FINAL

ENVIRONMENTAL ASSESSMENT FOR 354TH RANGE SQUADRON RADAR OPERATIONS SITES

PREPARED FOR:

UNITED STATES AIR FORCE
PACIFIC AIR FORCES
ELEVENTH AIR FORCE
354TH FIGHTER WING

JANUARY 2025

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FINDING OF NO SIGNIFICANT IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE

354TH RANGE SQUADRON RADAR OPERATIONS SITES EIELSON AIR FORCE BASE, ALASKA

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (USC) Sections 4321 to 4347, implemented by the 2020 version of the Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §1500-1508, and 32 CFR §989, Environmental Impact Analysis Process; the United States Air Force (Air Force) assessed the potential environmental consequences associated with the construction of radar simulator operations sites in Interior Alaska near Eielson Air Force Base (AFB), Alaska.

The purpose of the Proposed Action is to improve F-35 Lightning II Joint Strike Fighter training effectiveness in the North Pacific operational theater. This Proposed Action is needed to modernize the Joint Pacific Alaska Range Complex (JPARC) to support adequate training for 5th and 6th generation aircraft as directed by the Commander of Air Combat Command in the 2020 Enterprise Range Plan.

The Environmental Assessment (EA), incorporated by reference into this finding, analyzes the potential environmental consequences of activities associated with the Proposed Action, *354th Range Squadron Radar Operations Sites*, and provides environmental protection measures to avoid and reduce potential adverse environmental impacts.

The EA considers all potential impacts of the Preferred Alternative "Develop Radar Operations Sites on Mixed-Ownership Lands" and the No-Action Alternative. Additionally, the EA also considers cumulative environmental impacts with other projects in the Region of Influence.

Pursuant to the procedural requirements of NEPA, the Air Force solicited public comments on the Draft EA via a 50-day public notice, from March 13, 2024 to May 3, 2024. The comments are summarized in Appendix A of the Final EA. The consideration of the comments received on the Proposed Action described in the Draft EA compelled the Air Force to revise its Preferred Alternative for the Final EA.

PREFERRED ALTERNATIVE – DEVELOP SEVEN RADAR OPERATIONS SITES ON MIXED-OWNERSHIP LANDS

The Air Force will construct radar operations sites representing adversary surface-to-air missile (SAM) batteries and utilize modern radars (e.g., the Yukon Enhanced Training Initiative systems) and decoys at seven locations in Interior Alaska. The Preferred Alternative includes the construction of gravel roads connecting gravel radar pads to established roadways that will allow the Air Force to re-arrange the radars and decoys at the operations sites to represent diverse scenarios. Each operations site will be approximately 20-acres and require the removal of vegetation and other obstacles to provide unobstructed line-of-sight to the radar from training aircraft. The radar operations sites will be substantially similar in terms of the generic impacts, but will be configured to accommodate the specific topography, proximity to infrastructure, radar system, and other considerations germane to each site.

Two of the sites are on State of Alaska (SOA) land, three sites are on United States Army Garrison (USAG) Alaska land, one site is on Air Force land, and one site is on Fairbanks Northstar Borough (FNSB) land.

The sites from the Draft EA that have been carried forward to the Final EA are:

- Engineer Hill
- South Pole Hill
- Bridge to Terabithia
- Birch Hill
- Pogo Hill
- Gerstle River
- Tok Hill

The sites that have been removed from the Preferred Alternative are:

- Dry Creek
- Quartz Hill

If the Air Force chooses to revisit the Preferred Alternative to reintroduce the removed sites in the future, a supplemental analysis will be conducted with additional public involvement procedures.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Preferred Alternative would not occur, and the Air Force would take no action towards improving 5th and 6th generation fighter training effectiveness in the North Pacific operational theater. Procured radars would be operated from six temporary operations sites within USAG Alaska's Yukon Training Area. Training would continue to be limited, and the JPARC would remain inadequate to replicate a modern threat environment.

SUMMARY OF FINDINGS

The analyses of the affected environment and environmental consequences of implementing the Preferred Alternative presented in the EA concluded that by implementing standard environmental protection measures and operational planning, the Air Force will be in compliance with all applicable terms and conditions and reporting requirements of local, State, and Federal resource agencies.

The Air Force has concluded that no significant adverse effects will result to the following resources as a result of the Preferred Alternative: Airspace Management and Use, Land Use, Hazardous and Toxic Materials and Waste, Safety and Occupational Health, Noise, Air Quality, Water Resources, Earth Resources, Biological / Natural Resources, Cultural Resources, Socioeconomic Resources, Transportation, and Utilities. Furthermore, the Preferred Alternative will not lead to significant adverse effects in any of these resources when considered with past, present, or reasonably foreseeable future projects.

FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

Pursuant to the requirements and objectives of Executive Order (EO) 11990, "Protection of Wetlands;" EO 11988, "Floodplain Management;" and EO 13690, "Federal Flood Risk Management Standard;" the Air Force considered alternatives to its actions within wetlands (EO 11990) and floodplains (EO 11988 and EO 13690) and modified its Proposed Action to the extent feasible, to avoid adverse effects or potential harm. Based on my review of the facts and analyses contained in the EA incorporated by reference, I find that there is no practicable alternative to the Proposed Action outside of the wetlands and the 100-year and 500-year floodplains. Impacts to wetlands may require compensation.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Based on my review of the facts and analyses contained in the EA incorporated by reference, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR §989, I conclude that the Preferred Alternative, Develop Radar Operations Sites on Mixed-Ownership Lands, will not have a significant environmental impact, either by itself or cumulatively with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this FONSI and FONPA completes the environmental impact analysis process.

