any questions, please feel free to call.

V/r

Bob Tomlinson  
21 CES/CEIE  
719-556-6100, DSN 834  
21 SW Chief, Environmental Quality  
Clear Environmental Program Manager  
eDASH: [Blockedhttps://cs2.eis.af.mil/sites/10040/WPP/HomePage/Home.aspx](https://cs2.eis.af.mil/sites/10040/WPP/HomePage/Home.aspx)  
Peterson AFB eDASH:

[Blockedhttps://cs2.eis.af.mil/sites/10624/Peterson/\\_layouts/15/start.aspx#/SitePages/Home.aspx](https://cs2.eis.af.mil/sites/10624/Peterson/_layouts/15/start.aspx#/SitePages/Home.aspx)

CLASSIFICATION: UNCLASSIFIED

## **Appendix B: Notices and Stakeholder Letter**

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key cards, cipher locks, and combination locks.

**RECORD ACCESS PROCEDURES:**

Individuals seeking access to information about themselves contained in this system of records should address inquiries to the Office of the Secretary of Defense/Joint Staff (OSD/JS), Freedom of Information Act (FOIA) Requester Service Center, 1155 Defense Pentagon, Washington, DC 20301-1155. Signed, written requests should contain the individual's name, company name and work division/group, and the name and number of this system of records notice. In addition, the requester must provide either a notarized statement or an unsworn declaration made in accordance with 28 U.S.C. 1746, in the following format:

If executed outside the United States: "I declare (or certify, verify, or state) under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on (date). (Signature)."

If executed within the United States, its territories, possessions, or commonwealths: "I declare (or certify, verify, or state) under penalty of perjury that the foregoing is true and correct. Executed on (date). (Signature)."

**CONTESTING RECORD PROCEDURES:**

The Office of the Secretary of Defense (OSD) rules for accessing records, for contesting contents, and for appealing initial agency determinations are contained in OSD Administrative Instruction 81; 32 CFR part 311; or may be obtained from the system manager.

**NOTIFICATION PROCEDURES:**

Individuals seeking to determine whether this system of records contains information on themselves should address inquiries to Director, DIB Cybersecurity Office, 6000 Defense Pentagon, ATTN: DIB CS Program, Washington, DC 20301-6000. Signed, written requests should contain the individual's name, and company name and work division/group. In addition, the requester must provide either a notarized statement or an unsworn declaration made in accordance with 28 U.S.C. 1746, in the following format:

If executed outside the United States: "I declare (or certify, verify, or state) under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on (date). (Signature)."

If executed within the United States, its territories, possessions, or commonwealths: "I declare (or certify, verify, or state) under penalty of perjury that the foregoing is true and correct. Executed on (date). (Signature)."

**EXEMPTIONS PROMULGATED FOR THE SYSTEM:**

None.

**HISTORY:**

May 21, 2015, 80 FR 29315; May 8, 2012, 77 FR 29616.

[FR Doc. 2019-10207 Filed 5-16-19; 8:45 am]

**BILLING CODE 5001-06-P**

**DEPARTMENT OF DEFENSE**

**Office of the Secretary**

**Notice of Intent To Prepare an Environmental Impact Statement (EIS) for the Long Range Discrimination Radar (LRDR) at Clear Air Force Station (CAFS)**

**AGENCY:** Missile Defense Agency, Department of Defense.

**ACTION:** Notice of intent.

**SUMMARY:** The Missile Defense Agency (MDA) announces its intention to prepare an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA. MDA began construction of the LRDR following a 2016 Environmental Assessment (EA) and Finding of No Significant Impact (FONSI). Due to threat evolution, operational requirements have created the need to expand the current Special Use Airspace (SUA) at Clear Air Force Station (AFS) to protect nearby aircraft. Several potential designs of the additional SUA have been developed. The MDA is preparing this EIS to evaluate potential environmental impacts that could result from the LRDR SUA alternatives. The Department of Defense has not selected a preferred alternative for the proposed SUA.

**DATES:** Scoping meetings will be held in the Alaskan communities of Anderson, Fairbanks and Anchorage during June 2019. Notification of the meeting locations, dates, and times will be published and announced in local news media prior to public scoping meetings.

The MDA invites public comments on the scope of the LRDR EIS during a 30-day public scoping period beginning with publication of this notice in the **Federal Register**. Comments will be accepted on or before June 17, 2019.

**ADDRESSES:** Written comments, statements, and/or concerns regarding the scope of the EIS or requests to be added to the EIS distribution list should be addressed to MDA CAFS EIS and sent by email to [info@cleareis.com](mailto:info@cleareis.com), by facsimile 907-644-2022, or by U.S.

Postal Service to Clear EIS c/o HDR, Inc., 2525C Street, Suite 500, Anchorage, AK 99503. Electronic or facsimile comments are preferred. If sending comments by U.S. Postal Service, please do not submit duplicate electronic or facsimile comments. All comments, including names and addresses, will be included in the administrative record.

**FOR FURTHER INFORMATION CONTACT:** Mark Wright, MDA Public Affairs at 256-450-1599 or by email: [mda.info@mda.mil](mailto:mda.info@mda.mil). Additional information can be found at MDA's website: [https://www.mda.mil/news/nepa\\_documents.html](https://www.mda.mil/news/nepa_documents.html).

**SUPPLEMENTARY INFORMATION:** In accordance with 40 Code of Federal Regulations (CFR) 1501.6, cooperating agencies for consultation, review, and comment on the EIS include the Federal Aviation Administration (FAA) and U.S. Air Force (USAF). Other cooperating agencies may be identified during the scoping process.

An initial EA was prepared in April 2016 and resulted in a FONSI in June 2016 to support the construction and operation of the LRDR. A detailed analysis of all resource categories was assessed in the EA. Since that time, the adversary threat evaluation has evolved requiring changes to the LRDR's plans for operation, which in turn required MDA to reexamine the LRDR's operational tempo and battlespace coverage. To meet these more challenging requirements, LRDR operational and system procedures were adapted, resulting in expanded requirements for a Special Use Airspace (SUA) at CAFS that will provide continual protection for aircraft from LRDR High Intensity Radiated Fields (HIRF).

Restricted Area R-2206 is currently in effect at CAFS. Designed and implemented over 50 years ago to support the original Ballistic Missile Early Warning System (BMEWS) and its replacement, the Upgraded Early Warning Radar (UEWR), R-2206 will no longer be sufficient to protect aircraft from HIRF levels that will be generated by the more powerful LRDR in its expanded role discussed in this notice. Alternative designs for the additional Restricted Area have been developed. The EIS will analyze potential environmental impacts from each alternative. Our preliminary indications are that the majority of impacts will be in the areas of socioeconomics and airspace. However, to the extent these impacts differ from those analyzed in the 2016 EA, we will analyze them in this EIS process.

This EIS will support the FAA's SUA rule-making process and meet National Historic Preservation Act requirements, including Section 106 Consultation.

The MDA encourages all interested members of the public, as well as federal, state, tribal and local agencies, to participate in the scoping process for the preparation of this EIS. The scoping process assists in determining the scope of issues to be addressed and helps identify significant environmental issues to be analyzed in-depth in the EIS.

Dated: May 14, 2019.

**Aaron T. Siegel,**

*Alternate OSD Federal Register Liaison Officer, Department of Defense.*

[FR Doc. 2019-10244 Filed 5-16-19; 8:45 am]

**BILLING CODE 5001-06-P**

## DEPARTMENT OF EDUCATION

[Docket No.: ED-2019-ICCD-0021]

### Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Comment Request; Supporting Excellence in Adult Education

**AGENCY:** Office of Career, Technical, and Adult Education (OCTAE), Department of Education (ED).

**ACTION:** Notice.

**SUMMARY:** In accordance with the Paperwork Reduction Act of 1995, ED is proposing a new information collection.

**DATES:** Interested persons are invited to submit comments on or before June 17, 2019.

**ADDRESSES:** To access and review all the documents related to the information collection listed in this notice, please use <http://www.regulations.gov> by searching the Docket ID number ED-2019-ICCD-0021. Comments submitted in response to this notice should be submitted electronically through the Federal eRulemaking Portal at <http://www.regulations.gov> by selecting the Docket ID number or via postal mail, commercial delivery, or hand delivery. If the [regulations.gov](http://www.regulations.gov) site is not available to the public for any reason, ED will temporarily accept comments at [ICDocketMgr@ed.gov](mailto:ICDocketMgr@ed.gov). Please include the docket ID number and the title of the information collection request when requesting documents or submitting comments. *Please note that comments submitted by fax or email and those submitted after the comment period will not be accepted.* Written requests for information or comments submitted by postal mail or delivery should be

addressed to the Director of the Information Collection Clearance Division, U.S. Department of Education, 550 12th Street SW, PCP, Room 9086, Washington, DC 20202-0023.

**FOR FURTHER INFORMATION CONTACT:** For specific questions related to collection activities, please contact Braden Goetz, 202-245-7405.

**SUPPLEMENTARY INFORMATION:** The Department of Education (ED), in accordance with the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3506(c)(2)(A)), provides the general public and Federal agencies with an opportunity to comment on proposed, revised, and continuing collections of information. This helps the Department assess the impact of its information collection requirements and minimize the public's reporting burden. It also helps the public understand the Department's information collection requirements and provide the requested data in the desired format. ED is soliciting comments on the proposed information collection request (ICR) that is described below. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology. Please note that written comments received in response to this notice will be considered public records.

*Title of Collection:* Supporting Excellence in Adult Education.

*OMB Control Number:* 1830-NEW.

*Type of Review:* A new information collection.

*Respondents/Affected Public:* State, Local, and Tribal Governments.

*Total Estimated Number of Annual Responses:* 18.

*Total Estimated Number of Annual Burden Hours:* 110.

*Abstract:* The purpose of this information collection request is to identify and document innovative practices in adult education and literacy that are associated with positive outcomes for adult learners so that they may be disseminated to adult education programs. The U.S. Department of Education will analyze the information that is collected about adult education programs and the outcomes they achieve to identify innovative practices that merit dissemination to the field.

Dated: May 14, 2019.

**Kate Mullan,**

*PRA Coordinator, Information Collection Clearance Program, Information Management Branch, Office of the Chief Information Officer.*

[FR Doc. 2019-10268 Filed 5-16-19; 8:45 am]

**BILLING CODE 4000-01-P**

## DEPARTMENT OF ENERGY

### Federal Energy Regulatory Commission

[Docket No. CP19-118-000]

#### Trans-foreland Pipeline Company, LLC; Notice of Intent To Prepare an Environmental Assessment for the Proposed Kenai LNG Cool Down Project and Request for Comments on Environmental Issues

The staff of the Federal Energy Regulatory Commission (FERC or Commission) will prepare an environmental assessment (EA) that will discuss the environmental impacts of the proposed Kenai LNG Cool Down Project involving construction and operation of facilities by Trans-foreland Pipeline Company, LLC (Trans-foreland) near Nikiski in the Kenai Peninsula Borough, Alaska. The Commission will use this EA in its decision-making process to determine whether the project is in the public interest.

This notice announces the opening of the scoping process the Commission will use to gather input from the public and interested agencies about issues regarding the project. The National Environmental Policy Act (NEPA) requires the Commission to take into account the environmental impacts that could result from its action whenever it considers the issuance of an authorization. NEPA also requires the Commission to discover concerns the public may have about proposals. This process is referred to as "scoping." The main goal of the scoping process is to focus the analysis in the EA on the important environmental issues. By this notice, the Commission requests public comments on the scope of the issues to address in the EA. To ensure that your comments are timely and properly recorded, please submit your comments so that the Commission receives them in Washington, DC on or before 5:00 p.m. Eastern Time on June 12, 2019.

You can make a difference by submitting your specific comments or concerns about the project. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. Your

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*Annual Burden Hours:* 160.  
*Number Of Respondents:* 960.  
*Responses Per Respondent:* 1.  
*Annual Responses:* 960.  
*Average Burden Per Response:* 10 minutes.

*Information Being Collected from Other Law Enforcement Agencies (PFPA Form 1408).*

*Affected Public:* Individuals and Households.

*Annual Burden Hours:* 20.  
*Number Of Respondents:* 240.  
*Responses Per Respondent:* 1.  
*Annual Responses:* 240.  
*Average Burden Per Response:* 5 minutes.

*Needs and Uses:* This information collection is essential to PFPA and is used to make a determination of fitness for federal employment in the field of law enforcement. To that end, criminal, background and medical information is collected on the applicants.

*Affected Public:* Individuals and Households.

*Frequency:* On occasion.

*Respondent's Obligation:* Voluntary.

*OMB Desk Officer:* Ms. Jasmeet Seehra.

You may also submit comments and recommendations, identified by Docket ID number and title, by the following method:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

*Instructions:* All submissions received must include the agency name, Docket ID number, and title for this **Federal Register** document. The general policy for comments and other submissions from members of the public is to make these submissions available for public viewing on the internet at <http://www.regulations.gov> as they are received without change, including any personal identifiers or contact information.

*DOD Clearance Officer:* Ms. Angela James.

Requests for copies of the information collection proposal should be sent to Ms. James at [whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil](mailto:whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil).

Dated: June 5, 2019.

**Aaron T. Siegel,**

*Alternate OSD Federal Register Liaison Officer, Department of Defense.*

[FR Doc. 2019-12122 Filed 6-7-19; 8:45 am]

**BILLING CODE 5001-06-P**

## DEPARTMENT OF DEFENSE

### Office of the Secretary

[Docket ID: DOD-2019-HA-0065]

### Proposed Collection; Comment Request

**AGENCY:** Office of the Assistant Secretary of Defense for Health Affairs, DoD.

**ACTION:** Information collection notice.

**SUMMARY:** In compliance with the *Paperwork Reduction Act of 1995*, the Office of the Assistant Secretary of Defense for Health Affairs announces a proposed public information collection and seeks public comment on the provisions thereof. Comments are invited on: Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; the accuracy of the agency's estimate of the burden of the proposed information collection; ways to enhance the quality, utility, and clarity of the information to be collected; and ways to minimize the burden of the information collection on respondents, including through the use of automated collection techniques or other forms of information technology.

**DATES:** Consideration will be given to all comments received by August 9, 2019.

**ADDRESSES:** You may submit comments, identified by docket number and title, by any of the following methods:

*Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

*Mail:* Department of Defense, Office of the Chief Management Officer, Directorate for Oversight and Compliance, 4800 Mark Center Drive, Mailbox #24, Suite 08D09, Alexandria, VA 22350-1700.

*Instructions:* All submissions received must include the agency name, docket number and title for this **Federal Register** document. The general policy for comments and other submissions from members of the public is to make these submissions available for public viewing on the internet at <http://www.regulations.gov> as they are received without change, including any personal identifiers or contact information.

**FOR FURTHER INFORMATION CONTACT:** To request more information on this proposed information collection or to obtain a copy of the proposal and associated collection instruments, please write to Defense Health Agency, 7700 Arlington Blvd., Suite 5101, Falls

Church, VA 22042-5101, ATTN: Melanie Richardson, or call 703.681.8494.

### SUPPLEMENTARY INFORMATION:

*Title; Associated Form; and OMB Number:* Federal Agency Retail Pharmacy Program; OMB Control Number 0720-0032.

*Needs and Uses:* The information collection requirement is necessary to obtain and record refund amounts between the DoD and pharmaceutical manufacturers. The DoD quarterly provides pharmaceutical manufacturers with itemized utilization data on covered drugs dispensed to TRICARE beneficiaries through TRICARE retail network pharmacies. These manufacturers validate the refund amounts calculated from the difference in price between the Federal Ceiling Prices and the direct commercial contract sales price. Once the refund amounts are validated, the pharmaceutical manufacturers directly pay the DHA Government account.

*Affected Public:* Business or other for profit.

*Annual Burden Hours:* 9,600.  
*Number of Respondents:* 300.  
*Responses per Respondent:* 4.  
*Annual Responses:* 1,200.  
*Average Burden per Response:* 8 hours.

*Frequency:* Quarterly.

Dated: June 5, 2019.

**Aaron T. Siegel,**

*Alternate OSD Federal Register Liaison Officer, Department of Defense.*

[FR Doc. 2019-12128 Filed 6-7-19; 8:45 am]

**BILLING CODE 5001-06-P**

## DEPARTMENT OF DEFENSE

### Office of the Secretary

### Scoping Period Extension for the Environmental Impact Statement (EIS) for the Long Range Discrimination Radar (LRDR) at Clear Air Force Station (CAFS)

**AGENCY:** Missile Defense Agency, Department of Defense.

**ACTION:** Notice of decision to extend the scoping period for the Environmental Impact Statement (EIS) for the Long Range Discrimination Radar (LRDR) at Clear Air Force Station (CAFS).

**SUMMARY:** The Missile Defense Agency (MDA) has decided to extend the scoping period for the Environmental Impact Statement (EIS) for the Long Range Discrimination Radar (LRDR) at Clear Air Force Stations (CAFS) that published in the **Federal Register** on May 17, 2019. The EIS is being prepared

in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA. MDA began construction of the LRDR following a 2016 Environmental Assessment and Finding of No Significant Impact (FONSI). Due to threat evolution, operational requirements have created the need to expand the current Special Use Airspace (SUA) at Clear Air Force Station (AFS) to protect nearby aircraft. Several potential designs of the additional SUA have been developed. The MDA is preparing the EIS to evaluate potential environmental impacts that could result from the LRDR SUA alternatives. The Department of Defense has not selected a preferred alternative for the proposed SUA.

**DATES:** Interested persons are invited to submit comments on or before July 5, 2019.

**ADDRESSES:** Written comments, statements, and/or concerns regarding the scope of the EIS or requests to be added to the EIS distribution list should be addressed to MDA CAFS EIS and sent by email to [info@cleareis.com](mailto:info@cleareis.com), by facsimile 907-644-2022, or by U.S. Postal Service to Clear EIS c/o HDR, Inc., 2525C Street, Suite 500, Anchorage, AK 99503. Electronic or facsimile comments are preferred. If sending comments by U.S. Postal Service, please do not submit duplicate electronic or facsimile comments. All comments, including names and addresses, will be included in the administrative record.

**FOR FURTHER INFORMATION CONTACT:** Mark Wright, MDA Public Affairs at 256-450-1599 or by email: [mda.info@mda.mil](mailto:mda.info@mda.mil). Additional information can be found at MDA's website: [https://www.mda.mil/news/nepa\\_documents.html](https://www.mda.mil/news/nepa_documents.html).

**SUPPLEMENTARY INFORMATION:** MDA invites interested agencies, organizations, and members of the public to submit comments or suggestions to assist in identifying significant environmental issues, measures that might be adopted to reduce environmental impacts, and in determining the appropriate scope of the EIS. The public scoping period began with the publication of a Notice of Intent to Prepare an Environmental Impact Statement in the **Federal Register** on May 17, 2019 (84 FR 22479-22480). Written, electronic, and oral comments will be given equal weight and MDA will consider all comments received or postmarked by July 5, 2019

in defining the scope of the EIS. Comments received or postmarked after that date may be considered to the extent practicable.

Public scoping periods are designed to provide opportunities to offer comments on the environmental review for the proposed project. Interested individuals and groups are encouraged to present comments on the environmental issues they believe should be addressed in the EIS consistent with NEPA and its implementing regulations.

The EIS will support the FAAs SUA rule-making process and meet National Historic Preservation Act requirements, including Section 106 Consultation.

Dated: June 4, 2019.

**Aaron T. Siegel,**

*Alternate OSD Federal Register Liaison Officer, Department of Defense.*

[FR Doc. 2019-12099 Filed 6-7-19; 8:45 am]

**BILLING CODE 5001-06-P**

## DEPARTMENT OF DEFENSE

### Office of the Secretary

[Docket ID DOD-2019-OS-0031]

### Submission for OMB Review; Comment Request

**AGENCY:** National Guard Bureau, DoD.

**ACTION:** 30-Day information collection notice.

**SUMMARY:** The Department of Defense has submitted to OMB for clearance the following proposal for collection of information under the provisions of the Paperwork Reduction Act.

**DATES:** Consideration will be given to all comments received by July 10, 2019.

**ADDRESSES:** Comments and recommendations on the proposed information collection should be emailed to Ms. Jasmeet Sehra, DoD Desk Officer, at [aira\\_submission@omb.eop.gov](mailto:aira_submission@omb.eop.gov). Please identify the proposed information collection by DoD Desk Officer, Docket ID number, and title of the information collection.

**FOR FURTHER INFORMATION CONTACT:** Angela James, 571-372-7574, or [whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil](mailto:whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil).

### SUPPLEMENTARY INFORMATION:

*Title; Associated Form; and OMB Number:* Education Verification for National Guard Enlistees; High School Verification, NGB Form 900; College Enrollment Verification NGB Form 901; OMB Control Number 0704-XXXX.

*Type of Request:* New.

*Number of Respondents:* 10,000.

*Responses per Respondent:* 1.

*Annual Responses:* 10,000.

*Average Burden per Response:* 5 minutes.

*Annual Burden Hours:* 833.33.

*Needs and Uses:* The information collection is necessary to verify education status and projected graduation dates for students who agree to enlist in the Army National Guard. Information gathered by the NGB Form 900 is required to verify and determine the graduation dates for high school juniors who enlist in the National Guard. Information gathered by the NGB Form 901 is required to verify the enrollment and graduation dates for college students who enlist in the National Guard. The National Guard will use this information to schedule basic training dates to accommodate a student's educational obligations, thereby ensuring that the enlistee will complete his or her education in a timely manner.

*Affected Public:* Individuals or households.

*Frequency:* On occasion.

*Respondent's Obligation:* Voluntary.

*OMB Desk Officer:* Ms. Jasmeet Sehra.

You may also submit comments and recommendations, identified by Docket ID number and title, by the following method:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

*Instructions:* All submissions received must include the agency name, Docket ID number, and title for this **Federal Register** document. The general policy for comments and other submissions from members of the public is to make these submissions available for public viewing on the internet at <http://www.regulations.gov> as they are received without change, including any personal identifiers or contact information.

*DoD Clearance Officer:* Ms. Angela James.

Requests for copies of the information collection proposal should be sent to Ms. James at [whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil](mailto:whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil).

Dated: June 5, 2019.

**Aaron T. Siegel,**

*Alternate OSD Federal Register Liaison Officer, Department of Defense.*

[FR Doc. 2019-12119 Filed 6-7-19; 8:45 am]

**BILLING CODE 5001-06-P**

**From:** Christopher Smith (MDA)  
**To:**  
**Subject:** MDA Letter for the Long Range Discrimination Radar  
**Date:** Tuesday, April 7, 2020  
**Attachments:** LRDR-StakeholderLetter\_20200406.pdf

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Dear [Sir/Madam],

Hello. I'm the Missile Defense Agency environmental lead for the Environmental Impact Statement (EIS) for the Long Range Discrimination Radar (LRDR) operations at Clear Air Force Station and the Environmental Assessment (EA) necessary for functionality testing the radar before normal operations begin.

You are receiving the attached letter as an interested party/stakeholder in the proposed LRDR actions. This letter explains design revisions to the proposed restricted airspace and provides a status on the EA and EIS.

The EA analyzes the environmental impacts for proposed testing and supports a request to the Federal Aviation Administration (FAA) for "temporary airspace restrictions." Testing is proposed to begin this summer. The EIS is on schedule to support the revised Aeronautical Proposal submitted to the FAA for Special Use Airspace for radar operation in 2021.

Your input is important and we invite you to comment on the attached letter and diagram by May 1, 2020. You will also have an opportunity to comment on the Proposed Final EA for testing before it is finalized in May of this year.

If you have questions, please contact me at [christopher.smith@mda.mil](mailto:christopher.smith@mda.mil).

v/r.  
Chris Smith, PE  
MDA Environmental (MSR)  
Redstone Arsenal, AL 35898  
256.450.2691 (O)



**DEPARTMENT OF DEFENSE**  
**MISSILE DEFENSE AGENCY**  
5700 18<sup>TH</sup> STREET  
FORT BELVOIR, VIRGINIA 22060-5573

MSR

April 6, 2020

[Name]  
[Title (as applicable)]  
[Name of Organization (as applicable)]  
[City, State ZIP Code]

Dear Mr./Ms./Dr./Colonel Last Name:

The MDA is continuing to work on delivering the congressionally mandated Long Range Discrimination Radar (LRDR) as described in the Fiscal Year 2014 and 2016 National Defense Authorization Acts. The LRDR would enhance homeland defense against long-range missile threats. The MDA selected Clear Air Force Station (CAFS), Alaska as the location for LRDR in 2016, after completing an Environmental Assessment (EA) and Finding of No Significant Impact.

As we continue with CAFS site construction, we have also made significant progress with the LRDR Operational Environmental Impact Statement (EIS), addressing LRDR permanent operations, and a plan for phased functionality testing.

The MDA published a Notice of Intent to prepare the LRDR Operational EIS on May 17, 2019 in the Federal Register (FR) (84 FR 96, pages 22479-22480). The EIS will evaluate the potential environmental impacts associated with high-power operation of the LRDR. The EIS will also evaluate the potential environmental impacts of establishing additional Special Use Airspace (SUA) near CAFS, where the level of high-intensity radiated fields (HIRF) emitted during LRDR operation would exceed Federal Aviation Administration (FAA) certification standards for aircraft electrical and electronic systems. The Draft EIS is scheduled for public review and comment in the August 2020 timeframe, with a tentative completion date for the Final EIS and Record of Decision in summer of 2021. The MDA presented its initial draft design for the additional SUA at the EIS public scoping meetings in June 2019. Information about the scoping meetings may be found at [https://www.mda.mil/news/lrdr\\_eis.html](https://www.mda.mil/news/lrdr_eis.html).

We received valuable comments from the public and stakeholder groups regarding how the proposed SUA would impact the flying public. In collaboration with the FAA, the MDA used feedback to redesign the SUA and submitted a new, redesigned, SUA proposal to the FAA in October 2019. We believe the redesigned SUA proposal addresses most of the comments received.

In the redesigned proposal (see attachment), portions of the SUA outer boundaries were adjusted to reduce impacts to Visual Flight Rule flights, and vertical changes were also made to accommodate access to Clear Airport. The attached figure highlights differences between the initial draft SUA design and MDA's redesigned proposal.

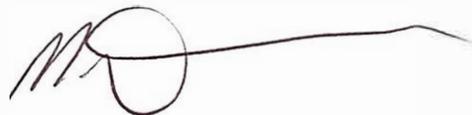
For the LRDR to become fully operational, functionality testing is required to ensure the LRDR functions according to design requirements and meets operational needs. Once functionality testing is complete, the LRDR will be integrated into the Missile Defense System. To prepare for functionality testing, the MDA is preparing an EA to evaluate potential environmental impacts associated with phased/limited high-power testing of the LRDR. The EA will also evaluate the potential impacts of introducing flight restrictions, from 4:00 p.m. to 8:00 a.m. Alaska Standard Time (or Alaska Daylight Time after daylight savings begins) during the testing period, in airspace outside the existing CAFS SUA (Restricted Area R-2206) to segregate aircraft from excessive LRDR-generated HIRF. The proposed airspace restrictions for the functionality testing would have the same volume and boundaries as the proposed SUA for LRDR permanent operations. The only differences would be the internal boundaries and time of operation. You will have an opportunity to comment on the EA before it is finalized in early to mid-May of this year.

Because both LRDR testing and operational phases involve FAA actions to protect aircraft from the associated HIRF hazard, the FAA is cooperating with the MDA to ensure the FAA would be able to adopt the EA and EIS to meet its environmental obligations for those actions. The MDA expects FAA's SUA rulemaking schedule to closely track the LRDR EIS schedule.

The MDA encourages you to review the enclosed information and provide any input by May 1, 2020 on issues related to the potential impacts to aviation activities or any environmental resource from the proposed airspace restrictions necessary for test and operation of LRDR. You will also have additional opportunities to comment during the EA, EIS and FAA rulemaking public comment periods.

Please send your comments or questions to Chris Smith, MDA LRDR Environmental Lead at [christopher.smith@mda.mil](mailto:christopher.smith@mda.mil) or mail to Missile Defense Agency/Directorate (FDOE), Attn: Chris Smith, Bldg. 5224 Martin Road, Redstone Arsenal, AL 35898. Your input is sincerely appreciated. Please contact Mr. Smith if you have any questions or would like additional information.

Sincerely,

A handwritten signature in dark ink, appearing to read 'M. Parent', with a long horizontal line extending to the right.

MICHAEL N. PARENT  
Colonel, USA  
Program Manager, Persistent Discrimination  
Radars

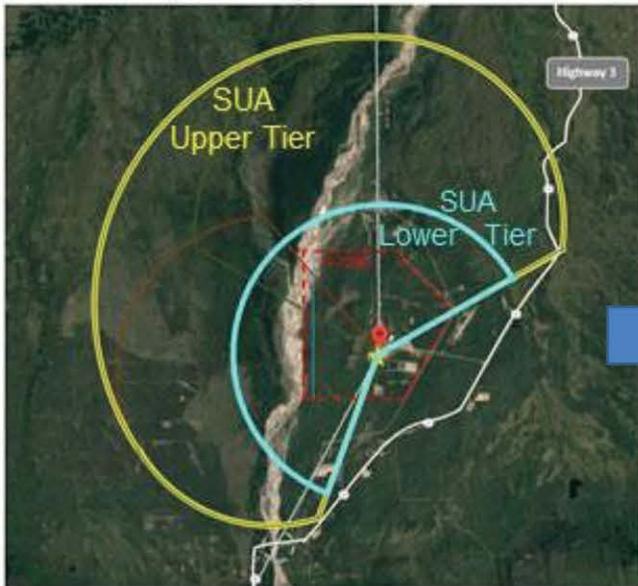
Attachment:  
As stated



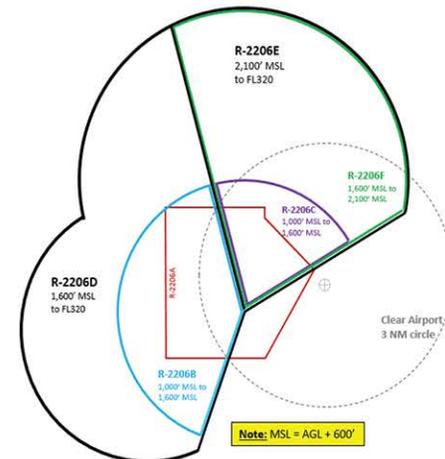
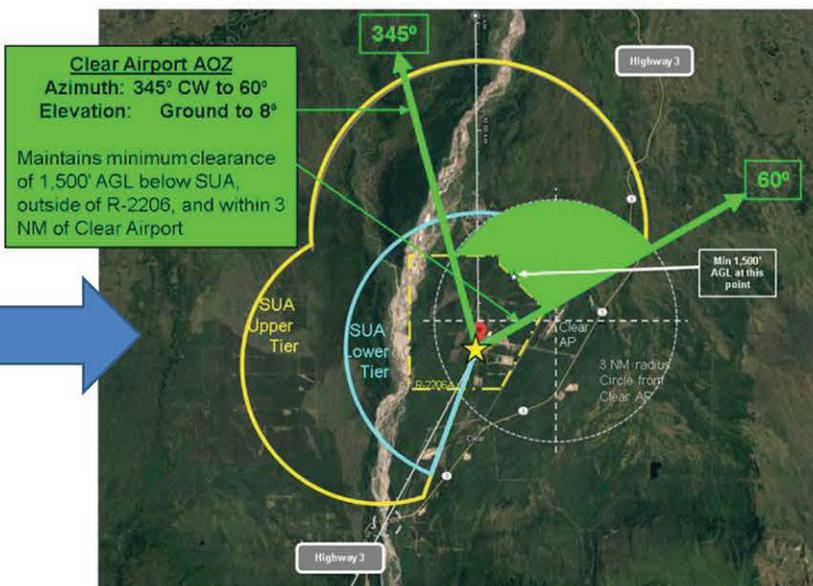
# LONG RANGE DISCRIMINATION RADAR SPECIAL USE AIRSPACE

## REVISED SUA PROPOSAL (OCTOBER 19)

Draft SUA Proposal (June 2019)



Revised Draft SUA Proposal (October 2019)

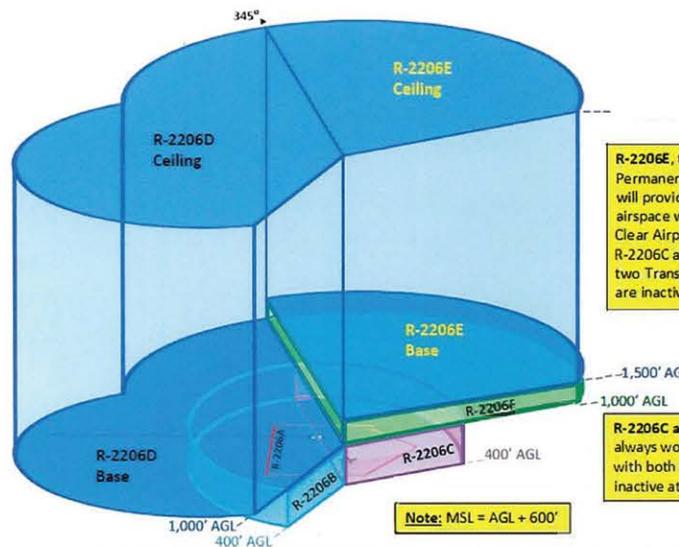


**ACRONYM KEY**

- AFS: Air Force Station
- AGL: Above Ground Level
- AOZ: Aircraft Operating Zone
- LRDR: Long Range Discrimination Radar
- MSL: Mean Sea Level
- SUA: Special Use Airspace

### Highlights of Changes to SUA Proposal

- June SUA proposal provided rough airspace architecture
- Following discussions with the FAA and numerous pilot organizations and completion of the EIS scoping meetings, revised SUA design was developed
- Allows for full operation of the LRDR
- Proposal maintains existing restricted airspace at CAFS (R-2206) and supplements with five new airspace segments
  - Provides flexibility to adapt the SUA to meet LRDR operational requirements
  - Maximizes navigable airspace around CAFS
  - R-2206C and R-2206F will be required only in specified situations – MDA and FAA are coordinating requirements
  - Environmental Assessment underway to support a limited test program starting next summer



R-2206E, the Upper Permanent North section, will provide 1,500' AGL airspace within 3 NM of Clear Airport when R-2206C and R-2206F (the two Transitory sections) are inactive.

R-2206C and R-2206F will always work in tandem, with both either active or inactive at the same time

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# **Appendix C: Airspace Management – Supporting Documentation and Methodology**

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## 1.0 Study Area

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The airspace analysis study area for this Environmental Impact Statement (EIS) is shown in **Figure 1-1**. Although the study area extends between Anchorage and Deadhorse, Alaska, the majority of changes to airspace resulting from the Proposed Action would occur between Fairbanks International Airport and Talkeetna Airport. This analysis focuses on those airspaces, airspace users, and airspace management considerations that may be affected by the Proposed Action.

### 1.1 Restricted Areas

The proposed Restricted Areas would be located south of Nenana. Boundaries for the proposed Restricted Areas are described below.

#### **R-2206A Clear, Alaska (AK) – Modified (R-2206)**

**Beginning at latitude (lat.)** 64° 19' 44" N., longitude (long.) 149° 15' 42" W.; to lat. 64° 19' 44" N., long. 149° 10' 18" W.; thence south, 100 feet west of and parallel to the Alaska Railroad to lat. 64° 16' 17" N., long. 149° 10' 14" W.; to lat. 64° 16' 17" N., long. 149° 15' 42" W.; to the point of beginning.

**Altitudes:** Surface to 8,800 feet mean sea level (MSL).

**Time of designation:** Continuous.

**Controlling agency:** Federal Aviation Administration (FAA), Anchorage Air Route Traffic Control Center (ARTCC).

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206B Clear, AK – New**

**Beginning at** lat. 64° 20' 13" N., long. 149° 13' 12" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; to lat. 64° 14' 31" N., long. 149° 13' 43" W.; thence clockwise along a 3.0 nautical mile (NM) arc radius centered at lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to the point of beginning; excluding that portion wholly contained in R-2206A.

**Altitudes:** from 1,000 feet MSL to but not including 1,600 feet MSL.

**Time of designation:** Continuous.

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206C Clear, AK – New**

**Beginning at** lat. 64° 19' 27" N., long. 149° 20' 22" W.; thence clockwise along a 4.0 NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 23' 56" N., long. 149° 15' 30" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; lat. 64° 14' 10" N., long. 149° 14' 01" W.; thence along a 3.0 NM arc radius centered at lat. 64° 16' 55" N., long. 149° 16' 41" W.; to the point of beginning; excluding that portion wholly contained in R-2206A.

**Altitudes:** from 1,600 feet MSL to 32,000 feet MSL.

**Time of designation:** Continuous.

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206D Clear, AK – New**

**Beginning at** lat. 64° 20' 13" N., long. 149° 13' 12" W.; thence clockwise along a 3.0 NM arc radius centered at lat. 64° 17' 20" N., long. 149° 11' 25" W.; to lat. 64° 18' 47" N., long. 149° 05' 23" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding that portion wholly contained in R-2206A.

**Altitudes:** from 1,000 feet MSL to but not including 1,600 feet MSL.

**Time of designation:** 0200 to 0400 local time, Tuesday, Thursday, and Saturday; other times by Notice to Airmen (NOTAM).

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206E Clear, AK – New**

**Beginning at** lat. 64° 23' 56" N., long. 149° 15' 30" W.; thence clockwise along a 4.0 NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding that portion wholly contained in R-2206A.