13 JAN 2025

KEVIN J. OSBORNE, Colonel, USAF
Command Civil Engineer
Headquarters Pacific Air Forces (HQ PACAF)

Date

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

11 AF	Eleventh Air Force
354 FW	354th Fighter Wing
AAC	Alaska Administrative Code
AC	Advisory Circular
ACAM	Air Conformity Applicability Model
ACHP	Advisory Council on Historic Preservation
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADH	Alaska Department of Health
ADNR	Alaska Department of Natural Resources
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film Forming Foam
AFI	Air Force Instruction
AFM	Air Force Manual
AFPD	Air Force Policy Direction
AFS	Alaska Fire Service
AGL	Above Ground Level
AHRS	Alaska Historic Resources Survey
Air Force	Department of the Air Force
AKOSH	Alaska Occupational Safety and Health
ANCSA	Alaska Native Claims Settlement Act
APE	Area of Potential Effect
AP&T	Alaska Power & Telephone
APDES	Alaska Pollutant Discharge Elimination System
ARRC	Alaska Railroad Corporation
ARRL	American Radio Relay League
ARTCC	Air Route Traffic Control Center
AS	Alaska Statute
ASL	Above Sea Level
AST	Aboveground Storage Tank
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
ATS	Air Traffic System
AWC	Anadromous Waters Catalog
BA	Bachelor of Arts
BE	Bioenvironmental Engineering
BGEPA	Bald and Golden Eagle Protection Act
bgs	Below Ground Surface
BLM	Bureau of Land Management
BMP	Best Management Practice
BOF	Board of Fish
BOG	Board of Game
BS	Bachelor of Science
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
C°	Celsius

CAA	Clean Air Act
CDP	Census Designated Place
CEMML	Center for Environmental Management of Military Lands
CEJST	Climate and Economic Justice Screening Tool
CEQ	Council on Environmental Quality
CFA	Controlled Firing Area
CFR	Code of Federal Regulations
CGP	Construction General Permit
cm	Centimeters
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
COC	Contaminant of Concern
COMACC	Commander of Air Combat Command
COMAR	Committee on Man and Radiation
CRC	Cultural Resource Consultants, LLC.
CWA	Clean Water Act
DAF	Department of the Air Force
dB	Decibels
dBA	A-weighted Decibels
DBH	Diameter Breast Height
DFP	Defensive Fighting Position
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOF	Division of Forestry & Fire Protection
DOI	Department of the Interior
DOT&PF	Department of Transportation & Public Facilities
DTA	Donnelly Training Area
CHPP	Central Heat and Power Plant
EA	Environmental Assessment
EAFB	Eielson Air Force Base
EC	Engineering Control
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EJ	Environmental Justice
EJScreen	Environmental Justice Screening and Mapping Tool
EMF	Electromagnetic Field
EMFR	Electromagnetic Field Radiation
EO	Executive Order
EPA	Environmental Protection Agency
EPN	Early Public Notice
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management
FIRM	Flood Insurance Rate Map
FNSB	Fairbanks North Star Borough
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact

FR	Federal Register
GCR	General Conformity Rule
GHG	Greenhouse Gas
GHz	Gigahertz
GMU	Game Management Unit
GPS	Global Positioning System
GREA	Gerstle River Expansion Area
GRTA	Gerstle River Training Area
GRTS	Gerstle River Test Site
GVEA	Golden Valley Electric Association
HAP	Hazardous Air Pollutant
HAZCOM	Hazard Communication
HFP	Haines-Fairbanks Pipeline
HIRF	High-Intensity Radiated Field
Hp	Horsepower
IBA	Important Bird Area
IC	Institutional Control
IEEE	Institute of Electrical and Electronics Engineers
IFR	Instrument Flight Rules
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
IRP	Installation Restoration Program
JPARC	Joint Pacific Alaska Range Complex
LOS	Line-of-Sight
LUC	Land Use Control
MA	Master of Arts
MBTA	Migratory Bird Treaty Act
MEC	Munitions of Concern
mg/m^3	Milligrams per Cubic Meter
MMRP	Military Munitions Response Program
MOA	Military Operations Area
MPE	Maximum Permissible Exposure
MS	Master of Science
MSGP	Multi-Sector General Permit
MSL	Mean Sea Level
mt	Metric Ton
MTR	Military Training Route
MW	Megawatts
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NH_3	Ammonia
NHPA	National Historic Preservation Act
NLUR	Northern Land Use Research, Inc.
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide

NOA	Notice of Availability
NOI	Notice of Intent
NOTAM	Notice to Airmen
NO_x	Nitrogen Oxide and Nitrogen Dioxide
NRHP	National Register of Historic Places
NSR	New Source Review
NTTR	Nevada Test and Training Range
NWI	National Wetland Inventory
O_3	Ozone
OHV	Off-Highway Vehicle
Ops Site	Operations Site
OSHA	Occupational Safety and Health Administration
PACAF	Pacific Air Forces
PAH	Polycyclic Aromatic Hydrocarbon
Pb	Lead
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
PLO	Public Land Order
PM_{10}	Particulate Matter Less Than or Equal to 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Microns in Diameter
POL	Petroleum, Oil, and Lubricants
ppb	Parts per Billion
PPE	Personal Protective Equipment
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
RNAV	Area Navigation
ROAA	Record of Air Analysis
ROI	Region of Influence
ROW	Right-of-Way
RPM	Remedial Project Manager
SAAQS	State Ambient Air Quality Standard
SAM	Surface-to-Air Missile
SAP	Sikes Act Permit
SAR	Specific Absorption Rate
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOA	State of Alaska
SS	Selection Standard
SUA	Special Use Airspace
SUAIS	Special Use Airspace Information Service

SVOC	Semivolatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethylene
TCP	Traditional Cultural Properties
TFTA	Tanana Flats Training Area
TNT	Trinitrotoluene
TRACON	Terminal Radar Approach Control
TVOP	Title V Operating Permit
µg/m^3	Micrograms per Cubic Meter
US	United States
USACE	United States Army Corps of Engineers
USAG	United States Army Garrison
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
WAMCATS	Washington-Alaska Military Cable and Telegraph System
W/kg	Watts per Kilogram
W/m^2	Watts per Meter Squared
WHO	World Health Organization
WOTUS	Waters of the United States
WQC	Water Quality Certification
WQS	Water Quality Standard
YETI	Yukon Enhanced Training Initiative System
YTA	Yukon Training Area

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION AND BACKGROUND

The United States (US) Air Force (Air Force) proposes to construct radar simulator infrastructure in the Joint Pacific Alaska Range Complex (JPARC) near Eielson Air Force Base (EAFB), Alaska (Figure 1-1).

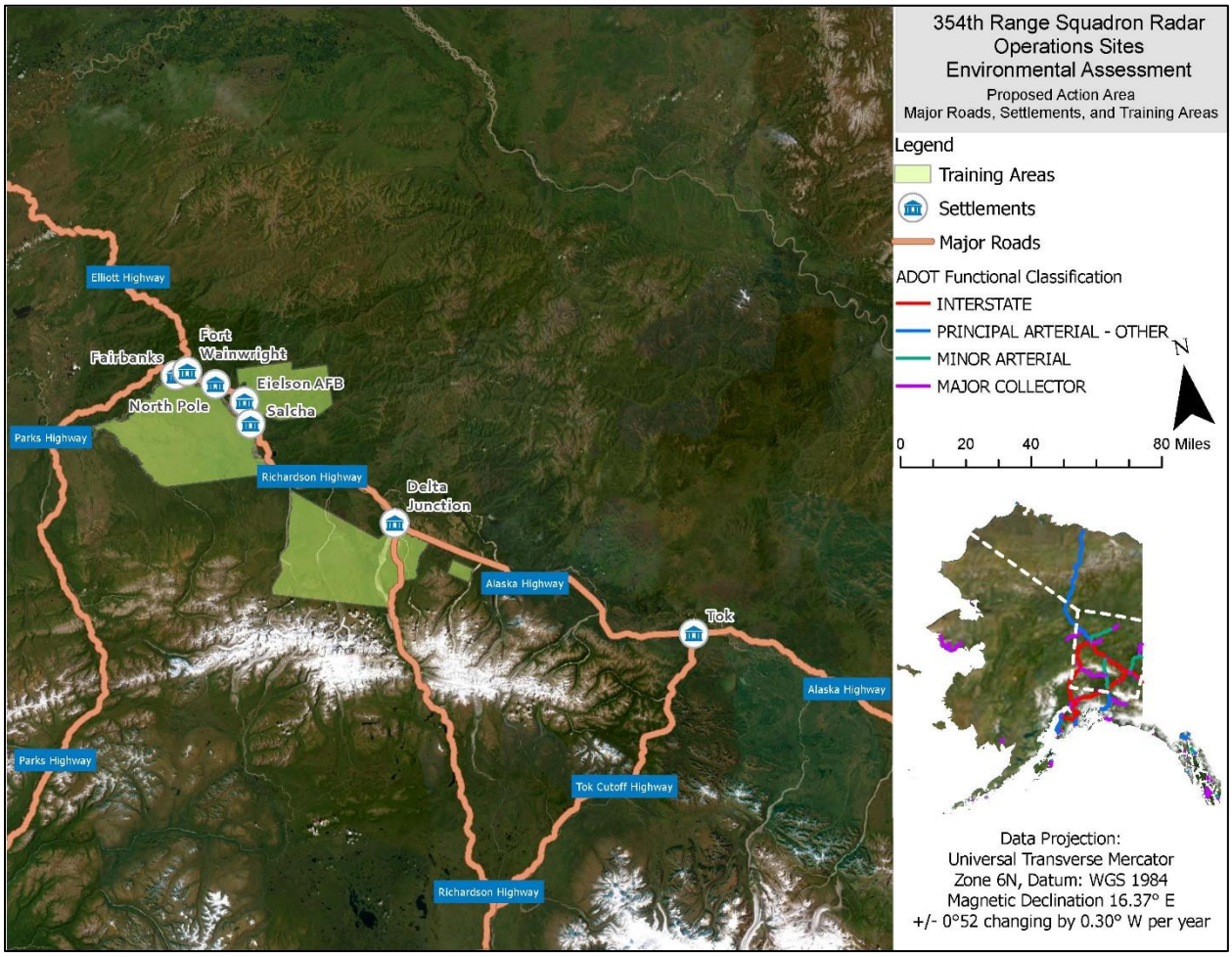

Figure 1-1. Proposed Action Area

The 354th Fighter Wing (354 FW) is the host unit at EAFB with the mission to provide combat ready airpower, advanced integration training, and a strategic Arctic basing option. To accomplish that mission, the 354 FW hosts ten tenant units and implements flying operations, mission support, maintenance, and medical care functions. The 354 FW is assigned to the Eleventh Air Force (11 AF), headquartered at Joint Base Elmendorf-Richardson near Anchorage, Alaska. 11 AF falls under Pacific Air Forces (PACAF) headquartered at Hickam Air Force Base (AFB), Hawaii.

Current JPARC threat systems represent adversary Nation systems that are 30 to 40 years old and do not provide adequate or realistic training. Newer radar simulator systems (herein, radars) like the Yukon Enhanced Training Initiative (YETI) system (i.e., a mobile trailer mounted radar system) were chosen to replace older radars to modernize training. The radars require road access for relocation efforts because they are too heavy to airlift. The radars also require

electrical power to operate. Because of the extended range of these new radars, current radar locations in the US Army Garrison (USAG) Alaska's Yukon Training Area (YTA) are too close in proximity to each other to maximize the full capability of these assets. Additionally, more radars are needed south of EAFB to increase the number of training lanes to support concurrent training for over 100 flight crews within the JPARC.

1.2 LOCATION

EAFB is located in Interior Alaska, approximately 20 miles southeast of Fairbanks, within the Fairbanks North Star Borough (FNSB). The proposed radar operations sites (ops sites) are distributed throughout an approximately 360-mile-long by 100-mile-wide corridor that is roughly bisected by the Richardson and Alaska Highways between the Yukon-Tanana Uplands and Alaska Range (Figure 1-1).

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to improve F-35 Lightning II Joint Strike Fighter training effectiveness in the North Pacific operational theater. *Improve* is defined as the Air Force's ability to optimize pilot training opportunities by providing realistic scenarios based on current and projected threat assessments. *Effectiveness* is the Air Force's ability to successfully operate in the modern, contested environment of the Pacific theater. Improved effectiveness would enable the Air Force to posture the theater with appropriate assets, equipment, and readiness.

The need for the Proposed Action is to support and modernize the JPARC radar systems. Existing radar emulators are based on Soviet Union era (1922 through 1991) technology and do not represent the modern threat environment. Current inadequate training effectiveness conditions include:

1) JPARC threat systems lagging the pacing threat by 30 to 40 years;
2) Current threat systems are incapable of providing adequate or realistic training; and,
3) Insufficient threat systems are available to allow simultaneous training in multiple lanes.

Modernization of the JPARC was directed by the Commander of Air Combat Command (COMACC) in the 2020 Enterprise Range Plan. The 2020 Enterprise Range Plan is a 10-year range capabilities development plan requiring realistic, static, multispectral target surrogates to represent real-world complex target sets and realistic full-spectrum electronic warfare emitters intended to replicate an Integrated Air Defense System environment. Air Force directives were established that defined thresholds and objectives required to reach the desired end state: to provide the capability to support high-end advanced flight training for the joint force and its mission partners. These directives included the modernization of the JPARC and the Nevada Test and Training Range (NTTR), which would also make these the only Air Force ranges capable of providing adequate training for 5th and 6th generation aircraft.