**Altitudes:** from 1,600 feet MSL to but not including 2,100 feet MSL.

**Time of designation:** 0200 to 0400 local time, Tuesday, Thursday, and Saturday; other times by NOTAM.

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206F Clear, AK – New**

**Beginning at** lat. 64° 22' 07" N., long. 149° 03' 09" W.; thence clockwise along the 4 NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 19' 19" N., 149° 03' 07" W.; to lat. 64° 19' 36" N., 149° 03' 18" W.; thence north, along a path 1/2 NM west of Highway 3, Parks Highway; to lat. 64° 21' 42" N., long. 149° 03' 37" W.; to the point of beginning.

**Altitudes:** 2,100 feet MSL to 3,200 feet MSL.

**Time of designation:** 0200 to 0400 local time Tuesday, Thursday, and Saturday; other times by NOTAM.

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

#### **R-2206G Clear, AK – New**

**Beginning at** lat. 64° 23' 56" N., long. 149° 15' 30" W.; thence clockwise along a 4.0 NM arc radius centered at lat. 64° 20' 22" N., long. 149° 11' 25" W.; to lat. 64° 19' 29" N., long. 149° 02' 27" W.; to lat. 64° 17' 20" N., long. 149° 11' 25" W.; thence to point of beginning; excluding (1) that portion wholly contained in R-2206A; (2) that portion wholly contained in R-2206F.

**Altitudes:** from 2,100 feet MSL to 32,000 feet MSL.

**Time of designation:** Continuous.

**Controlling agency:** FAA, Anchorage ARTCC.

**Using agency:** Commander 13th Missile Warning Squadron, Clear, AK.

## **1.2 Temporary Flight Restrictions**

The boundaries of the temporary flight restrictions (TFRs) would be the same as defined for the proposed Restricted Areas above, with the exception that for the TFR corresponding to proposed R-2206F, the boundary “along a path 0.5 NM west of Highway 3, Parks Highway” would be defined with points of latitude and longitude. Pursuant to 14 Code of Federal Regulations § 99.7, Special Security Instructions, during the interim phase, if needed, all aircraft flight operations would be prohibited within the areas defined below. These restrictions would exclude that portion of airspace wholly contained in existing R-2206 when active and would be continuous (i.e., in effect 24 hours per day, 7 days per week) while the TFRs are in effect.

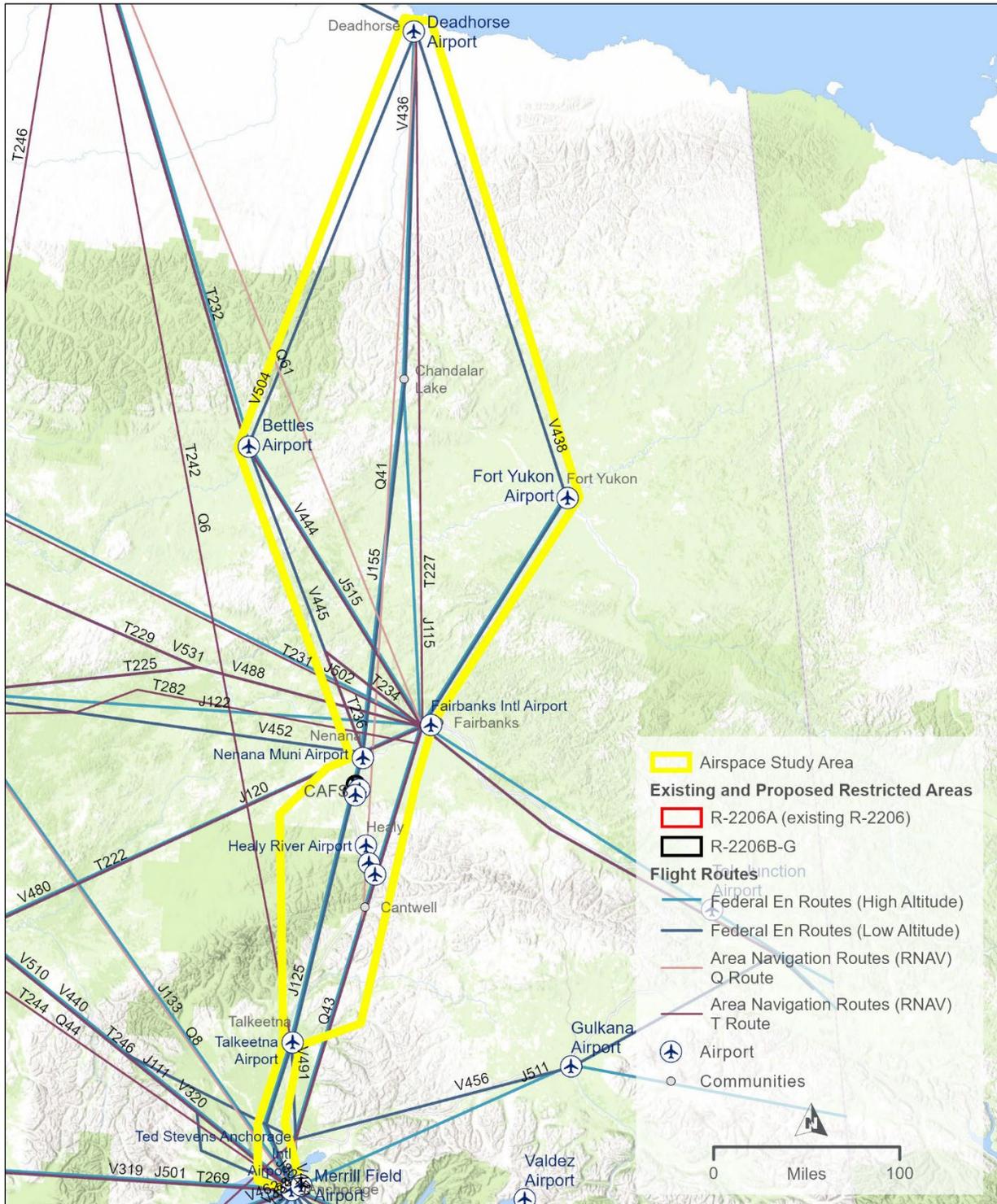
- 642013N1491312W (ENN173015.7) TO 641720N1491125W (ENN169018.4) TO 641431N1491343W (ENN170021.4) THEN CLOCKWISE ON A 3 NM ARC CENTERED ON 641720N1491125W (ENN169018.4) TO THE POINT OF ORIGIN. **Altitudes:** 1000FT MSL–1599FT MSL.

- 641927N1492022W (ENN183017.4) THEN CLOCKWISE ON A 4 NM ARC CENTERED ON 642022N1491125W (ENN170015.4) TO 642356N1491530W (ENN182012.5) TO 641720N1491125W (ENN169018.4) TO 641410N1491401W (ENN170021.7) THEN CLOCKWISE ON A 3 NM ARC CENTERED ON 641655N1491641W (ENN175019.3) TO THE POINT OF ORIGIN. **Altitudes:** 1600FT MSL–FL320.
- 642356N1491530W (ENN182012.5) THEN CLOCKWISE ON A 4 NM ARC CENTERED ON 642022N1491125W (ENN170015.4) TO 641929N1490227W (ENN156016) TO 641720N1491125W (ENN169018.4) TO THE POINT OF ORIGIN, **Altitudes:** 2100FT MSL–FL320; EXCLUDING AN AREA DEFINED AS 642207N1490309W (ENN157013.3) THEN CLOCKWISE ON A 4 NM ARC CENTERED ON 642022N1491125W (ENN170015.4) TO 641929N1490227W (ENN156016) TO 641919N1490307W (ENN157016.1) TO 641936N1490318W (ENN156015.5) TO 642049N1490344W (ENN158014.6) TO 642142N1490337W (ENN158014) TO THE POINT OF ORIGIN, **Altitudes:** 2100FT MSL–3200FT MSL.

The following restrictions would apply Tuesdays, Thursdays, and Saturdays from 2:00 a.m. to 4:00 a.m. local Alaska time while the TFRs are in effect.

- 642013N1491312W (ENN173015.7) THEN CLOCKWISE ON A 3 NM ARC CENTERED ON 641720N1491125W (ENN169018.4) TO 641847N1490523W (ENN160016.6) TO 641720N1491125W (ENN169018.4) TO THE POINT OF ORIGIN. **Altitudes:** 1000FT MSL–1599FT MSL.
- 642356N1491530W (ENN182012.5) THEN CLOCKWISE ON A 4 NM ARC CENTERED ON 642022N1491125W (ENN170015.4) TO 641929N1490227W (ENN156016) TO 641720N1491125W (ENN169018.4) TO THE POINT OF ORIGIN. **Altitudes:** 1600FT MSL–2099FT MSL.
- 642207N1490309W (ENN157013.3) THEN CLOCKWISE ON A 4 NM ARC CENTERED ON 642022N1491125W (ENN170015.4) TO 641929N1490227W (ENN156016) TO 641919N1490307W (ENN157016.1) TO 641936N1490318W (ENN156015.5) TO 642049N1490344W (ENN158014.6) TO 642142N1490337W (ENN158014) TO THE POINT OF ORIGIN. **Altitudes:** 2100FT MSL–3200FT MSL.

**Figure 1-1. Airspace Analysis Study Area**

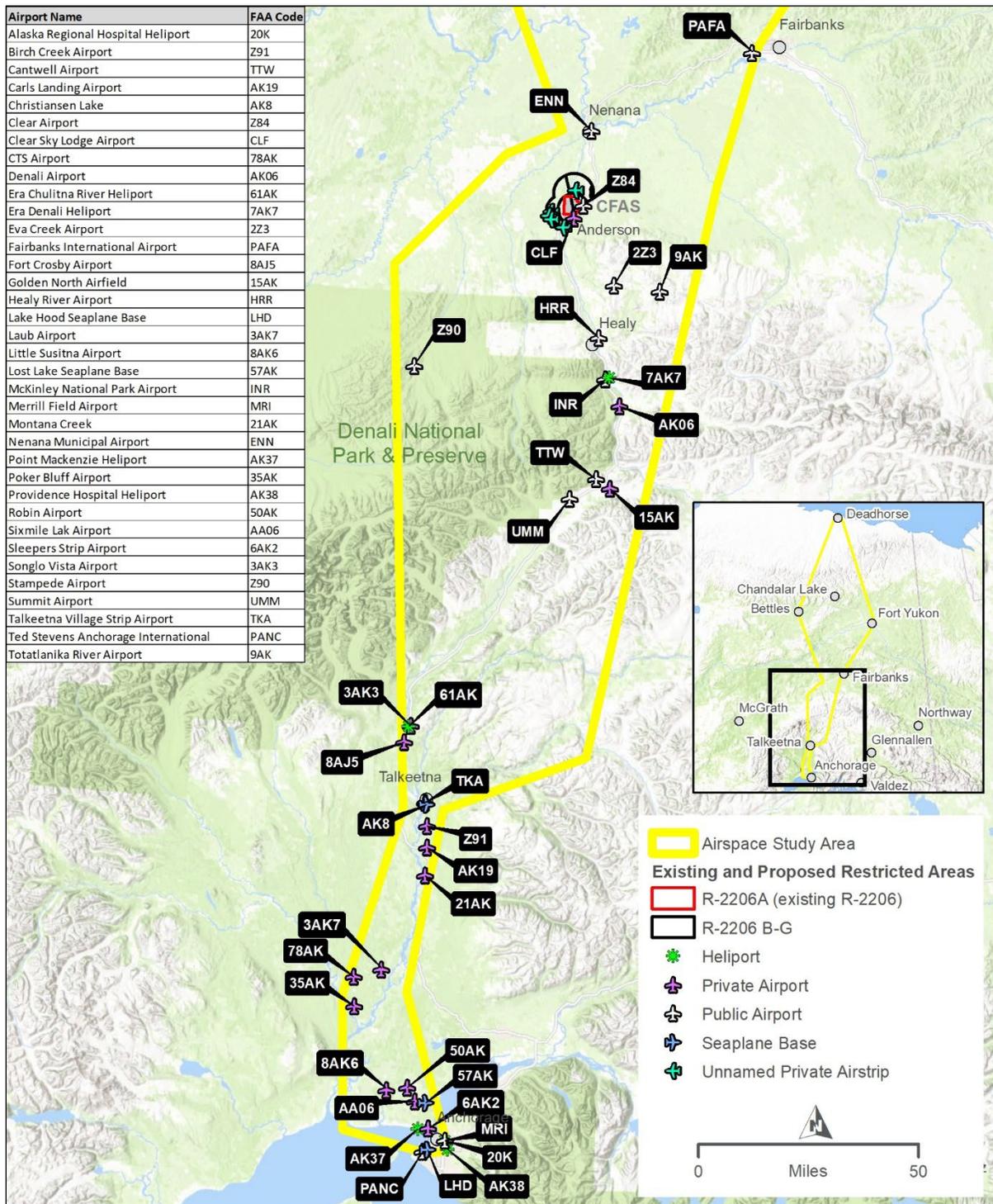


## 2.0 Operational Airports, Heliports, and Seaplane Bases

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**Table 2-1** provides information regarding airport facilities within the portion of the study area between Fairbanks and Anchorage. Airports within the study area between Fairbanks and Deadhorse airport are not considered because they would not be impacted by the Proposed Action. The study area south of Fairbanks International Airport encompasses 35 airports (21 private and 14 public) including chartered airports, heliports, and seaplane bases. These airports within the study area were identified using publicly available online airport databases (e.g., VFRmap.com, AirNav.com, and SkyNav.com). These airports are shown on **Figure 2-1**. Also shown on **Figure 2-1** are six privately owned airstrips located near Clear Air Force Station (CAFS). The presence of private airstrips was identified in comments received during the public scoping period and confirmed during a review of Google Earth visual imagery of the land areas surrounding CAFS that would be overlain by the proposed Restricted Areas.

**Figure 2-1. Airports, Heliports, Seaplane Bases, and Airstrips within the Airspace Study Area**



**Table 2-1. Operational Airports, Heliports, and Seaplane Bases within the Study Area**

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Fairbanks International Airport (PAFA) <i>Fairbanks, Alaska</i>	<p><i>Airspace:</i> Class D (surface to 2,900 feet MSL with 5.4-mile radius)  <i>Based Aircraft:</i> 569  <i>Runways/Approaches:</i> RWY-2L, RWY-2R, RWY-22L, RWY-22R, RWY-2/20, RWY-2W/20W. Three published Standard Terminal Arrival approaches, six published HI-ILS or Local runway approaches, six Area Navigation (RNAV) approaches, one VOR/TACAN approach. Special alternate minimums apply to avoid surface obstacles; five published departure procedures.  <i>Services:</i> Continuously attended; fuel, hangars (parking), major airframe and power plant services, bulk oxygen.  <i>Controlling Agency:</i> Fairbanks TRACON</p>	<p><b>113,880 total operations:</b></p> <ul style="list-style-type: none"> <li>• 33% transient general aviation</li> <li>• 30% local general aviation</li> <li>• 24% air taxi</li> <li>• 10% commercial</li> <li>• 3% military</li> </ul>	Public
Chena Marina Airport (AK28) <i>Fairbanks, Alaska</i>	<p><i>Airspace:</i> Underlies Class D airspace of Fairbanks International Airport.  <i>Based Aircraft:</i> 156  <i>Runways/Approaches:</i> RWY 18, RWY 36, RWW 18W, RWY 36W; No published procedures.  <i>Services:</i> 100 LL fuel available; parking by permission only; floatpond use by members only; all landings at your own risk.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	None reported.	Private
Nenana Municipal Airport (ENN) <i>Nenana, Alaska</i>	<p><i>Airspace:</i> Class E; airspace upward from 700 feet AGL with a 6.5-mile radius of the airport, and within 3 miles each side of the 249 bearing of the Ice Pool NDB, extending from the 6.5-mile radius to 10.3 miles southwest of the airport.  <i>Based Aircraft:</i> 15  <i>Runways/Approaches:</i> RWY-4L, RWY-4R, RWY-22L, RWY-22R. One RNAV (GPS) and one NDB RWY-4L approach published.  <u>RNAV (GPS) RWY-4L:</u> Missed approach climbing right turn to 3,000 feet MSL and hold (west of airfield).  <u>NDB RWY-4L:</u> Missed approach climbing right turn to 3,200 feet and hold (west of airfield).  <i>Services:</i> Untowered, attended (Monday through Friday 0800 to 1700), publicly accessible airport. Fuel and parking tiedowns provided; no other services.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>5,980 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 42% air taxi</li> <li>▪ 33% transient general aviation</li> <li>▪ 25% local general aviation</li> </ul>	Public

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
<p>Stampede Airport (Z90) Kantishna, Alaska Denali National Park</p>	<p><i>Airspace:</i> Class G <i>Based Aircraft:</i> 0 <i>Runways/Approaches:</i> RWY-15, RWY-33; no published procedures. Remarks indicate business/commercial use is prohibited. Private helicopter use is prohibited except in cases of emergency. <i>Services:</i> Untowered, unattended; no services. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>30 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 37% transient general aviation</li> <li>▪ 63% air taxi</li> </ul>	<p>Public</p>
<p>Healy River Airport (HRR) Healy River, Alaska</p>	<p><i>Airspace:</i> Class G <i>Based Aircraft:</i> 6 <i>Runways/Approaches:</i> Two published – RNAV (GPS)-RWY-115, RNAV (GPS)-A. One published Obstacle Approach/Departure Procedure for RWY-15/RWY-33. 30 NM straight-in TAA encompassing the CAFS area and existing R-2206. <u>RNAV (GPS) RWY 15:</u> Missed approach climbing right turn up 5,700 feet MSL and hold. Missed approach requires minimum altitude climb of 325 feet per NM up to 3,900 feet MSL. Procedure constraints: Procedures not applicable at night. Aircraft must instead use McKinley Park altimeter setting when not received. RWY-15 helicopter visibility reduction below 1 SM not applicable. <u>RNAV (GPS)-A:</u> Missed approach climb to 5,700 feet MSL direct and hold. Same procedure constraints as RWY-15. <u>Obstacle RWY-15/RWY-33:</u> Special procedures for approach and takeoff minimum altitudes to avoid surface obstacles. <i>Services:</i> Untowered, unattended. Parking tiedowns provided; no other services provided. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>1,300 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 38% transient general aviation</li> <li>▪ 38% air taxi</li> <li>▪ 23% local general aviation</li> </ul>	<p>Public</p>
<p>Era Denali Heliport (7AK7) Healy, Alaska</p>	<p><i>Airspace:</i> Class E <i>Based Aircraft:</i> 4 <i>Runways/Approaches:</i> Helipads H1, H2, H3, and H4; RWYS H2 H3 and H4 Approach R-290, Depart R-110. Remain below 300 FT AGL within ½ mile <i>Services:</i> Untowered, May through September (0800–1800h); no services provided. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p>None reported.</p>	<p>Private</p>

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Clear Airport (Z84) <i>Clear, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 1  <i>Runways/Approaches:</i> RWY-1, RWY-19; no published procedures. Taxiway is closed during winter.  <i>Services:</i> Untowered, unattended publicly accessible airport; also used by local military, as needed. Parking tiedowns; no other services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>100 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 100% transient general aviation</li> </ul>	Public
Clear Sky Lodge Airport (CLF) <i>Clear, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 2 fixed-wing  <i>Runways/Approaches:</i> RWY-2 and RWY-20 with 10-degree dogleg; rutted and unmaintained for fixed-wing operations. Rotary wing operations unspecified.  <i>Services:</i> Untowered, unattended publicly accessible airport; remarks indicate that the airfield is not safe for aircraft operations. No services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	None reported.	Privately owned, accessible to the public <sup>(4)</sup>
McKinley National Park Airport (INR) <i>McKinley Park, Alaska</i> <i>McKinley National Park</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 7  <i>Runways/Approaches:</i> No published procedures. Remarks indicate no overrun at either runway end. Canyons south and west of airport are subject to strong downdrafts. All traffic patterns are east of the airfield due to terrain clearance.  <i>Services:</i> Untowered, unattended; commercial or business use is prohibited except in emergency. No services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>3,172 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 53% transient general aviation</li> <li>▪ 31% air taxi</li> <li>▪ 16% local general aviation</li> </ul>	Public
Denali Airport (AK06) <i>McKinley Park, Alaska</i> <i>McKinley National Park</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 13 (9 in summer; 4 in winter)  <i>Runways/Approaches:</i> RWY-12, RWY-30; no published procedures.  <i>Services:</i> Untowered, unattended. No services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>2,184 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 91% air taxi</li> <li>▪ 5% transient general aviation</li> <li>▪ 5% local general aviation</li> </ul>	Private

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Eva Creek Airport (2Z3) <i>Eva Creek, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 0  <i>Runways/Approaches:</i> RWY-8, RWY-26; no published procedures. Remarks indicated severe turbulence at all times; terrain drops sharply on east side of the runway.  <i>Services:</i> Untowered, unattended, publicly accessible airport; used only as an emergency field. No services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	None reported.	Public
Totatlanika River Airport (9AK) <i>Totatlanika River, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 0  <i>Runways/Approaches:</i> RWY-7, RWY-25; no published procedures. Remarks indicate runway is located on top of a hill with rises and falls as high as 50 feet; severe turbulence at all times; runway slopes downhill from west to east; users must approach and land on RWY-25 and depart on RWY-7.  <i>Services:</i> Untowered, unattended. No services provided.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	None reported.	Public
Cantwell Airport (TTW) <i>Cantwell, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 3  <i>Runways/Approaches:</i> RWY-4, RWY-22; no published procedures.  <i>Services:</i> Unattended, no tower, no services.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>2,340 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 64% transient general aviation</li> <li>▪ 21% military</li> <li>▪ 9% air taxi</li> <li>▪ 6% local general aviation</li> </ul>	Public
Golden North Airfield Airport (15AK) <i>Cantwell, Alaska</i>	<p><i>Airspace:</i> Class G  <i>Based Aircraft:</i> 3  <i>Runways/Approaches:</i> RWY-2, RWY-20; no published procedures.  <i>Services:</i> Untowered, unattended, no services.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>120 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 83% transient general aviation</li> <li>▪ 17% local general aviation</li> </ul>	Private
Point MacKenzie Heliport (AK37) <i>Point MacKenzie, Alaska</i>	<p><i>Airspace:</i> Underlies Class D airspace of Ted Stevens Anchorage International Airport.  <i>Based Aircraft:</i> No information  <i>Runways/Approaches:</i> Helipad H1; no published procedures.  <i>Services:</i> Untowered, unattended, no services.  <i>Controlling Agency:</i> Anchorage ARTCC</p>	None reported.	Private

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Robin Airport (50AK) <i>Point MacKenzie, Alaska</i>	<i>Airspace: Class G Based Aircraft: 3 Runways/Approaches: RWY-16, RWY-34; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Sleepers Strip Airport (6AK2) <i>Point MacKenzie, Alaska</i>	<i>Airspace: Underlies Class D airspace of Ted Stevens Anchorage International Airport Based Aircraft: 0 Runways/Approaches: RWY-6, RWY-24; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	<b>110 total operations:</b> <ul style="list-style-type: none"> <li>▪ 91% air taxi</li> <li>▪ 9% transient general aviation</li> </ul>	Private
Summit Airport (UMM) <i>Summit, Alaska</i>	<i>Airspace: Class G Based Aircraft: 0 Runways/Approaches: RWY-3, RWY-20; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	<b>1,040 total operations:</b> <ul style="list-style-type: none"> <li>▪ 38% local general aviation</li> <li>▪ 38% air taxi</li> <li>▪ 24% transient general aviation</li> <li>▪ &lt;1% military</li> </ul>	Public
Little Susitna Airport (8AK6) <i>Susitna Station, Alaska</i>	<i>Airspace: Class G Based Aircraft: 1 Runways/Approaches: RWY-16, RWY-34; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	<b>110 total operations:</b> <ul style="list-style-type: none"> <li>▪ 91% transient general aviation</li> <li>▪ 9% air taxi</li> </ul>	Private
Montana Creek (21AK) <i>Talkeetna, Alaska</i>	<i>Airspace: Class E Based Aircraft: 0 Runways/Approaches: RWY-16, RWY-34; no published procedures. Services: Untowered, continuously attended. Bulk and bottled oxygen. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Talkeetna Village Strip Airport (AK44) <i>Talkeetna, Alaska</i>	<i>Airspace: Class G Based Aircraft: 7 Runways/Approaches: RWY-16, RWY-34; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	<b>6,968 total operations:</b> <ul style="list-style-type: none"> <li>▪ 50% local general aviation</li> <li>▪ 29% transient general aviation</li> <li>▪ 21% air taxi</li> </ul>	Private

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Christiansen Lake Talkeetna (AK8) <i>Talkeetna, Alaska</i>	<i>Airspace: Class E Based Aircraft: 20 Runways/Approaches: RWY-14W, RWY-32W, RWY 4W, RWY-22W; remarks indicate all traffic remains east of the SBP over the lake. Services: Untowered, continuously attended; fuel services. Controlling Agency: Anchorage ARTCC</i>	<b>828 total operations:</b> <ul style="list-style-type: none"> <li>▪ 60% local general aviation</li> <li>▪ 36% air taxi</li> <li>▪ 4% transient general aviation</li> </ul>	Public
Carl's Landing Airport (AK19) <i>Talkeetna, Alaska</i>	<i>Airspace: Class G Based Aircraft: 5 Runways/Approaches: RWY-16, RWY-34; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Songlo Vista Airport (3AK3) <i>Talkeetna, Alaska</i>	<i>Airspace: Class G Based Aircraft: 1 Runways/Approaches: RWY NE, RWY SW, RWY NW, RWY-SE; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Era Chulitna River Heliport (61AK) <i>Trapper Creek/Talkeetna, Alaska</i>	<i>Airspace: Class E Based Aircraft: 2 Runways/Approaches: Helipads H1 and H2; no published procedures. Services: Untowered, attended May through September 0800–2000h; no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Fort Crosby Airport (8AK5) <i>Trapper Creek/Talkeetna, Alaska</i>	<i>Airspace: Class G Based Aircraft: 4 Runways/Approaches: RWY-18, RWY-36; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Laub Airport (3AK7) <i>Willow, Alaska</i>	<i>Airspace: Class G Based Aircraft: 1 Runways/Approaches: RWY-18, RWY-36; no published procedures. Services: Untowered, unattended, no services. Controlling Agency: Anchorage ARTCC</i>	None reported.	Private

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Poker Bluff Airport (35AK) <i>Willow, Alaska</i>	<i>Airspace: Class G</i> <i>Based Aircraft: No information</i> <i>Runways/Approaches: RWY-9, RWY-27; no published procedures.</i> <i>Services: Untowered, unattended, no services.</i> <i>Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
CTS Airport (78AK) <i>Willow, Alaska</i>	<i>Airspace: Class G</i> <i>Based Aircraft: No information</i> <i>Runways/Approaches: RWY-9, RWY-27; no published procedures.</i> <i>Services: Untowered, unattended, no services.</i> <i>Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Lost Lake Seaplane Base (57AK) <i>Wasilla, Alaska</i>	<i>Airspace: Underlies Class D airspace of Ted Stevens Anchorage International Airport</i> <i>Based Aircraft: 1</i> <i>Runways/Approaches: RWY NE, RWY SW, RWY NW, RWY-SE; no published procedures.</i> <i>Services: Untowered, unattended, no services.</i> <i>Controlling Agency: Anchorage ARTCC</i>	None reported.	Private
Lake Hood Seaplane Base (LHD) <i>Anchorage, Alaska</i>	<i>Airspace: Class E</i> <i>Based Aircraft: 1,032</i> <i>Runways/Approaches: RWY-14, RWY-32, RWY E, RWY-W, RWY-N, RWY S, RWY NW, RWY-SE; no published procedures.</i> <i>Services: Untowered, continuously attended. Fuel, parking hangars and tie-downs, major airframe and power plant services, bottled and bulk oxygen.</i> <i>Controlling Agency: Anchorage ARTCC</i>	<b>74,095 total operations:</b> <ul style="list-style-type: none"> <li>▪ 60% transient general aviation</li> <li>▪ 25% air taxi</li> <li>▪ 15% local general aviation</li> <li>▪ &lt;1% commercial</li> <li>▪ &lt;1% military</li> </ul>	Public

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
<p>Ted Stevens Anchorage International Airport (PANC) <i>Anchorage, Alaska</i></p>	<p><i>Airspace:</i> Class C (surface up to 4,100 feet MSL within 5.2-mile radius of Anchorage ARTCC tower; and upward from 1,400 feet MSL to and including 4,100 feet within a 10-mile radius of the tower east and north of the tower as specified in the FAA Order JO 7400.11E. <i>Based Aircraft:</i> 109 <i>Runways/Approaches:</i> RWY-7R, RWY-25L, RWY-15, RWY-33, RWY-7L/25R. Eight published Standard Terminal Arrival procedures; Six ILS or local instrument approaches, five RNAV approaches, two visual approaches, six published departure procedures. Special take-off minimum altitudes apply to avoid surface obstacles. <i>Services:</i> Towered, continuously attended. Fuel, parking (hangars and tiedowns), major airframe and power plant services available, bottled oxygen (high/low), and bulk oxygen (high/low) available. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>261,705 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 38% commercial</li> <li>▪ 29% air taxi</li> <li>▪ 29% transient general aviation</li> <li>▪ 3% local general aviation</li> <li>▪ &lt;1% military</li> </ul>	<p>Public</p>
<p>Birch Creek Airport (Z91) <i>Birch Creek, Alaska</i></p>	<p><i>Airspace:</i> Class G <i>Based Aircraft:</i> 1 <i>Runways/Approaches:</i> RWY-16, RWY-34; no published procedures. <i>Services:</i> Untowered, unattended, parking and tiedowns. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p><b>504 total operations:</b></p> <ul style="list-style-type: none"> <li>▪ 100% air taxi</li> </ul>	<p>Private</p>
<p>Sixmile Lake Airport (AA06) <i>Anchorage, Alaska</i></p>	<p><i>Airspace:</i> Underlies Class D airspace of Ted Stevens Anchorage International Airport <i>Based Aircraft:</i> 1 <i>Runways/Approaches:</i> RWY-6, RWY-24; no published procedures. <i>Services:</i> Untowered, unattended, no services provided. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p>None reported.</p>	<p>Private</p>
<p>Providence Hospital Heliport (AK38) <i>Anchorage, Alaska</i></p>	<p><i>Airspace:</i> Underlies Class D airspace of Ted Stevens Anchorage International Airport <i>Based Aircraft:</i> 1 <i>Runways/Approaches:</i> Helipad H1 <i>Services:</i> Untowered, continuously attended, no services provided. <i>Controlling Agency:</i> Anchorage ARTCC</p>	<p>None reported.</p>	<p>Private</p>

Airport (FAA Identifier)	Description <sup>(1)(2)</sup>	Annual Operations <sup>(1)</sup>	Public/ Private <sup>(3)</sup>
Alaska Regional Hospital Heliport (20K) <i>Anchorage, Alaska</i>	<i>Airspace:</i> Underlies Class D airspace of Ted Stevens Anchorage International Airport <i>Based Aircraft:</i> No information <i>Runways/Approaches:</i> Helipad H1 <i>Services:</i> Untowered, attended Mon-Fri 0730–1700h; fuel services. <i>Controlling Agency:</i> Anchorage ARTCC	<b>100 total operations:</b> <ul style="list-style-type: none"> <li>▪ 100% air taxi</li> </ul>	Private
Merrill Field Airport (MRI) <i>Anchorage, Alaska</i>	<i>Airspace:</i> Class E <i>Based Aircraft:</i> 844 <i>Runways/Approaches:</i> RWY-7, RWY-25, RWY-16, RWY-34, RWY-5, RWY-23; Published RNAV (GPS) procedures <i>Services:</i> Towered, attended Mon-Fri 0730–1700h; fuel, hangars, tiedowns, major airframe and power plant services, bulk and bottled oxygen. <i>Controlling Agency:</i> Anchorage ARTCC	<b>126,290 total operations:</b> <ul style="list-style-type: none"> <li>▪ 53% transient general aviation</li> <li>▪ 47% local general aviation</li> <li>▪ &lt;1% air taxi</li> </ul>	Public

Sources: AirNav 2020, FAA Orders JO 7400.10B, JO 7400.11E

Notes: RWY = Runway; NDB = non-directional beacon (LF/MF radio station that transmits a carrier wave to indicate to aircraft the direction of the station).

<sup>(1)</sup> Descriptions of airport services, approaches, and operations as currently published on AirNav.com.

<sup>(2)</sup> All airspace class designations as currently published in FAA Order JO 7400.11E. Per FAA Order JO 7400.11E, where airspace was not specifically classified as A, B, C, D, or E, it was assumed to be Class G.

<sup>(3)</sup> Policy specifying applicability of exclusion zones and/or access rights for public and private airports in FAA Order JO 7400.2M, 23-1-4(b)(c).

## 3.0 Methodology for Determining Potential Effects on IFR Flights

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The following explains the methodology for determining the potential effects of the Proposed Action on instrument flight rules (IFR) flights that would be affected by the establishment of the proposed Restricted Areas or the temporary flight restrictions (TFRs), if necessary prior to charting of the Restricted Areas.

### 3.1 Data Sources

The Federal Aviation Administration's (FAA's) January 8, 2020, *Aeronautical Study* states that the average daily traffic count in the vicinity of the proposed Restricted Areas ranges from 70 operations in winter to approximately 90 operations in summer (FAA 2020f). For the purposes of analysis in this EIS, winter months were assumed to be November, December, January, and February, and summer months were assumed to be June, July, and August. Numbers of flights during the other months would fall between the highs of summer and the lows of winter.

Due to the unavailability of radar surveillance, traffic numbers for winter were derived from flight plans filed during the period of November 23 through November 26, 2019. Anchorage Air Route Traffic Control Center (ARTCC) calculated IFR flight operations numbers by drawing a line through the selected location and counting the total number of flights per day. Anchorage ARTCC then calculated the average daily total of 70 IFR flights for the November 23–26 time period.

Once the winter daily average was calculated, Anchorage ARTCC needed to account for additional tracks for summer because there is a large seasonal variation. Given the low volume of daily air traffic through the study area, it was determined that applying the seasonal growth rate for airports (e.g., ANC is 230 percent/FAI is 350 percent) would overestimate impacts and would not be reasonable to use. Using best professional judgment, Anchorage ARTCC determined that a seasonal variation of approximately 25 percent would be reasonable, and calculated an average daily count of 90 IFR flight operations for the summer months.

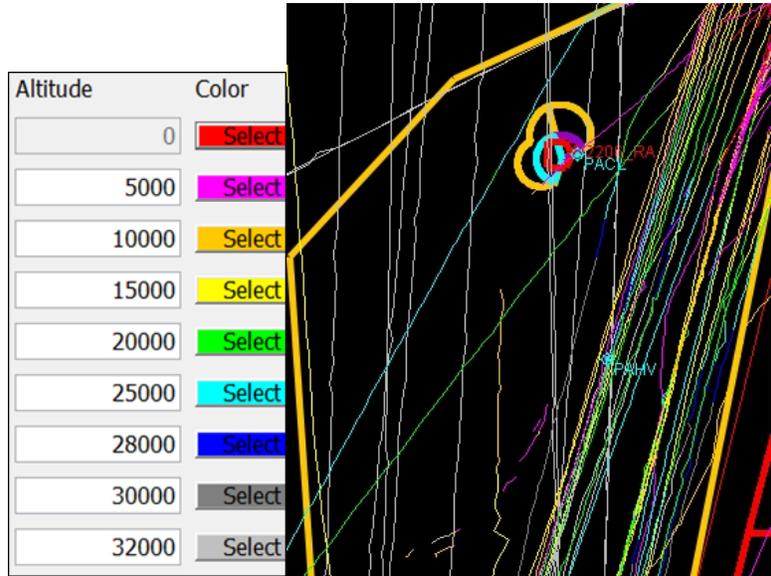
In addition, FAA provided IFR flight track data pulled for the state of Alaska over 19 days during July 2018 (FAA 2018). IFR track data were pulled using transponder beacons that were captured by radar. These data were used to assess IFR flight traffic that transected the airspace study area in the vicinity of CAFS. Further refinement was done for the available track data from July 2 through July 7, 2018. The number of flights within the study area ranged from 69 to 108, with an average of 89 operations per day. This number was rounded to 90 daily flights. This additional FAA data validated the data in the *Aeronautical Study*.

Due to gaps in coverage in radar data, the number of IFR radar tracks captured may underrepresent all IFR flights within the study area. The lower the altitude, the higher the likelihood of missed tracks because aircraft could drop off of radar and no longer be captured. The white arrows shown in **Figure 3-1** point to lower-altitude tracks that start and stop in what appear to be random locations away from any airports. Other tracks may be missed entirely.

If there has been any growth in number of flights since 2018, it is not accounted for in the estimate of 90 daily flights. However, given the low volume of air traffic through the region, and considering that the national forecast (FAA 2019) for aviation growth over a 20-year timeframe projects an increase of only a

couple of additional flights in the area, it is unlikely that there has been appreciable growth in the study area since 2018.

**Figure 3-1. Screenshot of July 2018 Flight Tracks in the Study Area**



Source: FAA 2018

## 3.2 Methodology

### 3.2.1 Affected Airways and Routes

Following review of the study area, it was determined that the proposed Restricted Areas, or TFRs (if needed), would affect two federal airways (V-436 and J-125), and infrequent direct flights to Deadhorse that also fly overhead at CAFS.

Between Anchorage and Fairbanks, V-436 transects airspace with typical assigned altitudes from 10,000 feet MSL up to 18,000 feet MSL overlying the existing R-2206 airspace above CAFS (FAA 2020g). J-125 (FL 180 up to FL 450) directly transits airspace between Anchorage and Nenana (southwest of Fairbanks) that would be partially overlapped and restricted by the proposed Restricted Areas that would extend up to FL 320 (FAA 2020g). Flights departing from Anchorage are also infrequently vectored directly overhead at CAFS toward Deadhorse.