1.4 SCOPE OF ENVIRONMENTAL ANALYSIS

The scope of analysis for the National Environmental Policy Act (NEPA) of 1969 (42 US Code [USC] § 4331 et seq.) and environmental compliance evaluations is the impacts associated with the construction of the radar ops sites and the operation of the radars.

The NEPA requires that decision-making proceed with full awareness of the environmental consequences that follow from a major Federal action, especially those consequences that could significantly and adversely affect the environment. Provisions for the Air Force to comply with and implement NEPA are found in the Council on Environmental Quality (CEQ) regulations

(40 Code of Federal Regulations [CFR] § 1500–1508) and the Air Force's Environmental Impact Analysis Process (EIAP; 32 CFR § 989). The Air Force's environmental assessment (EA) process leads to determining whether an environmental impact statement (EIS) or a Finding of No Significant Impact (FONSI) should be prepared.

The following NEPA documents have been prepared for previous JPARC projects:

- 2007. Eielson Air Force Base Infrastructure Development in Support of RED FLAG Alaska, Final Environmental Assessment.
- 2013. Modernization and Enhancement of Ranges, Airspace, and Training Areas in the Joint Pacific Alaska Range Complex in Alaska., Final Environmental Impact Statement.
- 2016. United States Air Force F-35A Operational Beddown – Pacific, Final Environmental Impact Statement.
- 2017. United States Air Force F-35A Operational Beddown – Pacific, Final Supplemental Environmental Impact Statement.

1.5 INTERGOVERNMENTAL COORDINATION, PUBLIC AND AGENCY PARTICIPATION

1.5.1 Interagency Consultations

Local, State, and Federal agencies with jurisdiction over the resources that may be affected by the Proposed Action were notified during the development of this EA.

A list of agencies consulted during EA analysis and copies of correspondence regarding the findings, concurrence, and resolution of any adverse effect are included in Appendix A.

1.5.2 Intergovernmental and Government-to-Government Consultations

Section 106 of the National Historic Preservation Act of 1966 (NHPA) implementing regulations (36 CFR § 800) require Federal agencies to consult with any Federally Recognized Tribes that attached religious and cultural significance to historic properties, including Traditional Cultural Properties (TCPs), that may be affected by the Proposed Action. The consultation "must recognize the government-to-government relationship between the Federal Government and Indian tribes" (36 CFR § 800.2[c][2][ii][C]). Additionally, Department of Defense Instruction (DoDI) 4710.02 Section 3.1(c) requires Department of the Air Force (DAF) to "consult in a timely and good faith manner with Alaska Native corporations on any proposed action or policy that may have a substantial direct effect on corporate lands, waters, or other natural resources." Consultation with Alaska Native Claims Settlement Act (ANCSA) corporations is also consistent with 36 CFR 800.5.

Consistent with the NHPA; Department of Defense Instruction (DoDI) 4710.02, "Interactions with Federally Recognized Tribes;" Air Force Instruction (AFI) 90-2002 "Air Force Interaction with Federally Recognized Tribes;" and Air Force Manual (AFM) 32-7003, Environmental Conservation; the Air Force consulted with Federally-recognized Tribes and ANCSA corporations that are historically affiliated with the geographic region being considered for the Proposed Action regarding the potential to affect properties of cultural, historical, or religious significance to the Tribes.

The Tribal coordination process is distinct from NEPA or NHPA consultation and the Interagency / Intergovernmental Coordination for Environmental Planning (IICEP) processes and requires separate notification to all relevant Tribes. The timelines for Tribal consultation are also distinct from those of intergovernmental consultations. The EAFB point-of-contact for

Alaska Native Tribes is the Installation Commander. The EAFB point-of-contact for consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) is the Cultural Resources Manager.

The Alaska Native Tribal governments and ANCSA corporations that were invited to Government-to-Government consultation with EAFB regarding this action are listed in Appendix A.

1.5.3 Public and Agency Participation

The Air Forces outreach efforts for the Proposed Action are summarized in a matrix within Appendix A.

Early Public Notice

Pursuant to EO 11988, "Floodplain Management," the Air Force published an Early Public Notice (EPN; Appendix A) because alternatives under consideration would potentially impact the 100-year floodplain of the Tanana River. A 30-day comment period was provided for the public and agencies to provide comments in response to the EPN.

The EPN was published in the following newspapers, both in the physical paper and electronically, and the EAFB Environmental website:

- Fairbanks Daily News Miner, Fairbanks, Alaska
- Delta Wind, Delta Junction, Alaska
- https://www.eielson.af.mil/General-Information/Environmental/

No public or agency comments were received for the EPN.

Notice of Availability of Draft EA and Proposed Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA)

A Notice of Availability (NOA; Appendix A) was published announcing the availability of the Draft EA and Proposed FONSI and FONPA for a 30-day review and comment period. The NOA was published on March 14, 2024, in the following newspapers, both in the physical paper and electronically, and the EAFB Environmental website:

- Fairbanks Daily News Miner, Fairbanks, Alaska
- Delta Wind, Delta Junction, Alaska
- https://www.eielson.af.mil/General-Information/Environmental/

The Draft EA and Proposed FONSI and FONPA were made available electronically on the EAFB Environmental website:

- https://www.eielson.af.mil/General-Information/Environmental/

Due to public and agency requests to extend the comment period for the Draft EA and Proposed FONSI and FONPA, the Air Force published an Amended NOA (Appendix A) in the aforementioned newspapers and Air Force website. The Amended NOA extended the comment period until May 3, 2024, which provided an additional 20 days to the original comment period.

The Air Force requested agency comments on the Draft EA and FONSI/FONPA concurrently with the public notice. The agencies contacted are listed in Appendix A. Public and agency comments and the Air Force's responses are included in Appendix A.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action would construct radar ops site infrastructure at nine locations on Federal, State, and FNSB land. Each new radar could operate independently. The concurrent operation of each additional simulator increases the variety and effectiveness of training. Infrastructure would include new gravel pads and access roads, powerlines and electrical feeders, generators, and fuel storage tanks. The land use designation for some of the lands selected would be changed from the implementation of the Proposed Action.