### 3.2.2 Numbers of Affected IFR Flights

FAA estimated that V-436, J-125, and the direct flights to Deadhorse support, on average, three daily IFR flights between these routes combined. To account for growth of aviation activity in the region, it was assumed that up to an estimated five daily (1,825 annual) IFR flights would be affected as a result of the Proposed Action. This projection is conservatively higher than what would be projected using the Alaska Department of Transportation and Public Facilities' 20-year forecast for aviation growth (1.2 percent growth annually) and the FAA's national forecast for annual growth in general aviation (0.8 percent) (Alaska DOT&PF 2012, FAA 2019).

### 3.2.3 Identification of Reroutes and Alternate Routes

FAA has identified potential reroutes and alternate routes for the impacted airways for the analysis of the impacts to IFR flights from the Proposed Action. During the interim phase, if it is needed, FAA would manually reroute IFR flights to one of two identified reroutes to avoid the TFRs. Following amendment of airways, IFR flights would use one of several identified alternate routes. Additional flight distances for the reroutes and alternate routes were calculated in Geographic Information Systems. Additional flight durations were calculated using engine factors for the aircraft climbout mode from a Boeing 737 aircraft, which is the largest aircraft expected to be affected by the Proposed Action. Additional fuel requirements were calculated using the average fuel burn rate of approximately 5,000 pounds or 750 gallons per hour for a Boeing 737 (AOPA 2020).

#### 3.2.3.1 Interim Phase

If continuous LRDR operations were to begin before the proposed Restricted Areas were established, the FAA would implement TFRs to temporarily restrict flight in the approximately 61 square nautical miles of airspace that would be encompassed by the proposed Restricted Areas. During such an interim phase, the FAA Anchorage ARTCC would manually reroute IFR flights around the TFRs until the proposed Restricted Areas were established and the revised airways and instrument flight procedures were published and available for use. The boundaries of the TFRs are described in Section 1.2. FAA would issue a Notice to Airmen (NOTAM) providing notice of the unavailability of the impacted segments of V-436 and J-125 while the TFRs are active. J-125 would be unavailable between Anchorage (ANC navigational aid [NAVAID]) and Nenana (ENN NAVAID), and V-436 would be unavailable between the PUYVO waypoint and ENN NAVAID.

FAA has identified potential reroutes for the portions of V-436 and J-125 that would be unavailable during the interim phase, if it is needed. The potential reroutes for V-436 are based on a baseline route from Anchorage to Nenana, and potential reroutes for J-125 are based on a baseline route from Anchorage to Deadhorse. **Table 3-1** details the identified reroutes for J-125 and V-436 for the interim phase, including additional flight distances, durations, and fuel requirements per flight.

Flights cleared for direct flight from Anchorage to Deadhorse by air traffic control (ATC) would be radar vectored to avoid the TFRs; this is consistent with how ATC currently clears such flights and would not constitute a material change from current conditions. Direct flights are cleared by ATC depending on other air traffic management considerations, and flight distances and headings may vary slightly. FAA indicated that direct flights to Deadhorse would be held on their initial departure trajectory for an additional 30 seconds to 2 minutes relative to current conditions before being cleared for direct flight in order to avoid the TFRs. The additional fuel requirements per flight are included in **Table 3-1**.

**Table 3-1. Summary of Interim Phase IFR Reroutes**

Baseline				Reroutes							
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM)	Duration (minutes) <sup>(2)</sup>	Reroute	Connecting Airway(s)	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Reroute Distance (NM)	Added Distance (NM)	Added Duration (minutes) <sup>(2)</sup>	Added Fuel Requirement (gal)
J-125	Anchorage – Deadhorse	551.5 <sup>(3)</sup>	103	West Reroute	J-125	Anchorage – AILEE WP	152.3	5,523.0	1.5	0.3	3.5
					West Reroute	AILEE WP - Nenana	62.3				
					J-155	Nenana – Chandalar Lake	338.2				
					J-115	Chandalar Lake – Deadhorse	162.4				
V-436	Anchorage – Nenana	213.1	40	West Reroute	V-436	Anchorage – AILEE WP	152.3	214.6	1.5	0.3	3.5
					West Reroute	AILEE WP – Nenana	62.3				
				V-438/ V-480	V-438	Anchorage – Fairbanks	225.5	255.6	42.5	7.9	98.8
					V-480	Fairbanks – Nenana	30.1				
Direct North Slope Flights	Anchorage – Deadhorse	544.4	102	Vectored direct	N/A			547.1	2.7	0.5	6.3
					555.4	11	2.0	25.0			

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Assumes J-125 to Nenana, J-155 to Chandalar Lake, and J-115 to Deadhorse.

### 3.2.3.2 Amendment/Establishment of Airways

To accommodate establishment of the proposed Restricted Areas, the FAA proposes to:

- Amend the two federal airways (V-436 and J-125) that currently intersect the airspace defined by the proposed Restricted Areas and reroute affected IFR air traffic on those airways.
- The segment of the existing V-436 airway between the AILEE waypoint and Nenana (ENN NAVAID) would be cancelled and replaced by a new segment (referred to as “the V-436 dogleg”) from the AILEE waypoint to Fairbanks (FAI NAVAID). The segment of V-436 from Nenana (ENN NAVAID) to Deadhorse (SCC NAVAID) would also be cancelled.
- The segment of the existing J-125 airway between Anchorage (ANC NAVAID) and Nenana (ENN NAVAID) would be cancelled. The segment of J-125 from Anchorage (ANC NAVAID) to Kodiak (ODK NAVAID) would be unaffected.
- Establish a new Area Navigation (RNAV) T route (T-399) beginning at Talkeetna (TKA NAVAID) and continuing north along the same route followed by V-436 to the AILEE waypoint, and then extending west around the proposed Restricted Areas to Nenana (ENN NAVAID).

Potential alternate routes for the portions of V-436 and J-125 that would be cancelled have been identified. The alternate routes for V-436 are based on baseline routes from Anchorage to Nenana and from Anchorage to Deadhorse, and the alternate routes for J-125 are based on a baseline route from Anchorage to Deadhorse.<sup>1</sup> **Table 3-2** details the potential routes available to aircraft following amendment and establishment of airways including added flight distances, flight durations, and fuel requirements for each flight.

Impacts to direct flights from Anchorage to Deadhorse would be the same as described for the interim phase in **Section 3.2.3.1** above.

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<sup>1</sup> Baseline flights using J-125 from Anchorage to Nenana are assumed to use the same rerouting as V-436 rerouting options shown in Table 3-2.

**Table 3-2. Potential Alternate Routes and Associated Changes in Flight Distance, Duration, and Fuel Requirements**

Baseline				Alternate Routes							
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM)	Duration (minutes) <sup>(2)</sup>	Route	Connecting Airway(s)	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Route Distance (NM)	Added Distance (NM)	Added Duration (minutes) <sup>(2)</sup>	Added Fuel Requirement (gal)
J-125	Anchorage – Deadhorse	551.5 <sup>(3)</sup>	103	J-115	J-115	Anchorage – Deadhorse	550.7	550.7	-0.8	-0.14	-1.3
				J-115/ Q-41	J-115	Anchorage – CAWIN WP	130.9	547.7	-3.8	-0.7	-8.8
					Q-41	CAWIN WIP – Deadhorse	416.8				
V-436	Anchorage – Nenana	213.1	40	V-438/ V-480	V-438	Anchorage – Fairbanks	225.5	255.6	42.5	7.9	98.8
					V-480	Fairbanks – Nenana	30.1				
				V-436/ V-436 dogleg/ V-480	V-436	Anchorage – AILEE WP	152.3	264.9	51.8	9.7	121.3
					V-436 dogleg	AILEE WP – Fairbanks	82.5				
					V-480	Fairbanks – Nenana	30.1				
				V-436/ Proposed T-399	V-436	Anchorage – Talkeetna	72.6	216.8	3.7	0.7	9.0
Proposed T-399	Talkeetna – Nenana	144.2									
V-436	Anchorage – Deadhorse	551.1	103	V-436/ V-436 dogleg/ V-438	V-436	Anchorage – AILEE WP	152.3	590.1	39.0	7.3	91.3
					V-436 dogleg	AILEE WP – Fairbanks	82.5				
					V-438	Fairbanks – Deadhorse	355.3				
				V-436/ V-436 dogleg/ T-227	V-436	Anchorage – AILEE WP	152.3	559.8	8.7	1.6	20.0
					V-436 dogleg	AILEE WP – Fairbanks	82.5				
					T-227	Fairbanks – Deadhorse	325.0				

Appendix C: Airspace Management – Supporting Documentation and Methodology

Baseline				Alternate Routes							
Impacted Airway	Impacted Route <sup>(1)</sup>	Distance (NM)	Duration (minutes) <sup>(2)</sup>	Route	Connecting Airway(s)	Segment <sup>(1)</sup>	Segment Distance (NM)	Total Route Distance (NM)	Added Distance (NM)	Added Duration (minutes) <sup>(2)</sup>	Added Fuel Requirement (gal)
V-436	Anchorage – Deadhorse	551.1	103	V-436/ V-436 dogleg/ V-444/ V-504	V-436	Anchorage – AILEE WP	152.3	597.7	46.6	8.7	108.8
					V-436 dogleg	AILEE WP – Fairbanks	82.5				
					V-444	Fairbanks – Bettles	153.6				
					V-504	Bettles – Deadhorse	209.3				
Direct North Slope Flights	Anchorage – Deadhorse	544.4	102	Vectored direct	N/A			547.1	2.7	0.5	6.3
					555.4	11	2.0	25.0			

<sup>(1)</sup> Assumes flight path between airports and/or waypoints.

<sup>(2)</sup> Flight durations do not account for takeoff or landing time.

<sup>(3)</sup> Assumes J-125 to Nenana, J-155 to Chandalar Lake, and J-115 to Deadhorse

## 4.0 Methodology to Estimate Added Distance of VFR Flight Detours

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The following explains FAA's methodology for determining the potential effects of the Proposed Action on the detouring of visual flight rules (VFR) flights that would be affected by the establishment of the proposed Restricted Areas or the TFRs, if necessary prior to charting of the Restricted Areas.

### 4.1 Flight Track Data Sources

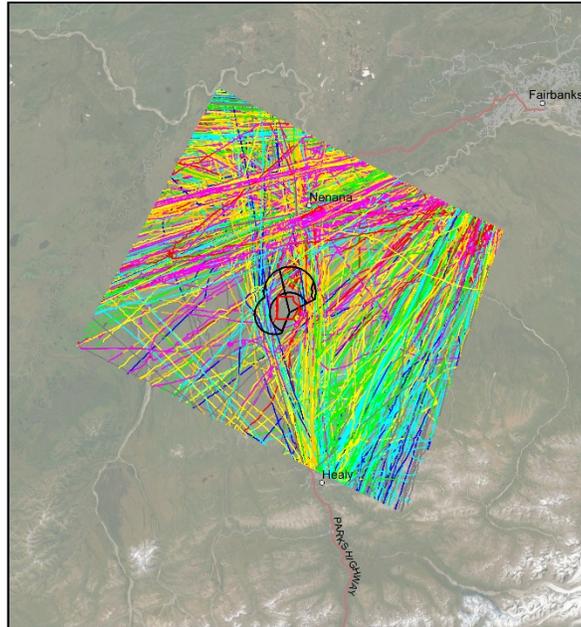
The data used to establish the methodology for determining impacts to VFR flights from the Proposed Action were received from FAA in the form of a KMZ file containing 31 days (July 1 to 31, 2018) of VFR tracks. This KMZ represents the best available flight track data, and encompasses the airspace area where impacts on VFR flight activity would occur. FAA pulled VFR track data (i.e., all 1200 beacon code points from the raw Microprocessor En-Route Automated Radar Tracking System [Micro-EARTS] data) to estimate the numbers of VFR flights potentially affected by the proposed TFRs and restricted areas (an area of approximately 45 NM by 55 NM centered on CAFS). The raw data were then processed into line segments using a combination of time and vicinity to determine which points go together. Due to gaps in coverage in radar data, the number of radar tracks may underrepresent all VFR tracks. The lower the altitude, the higher the likelihood of missed tracks because aircraft could drop off radar and no longer be captured.

The attributes of the lines (KMZ metadata for each flight track captured) provide the information about approximate altitude range of each segment for that flight path and the day of the month that the flight occurred. **Figure 4-1** presents the baseline screenshot of all July 2018 VFR flight tracks provided by FAA.

The following caveats and assumptions were used in this analysis:

1. The KMZ data did not provide unique identifiers for each individual flight, but the name field in the attributes enabled association of flight altitudes and flight paths for individual flights.
2. Based upon the provided KMZs, and understanding that some number of flights may not have been captured by the radar, it was determined that 2,222 VFR flights flew through the CAFS area from July 1 to 31, 2018.
3. The VFR flight tracks provided do not cover the entire study area. However, because the Proposed Action would predominantly affect VFR flight operations in the immediate vicinity of the proposed Restricted Areas, these flight tracks were determined to be the best available data for the analysis of impacts on VFR flight operations within the study area.
4. Due to the limitations on the raw Micro-EARTS data, and how FAA processed the raw data, no information about type of aircraft or departing or destination airport was available.
5. The flight track data provided by FAA are the best available VFR flight data for the study area. Considering the limitations on radar coverage of the area, which make it impossible to capture every VFR flight, there may have been VFR flights additional to those using the 1200 beacon code within the target area during July 2018.

**Figure 4-1. KMZ Screenshot of All VFR Flight Tracks Captured during July 2018**



Source: FAA 2018

## **4.2 Methodology**

### **4.2.1 Numbers of Affected VFR Flights**

Radar tracking of VFR flight paths in Alaska is limited. There are points along many of the tracks captured in the KMZs where a flight path has gaps (i.e., appears as a broken line). Based upon years of experience with flights and tracking in this area, FAA indicated that these gaps in the flight tracks exist because the aircraft was no longer captured by radar for that portion of the flight.

Because July 2018 VFR KMZ metadata did not provide unique identifiers for each flight track, the name field of the metadata was used to associate flight altitudes and paths to individual flights. In the name field, it was apparent that each flight path began with a segment identified as “1200 0” and proceeded in chronological order to “1200 1,” “1200 2,” “1200 3,” and so on in the attribute table until the next flight path starting again at “1200 0.” Using this pattern, MDA was able to identify and connect the segments of “broken” flight tracks into single continuous lines. Therefore, it was possible to logically and accurately reconnect those broken tracks, and to determine a total count of 2,222 VFR flights through the area.

Broken flight tracks that had gaps but did not have a “1200 0,” “1200 1,” “1200 2” progression were not merged, and no assumptions about those lines belonging to a particular flight were made. To err on the conservative side, these tracks were each counted as one. Because there was no way to accurately connect or account for these path segments, MDA excluded them from the total count of flights through the area.

Overall, approximately 91 percent of the distances flown by the VFR flights captured in the July 2018 dataset were at or higher than 2,000 feet above ground level (AGL).<sup>2</sup>

#### 4.2.2 Identification of Existing Flight Patterns

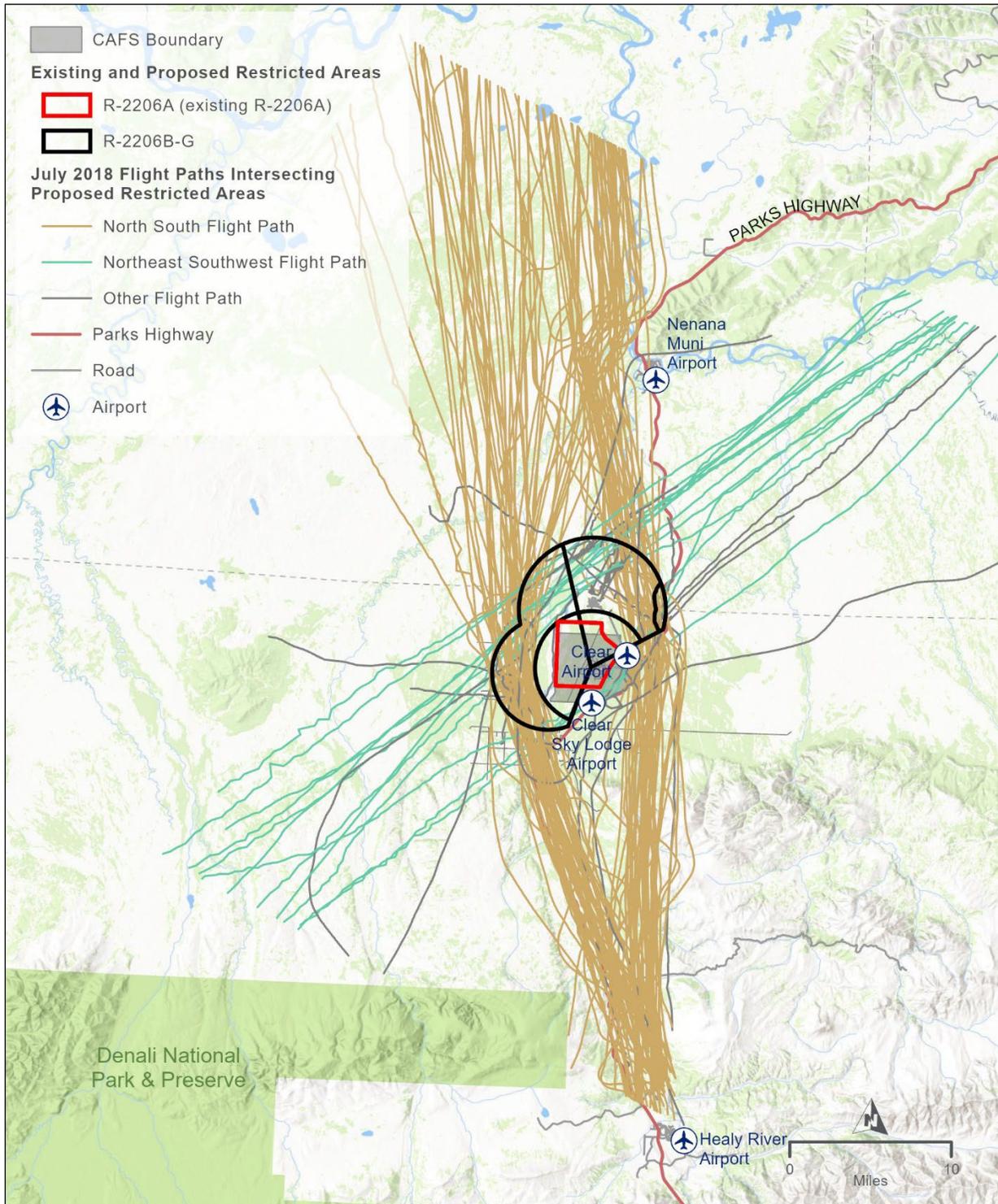
Once all of the July 2018 VFR flight tracks were merged, it was possible to separate those flight paths that transited the proposed Restricted Areas from those that did not to discern trends in flight direction. **Figure 4-2** presents, in a single screen capture, all of the July 2018 VFR flight paths that transited the proposed Restricted Areas. Also shown on **Figure 4-2** is mountainous terrain in the vicinity of CAFS. The terrain underlying airspace immediately surrounding the existing R-2206 ranges between 430 and 880 feet above sea level in elevation. Mountainous terrain (shown shaded in red on **Figure 4-2**) is present between approximately 3.5 NM and 5 NM south of the existing R-2206 (approximately 2.8 NM south of the proposed Restricted Areas). Terrain underlying the existing R-2206 is approximately 600 feet in elevation. Generally, the terrain begins to increase from elevations ranging between 900 and 1,000 feet at the foothills of the Alaska Range south of CAFS. For purposes of this analysis, mountainous terrain is conservatively defined as elevations at or higher than 900 feet above sea level.

From the July 2018 collection of flight tracks, it became apparent that most of the flights through the area followed two general paths (or “detour lanes”): a North-South detour lane and a Northeast-Southeast detour lane. Flight trends for the flight paths are described below.

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<sup>2</sup> Whenever an aircraft altitude is reported as “above ground level (AGL),” this indicates the vertical distance above the underlying terrain elevation along its flight path.

**Figure 4-2. July 2018 VFR Flights Transiting the Proposed Restricted Areas**



*North-South Flights.* The tan lines follow a definite north-south flight alignment and detour around the existing Restricted Area both to the west and to the east. Mountainous terrain encompassed by this alignment is about 4 NM south of the southern boundary of the existing R-2206, approximately 2.8 NM south of the southern boundary of the proposed Restricted Areas. West of the Nenana River, the terrain below the alignment ranges in elevation from approximately 1,000 feet to 1,790 feet above sea level. East of the Nenana River the terrain elevations range from approximately 1,000 feet above sea level at the river valley to around 2,700 feet above sea level 10 miles east of the river.

*Northeast-Southwest Flights.* The green lines follow an apparent northeast to southwest alignment, detouring around the existing R-2206 to the north and south. Mountainous terrain encompassed by this alignment is approximately 6 NM south and southwest of the southern boundary of the existing R-2206, which is approximately 2.8 NM south of the southern boundary of the proposed Restricted Areas. The terrain below the alignment west of the Nenana River extends from approximately 1,000 feet up to approximately 1,790 feet elevation.

*Other Flights.* The gray lines represent the remaining flight tracks that intersect the proposed Restricted Areas but did not follow or fall into either of the two general alignments. Based upon the altitude data provided in the KMZ metadata, many of these flights were either flying to/from an unknown destination, or were landing at or departing from either the Nenana Municipal Airport or Clear Airport. Terrain in and around the areas flown by these aircraft ranges between about 600 and 880 feet above sea level in elevation. Flight paths that were clearly associated with a landing or departure flight pattern for a particular airport (i.e., if the aerial imagery in the KMZ files showed an obvious altitude stepdown, pattern hold near the runway, or obvious altitude increase near the runway) were accounted for as follows:

- 13 flights were determined to be on approach or departure from Nenana Municipal Airport; and
- 10 flights were determined to be on approach or departure from Clear Airport.

The remaining 31 flights could not be associated with a particular airport.

Visual trends in the VFR KMZ flight path data were used to draw polygons that represent the general (baseline) areas where these flights occurred. The north-south polygon (North-South detour lane) was drawn to represent the general area where the majority of north-south VFR flights pass through the proposed Restricted Areas (**Figure 4-3**). The northeast-southwest polygon (Northeast-Southwest detour lane) was drawn to represent the general area where the majority of northeast-southwest flights pass through the proposed Restricted Areas (**Figure 4-4**).

Figure 4-3. North-South VFR Traffic Trend

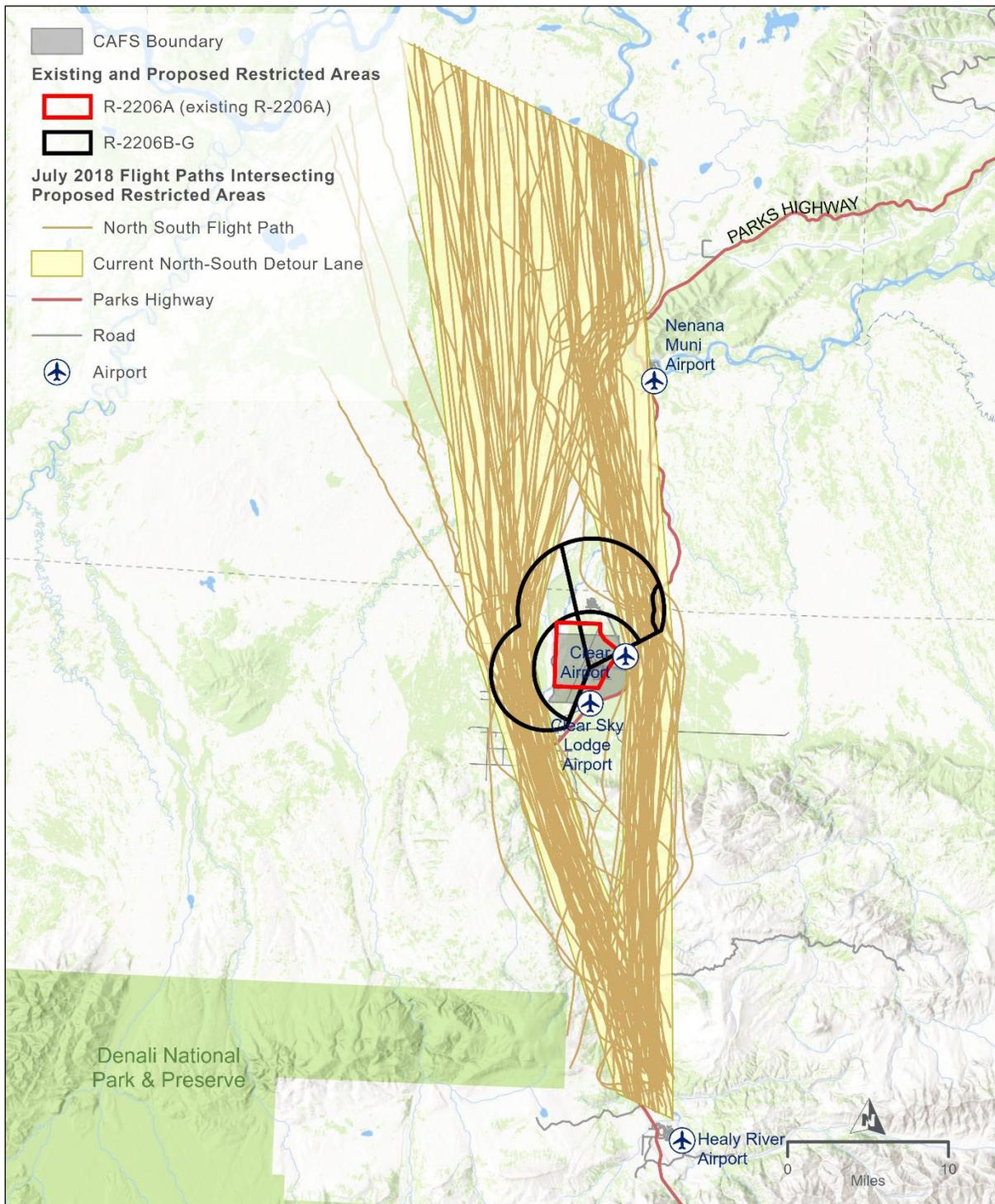
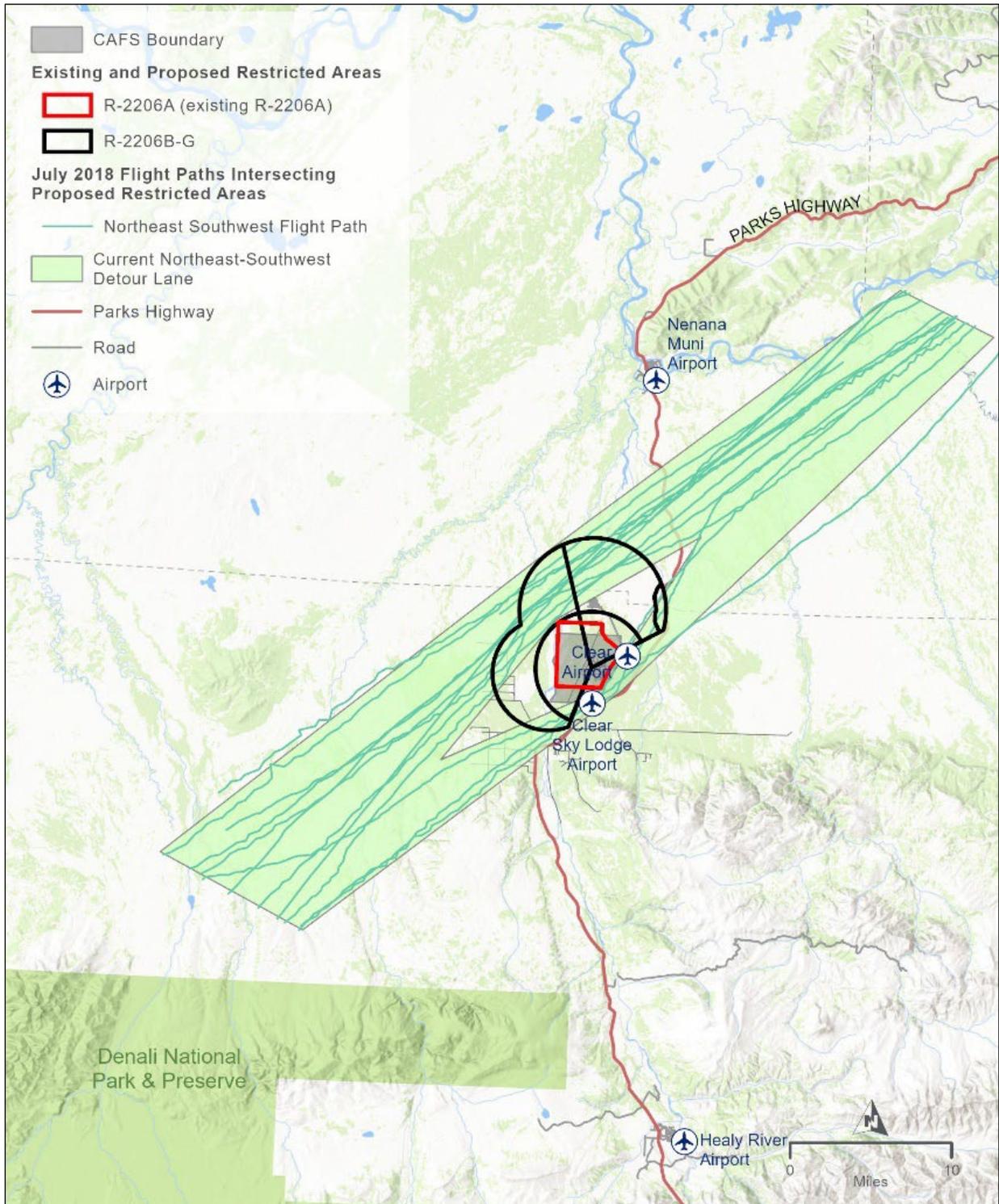


Figure 4-4. Northeast-Southwest VFR Traffic Trend



### 4.2.3 Estimated Numbers of Detoured VFR Flights

Based on the July 2018 VFR KMZ metadata, an overall total of 2,222 VFR flights transected the target area in July 2018. Of that total, 154 flights (approximately 7 percent of total flights for July 2018) intersect the airspace that would be encompassed within the proposed Restricted Areas and would have to detour. Of the 154 flights, 111 flights (71 percent) passed over mountainous terrain south and southwest of the proposed Restricted Areas. Elevations of this mountainous terrain ranged between approximately 1,000 feet and 2,700 feet above sea level.

- 87 flights (56 percent) were associated with the North-South detour lane.
  - Flights on this alignment were generally equally distributed east and west of the existing R-2206.
  - 86 flights (99 percent) of the 87 flights on this alignment flew over mountainous terrain. Slightly more than 99 percent of the distance flown by the captured VFR flights on this alignment ranged between 2,000 and 8,000 feet AGL (predominantly between 2,000 and 5,000 feet AGL) over the highest points of mountainous terrain directly underlying their flight paths.
  - South of the existing R-2206, aircraft on this alignment generally flew over or within sight of the Nenana River, with 98 percent of those flight tracks transiting airspace over mountainous terrain.
- 13 flights (8 percent) were associated with the Northeast-Southwest detour lane.
  - 10 (77 percent) of the 13 flights on this alignment flew around the north side of the existing R-2206, and 3 flights (23 percent) flew to the south of the existing R-2206.
  - 10 flights (77 percent) on this alignment, including flights that flew north and south around the existing R-2206, flew over mountainous terrain. Approximately 85 percent of the distance flown by the captured VFR flights on this alignment ranged between 2,000 feet and 8,000 feet AGL over the highest points of mountainous terrain directly underlying their flight paths. Approximately 11 percent of the distance flown ranged in altitude between 1,000 and 2,000 feet AGL; the remaining 4 percent of the distance flown ranged between 0 and 1,000 feet AGL (assumed to be associated with airport landing or departure).
- 54 flights (35 percent) intersected the proposed Restricted Areas but did not follow one of these trends.
  - Terrain underlying these flights around CAFS ranged in elevation between 430 and 880 feet above sea level. Where flights passed over the mountainous terrain to the south and southwest, the terrain elevation ranged between 900 and 2,700 feet above sea level.
  - Approximately 60 percent of flight distance flown by these 54 flights ranged in altitude between 2,000 and 5,000 feet AGL over the highest points of terrain directly underlying their flight paths. Approximately 29 percent of the distance flown ranged between 1,000 and 2,000 feet AGL; the remaining 11 percent of distance flown ranged between 0 and 1,000 feet AGL (assumed to be associated with airport landing or departure).

Analysis of impacts on VFR flights within the study area conservatively assumes the same operational level for all months using the July 2018 data as the representative surrogate. Per FAA input (based upon professional experience and review of available flight track data), summer (June, July, and August) is typically the busiest season for flight traffic, and winter (November, December, January, and February) is

the least busy season. July is typically the busiest month of flight activity within a given year. January is the least busy month of flight activity within a given year. Calculation details follow:

- 154 affected VFR flights/1 month multiplied by 12 months/1 year = 1,848 affected (i.e., projected detoured) VFR flights/year
- 1,848 flights/year divided by 365 days/year = 5.06 affected (i.e., projected detoured) VFR flights/day. This number was rounded to the nearest whole number (5).

The FAA national forecast estimates a growth in general aviation of 0.8 percent per year (FAA 2019). The Alaska Department of Transportation and Public Facilities' 20-year forecast for aviation growth is 1.2 percent (Alaska DOT&PF 2012). To account for the growth of aviation activity in the region and additional flights that may not have been captured in the July 2018 VFR flight track data due to limitations in radar coverage, the analysis in the EIS conservatively estimates that up to 10 VFR aircraft may be detoured per day (3,650 VFR flights detoured per year). This upper bound number reflects an annual growth rate of 5 percent over a standard 20-year forecast, and is conservatively higher than the projected state and national forecasts.

Applying the July 2018 data as the surrogate for monthly operations year-round enables assessment of the upper bound of impacts on VFR flights per year and calculation of a reasonable upper bound average number of VFR flights detoured per day. Because the analysis errs on the most conservative estimate for flight numbers affected, the potential for underrepresenting the flights not captured in the overall 2,222 flights is minimized. Additionally, because the actual operating levels for fall, winter, and spring would be less (in the case of winter flight operations, substantially less) than for the summer season, it is anticipated that impacts of VFR flights would be less than those assessed for the conservative upper bound.

#### 4.2.4 Projection of Increased Flight Distance

Assuming that aircraft would maintain the approximate same width of detour lane and distance from the proposed Restricted Areas that flights maintain around existing R-2206, new detour lane polygons were drawn to estimate how VFR flight traffic might shift following establishment of the proposed Restricted Areas. The projected North-South and Northeast-Southwest detour lanes are shown in **Figure 4-5** and **Figure 4-6**, respectively.

Development of the projected detour lanes included consideration of existing flight trends (preferred flight paths) and conditions (including proximity to the existing R-2206 and flight over mountainous terrain). The projected detour lanes would enable VFR pilots to maintain sight of the existing visual cues (i.e., George Parks Highway [Highway 3] and the Nenana River) that they currently use to transit the area (based on public input received during the scoping process for the EIS).

Figure 4-5. Projected North-South Detour Lane

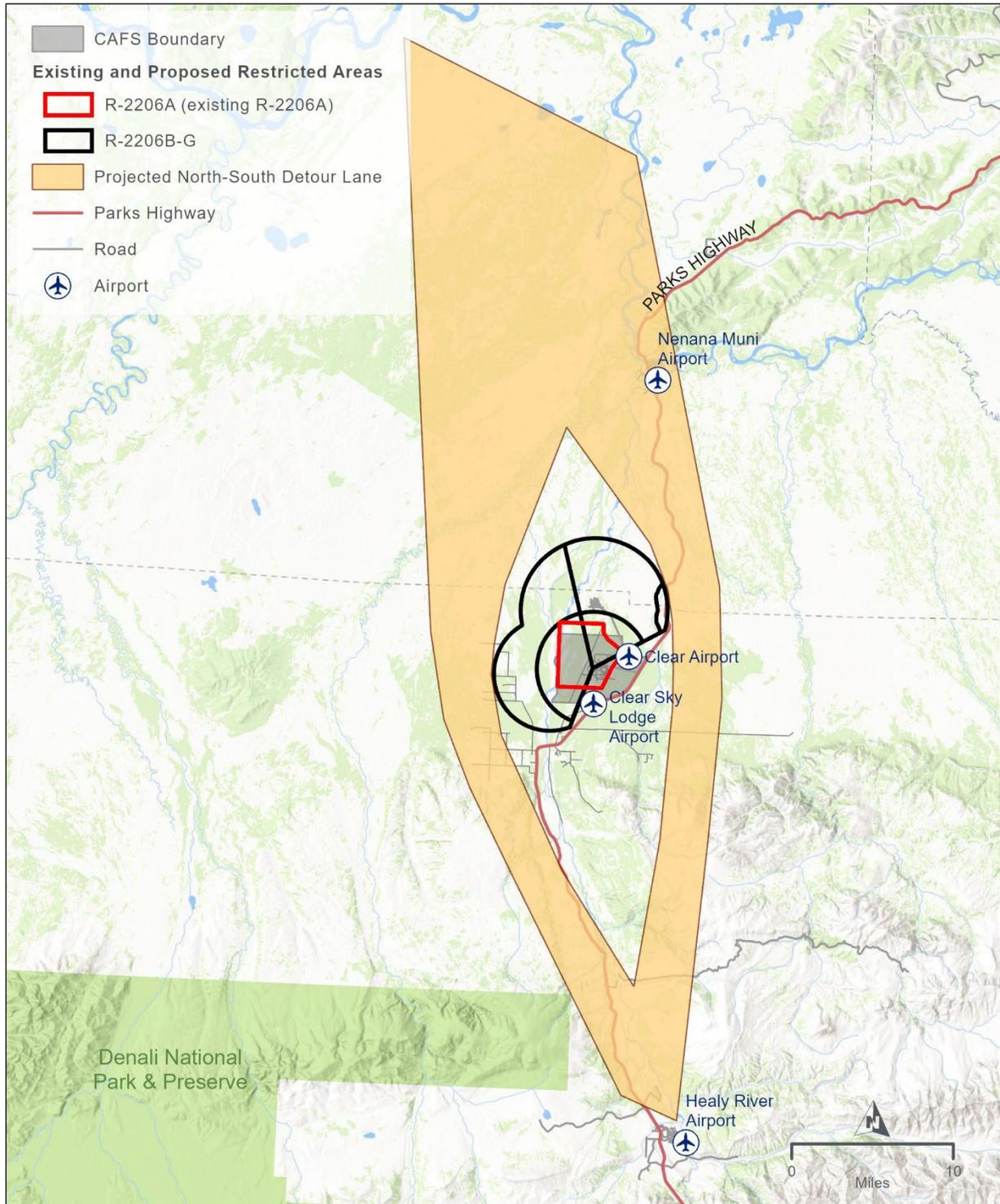
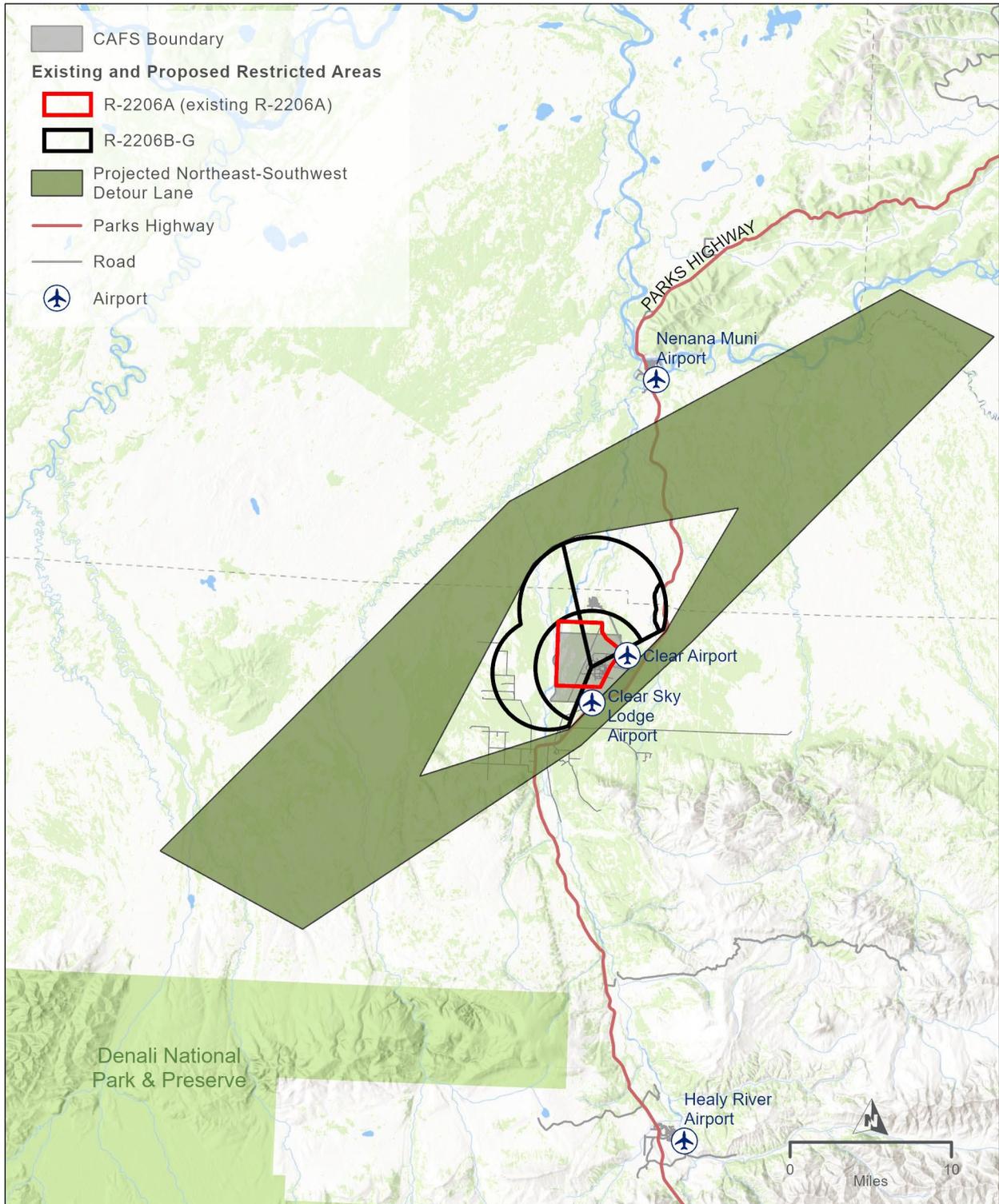


Figure 4-6. Projected Northeast-Southwest Detour Lane



After the existing and projected detour lanes were identified, the approximate centerlines of these lanes were drawn to determine the average baseline flight distance required to avoid the existing R-2206, and the estimated potential flight distance required to avoid the proposed Restricted Areas (**Figure 4-7**). The added detour distance was calculated as the difference between these lines. These calculations determined that, on average:

- Flights following the estimated potential North-South detour lane would fly an added distance of 1.3 NM. The following describes how altitude transitions (vertical climb to higher altitudes or vertical descent to lower altitudes) were considered in this estimated detour distance.

- *Early Adjustments.* Because so few VFR aircraft (estimated average of 10 daily) would be expected to detour around the proposed Restricted Areas, pilots flying southbound on the proposed North-South detour lane would continue to have sufficient time and airspace within which to either avoid mountainous terrain or make the altitude adjustments required to safely fly over it. Northbound flights would also continue to have sufficient time and space to adjust to avoid the proposed Restricted Areas.

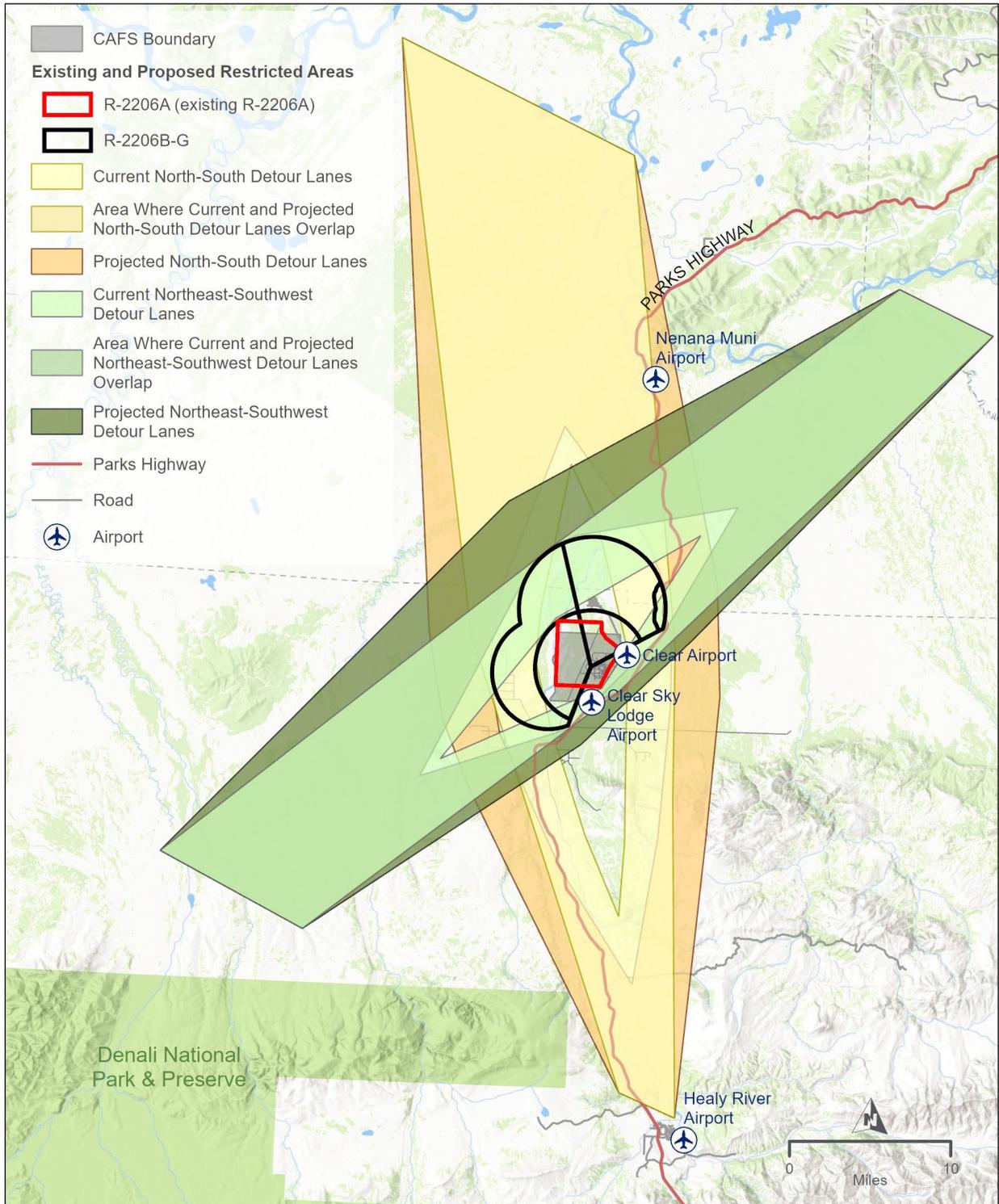
Based upon the flight trends for gradual altitude changes recorded in the July 2018 KMZ dataset and the anticipated continued ability of pilots to make altitude adjustments early in their flight paths, altitude transitions would not be appreciably affected by the estimated North-South detour lane. If aircraft ascend or descend gradually, approximately 100 feet (0.02 NM) would be added to the overall anticipated detour distance per 1,000 feet increase or decrease in altitude.

Additionally, around 99 percent of VFR aircraft diverting to avoid the existing R-2206 were reported as flying at or higher than 2,000 feet AGL (predominantly between 2,000 and 5,000 feet AGL). Given the elevation of the underlying terrain (980 feet up to around 3,000 feet) that would be overflowed by detouring VFR aircraft on this alignment, an altitude increase (or decrease) of more than 2,000 feet would be unlikely. Assuming 2,000 feet as the reasonable upper bound estimate for altitude increases or decreases, distance added by vertical climbs (or descents) would be around 200 feet (0.04 NM). This would not appreciably change the projected detour distance of 1.3 NM.

- *Late Adjustments.* If pilots were to wait to make altitude adjustments until they reach the edge of mountainous terrain to ascend, or until they reach the boundary of the proposed Restricted Areas to descend and fly around, the vertical climb or descent required to make those transitions would add more distance. The distance added would depend upon the space within which the aircraft would transition in altitude. For example, if increasing altitude by 1,000 feet AGL within the distance of 1,000 feet, the vertical climb would be expected to add around 414 feet (0.08 NM) to the projected detour distance per 1,000 feet AGL change in altitude. Because this scenario would result in potentially unsafe flying conditions, and it was assumed that aircraft would avoid flight safety risks and would more realistically continue to make early adjustments to avoid added distances, this scenario was not considered further as reasonable or likely.
- Flights following the estimated potential Northeast-Southwest detour lane would detour an added 0.66 NM.
    - Based upon the existing flight trends, it is not expected that the proposed Northeast-Southwest detour would result in more aircraft flying over mountainous terrain requiring altitude adjustments. If pilots opted to fly over mountainous terrain, distances added

associated with flight altitude transitions would be the same as the *Early Adjustments* scenario described for the North-South detour lane above. These altitude transitions would not be appreciably affected by the estimated Northeast-Southwest detour lanes.

**Figure 4-7. Overlay of Baseline and Projected Detour Lanes around CAFS**



Because so few (conservatively projected at 10 daily) VFR aircraft would need to detour in the area to avoid the proposed Restricted Areas, air traffic congestion that would require pilots to make greater than typical altitude shifts to avoid other aircraft would not be expected. Also, within the projected detours, it is expected that pilots would continue to have sufficient time and airspace within which to make early adjustments to avoid terrain or reach altitude to fly over it, and avoid the proposed Restricted Areas (depending upon the direction of flight). Aircraft flight over mountainous terrain south of the proposed Restricted Areas would not change appreciably from existing flight trends.

#### **4.2.5 Analysis of Impacts to VFR Flights**

To account for the flight operations in the estimated potential North-South and Northeast-Southwest detour lanes, and the remaining other flights that do not fall into either of these flight lanes, analysis of impacts to VFR flight operations in the EIS would assume that, on average, added flight distances for all 1,866 detoured VFR flights per year (average 5 daily detoured VFR flights) would be between 0.7 and 1.3 NM. This would be consistent with the distance required to avoid the proposed Restricted Areas as applied to determine the added distances for the estimated potential North-South and Northeast-Southwest detour lanes.

Additional flight durations were calculated using engine factors for the aircraft climbout mode from a Cessna 208 at full passenger load and cruise phase flight. Additional fuel requirements were calculated using the average fuel burn rate of approximately 415 pounds or 62 gallons per hour for a Cessna 208 (AOPA 2020). This range of added distance for the average VFR flight detour would result in an added flight time of approximately 30 seconds, and an added fuel burn of approximately 0.68 pound (3.5 gallons). These requirements are presented for comparison purposes and are not included in the additional cost calculations, because the operating costs include fuel costs. The analysis assumes the 2019 reported hourly operational cost of \$949 for a Cessna 208 (ACC 2020b). Operational costs include fuel costs, maintenance costs, and the value of aircraft ownership, but do not account for the value of travel time for pilots or passengers.<sup>3</sup>

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<sup>3</sup> Operational costs include fixed costs (e.g., aircraft insurance, hangar fees, and loans, as applicable), overhaul costs (e.g., overhaul maintenance of propeller, airframe, and engine), and direct costs (e.g., fuel, labor, and routine maintenance, based on 450 hours flown per year).

## 5.0 Arrival and Departure Procedures Proposed for Amendment

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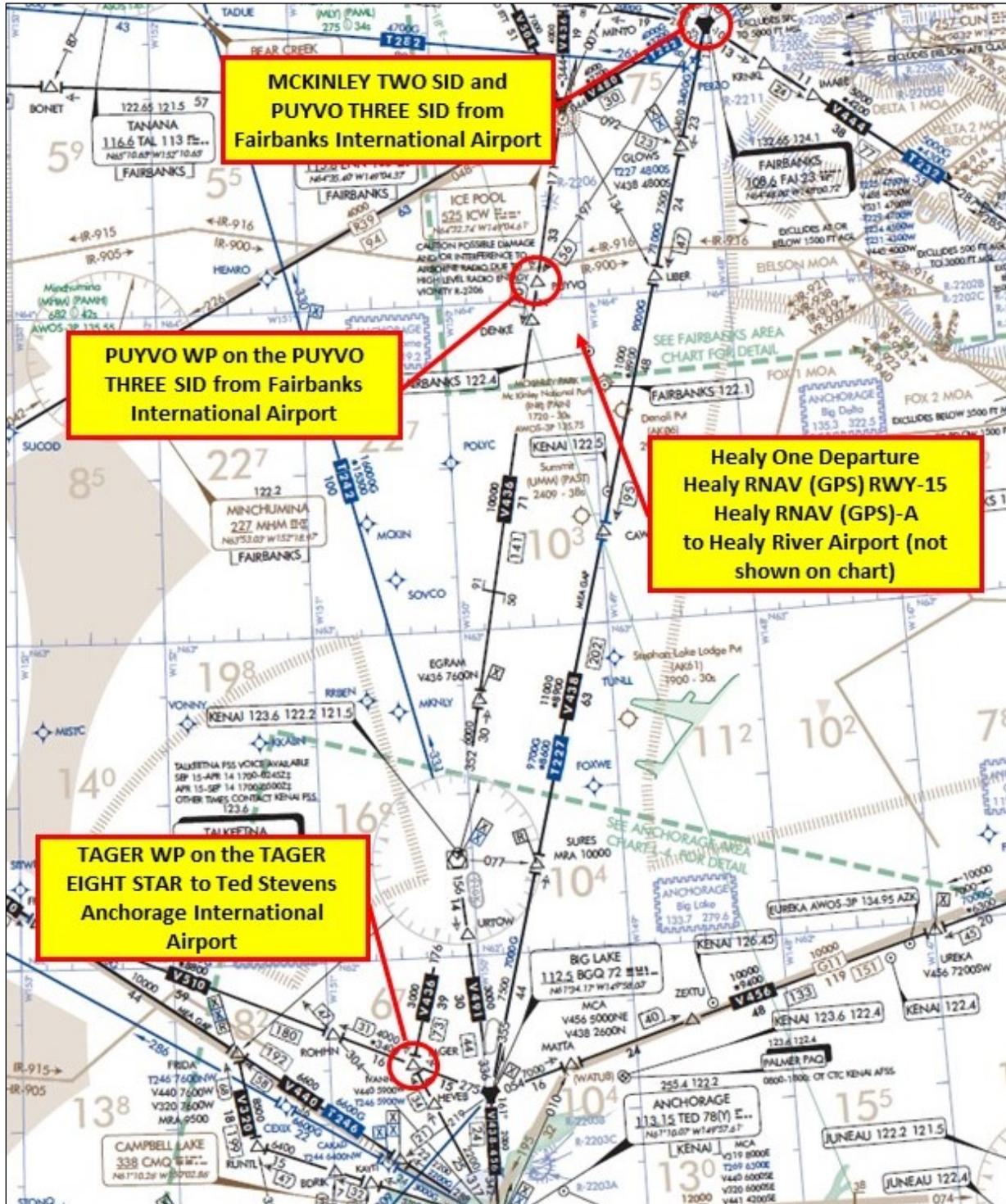
The proposed Restricted Areas would conflict with several existing procedures within the study area, and establishment of the proposed Restricted Areas would require that the FAA amend those procedures to accommodate the proposed Restricted Areas. **Figure 5-1** is a screenshot from the Enroute Low Altitude Chart, Alaska (ENR-AKL03), with red circles indicating the locations of waypoints and airports where arrival and departure procedures would need to be amended to accommodate the proposed Restricted Areas. Listed by associated airport, these procedures include:

- Fairbanks International Airport
  - PUYVO THREE DEPARTURE RNAV Standard Instrument Departure (SID)
  - MCKINLEY TWO DEPARTURE SID
- Healy River Airport
  - HEALY ONE DEPARTURE (Obstacle) (RNAV) – Obstacle Departure Procedure
  - HEALY RNAV (Global Positioning System [GPS]) Runway (RWY) 15 – Instrument Approach Procedure
  - HEALY RNAV (GPS)-A – Instrument Approach Procedure
- Ted Stevens Anchorage International Airport
  - TAGER EIGHT ARRIVAL – Standard Terminal Arrival (STAR) Procedure

Per the FAA’s naming format, when the procedures are changed, they are renamed and any numbers indicated in the original name are “up-numbered,” i.e., HEALY ONE DEPARTURE (Obstacle) (RNAV) would become HEALY TWO DEPARTURE (Obstacle) (RNAV), and TAGER EIGHT ARRIVAL would become TAGER NINE ARRIVAL.

Names for proposed waypoints are placeholders until the waypoints are officially established. Proposed waypoints, which are currently identified with “WP” followed by numbers, would be renamed with five letters right before charting.

Figure 5-1. Screenshot of Low-Altitude Enroute Chart ENR-AKL03 Showing Waypoint Locations



Source: FAA 2020g

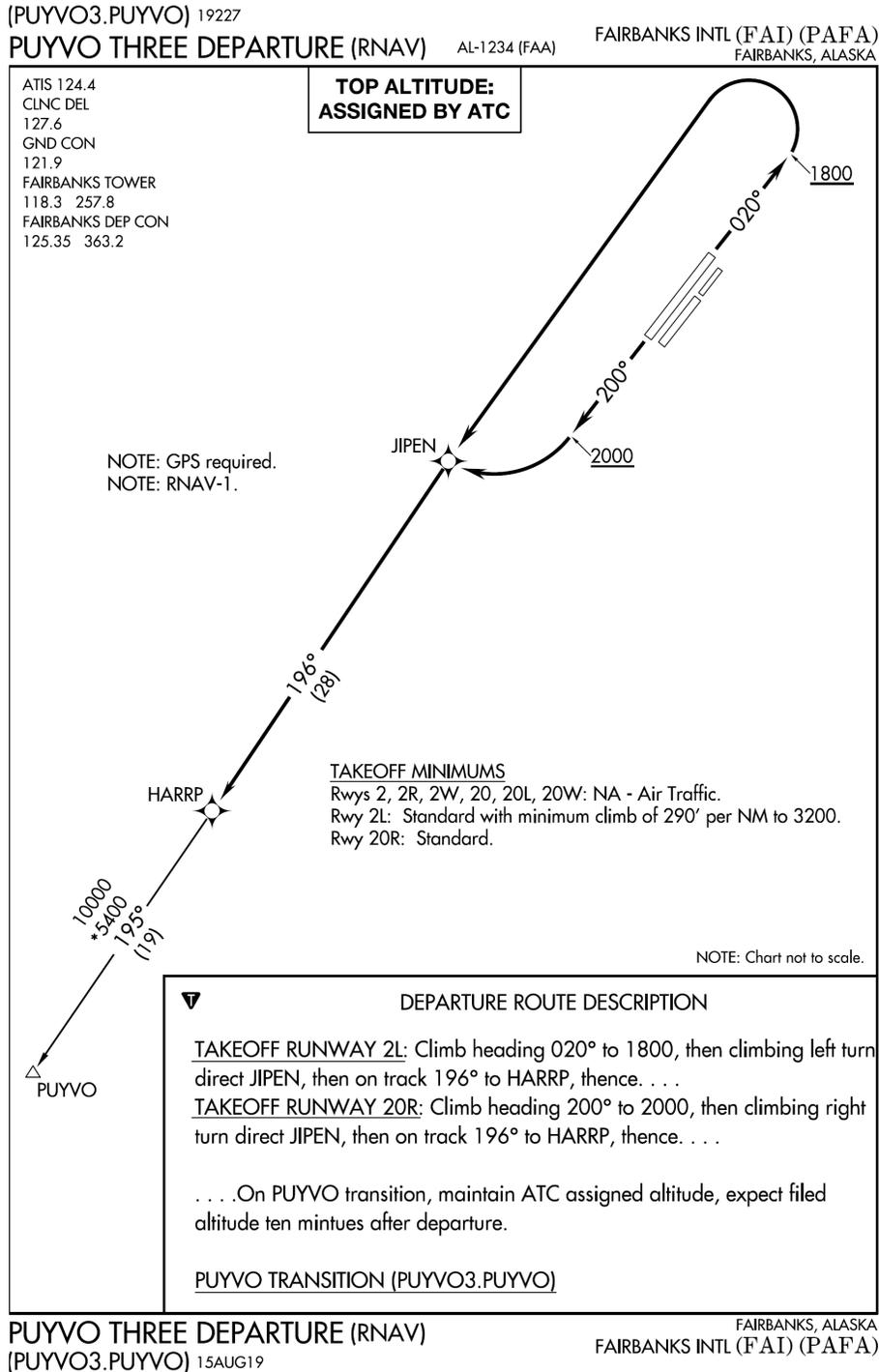
## **5.1 Fairbanks International Airport: PUYVO THREE DEPARTURE (RNAV) and MCKINLEY TWO DEPARTURE SID Procedures**

**Reason for Change(s):** The centerline for the PUYVO THREE and MCKINLEY TWO SIDs would come within 3 NM of the east boundary of proposed R-2206C, R-2206F, and R-2206G. This would be in conflict with FAA Order JO 7110.65Y (CHG 2), *Air Traffic Control* paragraph 9-3-2(b) (effective 16 July 2020), which specifies the 3-NM separation minimum for aircraft operating near special use airspace. However, because there would be no aircraft operating within the proposed Restricted Areas, Anchorage ARTCC would consider implementing a waiver under the Air Traffic Organization Policy (FAA Order JO 7210.3BB CHG 1, paragraph 2-1-18) to allow aircraft on the departures to continue to use the existing procedures.

**Description of Change(s):** The PUYVO THREE RNAV DEPARTURE and MCKINLEY TWO DEPARTURE SID procedures (**Figure 5-2** and **Figure 5-3**, respectively) would each be revised to include a note that radar is required. There would be no other amendments to the procedures.

These SIDs support an average of 45 daily flights during winter months (November through February) up to an average of 55 daily flights during summer months (June through August).

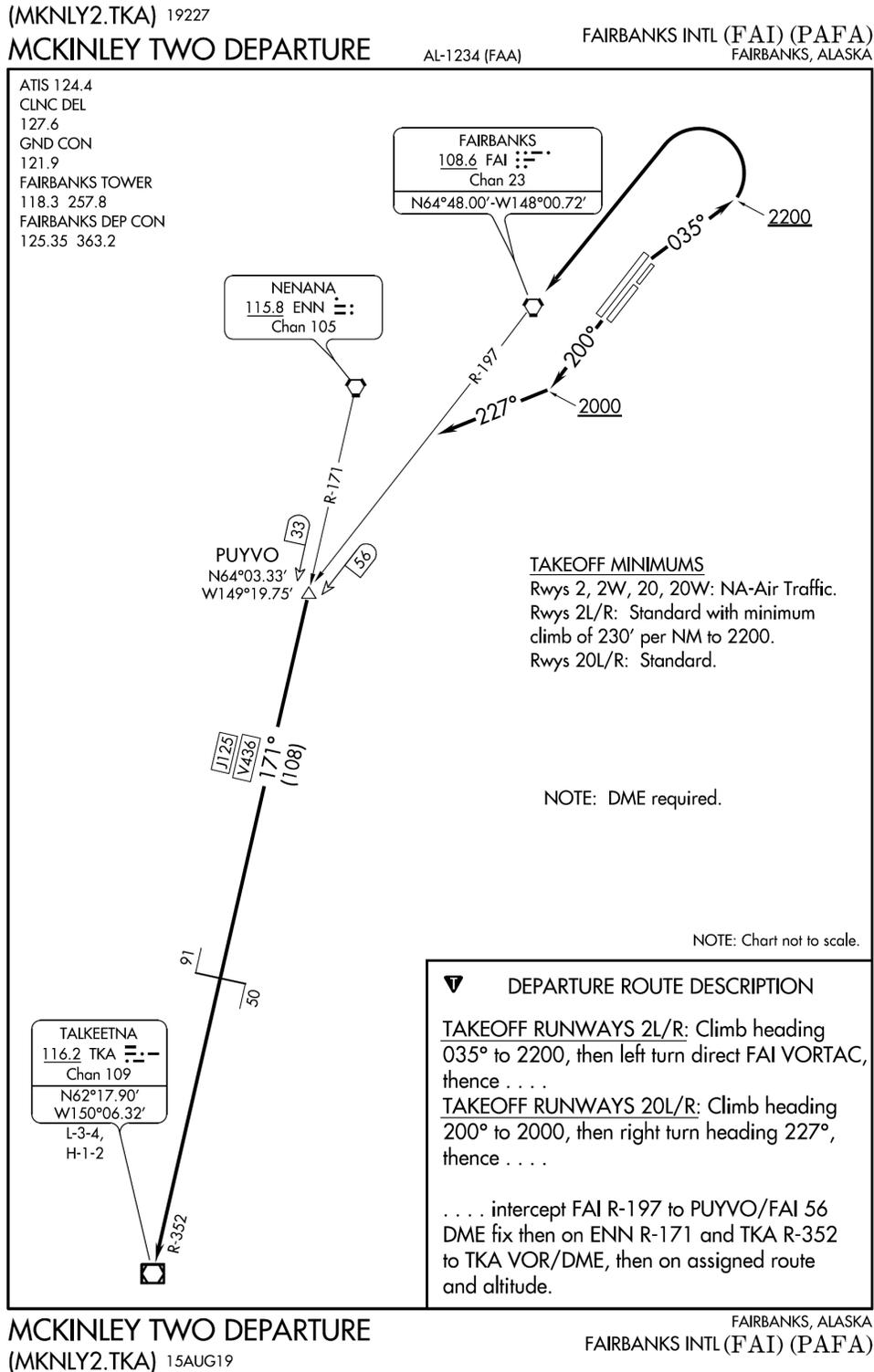
**Figure 5-2. Existing PUYVO THREE DEPARTURE Procedure**



**PUYVO THREE DEPARTURE (RNAV)**  
 (PUYVO3.PUYVO) 15AUG19

Source: FlightAware 2017a

**Figure 5-3. Existing MCKINLEY TWO DEPARTURE Procedure**



Source: FlightAware 2019

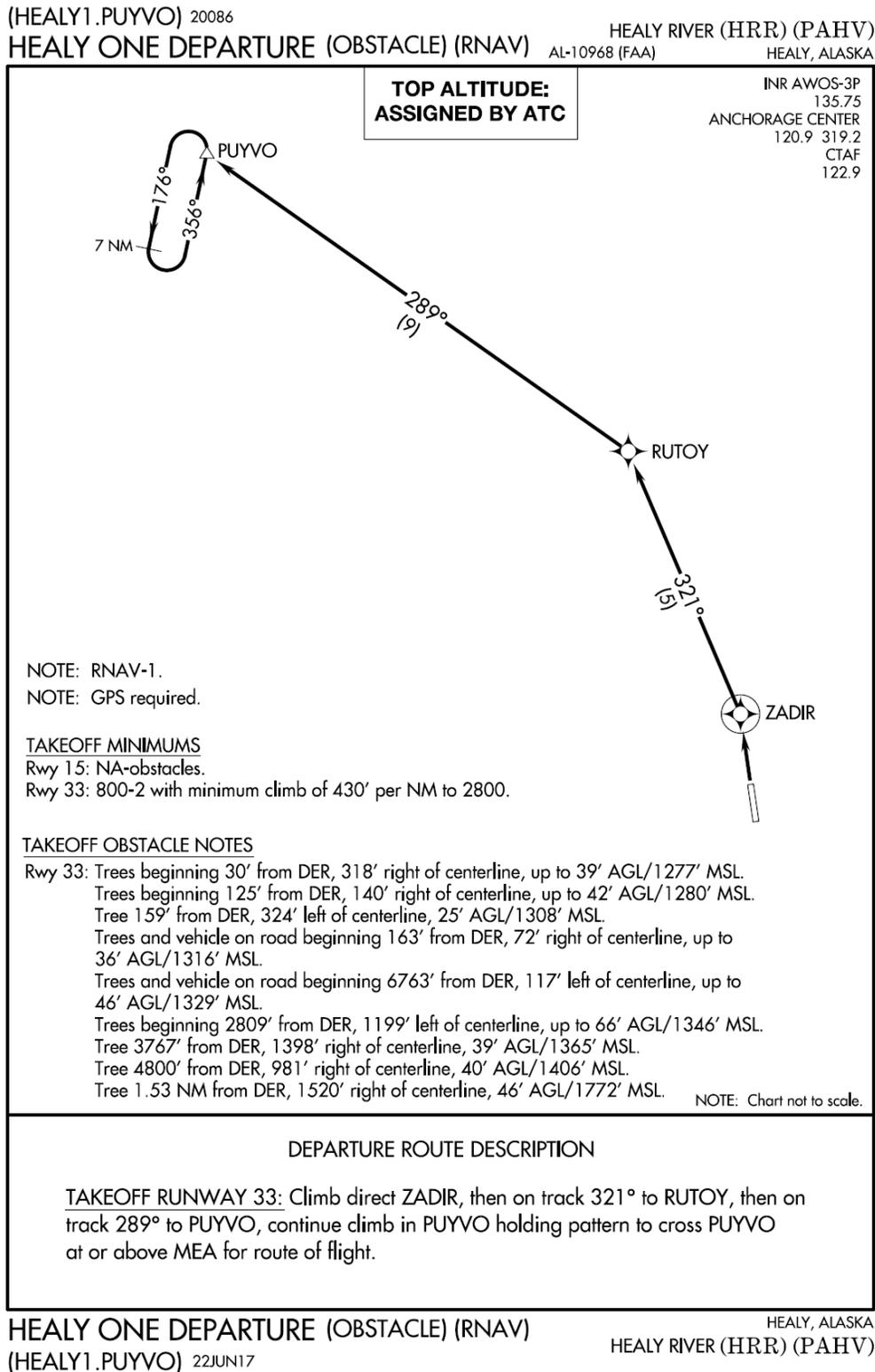
## 5.2 Healy River Airport Procedures

### 5.2.1 HEALY ONE DEPARTURE (Obstacle) (RNAV)

**Reason for Amendment:** Departure procedures are intended to connect the airport environment to the existing en route structure via waypoints (e.g., PUYVO waypoint). As such, the design of a procedure should, to the extent practicable, include a waypoint on the en route structure to permit a continuous defined route. Following cancellation of the segment of V-436 that includes the PUYVO waypoint, the FAA proposes to amend the HEALY ONE DEPARTURE (Obstacle) (RNAV) obstacle departure procedure to connect to the en route structure at the new WP122A, which would be established on the proposed T-399 route (described in **Section 3.2.3.2** of this appendix).

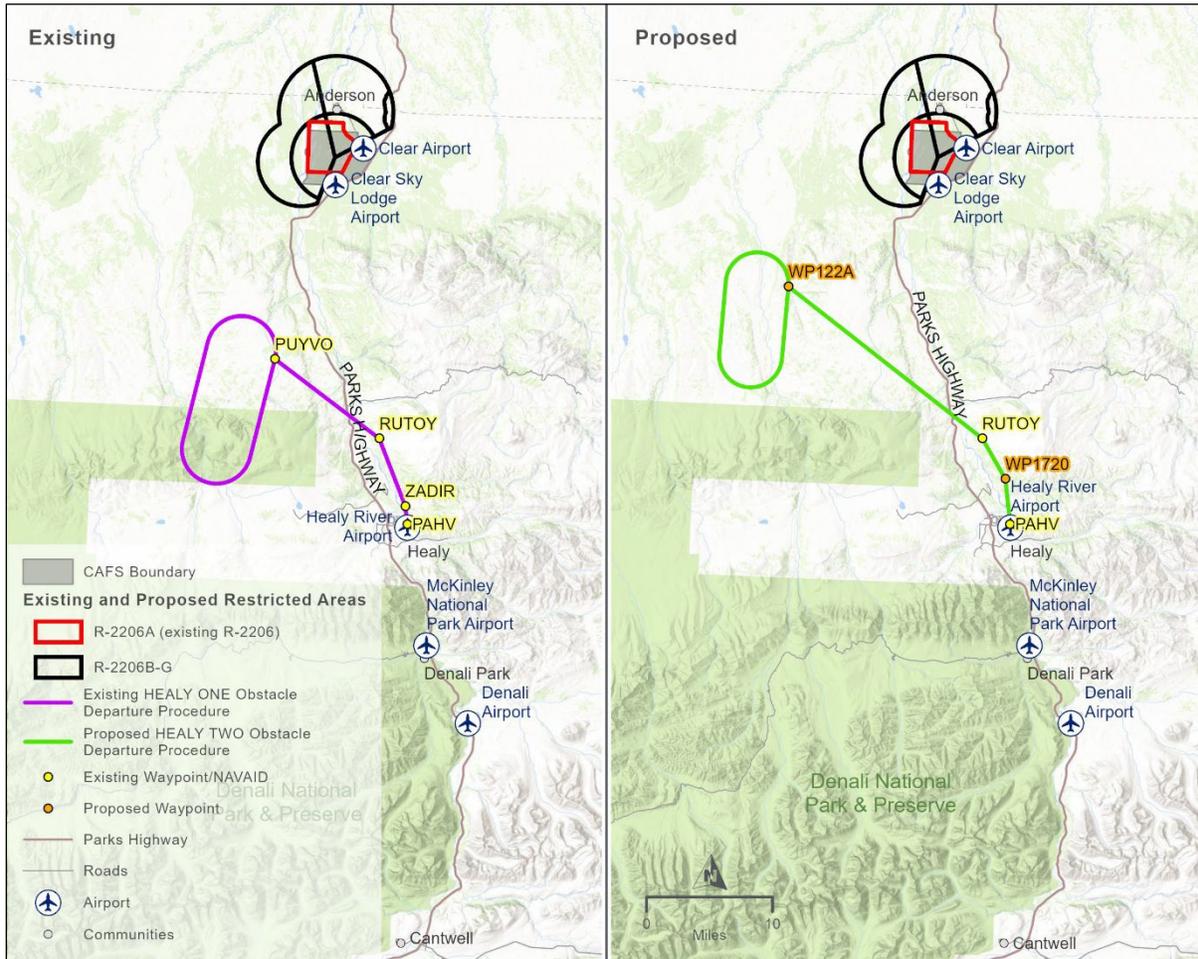
**Description of Amendment:** The existing published chart for HEALY ONE DEPARTURE (Obstacle) (RNAV) procedure is shown in **Figure 5-4**, and the existing and proposed procedures are shown in **Figure 5-5**. The existing H procedure would be redesigned and relocated northwest of the existing departure, and renamed HEALY TWO DEPARTURE (Obstacle) (RNAV). The climb gradient would change from 430 feet per NM to 2,900 feet MSL to 556 feet per NM to 2,900 feet MSL. ZADIR waypoint would be replaced by WP1720. Aircraft would depart Runway 33 from Healy River Airport and fly to WP1720, and then to RUTOY waypoint. From RUTOY waypoint, aircraft would fly a course of 290 degrees to WP122A and then enter a holding pattern to climb to the appropriate altitude for their route of flight. The holding pattern would be moved northwest from over the former PUYVO intersection to the new WP122A. The distance from Healy River Airport to the holding pattern would increase by 2.6 NM.