2.2 SELECTION STANDARDS AND CRITERIA

NEPA and its implementing regulations mandate the consideration of reasonable alternatives for the Proposed Action. ‘‘Reasonable’’ alternatives (32 CFR § 989.8b) are those that meet the underlying purpose and need for the Proposed Action and that would cause a reasonable person to inquire further before choosing a particular course of action. Reasonable alternatives are not limited to those directly within the power of the Air Force to implement. They may involve another government agency or military service to assist in the project or even to become the lead agency. The Air Force must also consider reasonable alternatives raised during the scoping process (32 CFR § 989.18) or suggested by others, as well as combinations of alternatives. The Air Force need not analyze highly speculative alternatives, such as those requiring a major, unlikely change in law or governmental policy. If the Air Force identifies a large number of reasonable alternatives, it may limit alternatives selected for detailed environmental analysis to a reasonable range or number of alternatives representative of the full spectrum of alternatives. Per the requirements of 32 CFR §989, the Air Force EIAP selection standards (SSs) are used to identify reasonable alternatives for meeting the purpose and need for the Proposed Action.

The Proposed Action alternatives must meet the following SSs:

1. *Maximize capability of the upgraded training system (Radar)*: Radars need to be located approximately 25 miles apart and support clear line-of-sight (LOS) from 10,000-feet above ground level (AGL) and above to enable maximum performance and accurate tactical representation of adversary Nations in the Pacific theater. The radars must also be positioned to simulate a defensive line that would likely be encountered along a coastal region and to support concurrent training for over 100 aircraft and flight crews.
2. *Road accessibility*: The radars are too heavy to airlift and as a result must be located within reasonable proximity of a road system to allow emplacement and maintenance. In the context of this SS, “reasonable” includes the consideration of cost, constructability, and environmental consequences.
3. *Electrical power*: The maximum power required for the operation of the radars are 0.4 megawatts (MW) for lower-draw systems and 0.75 MW for higher-draw systems. For large-scale air training events, the radars may operate for 12 hours per week for 10 weeks. However, average operation is 3 hours per week for 42 weeks. In total, the radars would operate approximately 246 hours per year. Mobile generators can provide the required power for some of the lower-draw systems, but long-term generator operation costs for the higher-draw systems is infeasible. Electrical grids must also be able to support simultaneous operation of connected radars.

Screening of Alternatives

The following potential alternatives that might meet the purpose and need for improving F-35 Lightning II Joint Strike Fighter training effectiveness in the North Pacific operational theater were considered:

- Alternative 1: Develop Radar Operations Sites on Mixed-Ownership Lands
- Alternative 2: Develop Five Radar Operations Sites Exclusively on Military Training Lands
- Alternative 3: Improve Eight Operations Sites in the YTA
- Alternative 4: Conduct Level 4 Training at NTTR
- Alternative 5: Make Improvements and Operate Radars from Previously Disturbed Sites in YTA
- Alternative 6: Construct Flight Simulators on EAFB

The SSs were applied to the alternatives to determine which alternative(s) could improve 5th and 6th generation fighter training effectiveness in the North Pacific operational theater and would fulfill the purpose and need of the Proposed Action (Table 2-1).

Table 2-1. Applicability of Selection Standards

Alternative Descriptions	Selection Standards		
	Maximize Capability	Road Accessibility	Electrical Power
	(1)	(2)	(3)
Alternative 1	Yes	Yes	Yes
Alternative 2	No	Yes	Yes
Alternative 3	No	Yes	Yes
Alternative 4	No	Yes	Yes
Alternative 5	No	Yes	Yes
Alternative 6	No	Yes	Yes

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Based on the application of the SSs, the following alternatives have been eliminated from further consideration and are not carried forward for analysis in this environmental analysis:

- Alternative 2: Develop Five Radar Operations Sites Exclusively on Military Training Lands
- Alternative 3: Improve Eight Operations Sites in the YTA
- Alternative 4: Conduct Level 4 Training at NTTR
- Alternative 5: Make Improvements and Operate Radars from Previously Disturbed Sites in YTA
- Alternative 6: Construct Flight Simulators on EAFB

2.3.1 Alternative 2 (Develop Five Radar Operations Sites Exclusively on Military Training Lands)

The Air Force would construct radar ops sites at five locations in Interior Alaska, exclusively on military training lands. These sites would consist of one site on Air Force land (Engineer Hill site) and four sites on USAG Alaska training land that includes one YTA site (South Pole Hill

Ops Site), one Tanana Flats Training Area (TFTA) site (Bridge to Terabithia Ops Site), and two Donnelly Training Area (DTA) sites (Gerstle River and Gerstle River 2 Ops Sites). These ops sites would represent adversary surface-to-air missile (SAM) batteries and utilize radar and decoy target systems. Gravel operating pads linked by gravel roads would provide the ability to re-arrange the ops sites on a regular basis to keep training fresh. Each ops site would be approximately 20-acres and require the removal of vegetation and other obstacles to provide unobstructed LOS for the radar. The ops sites are shown in Figure 2-1.