**Figure 5-4. Existing HEALY ONE DEPARTURE (Obstacle) (RNAV) Procedure Chart**



Source: FlightAware 2017b

**Figure 5-5. Existing and Proposed HEALY ONE DEPARTURE (Obstacle) (RNAV) Procedure**



### 5.2.2 RNAV (GPS) RWY 15

**Reason for Amendment:** The Healy River Airport currently has a Terminal Arrival Area (TAA) as part of the RNAV (GPS) RWY 15 instrument arrival procedure. TAAs are designed around waypoints (e.g., TOTLE waypoint) that appear on the existing procedure; including the intermediate fix (IF) and the initial approach fix (IAF) waypoints. The straight-in segment of the TAA at Healy River Airport directly overlies the lateral limits of the proposed Restricted Areas. Under the Proposed Action, the TAA would no longer be able to support aircraft arrivals. To address this, the TAA would be removed, and the IAF would be relocated from TOTLE waypoint to WP122A, a new waypoint that would be established on the proposed T-399 route. TOTLE waypoint would become the IF in the revised approach design.

**Description of Amendment:** The existing published chart for RNAV (GPS) RWY 15 is shown in **Figure 5-6**, and the existing and proposed procedures are shown in **Figure 5-7**. The existing TAA at Healy River Airport would be removed and a new feeder route for aircraft approaching the Healy River Airport for landing would start at WP121.

Currently there are four options for aircraft on approach to the RNAV (GPS) RWY 15 arrival procedure to the Healy River Airport: entering the procedure at the YURUL, FIGRO, or TOTLE waypoint; or entering a

racetrack holding pattern at TOTLE waypoint and waiting for clearance to land (**Figure 5-6**). Under the revised arrival procedure, aircraft would be able to enter at WP122A, fly to TOTLE waypoint, and then land. WP427 and WP63 would replace the FIGRO and YURUL waypoints, and the EMIDE waypoint would be removed. The lengths of the segments of the amended approach procedure would be designed so that pilots would have sufficient time and space to physically turn around in the airspace and appropriately orient for landing. Removal of the EMIDE waypoint would have no effect on the lateral or vertical position of aircraft using the arrival procedure.

These changes would slightly increase the distances between the entry points and Healy River Airport. The distance from the holding pattern at WP122A to the airport would increase 10.9 NM. The distance from WP427 to the airport would increase 3.9 NM over the FIGRO waypoint approach. The distance from WP63 to the airport would increase 1.4 NM over the YURUL waypoint approach.

An additional approach option would also be available for northbound aircraft on approach from WP121 to WP42 then following the route to TOTLE waypoint and landing at Healy River Airport. Aircraft that are flying north on the proposed new T-399 could use the WP121 approach to Healy River Airport because that waypoint is already connected to the proposed airway. For a missed approach, aircraft would depart, make a climbing right turn, transition to WP122A to hold in the racetrack pattern, and either wait for clearance to reattempt landing at Healy River Airport or fly north along T-399 to another airport. This change affects only the missed approach procedure.

The lowest holding altitude for the revised RNAV (GPS) RWY 15 instrument arrival procedure would be 5,800 feet MSL at WP122A. The altitude at WP121 would be 7,000 feet MSL. The altitude at WP427 would be 5,800 feet MSL. The altitude from WP63 and WP427 to TOTLE waypoint would be 5,700 feet MSL.

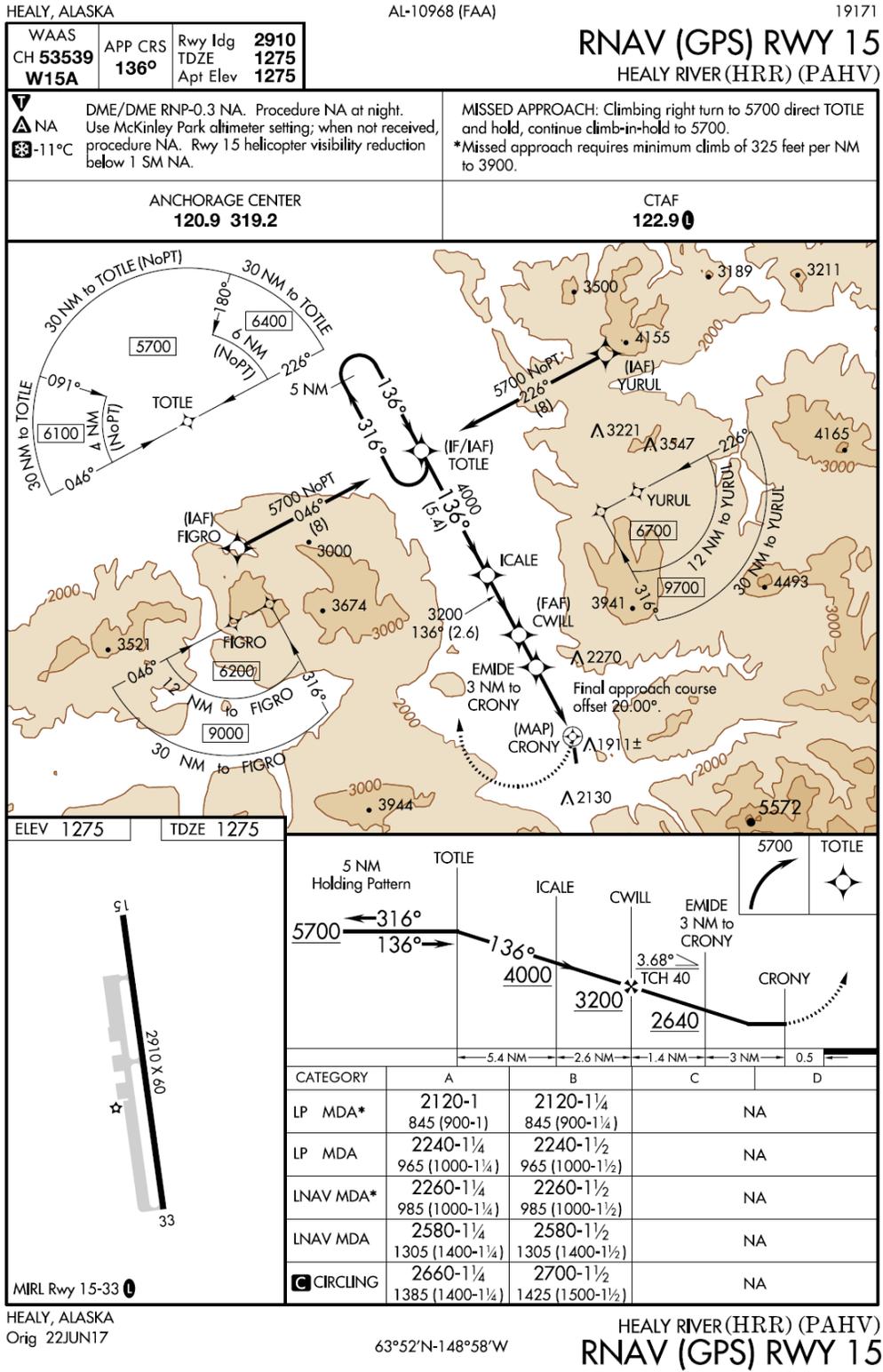
The three IAFs for the procedure would be WP427, WP63, and WP122A. With removal of the TAA, the missed approach holding waypoint would be amended from TOTLE waypoint to WP122A, and the IAF and hold-in-lieu of the racetrack holding pattern at TOTLE waypoint would also be removed. TOTLE waypoint would then become an IF, and the EMIDE waypoint would be removed.

Arrival aircraft would enter the procedure at one of three IAFs or WP63, WP122A or WP427. If an aircraft is on the proposed T-399 low-altitude airway, the aircraft could begin the approach at the feeder fix of WP121. Pending certain requirements, ATC may permit an aircraft to begin the approach at the new IF (i.e., TOTLE).

From one of the three IAFs, or the feeder fix of WP121, the aircraft would fly along the appropriate initial approach segment to TOTLE, where they would turn onto the final approach course for Runway 15. Following the descent gradients and minima, there are no changes on this segment that would be different from the current RNAV (GPS) RWY 15.

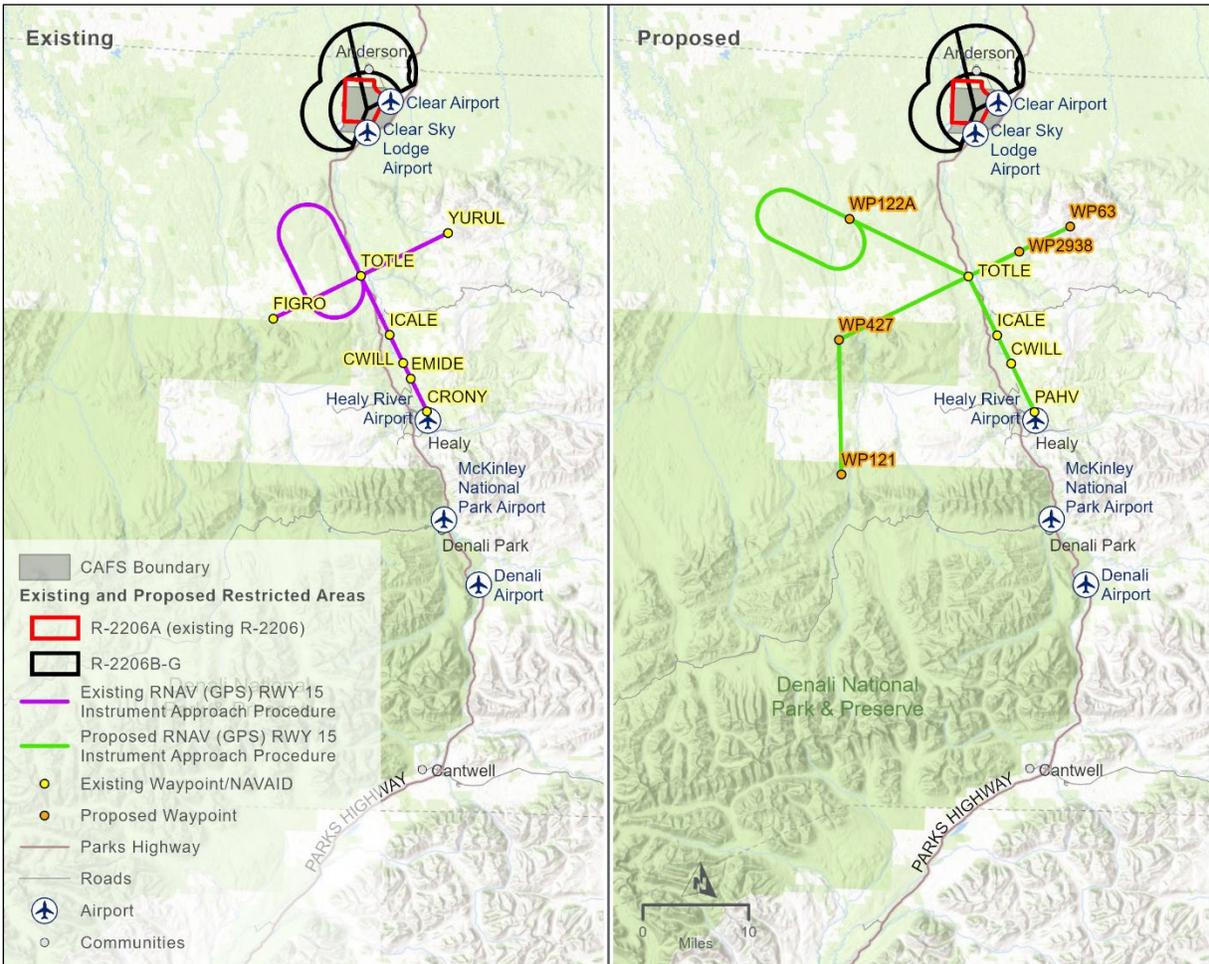
If a missed approach procedure is required, this would commence at CRONY waypoint. The missed approach procedure would require the aircraft to execute a climbing right turn and fly direct to TOTLE waypoint, then to WP122A where it would enter a holding pattern and wait for clearance to try again.

Figure 5-6. Existing RNAV (GPS) RWY-15 Procedure Chart



Source: FlightAware 2017c

**Figure 5-7. Existing and Proposed RNAV (GPS) RWY-15 Procedure**

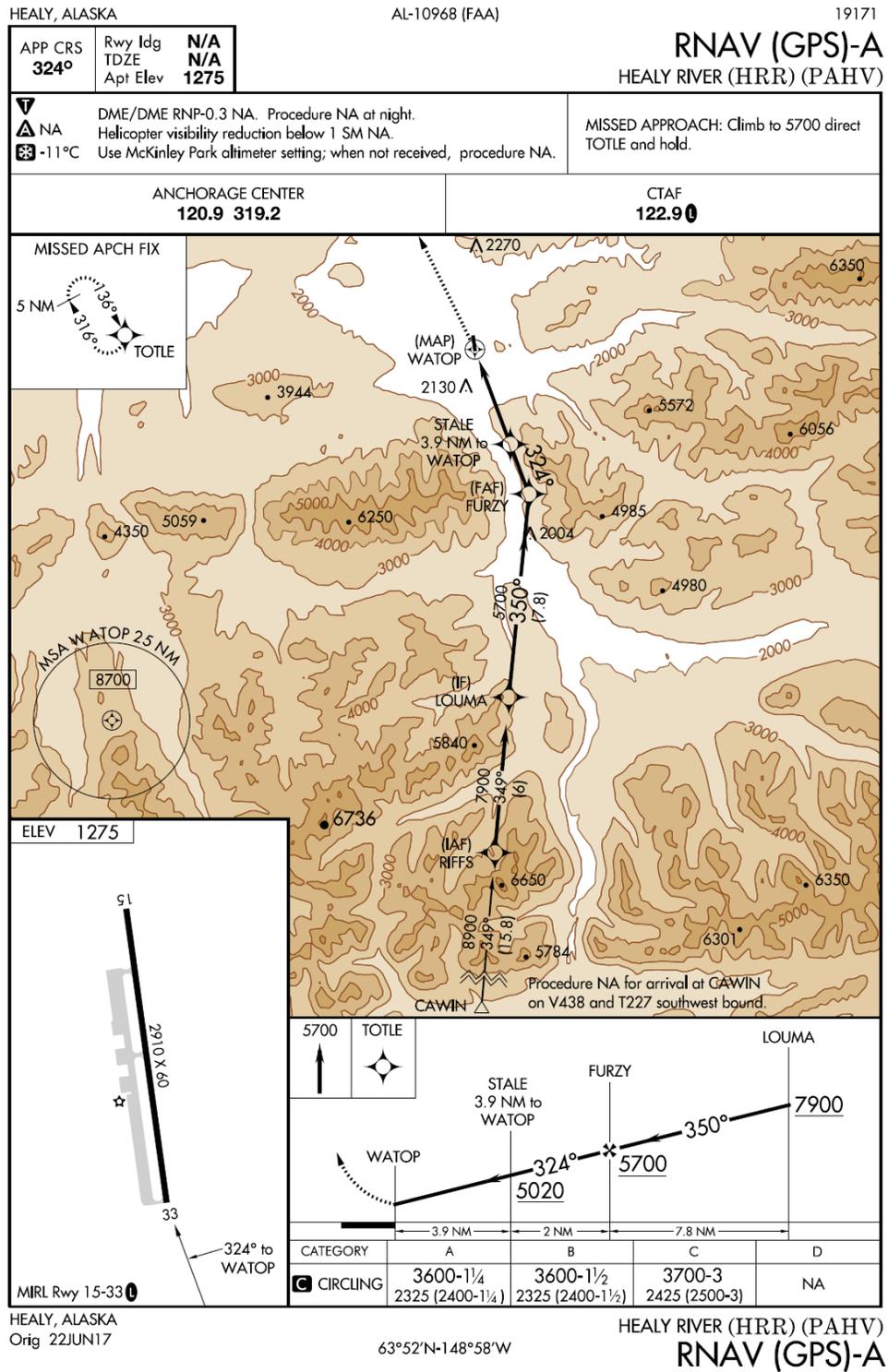


### 5.2.3 RNAV (GPS)-A Arrival

**Reason for Amendment:** The TOTLE waypoint's missed approach segment holding pattern would encroach on the lateral limits of the proposed Restricted Areas, requiring a change in missed approach holding location to accommodate the Restricted Areas. To address this, a new "step down" waypoint would be added via WP1934 (altitude 6,900 feet MSL). This is solely for obstacle clearance criteria and would not affect the behavior of aircraft on the procedure. The missed approach holding waypoint would change from TOTLE to WP122A. This holding pattern mimics that on the RNAV (GPS) RWY 15 procedure.

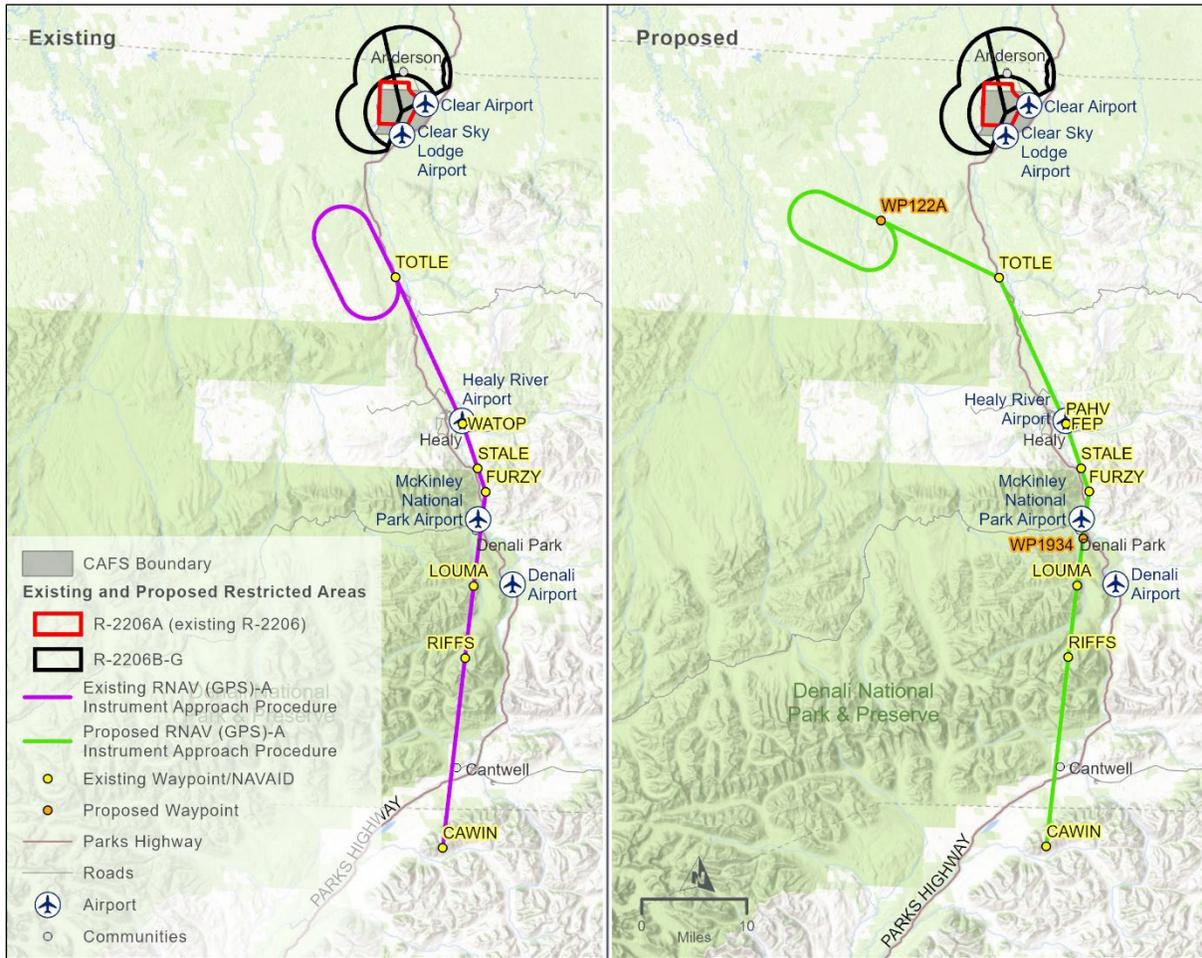
**Description of Amendment:** The existing published chart for the RNAV (GPS)-A instrument approach procedure is shown in **Figure 5-8** and the existing and proposed procedures are shown in **Figure 5-9**. The only proposed amendment to the RNAV (GPS)-A procedure that would be noticeable to pilots is the relocation of the missed approach holding pattern from TOTLE waypoint to WP122A, and the subsequent change to the missed approach procedure. From the missed approach point, the aircraft would fly direct to TOTLE waypoint, then to WP122A and enter the holding pattern, increasing the distance from the holding pattern to PAHV waypoint by 10.9 NM. The other change to this procedure would be the addition of WP1934 as a step-down fix. WP1934 is added solely to meet obstacle clearance criteria and because it would be added to the existing final approach course and glide path, would not affect how aircraft execute the approach. While WP1934 is a new waypoint, it is along the same descent gradient and would not affect lateral or vertical position of aircraft.

Figure 5-8. Existing Healy RNAV (GPS)-A Arrival Procedure Chart



Source: FlightAware 2017d

Figure 5-9. Existing and Proposed Healy RNAV (GPS)-A Arrival Procedure

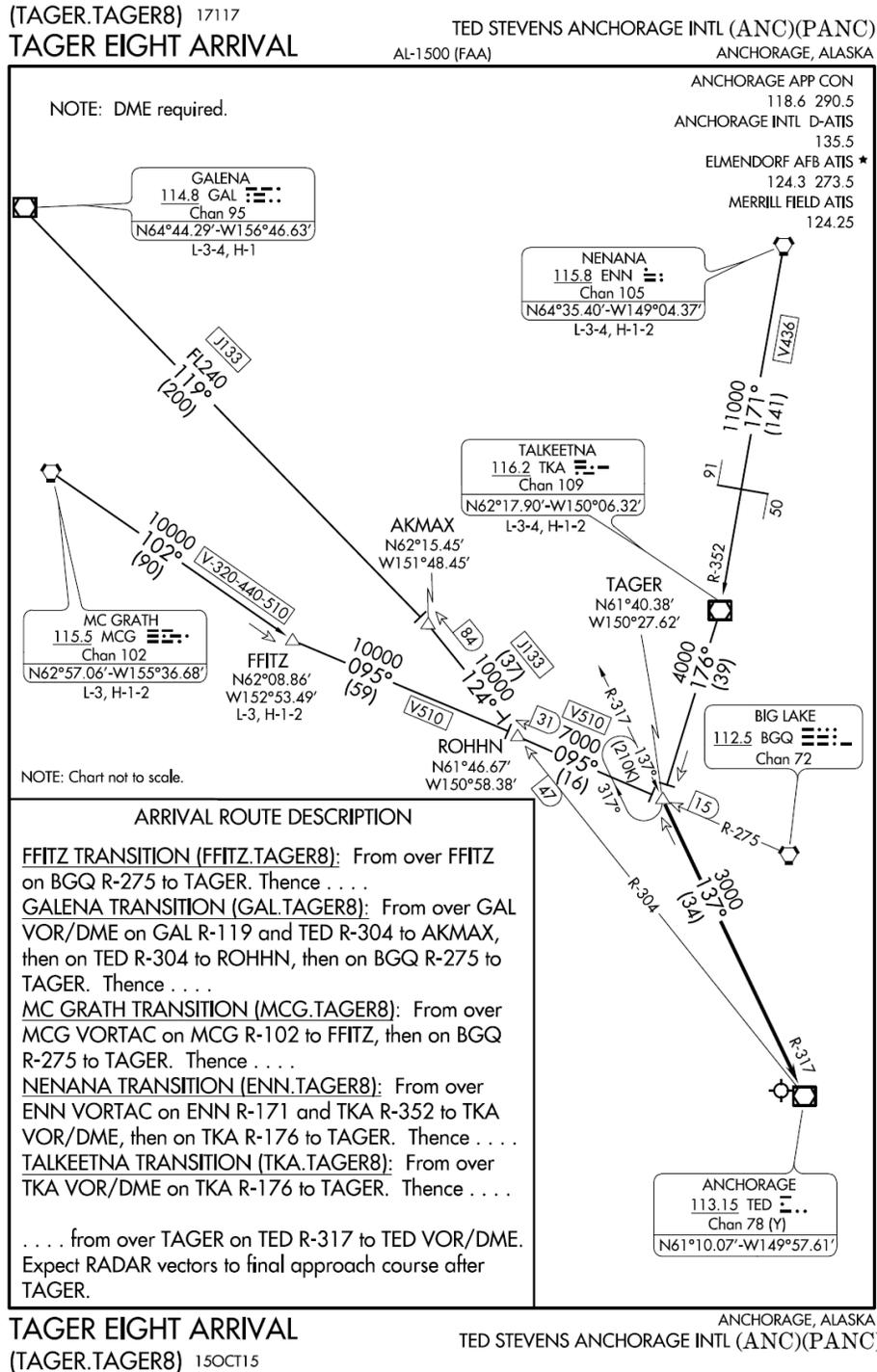


### **5.3 Ted Stevens Anchorage International Airport: TAGER EIGHT ARRIVAL Procedure**

**Reason for Amendment:** The proposed Restricted Areas would conflict with a segment of the Nenana transition to the TAGER EIGHT ARRIVAL procedure. This proposed amendment would remove the conflicting segment of the arrival route along V-436.

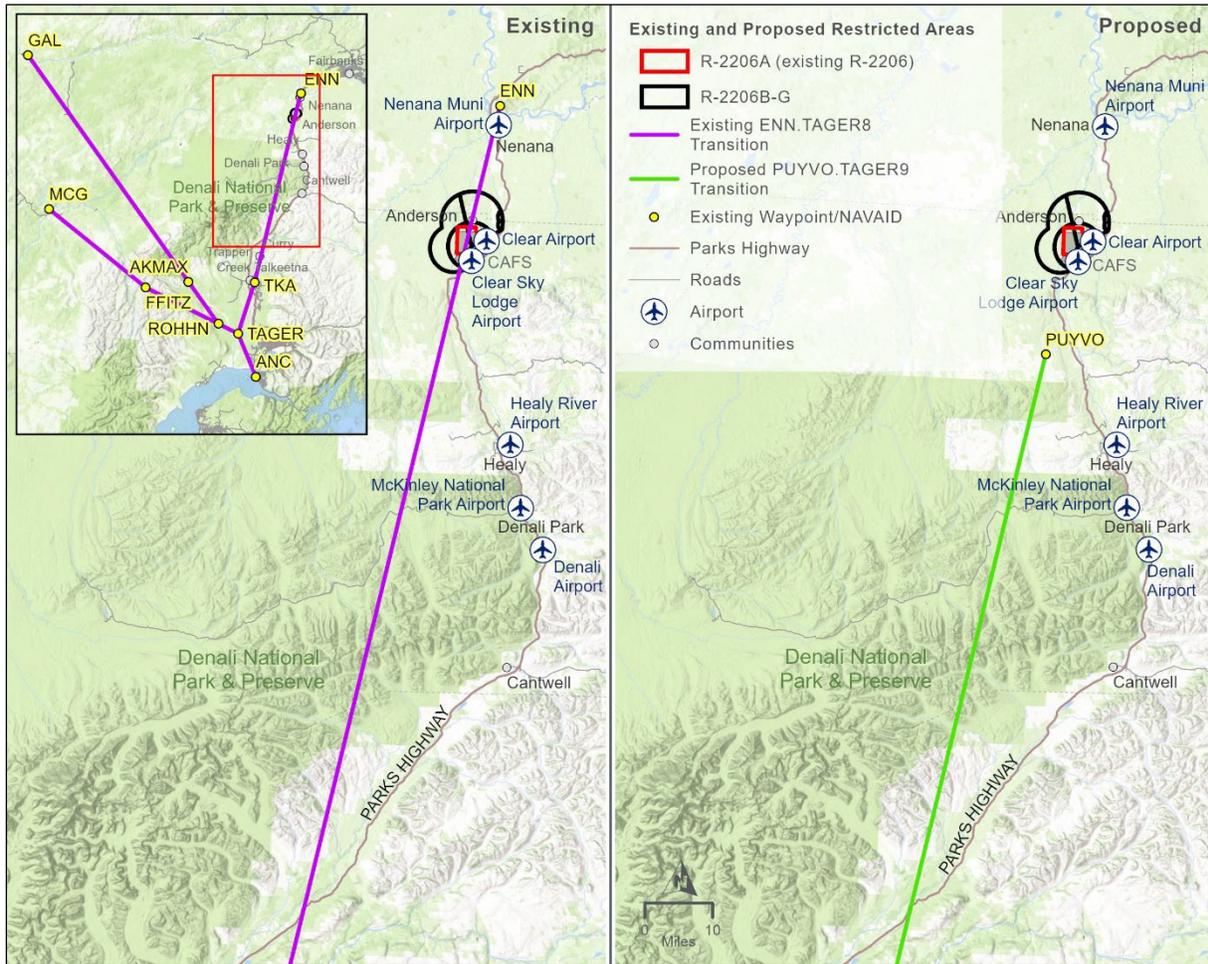
**Description of Amendment:** The existing published chart for the TAGER EIGHT ARRIVAL procedure is shown in **Figure 5-10**, and the existing and proposed procedures are shown in **Figure 5-11**. The segment of the TAGER EIGHT ARRIVAL procedure between the Nenana Municipal Airport and the TAGER intersection would be shortened to begin at PUYVO waypoint (altitude 11,000 feet MSL). This transition would be renamed the PUYVO.TAGER9. All other segments and portions of the TAGER EIGHT ARRIVAL would remain unchanged.

Figure 5-10. Existing TAGER EIGHT ARRIVAL Procedure Chart



Source: FlightAware 2015

**Figure 5-11. Existing and Proposed TAGER EIGHT ARRIVAL Procedure**



## **Appendix D: Applicable Laws, Regulations, Policy, and Guidance**

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**Acronyms and Abbreviations**

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AFI	Air Force Instruction
AFMAN	Air Force Manual
AS	Alaska Statute
CAFS	Clear Air Force Station
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DAF	Department of the Air Force
DoD	Department of Defense
DoDI	Department of Defense Instruction
EIS	Environmental Impact Statement
EMF	electromagnetic field
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
HIRF	high-intensity radiated fields
ICRMP	Integrated Cultural Resources Management Plan
IEEE	Institute of Electrical and Electronics Engineers
LRDR	Long Range Discrimination Radar
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
RCRA	Resource Conservation and Recovery Act
RFR	radio frequency radiation
U.S.	United States
USAF	U.S. Air Force
U.S.C.	United States Code
USEPA	U.S Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WOUS	Waters of the United States

# Applicable Laws, Regulations, Policy, and Guidance

This appendix presents the applicable regulatory information for each of the environmental categories discussed in **Chapter 3.0, Environmental Analysis**, of the Long Range Discrimination Radar (LRDR) Operations, Clear Air Force Station (CAFS), Alaska, Environmental Impact Statement (EIS).

## 1.0 Airspace

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The management of airspace is governed by federal law. Per 49 United States Code (U.S.C.) § 40103(b), *Sovereignty and Use of Airspace*, the Federal Aviation Administration (FAA) has overall responsibility for managing the use of navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace. The FAA Administrator also establishes security provisions that encourage and allow maximum use of the navigable airspace by civil aircraft consistent with national security in consultation with the Secretary of Defense.

FAA implements its authority in Section 40103(b) via promulgation of regulations in 14 Code of Federal Regulations (CFR), orders, and associated policies and procedures. Adherence to federal aviation regulations ensures that both military and civilian aircraft operate safely in shared airspace. The U.S. Air Force (USAF) conducts aviation operations in accordance with processes and procedures detailed in Air Force Instruction (AFI) 13-201, *Airspace Management*. AFI 13-201 also provides the guidance and procedures used to develop submissions to FAA for the proposed establishment of Special Use Airspace (SUA) pursuant to 14 CFR Part 73. It governs planning, acquisition, use, and operations within the airspace required to support the flight training necessary to ensure pilot proficiency.

In addition to the regulatory process, policy and procedures associated with FAA consideration of new airspace proposals, and management and modification of existing airspaces are addressed in FAA Order JO 7400.2M, *Procedures for Handling Airspace Matters* (effective January 28, 2019). The FAA, in consultation with the Department of Defense (DoD) or other federal security/intelligence agencies, may issue special security instructions via temporary flight restrictions (TFR) in the interest of national security (see 14 CFR § 99.7, *Special security instructions*).

The DoD requests the designation of airspace by FAA, and schedules and uses airspace in accordance with the processes and procedures detailed in DoD Directive 5030.19, *DoD Responsibilities on Federal Aviation*, and FAA regulations.

The airspace designations for all United States (U.S.) airports are listed in FAA Order JO 7400.11E, *Airspace Designations and Reporting Points*. FAA also ensures safety around airports through 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, and FAA Advisory Circular 50/5300-13A, *Airport Design*. Per FAA Order JO 7400.2M (Section 23-1-4), *Restricted Area Floor*:

- (a) A restricted area floor may be established to the surface only when the using agency owns, leases, or, by agreement, controls the underlying surface. Agencies proposing the new restricted area with a floor to the surface are encouraged to acquire sufficient control of the underlying surface to avoid impacting the existing owner's activities and functional land uses.<sup>1</sup>

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<sup>1</sup> Existing restricted areas established from the surface before December 1, 1967, are exempt from the "own, lease, or control" requirement. This remains valid until amendment action is taken that would expand the boundaries, altitudes, or times of use, or would change the designated purpose of the area. Nevertheless, using agencies of such

- (b) Provisions must be made for aerial access to private and public use land beneath the restricted area, and to accommodate instrument arrivals and departures at affected airports with minimum delay.
- (c) The restricted area must exclude the airspace 1,500 feet AGL [above ground level] and below within a 3-NM [nautical mile] radius of airports available for public use. This exclusion may be increased if necessary based on unique circumstances.

The FAA *Aeronautical Information Manual: Official Guide to Basic Flight Information and ATC Procedures* defines and provides the aviation community with basic flight information and ATC procedures for use in the National Airspace System of the U.S. (FAA 2020c). The USAF follows FAA Order JO 7110.65, *Air Traffic Control* (effective January 30, 2020), FAA Order JO 7610.4, *Special Operations* (effective July 5, 2019), and the *Memorandum of Agreement between FAA and DoD Concerning Environmental Review of Special Use Airspace Actions* (established October 17, 2019) for established procedures for flying, airfield, and flightline operations at USAF airfields. All SUA areas, as well as issued but not yet implemented amendments to those areas, established by FAA are listed in FAA Order JO 7400.10B, *Special Use Airspace* (effective February 16, 2020). Per DoD Directive 5030.19 and AFI 13-201 and consistent with the FAA's airspace management policies and procedures, airspace designated by the FAA for military use is released to the FAA for other uses when the airspace is not needed for military requirements.

Title 14 CFR Part 91, *FAA General Operating and Flight Rules*, prescribes rules governing the operation of aircraft within the U.S., including the waters within 3 NM of the U.S. coast. FAA Order 8260.3, *U.S. Standard for Terminal Instrument Procedures*, prescribes standardized methods for designing and evaluation instrument flight procedures (IFPs) in the United States and its territories. As described in the FAA's *Instrument Procedures Handbook* (FAA-H-8083-16B; effective September 2017) and the *Aeronautical Information Manual: Official Guide to Basic Flight Information and ATC Procedures*, most airways are 8 NM (14 kilometers) wide, and the airway flight levels keep aircraft separated by at least 500 vertical feet from aircraft on the flight levels above and below when operating under visual flight rules. When operating under instrument flight rules, between the surface and an altitude of flight level 290, no aircraft should come closer vertically than 1,000 feet. Generally, at altitudes higher than flight level 290, aircraft should be vertically separated by at least 2,000 feet.

Safety standards for personnel subjected to high-intensity radiated fields (HIRF) and electromagnetic field (EMF) exposure are established in DoD Instruction (DoDI) 6055.11, *Protecting Personnel from Electromagnetic Fields*, and AFI 48-109, *Electromagnetic Field Radiation Occupational and Environmental Health Program*. Additional safety guidelines and standards for non-ionizing EMF are outlined in the comprehensive Institute of Electrical and Electronics Engineers (IEEE) Standard C95.1, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 0 Hz to 300 GHz*, which addresses consideration of potential hazards of EMF to all personnel in unrestricted exposure environments, including aircraft pilots. This standard is consistent with the Maximum Permissible Exposure limits set in AFI 48-109. Respectively, 14 CFR § 23.1308 and Appendix J, 14 CFR § 25.1317 and Appendix L, 14 CFR § 27.1317 and Appendix D, and 14 CFR § 29.1317 and Appendix E specify the field strengths for internal and external radio frequency environments that various airplane and rotorcraft categories must be able to withstand for the safe flight and landing in various HIRF environments. FAA Advisory Circular 20/158A, *The Certification of Aircraft Electrical and Electronic*

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restricted areas are encouraged to acquire sufficient control of the property to prevent possible disruption of that agency's activities.

*Systems for Operation in the High Intensity Radiated Fields (HIRF) Environment*, describes a means to show compliance with the requirements for protection of the operation of electrical and electronic systems on an aircraft when the applicable HIRF protection requirements for aircraft are exposed to an external HIRF environment. Applicable regulations for protection of people and ground-based systems are discussed in **Section 10.0**.

## 2.0 Air Quality

### 2.1 Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for the six criteria pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health impacts; secondary standards protect against welfare impacts, such as damage to farm crops and vegetation, and damage to buildings. Some pollutants have short- and long-term standards. Short-term standards were designed to protect against acute, or short-term, health impacts, while long-term standards were established to protect against chronic health impacts. The state of Alaska has established ambient air quality standards for criteria pollutants, which are essentially the same as the NAAQS with an additional standard for ammonia. **Table 2-1** presents the current NAAQS and Alaska Ambient Air Quality Standards (AAAQS) as defined in 18 Alaska Administrative Code (AAC) 50.010.

**Table 2-1. Federal and State Ambient Air Quality Standards**

Pollutant	Averaging Period	NAAQS		AAAQS
		Primary	Secondary	
CO	1 hour <sup>(1)</sup>	35 ppm	--	40 mg/m <sup>3</sup>
	8 hour <sup>(1)</sup>	9 ppm	--	10 mg/m <sup>3</sup>
Pb	Rolling 3 month <sup>(2)</sup>	0.15 µg/m <sup>3</sup>	0.15 µg/m <sup>3</sup>	0.15 µg/m <sup>3</sup>
NO <sub>2</sub>	1 hour <sup>(3)</sup>	100 ppb	--	188 µg/m <sup>3</sup>
	Annual <sup>(2)</sup>	53 ppb	53 ppb	100 µg/m <sup>3</sup>
O <sub>3</sub>	8 hour <sup>(4)</sup>	0.070 ppm	0.070 ppm	0.070 ppm
PM <sub>2.5</sub>	24 hour <sup>(5)</sup>	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
	Annual <sup>(6)</sup>	12.0 µg/m <sup>3</sup>	15.0 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>
PM <sub>10</sub>	24 hour <sup>(7)</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
SO <sub>2</sub>	1 hour <sup>(8)</sup>	75 ppb	--	195 µg/m <sup>3</sup>
	3 hour <sup>(1)</sup>	--	0.5 ppm	1,300 µg/m <sup>3</sup>
	24 hour <sup>(1)</sup>	--	--	365 µg/m <sup>3</sup>
	Annual <sup>(2)</sup>	--	--	80 µg/m <sup>3</sup>
Ammonia	8 hour <sup>(1)</sup>	--	--	2.1 mg/m <sup>3</sup>

Sources: USEPA 2020a, ADEC 2020a.

Notes: ppm = parts per million; ppb = parts per billion; µg/m<sup>3</sup> = micrograms per cubic meter; mg/m<sup>3</sup> = milligrams per cubic meter

<sup>(1)</sup> Not to be exceeded more than once per year.

<sup>(2)</sup> Not to be exceeded.

<sup>(3)</sup> The 3-year average of the 98th percentile of 1-hour daily maximum concentrations over each year must not exceed the standard.

<sup>(4)</sup> The 3-year average of the fourth-highest daily maximum 8-hour average concentration over each year must not exceed the standard.

<sup>(5)</sup> The 3-year average of the 98th percentile of 24-hour concentrations must not exceed the standard.

<sup>(6)</sup> The 3-year average of the annual mean concentration must not exceed the standard.

<sup>(7)</sup> Not to be exceeded more than once per year on average over 3 years.

<sup>(8)</sup> The 3-year average of the 99th percentile of 1-hour daily maximum concentrations must not exceed the standard.

The Clean Air Act also established mandatory Class 1 areas, which include areas such as national parks, national wilderness areas, and national monuments where visibility is an important value (40 CFR Part 81). These areas are granted special air quality protections under the Regional Haze Rule (40 CFR Part 51). Addition or a major modification of a major stationary source of air pollutants requires a Prevention of Significant Deterioration permit, and a visibility analysis if located within 50 kilometers of a Class 1 protected area. The Proposed Action does not involve any stationary sources.

## 2.2 State Regulations

The Alaska Department of Environmental Conservation (ADEC) Division of Air Quality oversees programs for permitting the construction and operation of new or modified stationary source air emissions in the state of Alaska. CAFS currently holds a Title V permit for the operation of stationary emissions sources that include boilers, diesel generator and pump engines, and gasoline fuel storage and dispensing tanks. ADEC does not currently have applicable regulations regarding the operation of mobile sources such as vehicles and aircraft; motor vehicle inspection/maintenance requirements have been suspended or no longer apply. Other ADEC air quality rules that apply to CAFS include open burning, fugitive dust, visible emissions, and semi-annual and annual emissions reporting and fees for stationary source emissions/compliance (ADEC 2018).

## 3.0 Biological Resources

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Biological resources potentially affected by the Proposed Action are protected by several federal and state laws and regulations. These laws and regulations are summarized below.

### 3.1 Federal Laws and Regulations

**Endangered Species Act (ESA) of 1973**, as amended by the National Defense Authorization Act (NDAA) of 2004 (16 U.S.C. § 1531 et seq.). The ESA seeks to protect and recover imperiled species and the ecosystems on which they depend. The ESA protects endangered and threatened species and their habitats by prohibiting the “take” of listed animals and the interstate or international trade in listed plants and animals, including their parts and products, except under federal permit. Section 7(a)(2) requires federal agencies, in coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration National Marine Fisheries Service, to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The NDAA of 2004 amended Section 4 of the ESA by exempting military lands from critical habitat designations that are subject to an Integrated Natural Resources Management Plan.

**Migratory Bird Treaty Act of 1918 (16 U.S.C. § 703–712)**. This act protects migratory birds by prohibiting the take or sale of migratory birds or their parts and products, or any activity that would harm migratory birds, their eggs, or their nests. The Migratory Bird Treaty Act implements a series of international treaties to protect migratory birds that cross international boundaries during their migration.

**Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. § 668–668c).** This act protects bald and golden eagles by prohibiting unauthorized capture, purchase, habitat destruction (including nests), and transportation or use of eagles or eagle parts, including nests and eggs.

**Sikes Act (16 U.S.C. § 670a–670o).** The Sikes Act seeks to ensure that ecosystems on military lands are protected and enhanced while allowing military lands to meet the needs of military operations. The act includes provisions for preparation and implementation of Integrated Natural Resource Management Plans in cooperation with USFWS, the National Oceanic and Atmospheric Administration National Marine Fisheries Service, and the applicable state fish and wildlife agency.

**USAF Guidance AFI 32-7001, Environmental Management.** This AFI implements DoDI 4715.17, *Environmental Management System*, and Air Force Policy Directive 32-70, *Environmental Quality*, and is consistent with Air Force Policy Directive 90-8, *Environment, Safety, and Occupational Health*. This AFI establishes the framework for an Environmental Management System. The guidance and procedures outlined in this AFI generally apply to all USAF installations within the U.S. and its territories, and in foreign countries.

**DoDI 4715.03, Natural Resources Conservation Program.** This instruction establishes policy for the integrated management of natural resources (including biological and earth resources) on property and lands managed or controlled by DoD.

**Air Force Manual (AFMAN) 32-7003, Environmental Conservation.** This manual implements Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*, and supports AFI 32-7001, *Environmental Management*. It provides guidance and procedures for cultural resource and natural resource programs on USAF installations.

**CAFS Integrated Natural Resources Management Plan.** This plan is the principal tool for managing natural resources at CAFS and has been prepared in accordance with regulations, standards, and procedures of DoD, Department of the Air Force, and the Sikes Act (16 U.S.C. § 670a) in cooperation with USFWS and the Alaska Department of Fish and Game (ADF&G). The plan reflects the mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources on CAFS. The plan is reviewed for compliance with the Sikes Act every 5 years; the CAFS plan was most recently reviewed in 2019.

## 3.2 State Laws and Regulations

**Endangered Species (5 AAC 93.020).** This statute establishes a state list of endangered species and regulations that govern endangered species permits and other activities affecting endangered species.

**Fish Habitat Permits and Special Use Permits.** ADF&G Fish Habitat permits and Special Use permits are required for actions that would result in environmental impacts on fish, wildlife, habitats, or existing public uses.

## 4.0 Climate

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There are no federal or state regulations pertaining to greenhouse gas emissions that apply to the Proposed Action.

## 5.0 Hazardous Materials, Solid Waste, and Pollution Prevention

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The generation, use, storage, transport, and disposal of hazardous materials and wastes are regulated at the federal, state, and local levels. Some specific regulations and statutes are described below.

The **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** authorizes USEPA to respond to spills and other releases of hazardous substances to the environment and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a federal “Superfund” to respond to emergencies immediately. Although the “Superfund” provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters. Section 120(h) of CERCLA requires federal agencies to notify prospective buyers of contaminated federal properties about the type, quantity, and location of hazardous substances that might be present.

The **Resource Conservation and Recovery Act (RCRA)** authorizes USEPA to provide for “cradle-to-grave” management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. With the Hazardous and Solid Waste Amendments of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The amendments strengthen control of hazardous and nonhazardous waste and emphasizes the prevention of groundwater pollution.

The State of Alaska has enacted the following regulations for pollution prevention and control of hazardous materials:

- **Spill Prevention and Response (18 AAC 75)** – The Alaska Division of Spill Prevention and Response works to prevent and respond to spill releases of hazardous materials to rapidly protect human and environmental health. This division of ADEC also investigates, treats, and maintains a database of contaminated sites within Alaska.
- **Water, Air, Energy, and Environmental Conservation (Alaska Statute [AS] 46)** – This Alaska statute granted the State of Alaska provisions to protect the state’s environmental resources. Article 3 outlines water quality and pollution control standards, which include waste management and disposal. Section 46.03.299 to Section 46.03.317 specifically addresses hazardous waste regulations. Additionally, Article 6 regulates underground storage tanks containing and releasing hazardous materials. ADEC administers the Contaminated Sites Program.

DoD and the Department of the Air Force (DAF) also regulate hazardous materials and wastes. AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*; AFI 32-1001, *Civil Engineer Operations*; and AFI 23-201, *Fuels Management*, establish procedures and required standards that govern management and disposal of hazardous materials and wastes throughout the DAF.

## 6.0 Historical, Architectural, Archaeological, and Cultural Resources

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Several federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (NHPA; 1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). CAFS is required to comply with USAF regulations and instructions, including the Integrated Cultural Resources Management Plan (ICRMP) for CAFS; AFMAN 32-7003, Environmental Conservation; and AFI 90-2002, Interactions with Federally Recognized Tribes.

The National Environmental Policy Act (NEPA) requires federal agencies to analyze the impacts of their undertakings on historical, architectural, archaeological, and cultural resources as part of a broader review of the human environment. Conversely, Section 106 of the NHPA (36 CFR Part 800) focuses on a specific subset of cultural resources: historic properties (properties that are listed on or meet the eligibility requirements for listing on the NRHP). Coordination between NEPA and Section 106 of the NHPA is outlined in 36 CFR § 800.8, which states that agency officials should ensure that preparation of an EIS and Record of Decision includes appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects (36 CFR § 800.8(a)(3)).

Cultural resources management procedures are defined in AFMAN 32-7003, *Environmental Conservation* (USAF 2020); DoDI 4715.16, *Cultural Resources Management* (DoD 2018); and the FAA 1050.1F Desk Reference (FAA 2020b):

- AFMAN 32-7003 outlines the actions and processes required for managing and protecting cultural resources on property affected by operations on installments of the USAF. It details compliance requirements for protecting cultural resources through an ICRMP.
- DoDI 4715.16 establishes DoD policy and details the procedures for managing cultural resources at DoD facilities. It provides an overview of the program; lists roles and responsibilities; and discusses the procedures for implementing cultural resources management inventory, consultation, and ICRMP contents.
- FAA 1050.1F Desk Reference details the regulatory setting for cultural resource management and defining the Area of Potential Effects and provides guidelines for the evaluation of environmental consequences on cultural resources and examples of potential mitigation measures to avoid, minimize, or mitigate adverse impacts to cultural resources.

As directed by AFMAN 32-7003 and DoDI 4715.16, the ICRMP is a document that lists and describes the installation's cultural resources, defines procedures and policies, and outlines plans for managing cultural resources on military installations. The ICRMP is comprehensive in order to ensure that the installation fully integrates cultural resources planning with other land management and development plans at the installation.

The CAFS ICRMP was last updated in February 2019 (USAF 2019c). Per the standards discussed above, CAFS must update or review the plan at least annually and complete major revisions as mission changes warrant. The CAFS ICRMP summarizes the history and prehistory of CAFS, reviews past cultural resource surveys, outlines and assigns responsibilities for cultural resource management, addresses related concerns, and provides standard operating procedures that help preserve cultural resources within the installation.

## 7.0 Land Use

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Aside from regulations related to noise-compatible land use (addressed in **Section 9.0**), there is no regulatory framework for addressing land ownership and land use related to the Proposed Action.

## 8.0 Natural Resources and Energy Supply

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Sections 1502.16(e) and (f) of the Council on Environmental Quality Regulations require federal agencies to consider (1) energy requirements and conservation potential of various alternatives and mitigation measures; and (2) natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures. Additionally, the following statutes, Executive Order (EO), and policies pertain to natural resources and energy supply impacts of proposed federal facilities:

- **Energy Independence and Security Act (42 U.S.C. § 17001 et seq.)**. Requires federal agencies to take actions to move the U.S. toward greater energy independence and security; to increase the production of clean renewable fuels; to protect consumers; to increase the efficiency of products, buildings, and vehicles; to promote research on and deploy greenhouse gas capture and storage options; and to improve the energy performance of the federal government.
- **Energy Policy Act (42 U.S.C. § 13201 et seq.)**. Requires federal agencies to take actions to ensure jobs for the future with secure, affordable, and reliable energy.
- **EO 13834, *Efficient Federal Operations***. Instructs federal agencies to meet statutory requirements related to energy and environmental performance in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency must prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of its mission.
- **Air Force Policy Directive 90-17, *Energy and Water Management***. Implements DoD directive 4780.01, *Energy Policy* and DoDI 4170.11, *Installation Energy Management*. The directive addresses the use, conservation, and security of energy and water across all DAF missions and establishes the framework for energy management with the USAF.
- **Air Force Pamphlet 32-10144, *Implementing Utilities at U.S. Air Force Installations*** (March 8, 2016). Supports AFMAN 32-1061, *Providing Utilities to USAF Installations*. The pamphlet provides guidance to implement the provision of utilities at Air Force installations for the consistent and effective management of energy and utility programs.

## 9.0 Noise and Compatible Land Use

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**Table 9-1** summarizes the federal statutes and regulations related to noise and noise-compatible land use that may be relevant to the Proposed Action.

**Table 9-1. Federal Statutes and Regulations Related to Noise and Noise-Compatible Land Use**

Statute or Executive Order	Location in U.S. Code or Federal Register	Implementing Regulation(s) or Instructions	Oversight Agency	Summary
Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968	49 U.S.C. § 44715	49 CFR Part 821, 14 CFR Parts 21, 36, 91, 119, 135, and 150	FAA	Authorizes FAA to prescribe standards for the measurement of aircraft noise and establish regulations to abate noise.
Noise Control Act of 1972	42 U.S.C. § 4901-4918	40 CFR Part 209	USEPA	Amends the Control and Abatement of Aircraft Noise Sonic Boom Act of 1968 to add consideration of the protection of public health and welfare and to add USEPA to the rulemaking process for aircraft noise and sonic boom standards.
Aviation Safety and Noise Abatement Act of 1979	49 U.S.C. § 47501 et seq.	14 CFR Part 150	FAA	Directs FAA to establish, by regulation, a single system for measuring noise and determining the exposure of people to noise, which includes noise intensity, duration, frequency, and time of occurrence; and to identify land uses normally compatible with various noise exposures.

Federal agencies established 65 dB DNL as a threshold to determine residential land use compatibility around airports, highways, and other transportation corridors (FICON 1992). FAA's policies and procedures for evaluating potential noise effects of its actions under NEPA are described in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures. Additional guidance is provided in the 1050.1F Desk Reference.

The State of Alaska addresses noise in a nuisance-based manner under its disorderly conduct statute (AS 11.61.110); and the Matanuska-Susitna Borough, City of Fairbanks, and Town of Anderson have noise ordinances. None of these are directly relevant to noise associated with rerouted or detoured aircraft.

## 10.0 Safety

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. A safe work environment would entail continuous protection to workers from the HIRF generated by LRDR operation; however, there are no specific Occupational Safety and Health Administration standards for non-ionizing radio frequency radiation (RFR) such as HIRF (OSHA 2020). In lieu of relevant Occupational Safety and Health Administration standards, several international organizations have established safety standards for safe exposure levels. These safety standards include the World Health Organization's International Commission on Non-Ionizing Radiation Protection, and the C95.1 *Institute of Electrical and Electronics Engineers (IEEE) Standard for Safety*

*Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields.* These standards intend to limit human exposure to levels that can be absorbed and dissipated by human body cooling mechanisms.

The USAF has a program to establish exposure limits to prevent possible harmful effects to personnel from exposure to potentially hazardous levels of RFR. The criteria in AFI 48-109 provide the USAF's minimum occupational health requirements (USAF 2014). The exposure limits established in AFI 48-109 are derived from the recommended exposure levels in the current C95.1 IEEE Standard, which serve as a consensus standard developed by representatives of industry, scientific communities, government agencies, and the public. This AFI applies to government employees of all USAF organizations, but does not apply to employees working under government contract or private contractors performing work under government contracts. Contractors to USAF organizations must comply with the general duty clause in the Occupational Safety and Health Act to provide a safe and healthful work environment for their employees.

The LRDR project is governed by a set of RFR safety requirements enumerated in the LRDR contract documentation, which requires the creation of a Radio Frequency Safety Plan. A Radio Frequency Safety Plan to protect workers on CAFS from exposure to excessive RFR is under development by the Missile Defense Agency, USAF, and the radar prime contractor.

FAA requirements regarding aircraft and HIRF are outlined in 14 CFR 23 Appendix J and FAA Advisory Circular 20-158A.<sup>2</sup> Title 14 CFR 23 Appendix J specifies HIRF environments and equipment HIRF test levels for aviation electrical and electronic systems. The specifications apply to each electrical and electronic system that performs a function whose failure would prevent the continued safe flight and landing of the aircraft. Each safety-of-life system must be designed and installed so that its function is not adversely affected during and after the time the aircraft is exposed to HIRF. FAA Advisory Circular 20-158A provides information and guidance on how to show compliance with 14 CFR 23.1308, 25.1317, 27.1317, and 29.1317, *High-intensity Radiated Fields (HIRF) Protection*.

Safety standards for personnel subjected to HIRF and EMF exposure are established in DoDI 6055.11, *Protecting Personnel from Electromagnetic Fields*, and AFI 48-109, *Electromagnetic Field Radiation Occupational and Environmental Health Program*. Additional safety guidelines and standards for non-ionizing EMF are outlined in the comprehensive IEEE Standard C95.1, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 0 Hz to 300 GHz*, which addresses consideration of potential hazards of EMF to all personnel in unrestricted exposure environments, including aircraft pilots. This standard is consistent with the maximum permissible exposure limits set in AFI 48-109. 14 CFR § 23.1308 and Appendix J, 14 CFR § 25.1317 and Appendix L, 14 CFR § 27.1317 and Appendix D, and 14 CFR § 29.1317 and Appendix E specify the field strengths for internal and external radio frequency environments that various airplane and rotorcraft categories must be able to withstand for the safe flight and landing in various HIRF environments. FAA Advisory Circular 20/158A, *The Certification of Aircraft Electrical and Electronic Systems for Operation in the High Intensity Radiated Fields (HIRF) Environment*, describes a means to show compliance with applicable HIRF protection requirements for aircraft exposed to HIRF environments.

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<sup>2</sup> *The Certification of Aircraft Electrical and Electronic Systems for Operation in the High-intensity Radiated Field/s (HIRF) Environment*, issued May 30, 2014.

## 11.0 Socioeconomics and Environmental Justice

No statutes or regulations relevant to the Proposed Action were identified for the socioeconomics analysis. **Table 11-1** lists the statutes and regulations related to environmental justice.

**Table 11-1. Statutes and Regulations Related to Environmental Justice**

Statute or Executive Order	Location in U.S. Code or Federal Register	Implementing Regulation(s) or Instructions	Oversight Agency	Summary
Title VI of the Civil Rights Act of 1964, as amended	42 U.S.C. §§ 2000d-2000d-7	28 CFR § 42.401	U.S. Department of Justice	Title VI of the Civil Rights Act of 1964 states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title VI explicitly prohibits any discrimination in federally funded programs and projects.
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	59 <i>Federal Register</i> 7629 (February 11, 1994)	Not applicable	USEPA	Requires federal agencies to incorporate environmental justice into their programs.
Environmental Justice: Guidance Under the National Environmental Policy Act" (December 10, 1997)	Not applicable	Not applicable	Council on Environmental Quality	Outlines how environmental justice could be considered in NEPA documents. Provides widely used definitions of minority, low-income, and other environmental justice concepts.
Memorandum of Understanding on Environmental Justice and EO 12898 (August 4, 2011)	Not applicable	Not applicable	Not applicable	The participating federal agencies agree to declare the continued importance of identifying and addressing environmental justice considerations in their programs, policies, and activities as provided in EO 12898.
Promising Practices for EJ Methodologies in NEPA Reviews, Report of the Federal Interagency Working Group on Environmental Justice & NEPA Committee (March 2016)	Not applicable	Not applicable	Federal Interagency Working Group on Environmental Justice & NEPA Committee	Compilation of methodologies gleaned from current federal agency practices concerning the interface of environmental justice considerations through the NEPA processes.

Statute or Executive Order	Location in U.S. Code or Federal Register	Implementing Regulation(s) or Instructions	Oversight Agency	Summary
USDOT Order 5610.2(a) Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Not applicable	Not applicable	USDOT	Defines “disproportionately high and adverse effect” on minority and low-income populations as an adverse effect that: <ul style="list-style-type: none"> <li>• Is predominantly borne by a minority population and/or a low-income population; or</li> <li>• Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.</li> </ul>

Notes: EJ = Environmental Justice; USDOT = U.S. Department of Transportation

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate effects that could be imposed on them. This EO requires that federal agencies’ actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with the respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a Proposed Action. Such information aids in evaluating whether or not a Proposed Action would render vulnerable any of the groups targeted for protection in EO 12898.

## 12.0 Subsistence

Subsistence in Alaska is managed by either the State of Alaska or the federal government, depending on who owns or manages the land. Subsistence on state lands is managed by the State of Alaska Joint Board of Fisheries and Game under AS 16.05.940; 32. Title VIII, Section 803 of the Alaska National Interest Lands Conservation Act applies to federal lands.

Land status within the study area includes both state and federally managed lands (see **Section 3.7, Land Use**, of the EIS for a more detailed discussion). The Federal Subsistence Management Board has identified the Fairbanks North Star Borough as a non-rural community and area (USDOI Undated). The Alaska National Interest Lands Conservation Act requires that rural residents have priority over other users to take wildlife for subsistence uses on federal lands and waters. Non-rural Alaska residents may hunt under State of Alaska hunting regulations on most federal public lands, with the exception of National Park Service-managed parks and monuments, or where hunting is otherwise closed. The Federal Subsistence Management Program has identified areas within Alaska as non-rural. Only residents who have a primary, permanent residence in a rural area can qualify to hunt, trap, or fish under federal subsistence regulations (USDOI Undated).

Additionally, the State of Alaska Joint Board of Fisheries and Game has identified areas within the state as “nonsubsistence areas.” These are defined as areas where dependence on subsistence is not a principal characteristic of the economy, culture, and way of life. For areas identified as nonsubsistence by the State of Alaska Joint Board of Fisheries and Game, the subsistence priority does not apply. Subsistence fisheries and subsistence hunting are not authorized in nonsubsistence areas. Nonsubsistence areas include areas immediately around Anchorage and Fairbanks. The Fairbanks nonsubsistence area and the study area overlap in the region extending south from Fairbanks to almost Cantwell; the Anchorage nonsubsistence area and the study area both include the community of Talkeetna. The communities of Fairbanks, Healy, Denali Park, and Talkeetna are located within nonsubsistence use areas (ADF&G Undated). The nonsubsistence areas are shown on **Figure 3.12-1** of the EIS. The main difference between the state and federal laws regarding subsistence is who qualifies for participation in subsistence activities: under the Alaska National Interest Lands Conservation Act, rural Alaska residents qualify; under state law, all Alaska residents qualify for subsistence harvesting (ADF&G Undated).

## 13.0 Visual Effects

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There are no federal special purpose laws or requirements specific to visual effects. NEPA requires that visual impacts be considered for their potential to affect both the visual resources in the landscape and the experiences of those who view the landscape. In addition, laws protecting resources that may be affected by visual impacts include Section 106 of the NHPA and the Wild and Scenic Rivers Act. These regulations are discussed in relation to the environmental categories that they regulate in other sections of this document.

Locally, the three boroughs within the study area for visual resources (see **Section 3.13** of the EIS)—the Matanuska-Susitna Borough, Denali Borough, and Fairbanks North Star Borough—have ordinances regulating the visual character of particular land uses. Although no ordinances were found that would directly apply to the airspace considerations of the Proposed Action, in 2007 the Denali Borough Assembly passed Resolution No. 07-06 supporting the nomination of Denali National Park and Preserve (Denali National Park) as a United Nations Educational, Scientific and Cultural Organization World Heritage Site, stating that “designation as a World Heritage Site would increase international awareness of Denali’s global significance, and increase understanding to help protect and preserve its significant resources for the future...” (Denali Borough 2007). Although Denali National Park is not currently included on the U.S. World Heritage Tentative List (NPS 2020), adverse visual impacts to Denali National Park are likely to be of local concern.

## 14.0 Water Resources

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### 14.1 Federal Regulations

**Clean Water Act – 33 U.S.C. § 1251 et seq. (1972).** The primary statute regulating protection of the nation’s waters, the Clean Water Act regulates discharges of pollutants into waters of the United States (WOUS) and establishes water quality standards for surface waters in order to prevent, reduce, and eliminate pollution in the nation’s waters to restore and maintain their chemical, physical and biological integrity.

- **Section 303(d), Impaired Waters and Total Maximum Daily Loads.** Authorizes USEPA to assist states and tribal entities in listing impaired waters and developing Total Maximum Daily Loads for listed impaired waters.

- **Section 401, State Certification of Water Quality.** Provides state or tribal authority to protect water quality within their jurisdictions by authorizing states and tribes to certify that discharge into WOUS will comply with permitted provisions such as limiting discharges and requiring monitoring and reporting.
- **Section 404.** Regulates the discharge of dredged or fill material into WOUS, including wetlands through the U.S. Army Corps of Engineers and USEPA. The U.S. Army Corps of Engineers is responsible for issuing permits for the discharge of dredged or fill materials into WOUS, including wetlands, under Section 404, whereas USEPA is responsible for issuing policy guidance and evaluating permit criteria.

**Safe Drinking Water Act.** The Safe Drinking Water Act was established in 1974 (42 U.S.C. § 300f et seq.) and amended in 1996 to protect the quality of water that is intended for human consumption, including all sources, whether above or below ground.

**Wild and Scenic Rivers Act** (16 U.S.C. § 1271). This act was enacted by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational value in a free-flowing condition.

**EO 11990, *Protection of Wetlands*.** This EO requires federal agencies to provide leadership and take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

**EO 11988, *Floodplain Management*.** In accordance with EO 11988, as amended by EO 13690, Establishing a Federal Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input, requires federal agencies to determine whether a proposed action would occur within a floodplain and then to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

## 14.2 State Regulations

ADEC and the Alaska Department of Natural Resources are the primary agencies largely responsible for administering Alaska's environmental laws, regulations, and environmental permits related to water quality and quantity, wetlands, water withdrawal, discharges, stormwater, and water and sewage treatment. Alaska's water quality standards are identified at 18 AAC 70.

# **Appendix E: Air Emissions Calculations**

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**Long Range Discrimination Radar Operations, Clear Air Force Station, Alaska**  
**Draft Environmental Impact Statement**

Appendix E - Calculation of Air Emissions

September 2020

Sheet 1 of 3 - Flight Detour and Reroute Assumptions

**Visual Flight Rules (VFR) Flight Detour Assumptions**

3,650 Annual VFR flights detoured

41 percent Percent of annual VFR flights flying at 3,000 AGL or less

1497 Annual VFR flights rerouted flying at or below 3,000 AGL

Criteria Pollutants and GHG Emissions Calculations

*Most conservative individual aircraft detour distance around Restricted Areas/TFRs*

1.3 NM

1.5 Statute miles

VFR Aircraft Assumptions

Largest aircraft: Cessna 208

156 knots

BADA 3.0 Performance Summary Table, C421, Climbout Average Speed <sup>1</sup>

**Instrument Flight Rules (IFR) Flight Reroute Assumptions**

1,825 Annual IFR flights rerouted

3 percent Percent of annual IFR flights flying at 3,000 AGL or less

55 Annual VFR flights rerouted flying at or below 3,000 AGL

Criteria Pollutants Emissions Calculations

*Most conservative individual aircraft rerouting distance during Interim Phase: West Reroute*

1.5 NM

1.7 Statute miles

*Most conservative individual aircraft rerouting distance following airway amendments: T-399*

3.7 NM

4.3 Statute miles

GHG Emissions Calculations

*Average individual aircraft rerouting distance during Interim Phase*

11.8 NM

13.6 Statute miles

*Most conservative individual aircraft rerouting distance during Interim Phase: V-438*

42.5 NM

48.9 Statute miles

*Average individual aircraft rerouting distance following airway amendments*

20.1 NM

23.1 Statute miles

*Most conservative individual aircraft rerouting distance following airway amendments: V-436 dogleg*

51.8 NM

59.6 Statute miles

Largest aircraft: B737

321.7 knots

BADA 3.0 Performance Summary Table, B737, Climbout Average Speed <sup>1</sup>

<sup>1</sup> = Averaged aircraft flight speed data in climbout mode was used to convert flight distance to flight time. This data was obtained from the FAA provided document containing aircraft performance summary tables for the base of aircraft data. Reference is: European Organization for the Safety of Air Navigation. 1998. Aircraft Performance Summary Tables for the Base of Aircraft Data, Revision 3.0. October 1998.

**Long Range Discrimination Radar Operations, Clear Air Force Station, Alaska  
Draft Environmental Impact Statement**

Appendix E - Calculation of Air Emissions

September 2020

Sheet 2 of 3 - Criteria Pollutants Emissions Calculations

**VFR Flight Rerouting Emissions**

Aircraft Make/Model	Engines (number/aircraft)	Fuel Flow (lbs/hr)	Emission Factors (lbs/1,000 lbs fuel) <sup>1</sup>					
			NOx	SO <sub>2</sub>	CO	VOC	PM-10	PM-2.5
Cessna 208 <sup>2</sup>	O-320-D2J (1)	81	7.96	1.07	904.75	40.87	0.2	0.18

	Annual Rerouting Distance below 3,000 ft AGL (statute miles/yr)	Annual Average Rerouting Time at Climbout Mode (hrs/yr)	Annual Emissions (tpy)					
			NOx	SO <sub>2</sub>	CO	VOC	PM-10	PM-2.5
<b>Detour Around TFRs/RAs</b>	2,245.5	12.5	<0.01	<0.01	0.46	0.02	<0.01	<0.01

**IFR Flight Rerouting Emissions**

Aircraft Make/Model	Engines (number/aircraft)	Fuel Flow (lbs/hr)	Emission Factors (lbs/1,000 lbs fuel) <sup>1</sup>					
			NOx	SO <sub>2</sub>	CO	VOC	PM-10	PM-2.5
B737 <sup>3</sup>	CFM56-7B27 (2) <sup>4</sup>	8278	23.7	1.07	0.5	0.12	0.11	0.1

	Annual Rerouting Distance below 3,000 ft AGL (statute miles/yr)	Annual Average Rerouting Time at Climbout Mode (hrs/yr)	Annual Emissions (tpy)					
			NOx	SO <sub>2</sub>	CO	VOC	PM-10	PM-2.5
<b>Interim Phase: West Reroute</b>	93.5	0.3	0.06	<0.01	<0.01	<0.01	<0.01	<0.01
<b>Airway Changes: T-399</b>	236.5	0.6	0.12	0.01	<0.01	<0.01	<0.01	<0.01

**Total Flight Rerouting Emissions**

	Annual Emissions (tpy)					
	NOx	SO <sub>2</sub>	CO	VOC	PM-10	PM-2.5
<b>Interim Phase</b>	0.06	<0.01	0.46	0.02	<0.01	<0.01
<b>Airway Changes</b>	0.12	0.01	0.46	0.02	<0.01	<0.01

<sup>1</sup> = Emission factors were obtained from the *Air Force Air Emissions Guide for Air Force Mobile Sources* (dated August 2018) which also includes commercial aircraft data.

<sup>2</sup> = Conservatively assumed all aircraft are Cessna 208 as it is the largest aircraft rerouted. Cessna 421 used as surrogate for flight speed, Cessna 172P used as surrogate for engine emission factors

<sup>3</sup> = Conservatively assumed all aircraft are B737 as that is the largest aircraft rerouted.

<sup>4</sup> = Conservatively assumed this engine because it has the highest emission factors for all possible engines used in this aircraft.

**Long Range Discrimination Radar Operations, Clear Air Force Station, Alaska**  
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Appendix E - Calculation of Air Emissions

September 2020

Sheet 3 of 3 - GHG Emissions Calculations

**VFR Flight Rerouting Emissions**

Aircraft Make/Model	Engines (number/aircraft)	Fuel Flow (lbs/hr)	CO <sub>2</sub> e <sup>(1)</sup>
Cessna 208 <sup>2</sup>	O-320-D2J (1)	81	3214.59

	Annual Rerouting Distance (statute miles/yr)	Annual Average Rerouting Time at Climbout Mode (hrs/yr)	CO <sub>2</sub> e (tons/yr) <sup>(1)</sup>
<b>Detour Around TFRs/RAs</b>	5,475.0	30.5	<b>3.97</b>

**IFR Flight Rerouting Emissions**

Aircraft Make/Model	Engines (number/aircraft)	Fuel Flow (lbs/hr)	CO <sub>2</sub> e <sup>(1)</sup>
B737 <sup>3</sup>	CFM56-7B27 (2) <sup>4</sup>	8,278.0	3,214.59

	Annual Rerouting Distance (statute miles/yr)	Annual Average Rerouting Time at Climbout Mode (hrs/yr)	CO <sub>2</sub> e (tons/yr) <sup>(1)</sup>
<b>Interim Phase Average</b>	24,820.0	67.1	<b>1,785.56</b>
<b>Interim Phase Max: V-438</b>	89,242.5	241.2	<b>6,418.42</b>
<b>Airway Changes Average</b>	42,157.5	114	<b>3,033.58</b>
<b>Airway Changes Max: V-436 dogleg</b>	108,770.0	294	<b>7,823.45</b>

**Total Flight Rerouting Emissions**

	CO <sub>2</sub> e (tons/yr)	CO <sub>2</sub> e (metric tons/yr)
<b>Interim Phase Average</b>	<b>1,789.5</b>	<b>1,623.1</b>
<b>Interim Phase Max</b>	<b>6,422.4</b>	<b>5,825.1</b>
<b>Airway Changes Average</b>	<b>3,037.6</b>	<b>2,755.1</b>
<b>Airway Changes Max</b>	<b>7,827.4</b>	<b>7,099.5</b>

<sup>1</sup> = Emission factors were obtained from the *Air Force Air Emissions Guide for Air Force Mobile Sources* (dated August 2018) which also includes commercial aircraft data.

<sup>2</sup> = Conservatively assumed all aircraft are Cessna 208 as it is the largest aircraft rerouted. Cessna 421 used as surrogate for flight speed, Cessna 172P used as surrogate for engine emission factors

<sup>3</sup> = Conservatively assumed all aircraft are B737 as that is the largest aircraft rerouted.

<sup>4</sup> = Conservatively assumed this engine because it has the highest emission factors for all possible engines used in this aircraft.

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## **Appendix F: USFWS IPaC Resource List**

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# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Alaska



## Local offices

Anchorage Fish And Wildlife Conservation Office

☎ (907) 271-2888

📠 (907) 271-2786

4700 Blm Road  
Anchorage, AK 99507

Fairbanks Fish And Wildlife Conservation Office

☎ (907) 456-0203

📞 (907) 456-0208

MAILING ADDRESS

101 12th Avenue

Room 110

Fairbanks, AK 99701-6237

PHYSICAL ADDRESS

101 12th Avenue, Room 110

Fairbanks, AK 99701-6237

NOT FOR CONSULTATION

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

- 
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
  2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

THERE ARE NO ENDANGERED SPECIES EXPECTED TO OCCUR AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE.