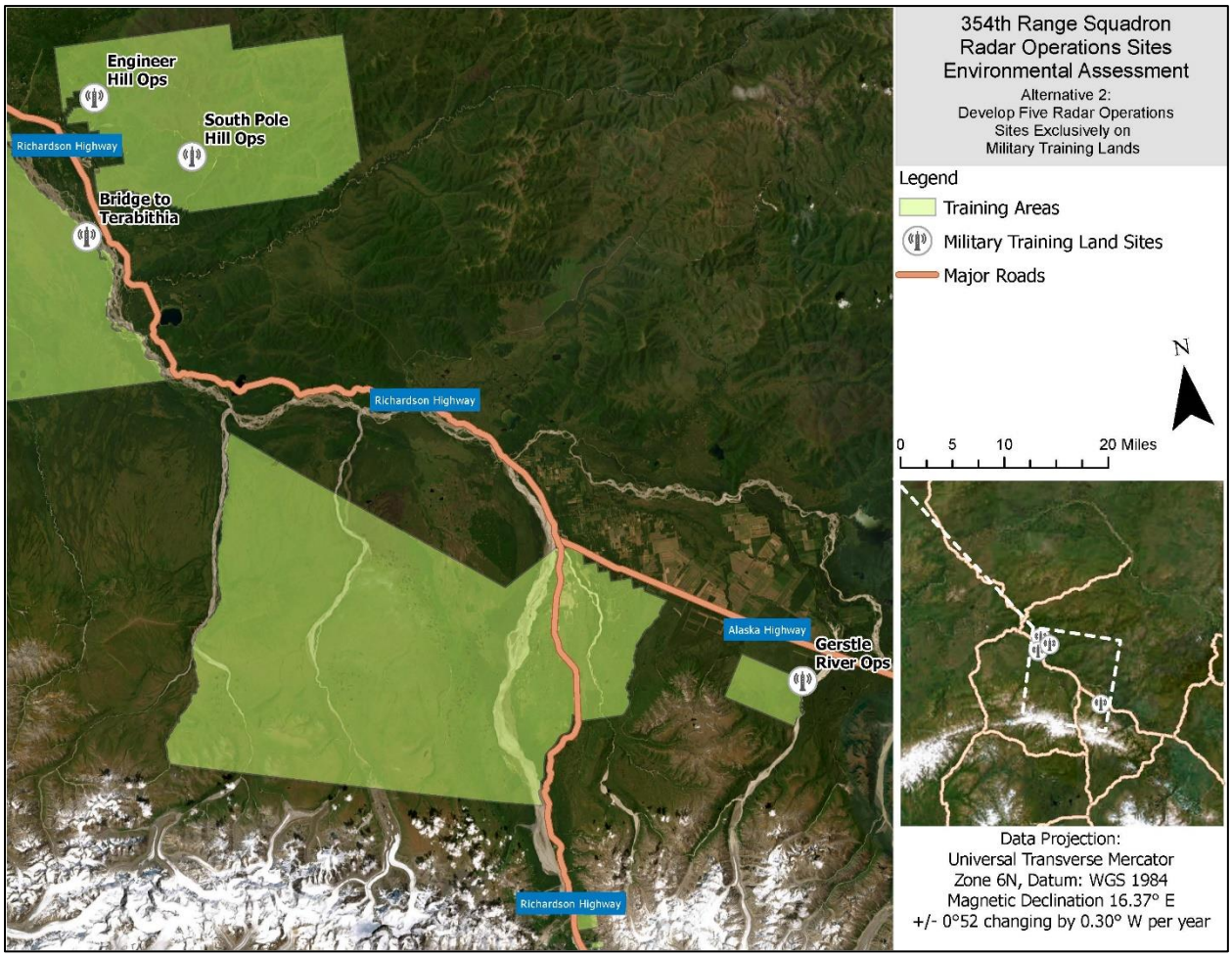

Figure 2-1. Alternative 2: Develop Five Radar Operations Sites Exclusively on Military Training Lands

All five ops sites would share features like those described in Section 2.4.2., and the unique features from the respective ops sites' descriptions. The Gerstle River 2 Ops Site would be located on USAG Alaska training lands within 6.5 miles of the defined Gerstle River Ops Site and would feature the same operating pad configuration.

SS Applicability: Alternative 2 does not satisfy SS #1. The geographic distribution of the systems fielded under Alternative 2 would not resemble the coast of potential adversary Nations in the Pacific theater, and the concentration of the systems would not allow for over 100 flight crews to train concurrently, violating SS #1.

2.3.2 Alternative 3 (Improve Eight Operations Sites in YTA)

The Air Force would improve eight existing radar ops sites on currently leased sites in the YTA to satisfy the requirements of the radar. One of these sites has the necessary electrical infrastructure to support the new radars. Electrical feeders and powerlines would be constructed to provide power to the remaining seven ops sites. Sites 1 and Site 3 have enough space to locate the inert decoy targets and the remaining six ops sites (Site 2 and Sites 4 through 8) would require improvements substantially similar to those described in Alternative 1 (Section 2.4.1.). The YTA sites are shown in Figure 2-2.