"BREEDS ELSEWHERE" INDICATES  
THAT THE BIRD DOES NOT LIKELY  
BREED IN YOUR PROJECT AREA)

American Golden-plover *Pluvialis dominica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 20 to Aug 15

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Feb 1 to Sep 30

Golden Eagle *Aquila chrysaetos*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Breeds Jan 1 to Aug 31

Hudsonian Godwit *Limosa haemastica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 15 to Jul 31

Lesser Yellowlegs *Tringa flavipes*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9679>

Breeds May 1 to Aug 15

Olive-sided Flycatcher *Contopus cooperi*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3914>

Breeds May 20 to Aug 31

Rusty Blackbird *Euphagus carolinus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Jul 20

Semipalmated Sandpiper *Calidris pusilla*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Short-billed Dowitcher *Limnodromus griseus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9480>

Breeds Jun 1 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9483>

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

### Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

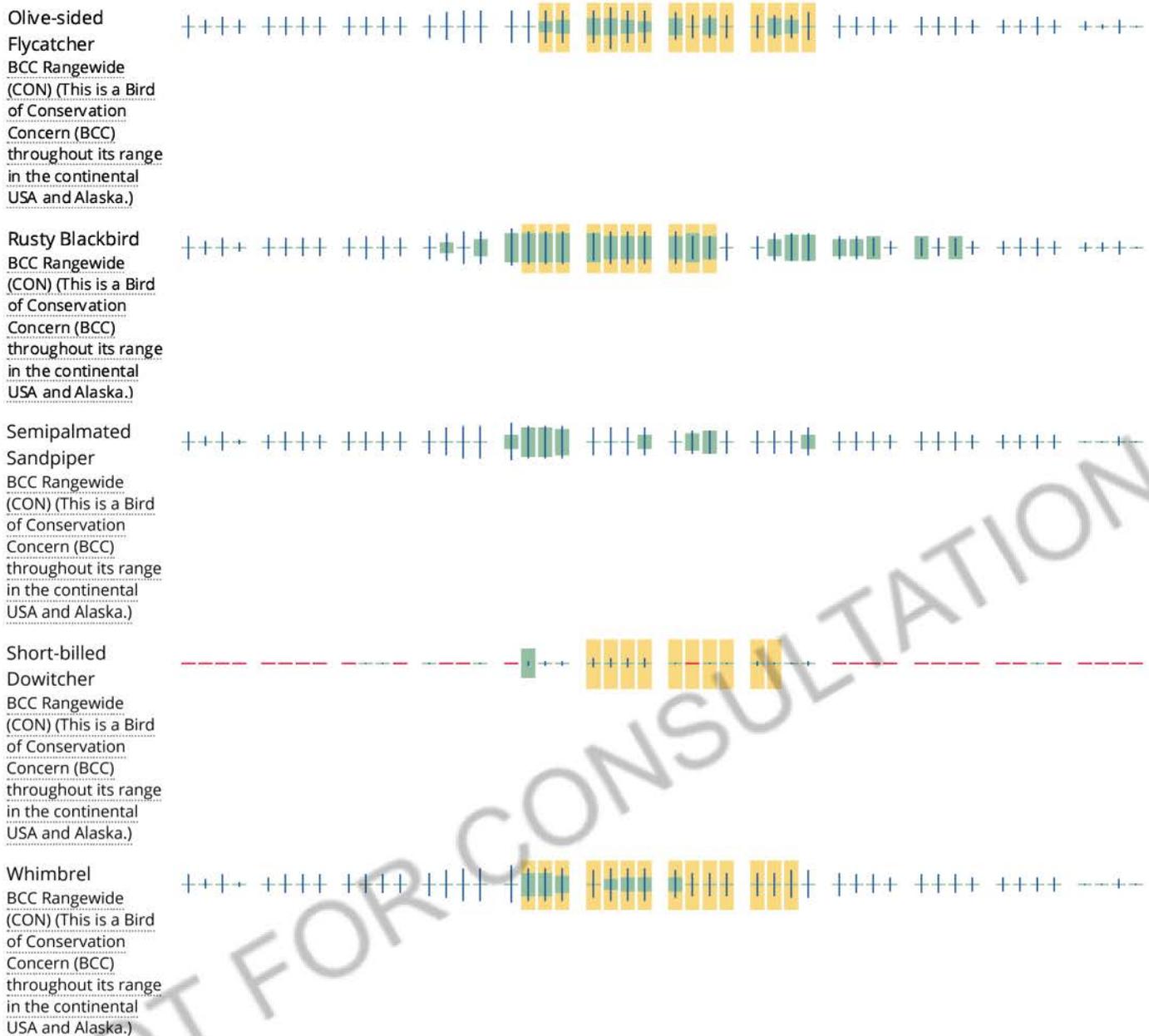
### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

### No Data (-)





**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project

intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

### **What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. *To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location".* Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

### National Wildlife Refuge lands

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

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

### Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

# Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

## Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

## Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

## Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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# **Appendix G: Cultural Resources Information**

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Table 1. Cultural Resources Sites within the APE

AHRS #	NRHP Status	Site Name	Period
FAI-00010	Unevaluated	Clear Railroad STATION	Historic
FAI-00011	Eligible	Chena Townsite Archaeological District	Historic
FAI-00027	Unevaluated	Chena Ridge Site	Prehistoric
FAI-00029	Unevaluated	Rosie Creek Site	Prehistoric
FAI-00031	Unevaluated	Saint Mark's Mission	Historic
FAI-00039	Nomination Closed	M/V Taku Chief	Historic
FAI-00059	Unevaluated	FAI-00059	Prehistoric
FAI-00060	Unevaluated	FAI-00060	Prehistoric
FAI-00067	Unevaluated	Julius	Historic
FAI-00068	Unevaluated	Kobe	Historic
FAI-00069	Unevaluated	Browne	Historic
FAI-00070	Unevaluated	Moss	Historic
FAI-00074	Unevaluated	Roadhouse	Historic
FAI-00081	Unevaluated	Golden Spike Site	Historic
FAI-00082	Unevaluated	Elsie Creek	Prehistoric
FAI-00083	Unevaluated	Eva Creek Site	Prehistoric
FAI-00089	Unevaluated	Nenana River Railroad Bridge	Historic
FAI-00090	Unevaluated	Ferry Railroad Station	Historic
FAI-00091	Eligible	Owl Ridge Site	Prehistoric
FAI-00092	Unevaluated	Tanana River Railroad Bridge	Historic
FAI-00094	Unevaluated	High Ridge #2	Prehistoric
FAI-00096	Unevaluated	High Ridge #3	Prehistoric
FAI-00099	Unevaluated	St Theresa's Catholic Church	Historic
FAI-00105	Listed	Nenana Depot	Historic
FAI-00106	Unevaluated	Plateau #2	Prehistoric
FAI-00107	Unevaluated	Plateau #3	Prehistoric
FAI-00108	Unevaluated	First Creek South	Prehistoric
FAI-00109	Unevaluated	FAI-00109	Prehistoric
FAI-00111	Unevaluated	Moose Creek West	Prehistoric
FAI-00112	Unevaluated	FAI-112	Prehistoric
FAI-00121	Unevaluated	Blowout #1	Prehistoric
FAI-00122	Unevaluated	Blowout #2	Prehistoric
FAI-00123	Unevaluated	Blowout #3	Prehistoric
FAI-00124	Unevaluated	Blowout #4	Prehistoric
FAI-00125	Unevaluated	Blowout #5	Prehistoric
FAI-00126	Unevaluated	Blowout #6	Prehistoric
FAI-00127	Unevaluated	Upper Rock Creek	Prehistoric
FAI-00128	Unevaluated	FAI-00128	Historic
FAI-00129	Unevaluated	FAI-00129	Historic
FAI-00130	Unevaluated	FAI-00130	Historic
FAI-00132	Unevaluated	Toklat Village	Historic
FAI-00138	Unevaluated	Plateau #1	Prehistoric

Appendix G: Cultural Resources Information

AHRS #	NRHP Status	Site Name	Period
FAI-00140	Unevaluated	Rock Creek Site	Prehistoric
FAI-00141	Unevaluated	Walker Creek I	Prehistoric
FAI-00142	Unevaluated	Walker Creek II and III	Prehistoric
FAI-00143	Unevaluated	Walker Creek IV	Prehistoric
FAI-00144	Unevaluated	Walker Creek V	Prehistoric
FAI-00145	Unevaluated	Walker Creek VI	Prehistoric
FAI-00146	Unevaluated	Sherman Site	Prehistoric
FAI-00147	Unevaluated	Hart Site	Prehistoric
FAI-00148	Unevaluated	Goldie Site	Prehistoric
FAI-00149	Unevaluated	Lady Site	Prehistoric
FAI-00160	Eligible	Cemetery on Howard Luke Native Allotment	Historic
FAI-00161	Unevaluated	Consolidated B-24 Aircraft	Historic
FAI-00169	Unevaluated	Strand Family Cemetery	Historic
FAI-00170	Unevaluated	FAI-00170	Prehistoric
FAI-00171	Unevaluated	FAI-00171	Prehistoric
FAI-00172	Unevaluated	FAI-00172	Prehistoric
FAI-00173	Unevaluated	FAI-00173	Prehistoric
FAI-00174	Unevaluated	FAI-00174	Prehistoric
FAI-00175	Unevaluated	FAI-00175	Prehistoric
FAI-00176	Unevaluated	FAI-00176	Prehistoric
FAI-00177	Unevaluated	FAI-00177	Prehistoric
FAI-00178	Unevaluated	FAI-00178	Prehistoric
FAI-00179	Unevaluated	FAI-00179	Prehistoric
FAI-00180	Unevaluated	FAI-00180	Prehistoric
FAI-00181	Unevaluated	FAI-00181	Prehistoric
FAI-00182	Unevaluated	FAI-00182	Prehistoric
FAI-00183	Unevaluated	FAI-00183	Prehistoric
FAI-00184	Unevaluated	FAI-00184	Prehistoric
FAI-00185	Unevaluated	FAI-00185	Prehistoric
FAI-00186	Unevaluated	FAI-00186	Prehistoric
FAI-00187	Unevaluated	FAI-00187	Prehistoric
FAI-00188	Unevaluated	FAI-00188	Prehistoric
FAI-00189	Unevaluated	FAI-00189	Prehistoric
FAI-00190	Not Eligible	FAI-00190	Prehistoric
FAI-00191	Unevaluated	FAI-00191	Prehistoric
FAI-00192	Unevaluated	FAI-00192	Prehistoric
FAI-00193	Unevaluated	FAI-00193	Prehistoric
FAI-00205	Unevaluated	FAI-00205	Prehistoric
FAI-00206	Unevaluated	Moose Creek Site	Prehistoric
FAI-00213	Unevaluated	FAI-00213	Prehistoric
FAI-00214	Not Eligible	FAI-00214	Prehistoric
FAI-00215	Not Eligible	Bonanza Creek Bluff Locality 1	Prehistoric
FAI-00216	Unevaluated	Bonanza Creek Bluff Locality 2	Prehistoric
FAI-00217	Unevaluated	FAI-00217	Historic
FAI-00230	Eligible	Tanana Valley Railroad	Historic
FAI-00235	Unevaluated	Mile 301.9 Site	Prehistoric

AHRS #	NRHP Status	Site Name	Period
FAI-00238	Unevaluated	15 Mile Shelter Cabin	Historic
FAI-00239	Unevaluated	4 Mile Shelter Cabin	Historic
FAI-00241	Unevaluated	FAI-00241	Prehistoric
FAI-00242	Unevaluated	FAI-00242	Prehistoric
FAI-00243	Unevaluated	FAI-00243	Prehistoric
FAI-00252	Unevaluated	FAI-00252	Historic
FAI-00253	Unevaluated	FAI-00253	Prehistoric
FAI-00337	Unevaluated	Wood River Archaeological District	Prehistoric
FAI-00342	Eligible	Clear White Alice Communication System	Historic
FAI-00348	Unevaluated	FAI-348	Prehistoric
FAI-00361	Unevaluated	Skidoo Ridge	Prehistoric
FAI-00362	Unevaluated	Walker Creek VII	Prehistoric
FAI-00363	Unevaluated	Chief John Heights Pictographs	Prehistoric
FAI-00391	Unevaluated	Darby Cabin	Historic
FAI-00423	Unevaluated	Native Village	Historic
FAI-00428	Unevaluated	Logging Operations Building	Historic
FAI-00437	Unevaluated	FAI-00437	Prehistoric
FAI-00438	Unevaluated	FAI-00438	Prehistoric
FAI-00439	Unevaluated	Historic Camp	Historic
FAI-00440	Unevaluated	Alaska Railroad Bed	Historic
FAI-00442	Unevaluated	Fish Camp and Possible Village Site	Unknown
FAI-00534	Eligible	Clear Air Station BMEWS	Historic
FAI-00544	Not Eligible	Building 1, Recreation Workshop	Historic
FAI-00545	Not Eligible	Building 3, Airman Dormitory	Historic
FAI-00546	Not Eligible	Building 4, Airman Dormitory	Historic
FAI-00547	Not Eligible	Building 5, Water Supply	Historic
FAI-00548	Not Eligible	Building 26, Maintenance Shop	Historic
FAI-00549	Not Eligible	Building 29, Warehouse	Historic
FAI-00550	Not Eligible	Building 35, Recreation Shop	Historic
FAI-00551	Not Eligible	Building 37, Security Police Operations	Historic
FAI-00552	Not Eligible	Building 40, Airman Dormitory	Historic
FAI-00553	Not Eligible	Building 41, Airman Dormitory	Historic
FAI-00554	Not Eligible	Building 42, Airman Dormitory	Historic
FAI-00555	Not Eligible	Building 43, Airman Dormitory	Historic
FAI-00556	Not Eligible	Building 48, Fire Station	Historic
FAI-00557	Not Eligible	Building 50, Bottle Gas Storage	Historic
FAI-00558	Not Eligible	Building 51, Auto Shop	Historic
FAI-00559	Not Eligible	Building 52, Fire Training Building	Historic
FAI-00560	Not Eligible	Building 560, Emergency Power Building	Historic
FAI-00561	Not Eligible	Building 62, Officers Dining Hall	Historic
FAI-00562	Not Eligible	Building 65, Airman Dormitory	Historic
FAI-00563	Not Eligible	Building 66, Headquarters Building	Historic
FAI-00564	Not Eligible	Building 79, Vehicle Ops Building	Historic
FAI-00565	Not Eligible	Building 80, Auto Storage Building	Historic
FAI-00566	Not Eligible	Building 82, Auto Storage Building	Historic
FAI-00567	Not Eligible	Building 87, Electric Power Plant	Historic

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AHRS #	NRHP Status	Site Name	Period
FAI-00568	Not Eligible	Building 93, Airman Dormitory	Historic
FAI-00569	Eligible	Building 101, Transmitter Building	Historic
FAI-00570	Eligible	Building 102, Transmitter Building	Historic
FAI-00571	Not Eligible	Building 103, Warehouse	Historic
FAI-00572	Eligible	Building 104, Scanner Building	Historic
FAI-00573	Eligible	Building 105, Scanner Building	Historic
FAI-00574	Eligible	Building 106, Scanner Building	Historic
FAI-00575	Not Eligible	Building 110, Equipment Building, Thaw Shed	Historic
FAI-00576	Not Eligible	Building 111, Electric Power Station	Historic
FAI-00577	Not Eligible	Building 113, Chemical Storage	Historic
FAI-00578	Not Eligible	Building 114, Refuse Incinerator	Historic
FAI-00579	Not Eligible	Building 115, Heating Facility	Historic
FAI-00580	Not Eligible	Building 118, Locomotive Shelter	Historic
FAI-00581	Not Eligible	Building 121, Fire Station	Historic
FAI-00582	Not Eligible	Building 125, Water Pump Station	Historic
FAI-00583	Not Eligible	Building 126, Water Supply Building	Historic
FAI-00584	Not Eligible	Building 127, Water Supply Building	Historic
FAI-00585	Not Eligible	Building 128, Water Supply Building	Historic
FAI-00586	Not Eligible	Building 129, Water Supply Building	Historic
FAI-00587	Eligible	Building 735, An/Fps-50 Detection Radar Antenna	Historic
FAI-00588	Eligible	Building 736, An/Fps-50 Detection Radar Antenna	Historic
FAI-00589	Eligible	Building 737, An/Fps-50 Detection Radar Antenna	Historic
FAI-00590	Not Eligible	Building 196, Auto Maintenance Building	Historic
FAI-00591	Not Eligible	Building 199, Electric Power Station	Historic
FAI-00592	Not Eligible	Building 200, Headquarters	Historic
FAI-00593	Not Eligible	Building 201, Recreation Hall, Gymnasium	Historic
FAI-00594	Not Eligible	Building 202, Airman Dormitory	Historic
FAI-00595	Not Eligible	Building 203, Airman Dormitory	Historic
FAI-00596	Not Eligible	Building 204, Airman Dormitory	Historic
FAI-00597	Not Eligible	Building 205, Sewage Pump Station	Historic
FAI-00598	Not Eligible	Building 206, Recreation Building	Historic
FAI-00599	Not Eligible	Building 207, Recreation Building	Historic
FAI-00600	Not Eligible	Building 208, Sentry Building	Historic
FAI-00601	Not Eligible	Building 209, Recreation Center	Historic
FAI-00602	Not Eligible	Building 250, Warehouse	Historic
FAI-00603	Not Eligible	Building 251, Fire Station	Historic
FAI-00604	Not Eligible	Building 252, Fueling Station	Historic
FAI-00605	Not Eligible	Building 260, Pump Station	Historic
FAI-01291	Unevaluated	Fairbanks FAA Station Facility District	Historic
FAI-01292	Eligible	Building 206, Engine Generator Building	Historic
FAI-01293	Eligible	Building 207, Storage Building	Historic
FAI-01294	Eligible	Building 208, Storage Building	Historic
FAI-01295	Eligible	Building 300, Warehouse	Historic
FAI-01296	Eligible	Building 404, Warehouse	Historic
FAI-01297	Eligible	Building 202, Shop	Historic
FAI-01356	Unevaluated	FAI-01356	Prehistoric

AHRS #	NRHP Status	Site Name	Period
FAI-01358	Not Eligible	Salchaket Slough Cabin	Historic
FAI-01553	Unevaluated	Mail Trail-Trapline Trail Segment	Historic
FAI-01554	Unevaluated	Older Native Cemetery North Of Nenana	Historic
FAI-01555	Unevaluated	Railroad Cemetery North Of Nenana	Historic
FAI-01591	Unevaluated	FAI-01591	Unknown
FAI-01592	Not Eligible	Building 20, Storage	Historic
FAI-01593	Not Eligible	Building 203, Storage/Warehouse	Historic
FAI-01722	Not Eligible	Fairbanks International Airport Terminal	Historic
FAI-01725	Unevaluated	FAI-01725	Prehistoric
FAI-01727	Unevaluated	North Nenana FAA Facility	Historic
FAI-01728	Not Eligible	Old George Hall	Historic
FAI-01735	Unevaluated	Nenana River Bridge At Rex	Historic
FAI-01749	Not Eligible	Carlson House	Historic
FAI-01768	Unevaluated	Liberty Bell Mine	Historic
FAI-01769	Eligible	Utilidor	Historic
FAI-01885	Unevaluated	FAI-01885	Prehistoric
FAI-01886	Unevaluated	FAI-01886	Prehistoric
FAI-01887	Unevaluated	FAI-01887	Prehistoric
FAI-01993	Unevaluated	Carlo House	Historic
FAI-01994	Unevaluated	Elliott House	Historic
FAI-01995	Unevaluated	Weber House	Historic
FAI-01999	Unevaluated	Simpson Site	Prehistoric
FAI-02004	Unevaluated	FAI-02004	Prehistoric
FAI-02005	Unevaluated	FAI-02005	Prehistoric
FAI-02006	Unevaluated	FAI-02006	Prehistoric
FAI-02007	Unevaluated	FAI-02007	Prehistoric
FAI-02008	Unevaluated	FAI-02008	Prehistoric
FAI-02009	Unevaluated	FAI-02009	Prehistoric
FAI-02010	Unevaluated	FAI-02010	Prehistoric
FAI-02011	Unevaluated	FAI-02011	Prehistoric
FAI-02012	Unevaluated	FAI-02012	Prehistoric
FAI-02013	Unevaluated	FAI-02013	Prehistoric
FAI-02014	Unevaluated	FAI-02014	Prehistoric
FAI-02020	Unevaluated	FAI-02020	Prehistoric
FAI-02021	Unevaluated	FAI-02021	Prehistoric
FAI-02022	Unevaluated	FAI-02022	Prehistoric
FAI-02023	Unevaluated	FAI-02023	Prehistoric
FAI-02024	Unevaluated	FAI-02024	Prehistoric
FAI-02025	Unevaluated	FAI-02025	Prehistoric
FAI-02026	Unevaluated	FAI-02026	Prehistoric
FAI-02027	Unevaluated	FAI-02027	Prehistoric
FAI-02028	Unevaluated	FAI-02028	Prehistoric
FAI-02029	Unevaluated	FAI-02029	Prehistoric
FAI-02030	Unevaluated	FAI-02030	Prehistoric
FAI-02031	Unevaluated	FAI-02031	Prehistoric
FAI-02032	Unevaluated	FAI-02032	Prehistoric

Appendix G: Cultural Resources Information

AHRS #	NRHP Status	Site Name	Period
FAI-02033	Unevaluated	FAI-02033	Prehistoric
FAI-02036	Unevaluated	McCulloch House, 4590 Elliott Lane	Historic
FAI-02038	Unevaluated	Native Cemetery	Historic
FAI-02079	Unevaluated	FAI-02079	Prehistoric
FAI-02080	Unevaluated	FAI-02080	Prehistoric
FAI-02081	Unevaluated	FAI-02081	Prehistoric
FAI-02082	Unevaluated	FAI-02082	Prehistoric
FAI-02083	Unevaluated	FAI-02083	Prehistoric
FAI-02084	Unevaluated	FAI-02084	Prehistoric
FAI-02085	Unevaluated	FAI-02085	Prehistoric
FAI-02086	Unevaluated	FAI-02086	Prehistoric
FAI-02087	Unevaluated	FAI-02087	Prehistoric
FAI-02088	Unevaluated	FAI-02088	Prehistoric
FAI-02089	Unevaluated	FAI-02089	Prehistoric
FAI-02090	Unevaluated	FAI-02090	Prehistoric
FAI-02091	Unevaluated	FAI-02091	Prehistoric
FAI-02094	Unevaluated	FAI-02094	Prehistoric
FAI-02201	Unevaluated	Modern Grave	Modern
FAI-02230	Not Eligible	Tanana Flats Trespass Cabin	Historic
FAI-02252	Unevaluated	Railroad Structure	Historic
FAI-02253	Unevaluated	Cedar Rapids Bin	Historic
FAI-02254	Unevaluated	Old Railroad Bed	Historic
FAI-02255	Unevaluated	Dozer Cut With Historic Debris	Historic, Modern
FAI-02256	Unevaluated	Historic Trash Dump	Historic
FAI-02257	Unevaluated	Railroad Ties	Historic
FAI-02261	Unevaluated	Julius 2	Historic
FAI-02262	Unevaluated	Sqaw Pants Crossing	Historic
FAI-02263	Not Eligible	Charlie Family Subsistence Camp	Historic
FAI-02269	Unevaluated	FAI-02269	Historic
FAI-02271	Unevaluated	FAI-02271	Historic
FAI-02272	Not Eligible	Clear Air Force Base Building B. 37	Historic
FAI-02273	Not Eligible	Clear Air Force Base Building B.48	Historic
FAI-02274	Not Eligible	Clear Air Force Base Building B.196	Historic
FAI-02275	Not Eligible	Clear Air Force Base Building B.250	Historic
FAI-02276	Not Eligible	Clear Air Force Base Building B.252	Historic
FAI-02289	Not Eligible	FAI-02289	Modern
FAI-02299	Not Eligible	Modern Debris	Modern
FAI-02303	Not Eligible	Building 1	Historic
FAI-02304	Not Eligible	Building 3	Historic
FAI-02305	Not Eligible	Building 5	Historic
FAI-02306	Not Eligible	Building 26	Historic
FAI-02307	Not Eligible	Building 29	Historic
FAI-02308	Not Eligible	Building 35	Historic
FAI-02309	Not Eligible	Building 50	Historic
FAI-02310	Not Eligible	Building 51	Historic
FAI-02311	Not Eligible	Building 60	Historic

AHRS #	NRHP Status	Site Name	Period
FAI-02312	Not Eligible	Building 65	Historic
FAI-02313	Not Eligible	Building 65	Historic
FAI-02314	Not Eligible	Building 66	Historic
FAI-02315	Not Eligible	Building 79	Historic
FAI-02316	Not Eligible	Building 80	Historic
FAI-02317	Not Eligible	Building 82	Historic
FAI-02318	Not Eligible	Building 93	Historic
FAI-02335	Not Eligible	201 University Ave.	Historic
FAI-02336	Not Eligible	3670 Geraghty Ave.	Modern
FAI-02337	Unevaluated	3568 Geraghty Ave	Modern
FAI-02357	Not Eligible	3707 Mitchell Ave./1448 University Ave	Historic
FAI-02358	Unevaluated	1716 S University Ave	Modern
FAI-02359	Not Eligible	1818 University Ave	Modern
FAI-02366	Eligible	Nenana Kantishna Trail Segment RS2477 346	Historic
FAI-02370	Unevaluated	4899 Old Airport Way	Historic
FAI-02374	Not Eligible	3530 Geraghty Avenue	Historic
FAI-02386	Eligible	FAI-02386	Historic
FAI-02387	Unevaluated	FAI-02387	Prehistoric
FAI-02390	Eligible	FAI-02390	Historic
FAI-02397	Unevaluated	Nenana Valley 1	Prehistoric
HEA-00001	Contributing Site	Teklanika West	Prehistoric
HEA-00002	Contributing Site	Teklanika East	Prehistoric
HEA-00004	Unevaluated	Mt. McKinley National Park	Historic
HEA-00005	National Historic Landmark	Dry Creek Archeological Site	Prehistoric
HEA-00006	Unevaluated	HEA-00006	Prehistoric
HEA-00007	Unevaluated	HEA-00007	Prehistoric
HEA-00008	Unevaluated	Mercer Hill Site	Prehistoric
HEA-00009	Unevaluated	HEA-00009	Prehistoric
HEA-00010	Not Eligible	HEA-00010	Prehistoric
HEA-00011	Unevaluated	HEA-00011	Prehistoric
HEA-00012	Not Eligible	HEA-00012	Prehistoric
HEA-00014	Not Eligible	Coyote Creek Site	Prehistoric
HEA-00015	Not Eligible	HEA-00015	Prehistoric
HEA-00018	Unevaluated	HEA-00018	Prehistoric
HEA-00019	Unevaluated	HEA-00019	Prehistoric
HEA-00020	Unevaluated	HEA-00020	Prehistoric
HEA-00021	Unevaluated	HEA-00021	Prehistoric
HEA-00022	Unevaluated	HEA-00022	Prehistoric
HEA-00023	Unevaluated	HEA-00023	Prehistoric
HEA-00024	Unevaluated	HEA-00024	Prehistoric
HEA-00025	Unevaluated	HEA-00025	Prehistoric
HEA-00026	Unevaluated	HEA-00026	Prehistoric
HEA-00027	Unevaluated	HEA-00027	Prehistoric
HEA-00028	Unevaluated	Dragonfly Creek Site	Prehistoric
HEA-00029	Unevaluated	HEA-00029	Prehistoric

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AHRS #	NRHP Status	Site Name	Period
HEA-00030	Unevaluated	HEA-00030	Prehistoric
HEA-00031	Eligible	Carlo Creek Site	Prehistoric
HEA-00032	Unevaluated	HEA-00032	Prehistoric
HEA-00033	Unevaluated	HEA-00033	Prehistoric
HEA-00034	Unevaluated	HEA-00034	Prehistoric
HEA-00035	Unevaluated	Deleted, Combined With HEA-00137 Panguingue Creek li	
HEA-00036	Unevaluated	HEA-00036	Prehistoric
HEA-00037	Unevaluated	HEA-00037	Prehistoric
HEA-00038	Unevaluated	Little Panguingue Creek	Prehistoric
HEA-00039	Unevaluated	HEA-00039	Prehistoric
HEA-00040	Unevaluated	C. Lester Plumb Cabin Site	Historic
HEA-00041	Not Eligible	Ski Hut Site	Historic
HEA-00042	Unevaluated	HEA-00042	Prehistoric
HEA-00043	Unevaluated	Cabin Site	Historic
HEA-00044	Unevaluated	Isolated Find	Prehistoric
HEA-00045	Unevaluated	Flake Scatter	Prehistoric
HEA-00046	Eligible	Savage Camp	Historic
HEA-00051	Unevaluated	Lignite Railroad Station	Historic
HEA-00052	Unevaluated	Moody	Historic
HEA-00053	Unevaluated	Yanert	Historic
HEA-00054	Unevaluated	Sullivan's Roadhouse	Historic
HEA-00055	Unevaluated	Summit Roadhouse	Historic
HEA-00056	Unevaluated	Cantwell Roadhouse	Historic
HEA-00057	Unevaluated	Panorama Roadhouse	Historic
HEA-00059	Unevaluated	Morino Roadhouse/Homestead Site	Historic
HEA-00060	Unevaluated	Singleton Roadhouse	Historic
HEA-00061	Not Eligible	Broad Pass Roadhouse	Historic
HEA-00062	Eligible	Nenana River Gorge Site	Prehistoric, Historic
HEA-00063	Unevaluated	Hurricane Gulch Railroad Bridge	Historic
HEA-00064	Unevaluated	Honolulu	Historic
HEA-00065	Unevaluated	Colorado Station	Historic
HEA-00066	Eligible	Broad Pass	Historic, Modern
HEA-00067	Unevaluated	Summit	Historic
HEA-00068	Unevaluated	Cantwell Railroad Section House	Historic
HEA-00069	Unevaluated	Cantwell	Historic
HEA-00070	Unevaluated	Windy Creek Railroad Bridge	Historic
HEA-00071	Unevaluated	Windy	Historic
HEA-00072	Unevaluated	Clear Creek Railroad Bridge	Historic
HEA-00073	Unevaluated	Carlo	Historic
HEA-00074	Unevaluated	Riley Creek Railroad Bridge	Historic
HEA-00075	Unevaluated	McKinley Park Station	Historic
HEA-00076	Eligible	Moody Tunnel	Historic
HEA-00077	Not Eligible	Tunnel 9	Historic
HEA-00078	Unevaluated	Garner	Historic
HEA-00079	Not Eligible	Garner Tunnel	Historic

AHRS #	NRHP Status	Site Name	Period
HEA-00080	Unevaluated	Healy	Historic
HEA-00081	Unevaluated	Dry Creek Railroad Bridge	Historic
HEA-00082	Not Eligible	Suntrana	Historic
HEA-00083	Unevaluated	HEA-00083	Historic
HEA-00084	Eligible	ARRC Bridge 352.7, Sheep Creek Railroad Bridge	Historic
HEA-00085	Listed	Teklanika Archeological District	Prehistoric
HEA-00086	Unevaluated	Teklanika Ridge #1	Prehistoric
HEA-00087	Unevaluated	Teklanika Ridge #2	Prehistoric
HEA-00088	Unevaluated	Teklanika Ridge #3	Prehistoric
HEA-00089	Unevaluated	Teklanika Ridge #4	Prehistoric
HEA-00090	Unevaluated	Camp David Cabin	Historic
HEA-00091	Not Eligible	Stampede Trail (Lignite-Stampede Trail [RST 344], Lignite-Stampede-Kantishna via Clearwater Trail [RST 340])	Historic
HEA-00092	Unevaluated	HEA-00092	Historic
HEA-00093	Unevaluated	HEA-00093	Historic
HEA-00094	Unevaluated	HEA-00094	Historic
HEA-00095	Unevaluated	HEA-00095	Historic
HEA-00096	Not Eligible	HEA-00096, Jack River Bluff	Prehistoric
HEA-00105	Unevaluated	HEA-00105	Historic
HEA-00106	Unevaluated	Teklanika Roadhouse	Historic
HEA-00107	Unevaluated	HEA-00107	Historic
HEA-00108	Unevaluated	HEA-00108	Historic
HEA-00109	Unevaluated	Bison Gulch Bluff	Prehistoric
HEA-00110	Unevaluated	Wick Rock-Shelter	Prehistoric
HEA-00112	Unevaluated	4 Mile Reindeer Cabin	Historic
HEA-00113	Unevaluated	7 Mile Reindeer Cabin	Historic
HEA-00114	Unevaluated	10 Mile Reindeer Cabin	Historic
HEA-00119	Unevaluated	Nenana Bridge Cabin	Historic
HEA-00121	Unevaluated	Bison Gulch 2	Prehistoric, Historic
HEA-00128	Unevaluated	Usibelli Site	Prehistoric
HEA-00129	Unevaluated	Slate Creek Site	Prehistoric
HEA-00130	Unevaluated	Walker Road Site	Prehistoric
HEA-00132	Unevaluated	Thompson/Stubbs Complex	Historic
HEA-00133	Unevaluated	Riley Creek Lithic Site	Prehistoric
HEA-00134	Unevaluated	Riley Creek Camp	Historic
HEA-00135	Unevaluated	HEA-00135	Prehistoric
HEA-00136	Unevaluated	Savage River Microblade Site	Prehistoric
HEA-00137	Unevaluated	Big Panguingue Creek Site	Prehistoric
HEA-00138	Unevaluated	Lignite Creek I	Prehistoric
HEA-00139	Unevaluated	Lignite Creek li	Prehistoric
HEA-00140	Unevaluated	Lignite Creek lii	Prehistoric
HEA-00141	Unevaluated	Lignite Creek Iv	Prehistoric
HEA-00142	Unevaluated	Lignite Creek V	Prehistoric
HEA-00143	Unevaluated	Hotel Overlook Site	Prehistoric
HEA-00144	Unevaluated	Reservoir Hill Site	Prehistoric

Appendix G: Cultural Resources Information

<b>AHRS #</b>	<b>NRHP Status</b>	<b>Site Name</b>	<b>Period</b>
HEA-00145	Unevaluated	Morino Hill Site	Prehistoric
HEA-00146	Unevaluated	HEA-00146	Prehistoric
HEA-00147	Listed	Mount McKinley National Park Headquarters District	Historic
HEA-00148	Unevaluated	HEA-00148	Prehistoric
HEA-00149	Unevaluated	HEA-00149	Prehistoric
HEA-00150	Unevaluated	HEA-00150	Prehistoric
HEA-00151	Unevaluated	HEA-00151	Prehistoric
HEA-00152	Unevaluated	HEA-00152	Prehistoric
HEA-00153	Unevaluated	HEA-00153	Prehistoric
HEA-00154	Unevaluated	HEA-00154	Prehistoric
HEA-00155	Unevaluated	HEA-00155	Prehistoric
HEA-00156	Unevaluated	HEA-00156	Prehistoric
HEA-00157	Unevaluated	HEA-00157	Prehistoric
HEA-00158	Unevaluated	HEA-00158	Prehistoric
HEA-00159	Unevaluated	HEA-00159	Prehistoric
HEA-00160	Unevaluated	HEA-00160	Prehistoric
HEA-00161	Unevaluated	HEA-00161	Prehistoric
HEA-00162	Unevaluated	HEA-00162	Prehistoric
HEA-00163	Unevaluated	HEA-00163	Prehistoric
HEA-00164	Unevaluated	HEA-00164	Prehistoric
HEA-00165	Unevaluated	HEA-00165	Prehistoric
HEA-00166	Unevaluated	HEA-00166	Prehistoric
HEA-00167	Unevaluated	HEA-00167	Prehistoric
HEA-00168	Unevaluated	HEA-00168	Prehistoric
HEA-00169	Unevaluated	HEA-00169	Prehistoric
HEA-00170	Unevaluated	HEA-00170	Prehistoric
HEA-00171	Unevaluated	HEA-00171	Prehistoric
HEA-00173	Unevaluated	HEA-00173	Prehistoric
HEA-00188	Unevaluated	HEA-00188	Historic
HEA-00190	Unevaluated	HEA-00190	Prehistoric
HEA-00191	Unevaluated	HEA-00191	Prehistoric
HEA-00192	Unevaluated	HEA-00192	Prehistoric
HEA-00193	Unevaluated	HEA-00193	Prehistoric
HEA-00195	Unevaluated	HEA-00195	Prehistoric
HEA-00196	Unevaluated	HEA-00196	Prehistoric
HEA-00197	Unevaluated	HEA-00197	Prehistoric
HEA-00198	Unevaluated	HEA-00198	Prehistoric
HEA-00199	Unevaluated	HEA-00199	Prehistoric
HEA-00200	Unevaluated	HEA-00200	Prehistoric
HEA-00201	Unevaluated	HEA-00201	Prehistoric
HEA-00202	Unevaluated	HEA-00202	Prehistoric
HEA-00203	Unevaluated	HEA-00203	Prehistoric
HEA-00204	Unevaluated	HEA-00204	Prehistoric
HEA-00205	Unevaluated	HEA-00205	Prehistoric
HEA-00206	Unevaluated	HEA-00206	Historic
HEA-00207	Unevaluated	HEA-00207	Historic

AHRS #	NRHP Status	Site Name	Period
HEA-00208	Unevaluated	Worker's Cabins	Historic
HEA-00209	Unevaluated	Hotel Intake Dam Structures	Historic
HEA-00210	Unevaluated	HEA-00210	Prehistoric
HEA-00215	Not Eligible	Upper Savage River Cabin	Historic
HEA-00216	Listed	Sanctuary River Cabin 31	Historic
HEA-00217	Listed	Igloo Creek Cabin 25	Historic
HEA-00218	Listed	Upper East Fork Cabin 29	Historic
HEA-00219	Listed	Lower East Fork Ranger Cabin #9	Historic
HEA-00220	Listed	Riley Creek Ranger Cabin #20	Historic
HEA-00221	Listed	Upper Windy Creek Ranger Cabin #7	Historic
HEA-00222	Listed	Ewe Creek Ranger Cabin #8	Historic
HEA-00223	Listed	Sushana River Ranger Cabin #17	Historic
HEA-00224	Listed	Lower Windy Creek Ranger Cabin #15	Historic
HEA-00225	Unevaluated	HEA-00225	Prehistoric
HEA-00226	Unevaluated	HEA-00226	Prehistoric
HEA-00227	Unevaluated	HEA-00227	Historic
HEA-00228	Unevaluated	HEA-00228	Historic
HEA-00229	Unevaluated	HEA-00229	Historic
HEA-00230	Unevaluated	West Fork Chulitna River Bridge	Historic
HEA-00231	Unevaluated	HEA-00231	Historic
HEA-00232	Unevaluated	HEA-00232	Prehistoric
HEA-00237	Unevaluated	Arctic Coal Company Camp	Historic
HEA-00238	Not Eligible	Popovitch Creek Cabin Site	Historic
HEA-00239	Unevaluated	Eroadaway	Unknown
HEA-00240	Unevaluated	Walker Ridge Overlook Site	Prehistoric
HEA-00241	Unevaluated	Helipad Site	Prehistoric
HEA-00242	Unevaluated	HEA-00242	Prehistoric
HEA-00243	Unevaluated	Moose Hole Overlook Site	Prehistoric
HEA-00244	Unevaluated	HEA-00244	Prehistoric
HEA-00245	Unevaluated	HEA-00245	Prehistoric
HEA-00246	Unevaluated	Mercer Ranch Site	Prehistoric
HEA-00247	Unevaluated	HEA-00247	Prehistoric
HEA-00252	Unevaluated	Healy Hotel	Historic
HEA-00254	Unevaluated	Golden Zone Mine	Historic
HEA-00255	Unevaluated	HEA-00255	Prehistoric
HEA-00256	Unevaluated	HEA-00256	Prehistoric
HEA-00257	Unevaluated	HEA-00257	Prehistoric
HEA-00258	Unevaluated	HEA-00258	Prehistoric
HEA-00259	Unevaluated	HEA-00259	Prehistoric
HEA-00260	Unevaluated	HEA-00260	Prehistoric
HEA-00261	Unevaluated	HEA-00261	Prehistoric
HEA-00262	Unevaluated	HEA-00262	Historic
HEA-00263	Unevaluated	HEA-00263 (Ewe Creek Blade Site, Ewe Creek Blade II)	Prehistoric
HEA-00264	Unevaluated	HEA-00264	Prehistoric
HEA-00265	Unevaluated	HEA-00265	Prehistoric

Appendix G: Cultural Resources Information

AHRS #	NRHP Status	Site Name	Period
HEA-00276	Unevaluated	CCC Camp At Teklanika Campground	Historic
HEA-00277	Not Eligible	CCC Camp Site	Historic
HEA-00278	Unevaluated	Arc Vehicle And Machinery Dump	Historic
HEA-00279	Unevaluated	Large Can Dump	Historic
HEA-00280	Unevaluated	Maurice Morino Grave	Historic
HEA-00281	Unevaluated	Northwest Dump Area	Historic
HEA-00282	Unevaluated	McClarty/Smith Graves	Historic
HEA-00283	Unevaluated	Rock Creek Mouth Cabin	Historic
HEA-00284	Unevaluated	Kennedy Cabin Foundation And Dump Area	Historic
HEA-00285	Unevaluated	W.A. Baker Cabin Ruins	Historic
HEA-00286	Unevaluated	Lithic Site	Prehistoric
HEA-00287	Unevaluated	Lithic Site	Prehistoric
HEA-00288	Unevaluated	Lithic Site	Prehistoric
HEA-00289	Unevaluated	Old Cantwell Cemetery	Historic
HEA-00290	Unevaluated	Jack River Graves	Historic
HEA-00291	Unevaluated	Jack Secondchief Grave	Historic
HEA-00292	Not Eligible	Fanny's Grave	Historic
HEA-00293	Unevaluated	Nenana Canyon Roadhouse And Patrol Cabin Complex	Historic
HEA-00294	Unevaluated	HEA-00294	Prehistoric
HEA-00295	Unevaluated	HEA-00295	Prehistoric
HEA-00296	Unevaluated	HEA-00296	Prehistoric
HEA-00297	Unevaluated	HEA-00297	Prehistoric
HEA-00298	Unevaluated	HEA-00298	Unknown
HEA-00299	Unevaluated	HEA-00299	Historic
HEA-00300	Unevaluated	Cabin North of Yanert	Historic
HEA-00301	Unevaluated	Lagoon Section Station	Historic
HEA-00302	Unevaluated	Yanert Mouth Cabin	Historic
HEA-00303	Unevaluated	Yanert Coal Mine	Historic
HEA-00304	Unevaluated	Tent Foundation	Historic
HEA-00305	Unevaluated	Shed At Oliver Flag Stop	Historic
HEA-00306	Unevaluated	Johnny Romanov Cabin	Historic
HEA-00312	Eligible	Building 121, Mess Hall C-Camp	Historic
HEA-00313	Unevaluated	HEA-00313	Prehistoric
HEA-00314	Unevaluated	Zeboff Cabin	Historic
HEA-00315	Unevaluated	Grave Site Of Three Unidentified People	Historic
HEA-00322	Unevaluated	Historic Site Across Reily Creek From HEA-00134	Historic
HEA-00323	Unevaluated	East Fork Can Dump	Historic
HEA-00324	Not Eligible	HEA-00324	Prehistoric
HEA-00325	Unevaluated	ARRC Bridge 287.7 Honolulu Creek	Historic
HEA-00326	Unevaluated	ARRC Bridge MP 351.4 Unnamed Trib Of Nenana River	Historic
HEA-00327	Eligible	Healy's Lucky Strike Site	Prehistoric
HEA-00328	Not Eligible	HEA-00328	Historic
HEA-00329	Eligible	HEA-00329	Historic
HEA-00330	Unevaluated	Old Healy	Historic

AHRS #	NRHP Status	Site Name	Period
HEA-00335	Unevaluated	Windy Creek Overlook	Prehistoric
HEA-00336	Not Eligible	Dunkle Mine	Historic
HEA-00337	Eligible	ARRC Bridge MP 305.7	Historic
HEA-00338	Eligible	ARRC Bridge MP 354.4	Historic
HEA-00339	Unevaluated	HEA-00339	Historic
HEA-00340	Unevaluated	HEA-00340	Historic
HEA-00341	Unevaluated	HEA-00341	Historic
HEA-00342	Unevaluated	HEA-00342	Historic
HEA-00343	Unevaluated	Sledge Hammer And Spike	Historic
HEA-00344	Unevaluated	HEA-00344	Historic
HEA-00345	Unevaluated	HEA-00345	Historic
HEA-00346	Unevaluated	HEA-00346	Historic
HEA-00350	Unevaluated	HEA-00350	Historic
HEA-00376	Unevaluated	Military Cache AFC-10	Historic
HEA-00377	Unevaluated	ARRC Bridge 355.2	Historic
HEA-00378	Unevaluated	ARRC Timber Bridge MP 287.3	Historic, Modern
HEA-00379	Not Eligible	ARRC Timber Bridge MP 319.0	Historic, Modern
HEA-00380	Unevaluated	ARRC Timber Bridge MP 319.7	Historic, Modern
HEA-00381	Unevaluated	ARRC Timber Bridge MP 335.8	Historic, Modern
HEA-00382	Unevaluated	ARRC Timber Bridge MP 337.0	Historic, Modern
HEA-00383	Unevaluated	ARRC Timber Bridge MP 348.8	Modern
HEA-00384	Unevaluated	ARRC Timber Bridge MP 358.2	Modern
HEA-00385	Unevaluated	ARRC Timber Bridge MP 364.7	Modern
HEA-00386	Unevaluated	ARRC Timber Bridge MP 364.8	Modern
HEA-00387	Unevaluated	ARRC Timber Bridge MP 369.7	Historic, Modern
HEA-00388	Unevaluated	Bull River 1	Prehistoric
HEA-00389	Unevaluated	Bull River II	Prehistoric
HEA-00390	Unevaluated	Camp Creek	Prehistoric
HEA-00391	Unevaluated	Camp Creek II	Prehistoric
HEA-00392	Unevaluated	HEA-00392	Prehistoric
HEA-00393	Unevaluated	Costello Creek	Prehistoric
HEA-00394	Unevaluated	Costello II	Prehistoric
HEA-00395	Unevaluated	HEA-00395	Prehistoric
HEA-00396	Unevaluated	HEA-00396	Prehistoric
HEA-00397	Unevaluated	Reflection Pond	Prehistoric
HEA-00398	Unevaluated	HEA-00398	Prehistoric
HEA-00399	Unevaluated	HEA-00399	Prehistoric
HEA-00400	Unevaluated	HEA-00400	Prehistoric
HEA-00401	Not Eligible	HEA-00401	Historic
HEA-00402	Unevaluated	River Cobble Quarry	Prehistoric
HEA-00403	Unevaluated	HEA-00403	Prehistoric
HEA-00404	Unevaluated	Hunting Blind	Prehistoric, Protohistoric
HEA-00405	Unevaluated	Cold Meat Cache	Prehistoric, Protohistoric
HEA-00406	Unevaluated	Trapline	Historic

Appendix G: Cultural Resources Information

AHRS #	NRHP Status	Site Name	Period
HEA-00407	Unevaluated	Teklanika Canyon Sluice Site	Historic
HEA-00408	Unevaluated	Trapline	Historic
HEA-00409	Unevaluated	Windy Creek Light Scatter	Prehistoric
HEA-00410	Eligible	Usibelli Coal Wash Plant Hd	Historic
HEA-00419	Unevaluated	ARRC Berm	Historic
HEA-00420	Unevaluated	ARRC Rail Dump	Historic
HEA-00421	Unevaluated	ARRC Concrete Fragments	Historic
HEA-00422	Unevaluated	ARRC Cabin	Historic
HEA-00423	Unevaluated	ARRC Telegraph Segment	Historic
HEA-00427	Not Eligible	Healy School House	Historic
HEA-00428	Not Eligible	6-Unit Employee Garage	Historic
HEA-00429	Eligible	Denali Park Road (HEA Quad Portion)	Historic, Modern
HEA-00435	Unevaluated	HEA-00435	Prehistoric
HEA-00436	Unevaluated	HEA-00436	Prehistoric
HEA-00437	Unevaluated	HEA-00437	Prehistoric
HEA-00438	Unevaluated	HEA-00438	Prehistoric
HEA-00447	Unevaluated	HEA-00447	Historic
HEA-00448	Unevaluated	HEA-00448	Historic
HEA-00449	Unevaluated	HEA-00449	Historic
HEA-00450	Eligible	DENALI HWY MP 60 To MP 134 (HEA Quad Portion)	Historic
HEA-00451	Unevaluated	Big Creek Cabin	Historic
HEA-00453	Unevaluated	HEA-00453	Prehistoric
HEA-00464	Unevaluated	HEA-00464	Historic, Modern
HEA-00465	Not Eligible	Rock Creek Bridge	Historic
HEA-00466	Eligible	Horseshoe Lake Trail	Historic
HEA-00467	Unevaluated	Trails	Historic
HEA-00468	Not Eligible	Utilidor	Historic
HEA-00469	Eligible	Building 51	Historic
HEA-00470	Unevaluated	Sanctuary Saddle Lithic Scatter	Prehistoric
HEA-00471	Not Eligible	Horseshoe Lake Pit	Historic
HEA-00472	Not Eligible	Horseshoe Lake Railroad Debris	Historic
HEA-00473	Unevaluated	NPS Dena Using	Unknown
HEA-00474	Unevaluated	HEA-00474	Historic
HEA-00476	Unevaluated	HEA-00476	Prehistoric
HEA-00477	Unevaluated	HEA-00477	Prehistoric
HEA-00478	Unevaluated	HEA-00478	Prehistoric
HEA-00479	Unevaluated	HEA-00479	Prehistoric
HEA-00480	Unevaluated	HEA-00480	Prehistoric
HEA-00481	Unevaluated	HEA-00481	Prehistoric
HEA-00482	Unevaluated	HEA-00482	Prehistoric
HEA-00483	Unevaluated	HEA-00483	Prehistoric
HEA-00484	Unevaluated	HEA-00484	Historic
HEA-00485	Unevaluated	Arc Mine	Historic
HEA-00486	Unevaluated	Rock Cairn	Prehistoric
HEA-00487	Unevaluated	Argillite Flakes	Prehistoric
HEA-00490	Not Eligible	Horseshoe Lake Cabin Remains	Historic

AHRS #	NRHP Status	Site Name	Period
HEA-00512	Unevaluated	Lower Hotel Creek Site	Historic
HEA-00513	Not Eligible	Ski Hill Road	Historic
HEA-00515	Not Eligible	HEA-00515	Unknown
HEA-00516	Unevaluated	Healy Area Trash Dump	Historic
HEA-00517	Eligible	Denali Park Road Historic District (HEA Quad Portion)	Historic
HEA-00518	Not Eligible	HEA-00518	Historic
HEA-00519	Unevaluated	HEA-00519	Historic
HEA-00520	Unevaluated	HEA-00520	Prehistoric
HEA-00521	Not Eligible	HEA-00521	Prehistoric
HEA-00522	Unevaluated	Well Pump And Structure	Historic
HEA-00554	Unevaluated	New Cantwell Cemetery	Historic
HEA-00592	Eligible	HEA-00592	Prehistoric
HEA-00593	Unevaluated	HEA-00593	Prehistoric
HEA-00594	Unevaluated	HEA-00594	Prehistoric
HEA-00595	Eligible	HEA-00595	Prehistoric
HEA-00596	Not Eligible	HEA-00596	Prehistoric
HEA-00597	Unevaluated	HEA-00597	Prehistoric
HEA-00598	Not Eligible	HEA-00598	Prehistoric
HEA-00600	Unevaluated	HEA-00600	Prehistoric
HEA-00601	Unevaluated	HEA-00601	Prehistoric
HEA-00602	Not Eligible	HEA-00602	Historic
HEA-00603	Not Eligible	HEA-00603	Historic
HEA-00604	Unevaluated	HEA-00604	Prehistoric
HEA-00605	Not Eligible	HEA-00605	Historic
HEA-00606	Not Eligible	HEA-00606	Historic
HEA-00607	Unevaluated	HEA-00607	Prehistoric
HEA-00609	Unevaluated	HEA-00609	Historic
HEA-00611	Unevaluated	HEA-00611	Prehistoric
HEA-00613	Unevaluated	HEA-00613	Unknown
HEA-00614	Unevaluated	HEA-00614	Unknown
HEA-00615	Eligible	McKinley Park Hotel Power House	Historic
HEA-00616	Unevaluated	McKinley Airfield	Historic
HEA-00617	Unevaluated	Kennel Trail Excavation	Historic
HEA-00618	Unevaluated	Hydrant Berm Test	Historic
HEA-00619	Unevaluated	HEA-00619	Unknown
HEA-00620	Not Eligible	Healy Engine House	Historic
HEA-00647	Unevaluated	Crabbies Crossing Cabin On The Alaska Railroad	Historic
HEA-00648	Unevaluated	Magic Bus 142	Modern
HEA-00649	Not Eligible	5 Mile Pit	Historic, Modern
HEA-00650	Not Eligible	7 Mile Pit	Historic, Modern
HEA-00657	Unevaluated	HEA-00657	Prehistoric
HEA-00658	Eligible	HEA-00658	Prehistoric
HEA-00659	Not Eligible	HEA-00659	Prehistoric
HEA-00660	Eligible	HEA-00660	Prehistoric
HEA-00661	Not Eligible	HEA-00661	Prehistoric
HEA-00662	Eligible	HEA-00662	Prehistoric

Appendix G: Cultural Resources Information

AHRS #	NRHP Status	Site Name	Period
HEA-00663	Not Eligible	HEA-00663	Prehistoric
HEA-00664	Unevaluated	Box At MP 45	Historic
HEA-00665	Unevaluated	Hotel Creek Site	Historic
HEA-00666	Unevaluated	Riley Creek Bridge Pilings	Historic
HEA-00667	Unevaluated	Oxbow Trail Cable	Historic
HEA-00668	Unevaluated	Oh-Riley Auto Parts	Historic
HEA-00669	Unevaluated	NPS Denali	Historic
HEA-00670	Unevaluated	Sable Obsidian Point	Prehistoric
HEA-00671	Unevaluated	Five Drum Site	Historic
HEA-00672	Unevaluated	Nenana Terrace Lumber	Historic
HEA-00673	Unevaluated	Cut Bone Stp	Historic
HEA-00674	Unevaluated	Historic Can Base Isolated Find	Historic
HEA-00675	Unevaluated	Polychrome Summit Marker	Historic
HEA-00676	Unevaluated	Sushana Boundary Marker	Historic
HEA-00677	Unevaluated	Nenana Historic Creekside Scatter	Historic
HEA-00678	Unevaluated	Nenana Historic Downslope Scatter	Historic
HEA-00679	Unevaluated	Nenana Historic Sidehill Scatter	Historic
HEA-00680	Unevaluated	HEA-00680	Prehistoric
HEA-00681	Unevaluated	Igloo Creek Artifact Scatter	Historic
HEA-00682	Unevaluated	Igloo Creek Camp And Artifact Scatter	Historic
HEA-00683	Unevaluated	Sanctuary River Artifact Scatter	Historic
HEA-00684	Unevaluated	Riley Creek Cabin	Historic
HEA-00686	Unevaluated	Alaska Railroad Telephone/Telegraph Line	Historic
HEA-00687	Unevaluated	HEA-00687	Historic
HEA-00688	Unevaluated	HEA-00688	Historic
HEA-00689	Unevaluated	HEA-00689	Historic
HEA-00690	Unevaluated	HEA-00690	Historic
HEA-00692	Unevaluated	Savage River Check Station	Historic
HEA-00693	Unevaluated	Teklanika Gravel Pit	Historic
HEA-00695	Unevaluated	Old Toklat Gravel Pit	Historic
HEA-00696	Unevaluated	Railroad Bridge MP 354.0	Historic
HEA-00697	Unevaluated	18OM01	Prehistoric
HEA-00698	Unevaluated	18JP15	Historic
HEA-00699	Unevaluated	18JS01	Prehistoric
HEA-00700	Unevaluated	19AB02	Prehistoric
HEA-00701	Unevaluated	19AB03	Prehistoric
HEA-00702	Unevaluated	19AB04	Prehistoric
HEA-00703	Unevaluated	19AB06	Prehistoric
HEA-00704	Unevaluated	19AB07	Historic
HEA-00705	Unevaluated	19AB08	Prehistoric
HEA-00706	Unevaluated	19AB09	Prehistoric
HEA-00707	Unevaluated	19AB10	Prehistoric
HEA-00708	Unevaluated	19CH05	Prehistoric
HEA-00709	Unevaluated	19CH12	Prehistoric
HEA-00710	Unevaluated	19CH13	Prehistoric
HEA-00711	Unevaluated	19CH21	Prehistoric

AHRS #	NRHP Status	Site Name	Period
HEA-00712	Unevaluated	19RB02	Historic
HEA-00713	Unevaluated	19RB04	Prehistoric
HEA-00715	Unevaluated	19CH09	Historic
HEA-00716	Unevaluated	13TH02	Prehistoric
HEA-00717	Unevaluated	13CB01	Prehistoric
HEA-00718	Unevaluated	13CH02	Prehistoric
HEA-00719	Unevaluated	13CH03	Prehistoric
HEA-00720	Unevaluated	13TH03	Prehistoric
HEA-00721	Unevaluated	13JF01	Prehistoric
HEA-00722	Unevaluated	18EM01	Prehistoric
HEA-00723	Unevaluated	18JP04	Prehistoric
HEA-00724	Unevaluated	18EM04	Prehistoric
HEA-00725	Unevaluated	19PF02	Prehistoric
HEA-00726	Unevaluated	10JB01	Prehistoric
HEA-00727	Unevaluated	10JB02	Prehistoric
HEA-00728	Unevaluated	10JB03	Historic
MMK-00016	Eligible	Stampede Mine	Historic
MMK-00073	Listed	Toklat Ranger Station - Pearson Cabin #4	Historic
MMK-00074	Listed	Upper Toklat River Cabin 24	Historic
MMK-00075	Listed	Lower Toklat River Ranger Cabin #18	Historic
MMK-00078	Unevaluated	Mmk-078	Prehistoric
MMK-00095	Unevaluated	Stampede Trail	Historic
MMK-00121	Unevaluated	CCC Camp	Historic
MMK-00125	Eligible	Copper Mountain Mining Camp	Historic
MMK-00137	Unevaluated	Historic Structural Remains	Historic
MMK-00161	Eligible	Eielson Visitor Center Site	Historic
MMK-00162	Not Eligible	Eielson Visitor Center	Historic
MMK-00171	Eligible	Denali Park Road	Historic, Modern
MMK-00178	Unevaluated	Stone Hill Meat Cache	Prehistoric
MMK-00188	Unevaluated	Heli Cairn	Prehistoric
MMK-00195	Eligible	Denali Park Road Historic District	Historic
MMK-00196	Unevaluated	Steep Bluff Historic Site	Historic
MMK-00197	Unevaluated	River Side Historic Site	Historic
MMK-00198	Unevaluated	Anderson Pass Collection	Historic
MMK-00199	Unevaluated	Stampede Trail Kettle	Historic
MMK-00200	Unevaluated	Historic Wood	Historic
MMK-00202	Unevaluated	Stony Creek Location #2	Historic
MMK-00222	Unevaluated		Historic
MMK-00223	Unevaluated		Historic
TAL-00001	Listed	Curry Lookout	Historic
TAL-00003	Unevaluated	Chase Railroad Station	Historic
TAL-00004	Unevaluated	Curry	Historic
TAL-00006	Listed	Fairview Inn	Historic
TAL-00008	Contributing Site	Frank Lee Cabin	Historic
TAL-00009	Unevaluated	Deadhorse Hill Roadhouse	Historic
TAL-00014	Unevaluated	Talkeetna Railroad Depot	Historic

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AHRS #	NRHP Status	Site Name	Period
TAL-00015	Unevaluated	Talkeetna River Railroad Bridge	Historic
TAL-00016	Unevaluated	Lane Creek Railroad Bridge	Historic
TAL-00017	Contributing Site	Nagley's Store	Historic
TAL-00018	Unevaluated	Bucket Of Blood Saloon	Historic
TAL-00019	Contributing Site	David St Lawrence Cabin	Historic
TAL-00020	Not Eligible	Peter Dana Cabin	Historic
TAL-00022	Contributing Site	Ole Dahl Cabin #1	Historic
TAL-00023	Unevaluated	Frank Jenkin House	Historic
TAL-00024	Unevaluated	Blacksmith Shop	Historic
TAL-00025	Contributing Site	Talkeetna Schoolhouse	Historic
TAL-00026	Unevaluated	Pilot School	Historic
TAL-00027	Contributing Site	Ole Dahl Cabin #2	Historic
TAL-00028	Unevaluated	H.W. Nagley House	Historic
TAL-00029	Contributing Site	Helmer Ronning Cabin	Historic
TAL-00030	Contributing Site	Tom Weatherell Cabin	Historic
TAL-00033	Listed	Talkeetna Historic District	Historic
TAL-00035	Unevaluated	Alaska Railroad Horse Pasture	Historic
TAL-00038	Listed	Talkeetna Village Airstrip (Talkeetna Airstrip)	Historic
TAL-00042	Unevaluated	Talkeetna Cemetery	Historic
TAL-00043	Unevaluated	George Tuffluck Cemetery	Historic
TAL-00048	Contributing Site	Black John Zulich Cabin	Historic
TAL-00051	Unevaluated	David Lawrence Shop	Historic
TAL-00052	Unevaluated	Colonel Johnson's Cabin	Historic
TAL-00053	Contributing Site	Mike Trepte House	Historic
TAL-00054	Contributing Site	Red John Cuculich Cabin	Historic
TAL-00056	Contributing Site	Frank Lee Barn	Historic
TAL-00057	Unevaluated	David Lawrence Barn	Historic
TAL-00058	Unevaluated	Railroad Station House	Historic
TAL-00059	Unevaluated	Curry Building	Historic
TAL-00075	Unevaluated	Don Sheldon Hanger	Historic
TAL-00076	Unevaluated	Rabideux Cabin	Historic
TAL-00077	Eligible	Building 400, Flight Service Station	Historic
TAL-00081	Eligible	Milepost 233.4 Bridge, ARRC Timber Bridge No 172	Historic
TAL-00082	Eligible	Milepost 233.6 Bridge	Historic
TAL-00083	Eligible	Alaska Railroad Bridge MP 239.0	Historic
TAL-00084	Eligible	Alaska Railroad Bridge MP 239.1	Historic
TAL-00085	Eligible	Alaska Railroad Bridge MP 238.4	Historic
TAL-00086	Eligible	Alaska Railroad Bridge MP 245.8	Historic
TAL-00089	Unevaluated	Post Mold Site	Prehistoric
TAL-00090	Unevaluated	Spirit Tree Site	Prehistoric
TAL-00091	Unevaluated	Confluence Point	Prehistoric
TAL-00092	Eligible	Trapper Creek Overlook Site	Prehistoric
TAL-00093	Unevaluated	Billion's Cabin	Historic
TAL-00094	Unevaluated	Alaska Road Commission Construction Camp	Historic
TAL-00100	Unevaluated	Ch'anilkaq Site	Prehistoric
TAL-00101	Unevaluated	Ch'aniltnu	Prehistoric

AHRS #	NRHP Status	Site Name	Period
TAL-00102	Unevaluated	Powerline Cache Pits	Prehistoric
TAL-00105	Eligible	Curry Ski Lodge	Historic
TAL-00106	Eligible	Curry Wye	Historic
TAL-00107	Unevaluated	Curry Airstrip	Historic
TAL-00108	Unevaluated	Robson Cow Camp Site	Modern
TAL-00111	Eligible	ARRC Bridge MP 233.9	Historic
TAL-00112	Eligible	ARRC Bridge MP 244.6	Historic
TAL-00113	Not Eligible	ARRC Bridge MP 248.7	Historic, Modern
TAL-00114	Unevaluated	TAL-00114	Prehistoric
TAL-00117	Not Eligible	Petersville Road (Talkeetna-Cache Creek Road)	Historic
TAL-00119	Unevaluated	Byers Lake Cabins	Historic
TAL-00122	Eligible	ARRC Bridge MP 233.3	Historic
TAL-00127	Not Eligible	ARRC Bridge MP 227.9	Historic
TAL-00128	Unevaluated	Cache Pit Site	Prehistoric
TAL-00130	Unevaluated	Bell's Barn	Prehistoric, Historic
TAL-00137	Unevaluated	Cache Pit Bluff Site	Prehistoric
TAL-00138	Unevaluated	Confluence Point House	Prehistoric
TAL-00144	Unevaluated	Dock Houses	Prehistoric, Historic
TAL-00154	Unevaluated	B-17G Aircraft Wreckage	Historic
TAL-00155	Unevaluated	2 Pioneer Bridges And Trail	Historic
TAL-00157	Eligible	TAL-00157	Historic
TAL-00173	Unevaluated	Historic Remains In Talkeetna	Historic
TAL-00175	Unevaluated	Saunders Field	Historic
TAL-00176	Unevaluated	Chulitna Overlook	Prehistoric
TAL-00180	Eligible	TAL-00180	Historic
TAL-00187	Not Eligible	TAL-00187	Unknown
TAL-00192	Not Eligible	TAL-00192	Unknown
TAL-00194	Not Eligible	TAL-00194	Unknown
TAL-00195	Not Eligible	TAL-00195	Modern
TAL-00196	Not Eligible	TAL-00196	Unknown
TAL-00203	Not Eligible	1965 Log Cabin	Historic
TAL-00208	Not Eligible	TAL-00208	Prehistoric, Modern
TAL-00209	Unevaluated	TAL-00209	Unknown
TAL-00210	Unevaluated	TAL-00210	Prehistoric
TAL-00216	Unevaluated	Chief Nicolie's House	Historic
TAL-00220	Unevaluated	TAL-00220	Historic
TAL-00221	Unevaluated	TAL-00221	Historic
TAL-00222	Unevaluated	TAL-00222	Historic
TAL-00223	Unevaluated	James P. Sherman Cabin	Historic
TLM-00001	Unevaluated	Canyon Station	Historic
TLM-00002	Unevaluated	Chulitna Railroad Station	Historic
TLM-00003	Unevaluated	Mile 281 Roadhouse	Historic
TLM-00004	Unevaluated	Sherman Railroad Station	Historic
TLM-00005	Unevaluated	Gold Creek	Historic
TLM-00006	Listed	Susitna River Railroad Bridge	Historic
TLM-00007	Unevaluated	Stephan Lake	Prehistoric

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AHRS #	NRHP Status	Site Name	Period
TLM-00008	Unevaluated	Hurricane Railroad Station	Historic
TLM-00011	Unevaluated	Benchmark Dead Camp	Historic
TLM-00020	Unevaluated	Susitna Marker	Historic
TLM-00101	Unevaluated	TLM-00101	Prehistoric
TLM-00103	Unevaluated	TLM-00103	Prehistoric
TLM-00108	Unevaluated	TLM-00108	Prehistoric
TLM-00109	Unevaluated	TLM-00109	Prehistoric
TLM-00110	Unevaluated	TLM-00110	Prehistoric
TLM-00111	Unevaluated	TLM-00111	Prehistoric
TLM-00112	Unevaluated	TLM-00112	Prehistoric
TLM-00113	Unevaluated	TLM-00113	Prehistoric
TLM-00114	Unevaluated	TLM-00114	Prehistoric
TLM-00118	Unevaluated	TLM-00118	Prehistoric
TLM-00252	Unevaluated	TLM-00252	Prehistoric
TLM-00253	Unevaluated	TLM-00253	Prehistoric
TLM-00265	Eligible	Valentine Creek Bridge	Historic, Modern
TLM-00267	Eligible	Alaska Railroad Bridge MP 260.3	Historic
TLM-00268	Not Eligible	Alaska Railroad Bridge MP 255.1	Historic
TLM-00270	Unevaluated	ARRC Timber Bridge MP 270.9	Historic, Modern
TLM-00271	Unevaluated	ARRC Timber Bridge MP 271.7	Historic, Modern
TLM-00272	Unevaluated	ARRC Timber Bridge MP 276.1	Historic, Modern
TLM-00275	Unevaluated	TLM-00275	Prehistoric
TLM-00276	Unevaluated	TLM-00276	Historic
TLM-00277	Unevaluated	ARRC Timber Bridge MP 281.1	Historic, Modern
TLM-00278	Eligible	ARRC Bridge MP 252.5	Historic
TLM-00279	Not Eligible	ARRC Bridge MP 255.7	Historic, Modern
TLM-00280	Eligible	ARRC Bridge MP 256.2	Historic
TLM-00285	Unevaluated	Fish Creek	Protohistoric
TLM-00288	Unevaluated	TLM-00288	Prehistoric
TLM-00289	Unevaluated	TLM-00289	Prehistoric
TLM-00290	Unevaluated	TLM-00290	Prehistoric
TLM-00291	Unevaluated	TLM-00291	Unknown
TLM-00292	Unevaluated	TLM-00292	Unknown
TLM-00293	Unevaluated	TLM-00293	Unknown
TLM-00295	Unevaluated	TLM-00295	Historic
TLM-00296	Unevaluated	TLM-00296	Unknown
TLM-00297	Unevaluated	TLM-00297	Unknown
TLM-00298	Unevaluated	TLM-00298	Prehistoric
TLM-00299	Unevaluated	TLM-00299	Prehistoric
TLM-00300	Unevaluated	TLM-00300	Unknown
TLM-00312	Unevaluated	TLM-00312	Unknown
TLM-00324	Unevaluated	TLM-00324	Unknown
TLM-00325	Unevaluated	TLM-00325	Prehistoric
TLM-00327	Eligible	TLM-00327	Prehistoric
TLM-00337	Unevaluated	TLM-00337	Unknown
TLM-00338	Unevaluated	TLM-00338	Historic

Table 2. NRHP-Eligible Properties within the APE

<b>AHRS Number</b>	<b>Name</b>	<b>Significance</b>
FAI-00105	Nenana Depot	Its role in the construction of the Alaska Railroad and the importance of Nenana in the economy of interior Alaska.
HEA-00085	Teklanika Archaeological District	Archaeological sites within this district are important because of the data potential for the great antiquity of culture represented at this location. Includes contributing properties HEA-00001 and HEA-00002.
HEA-00147	Mount McKinley National Park Headquarters District	Illustrates the presence and early growth of the NPS in Alaska. The district's buildings are reminiscent of an early Alaskan frontier settlement.
HEA-00216	Sanctuary River Cabin 31	Part of the Patrol Cabins of Mount McKinley National Park, the cabin is significant for its association with the history of transportation and wildlife conservation in the Park.
HEA-00217	Igloo Creek Cabin 25	Part of the Patrol Cabins of Mount McKinley National Park, the cabin is significant for its association with the history of transportation and wildlife conservation in the Park.
HEA-00218	Upper East Fork Cabin 29	Part of the Patrol Cabins of Mount McKinley National Park, the cabin is significant for its association with the history of transportation and wildlife conservation in the Park.
HEA-00219	Lower East Fork Ranger Cabin #9	Part of the Patrol Cabins of Mount McKinley National Park and is the oldest extant boundary Patrol Cabin in Denali National Park.
HEA-00220	Riley Creek Ranger Cabin #20	Part of the Patrol Cabins of Mount McKinley National Park, this cabin provides visual testimony of the winter patrol activities of the park ranger force in their efforts to protect park wildlife from illegal hunters and trappers.
HEA-00221	Upper Windy Creek Ranger Cabin #7	Part of the Patrol Cabins of Mount McKinley National Park, the Upper Windy Creek Ranger Cabin and site are a visual testimony to the winter ranger patrol activities that played a critical role in the Park's early efforts to protect and conserve wildlife.
HEA-00222	Ewe Creek Ranger Cabin #8	Part of the Patrol Cabins of Mount McKinley National Park, the cabin was one of four cabins built on the park boundary in 1931.
HEA-00223	Sushana River Ranger Cabin #17	Part of the Patrol Cabins of Mount McKinley National Park, the cabin represents patrol activities in the 1930s that served to deter illegal hunting and trapping in the Park.
HEA-00224	Lower Windy Creek Ranger Cabin #15	Part of the Patrol Cabins of Mount McKinley National Park, the cabin and represents the early history of wildlife conservation in Alaska's first national park.

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<b>AHRS Number</b>	<b>Name</b>	<b>Significance</b>
HEA-00254	Golden Zone Mine	This mine was the largest lode gold project attempted outside of a historic Alaska mining locality.
MMK-00073	Toklat Ranger Station – Pearson Cabin #4	Part of the Patrol Cabins of Mount McKinley National Park, this station is significant for its association with the history of early wildlife conservation efforts accomplished by the NPS in the park.
MMK-00074	Upper Toklat River Cabin 24	Associated with the history of transportation and wildlife conservation in Alaska's first national park. In 2013, it was also determined to be eligible as a contributing property to the Denali Park Road Historic District (MMK-00195/HEA-00517).
MMK-00075	Lower Toklat River Ranger Cabin #18	Part of the Patrol Cabins of Mount McKinley National Park, this cabin visually represents the winter activities of the ranger force that patrolled the Park for illegal trappers and hunters throughout the 1920s and 1930s.
TAL-00001	Curry Lookout	A survivor from the time when railroads and steamboats were the means by which tourists reached Alaska.
TAL-00033	Talkeetna Historic District	Thirteen buildings from Talkeetna's early years contribute to the district; the three oldest date from 1917, five are from the 1920s, and five are from the 1930s. Together, the historic properties reflect a small supply town in Alaska. Contributing properties include TAL-00006, TAL-00008, TAL-00017, TAL-00019, TAL-00022, TAL-00025, TAL-00027, TAL-00029, TAL-00030, TAL-00048, TAL-00053, TAL-00054, and TAL-00056.
TAL-00038	Talkeetna Village Airstrip	This site played an important role in Talkeetna's economic development and in the aviation history of Southcentral Alaska.
TLM-00006	Susitna River Railroad Bridge	The successful construction of this structure marked completion of the first of a series of major bridges required for construction of the Alaska Railroad between the Tanana Valley and a warm-water port on the Southcentral coast.

Source: AHRS Database February 2020 (ADNR 2020a)

Table 3. RS 2477 Trails within the APE

<b>Trail # (RST)</b>	<b>Trail Name</b>
100	Indian River-Portage Creek Trail
119	Kobi-Bonnifield Trail to Tatlanika Creek
1509	Curry Land Strip-Lookout
1620	Talkeetna River Trail
264	Old Mail Train (Nenana-Minto)
331	Talkeetna-Iron Creek
340	Lignite-Stampede (also listed as HEA-00091, determined not eligible for listing on the NRHP)
343	Kobi-Kantishna
344	Lignite-Kantishna (also listed as HEA-00091, determined not eligible for listing on the NRHP)
345	Kobi-McGrath (via Nikolia and Big River)
346	Nenana-Kantishna (also listed as FAI-02366, determined eligible for listing on the NRHP)
356	Nenana-Kantishna
377	Stephen-Murder and Daneka Lake Connector
469	McWilliams-Gold Creek Trail
491	Rex-Roosevelt
52	Chulitna Trail
61	Stephan Lake-Murder Lake
625	Cantwell Small Tracts Road (Lovers Lane)
707	Windy Creek Trails (Cantwell)
709	Healy-Diamond Coal Mine Dirt Road
80	Murder Lake North to Ridgeline
1826	Chena – Ester Trail

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