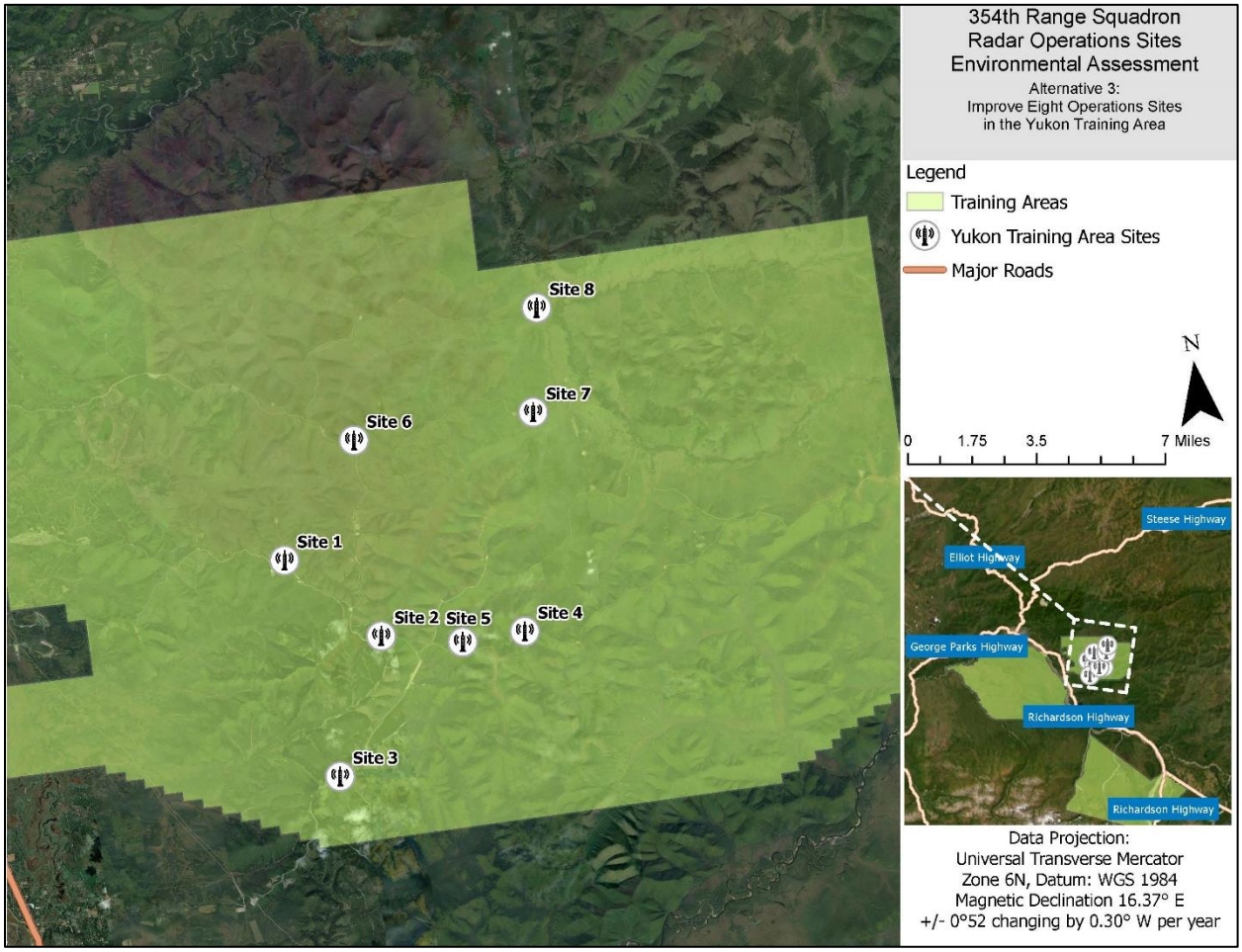

Figure 2-2. Alternative 3: Improve Eight Operations Sites in the YTA

SS Applicability: Alternative 3 does not satisfy SS #1. The geographic distribution of the systems that would be fielded under Alternative 3 would not resemble the coast of potential adversary Nations in the Pacific theater, and the concentration of the systems would not allow for over 100 flight crews to train concurrently. The greatest distance between ops sites would be nine miles, substantially less than the 25-miles between ops sites required by SS #1.

2.3.3 Alternative 4 (Conduct Level 4 Training at NTTR)

The Air Force would conduct the required training at the NTTR at Nellis AFB, Nevada. Pilots would travel to the NTTR and conduct training at the existing range facilities. The Air Force would not construct any new ops sites in Alaska.

SS Applicability: Alternative 4 would violate SS #1. The NTTR is a third of the size of the JPARC and is unable to support the requirement to train over 100 flight crews concurrently. The NTTR is surrounded by commercial airspace and does not allow for effective use of 5th Generation fighter tactics nor can the NTTR support the large joint force exercises of the JPARC.

2.3.4 Alternative 5 (Make Improvements and Operate Radars from Previously Disturbed Sites in YTA)

The Air Force would construct improvements at four permanent ops sites in YTA to attain the capability to temporarily operate radars. The improvements at the four permanent ops sites would resemble those described in Section 2.4.1. The temporary ops sites in YTA would be unimproved and electrical power would be provided by generators. Army training requirements would dictate the availability of the temporary ops sites, so the capability of Alternative 5 would vary between four to nine ops sites. The distribution of the ops sites is shown in Figure 2-3.

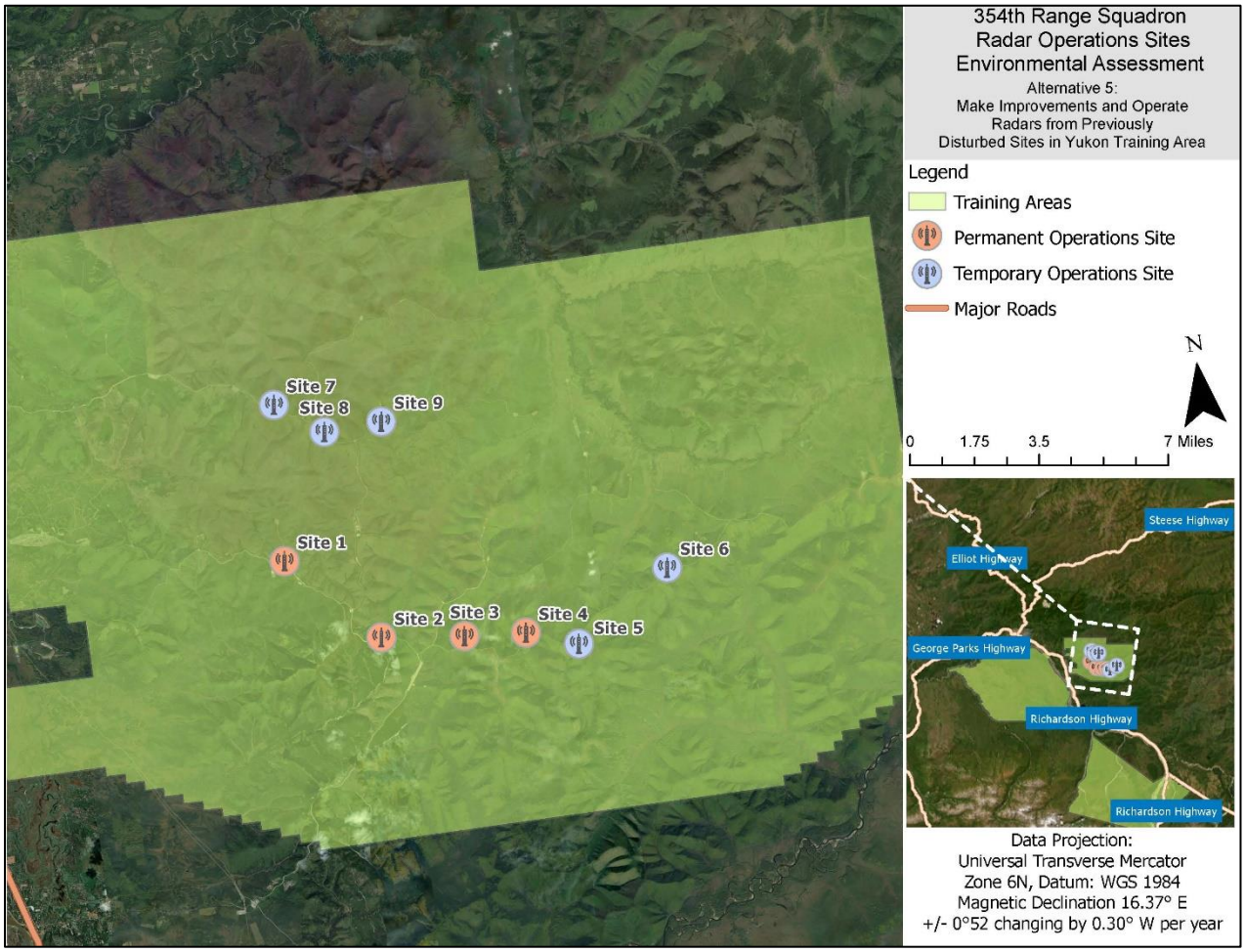

Figure 2-3. Alternative 5: Make Improvements and Operate Radars from Previously Disturbed Sites

SS Applicability: Alternative 5 does not satisfy SS #1. The geographic distribution of the radars that would be fielded under Alternative 5 would not resemble the coast of potential adversary Nations in the Pacific theater and the concentration of the systems would not allow for over 100 flight crews to train concurrently. The greatest distance between ops sites would be 11 miles, substantially less than the 25-miles between ops sites required by SS #1.

2.3.5 Alternative 6 (Construct Flight Simulators on EAFB)

The Air Force would construct additional radar simulators at EAFB to provide training to air crews. Currently EAFB operates six F-35 simulators. Approximately 24 additional F-35 simulators would be needed, as well as simulators to support exercise aircraft including F-15's, F-16's, F-18's, and other allied aircraft. Software would be developed to link the simulators to provide a realistic joint exercise training experience.

SS Applicability: Alternative 6 would violate SS #1. Air Force aircrew training requirements across the spectrum of fighter and mobility platforms can only be partially fulfilled through simulators. This portion of training is already being met with the number of simulators at EAFB. Thus, to accomplish the flight phase of training requirements, modern training radar equipment and infrastructure to support air training operations must be constructed. Alternative 6 by nature cannot support such operations. Thus, Alternative 6 would violate SS #1 because it would not allow the concurrent training of over 100 flight crews.

2.4 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

2.4.1 Alternative 1 / Preferred Alternative (Develop Radar Operations Sites on Mixed-Ownership Lands)

Herein, this alternative will be referred to as the Preferred Alternative. The Air Force would construct radar ops sites at nine locations in Interior Alaska (Figure 2-4).

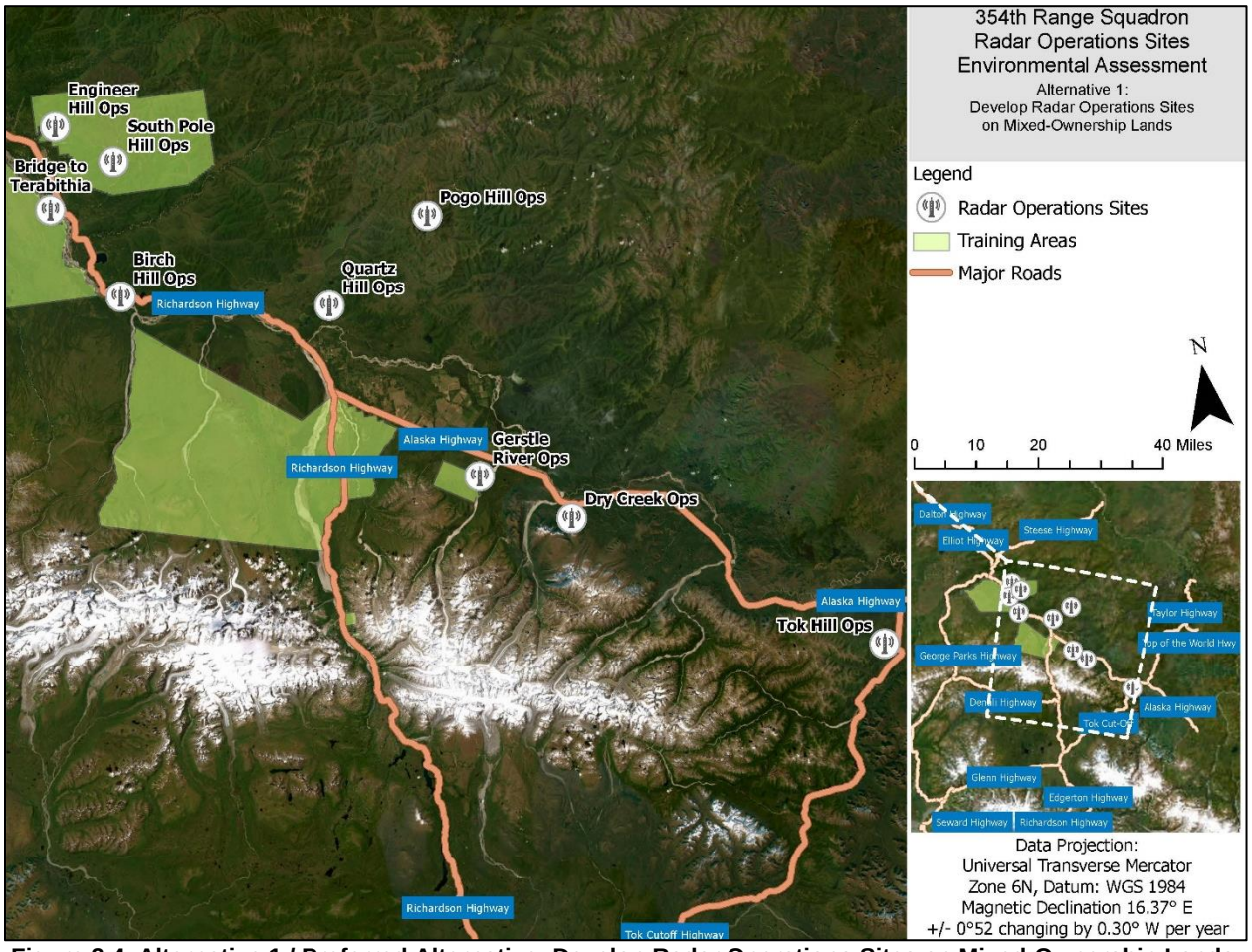

Figure 2-4. Alternative 1 / Preferred Alternative: Develop Radar Operations Sites on Mixed-Ownership Lands

Four of the ops sites would be located on State of Alaska (SOA) land, three ops sites would be on USAG Alaska land, one ops site would be on Air Force land, and one ops site would be on FNSB land (Table 2-2).

Table 2-2. Radar Ops Sites on Mixed-Ownership Lands

Landowner	Ops Site
Air Force	Engineer Hill
USAG Alaska	South Pole Hill
USAG Alaska	Bridge to Terabithia
FNSB	Birch Hill
SOA	Pogo Hill
SOA	Quartz Hill
USAG Alaska	Gerstle River
SOA	Dry Creek
SOA	Tok Hill

Life expectancy of the proposed ops sites is approximately 20 to 40 years or until requirements from the Air Force or Department of Defense (DoD) change. Once the purpose of the ops sites is deemed non-operational or no longer supports the training required by Air Force assets, radar training systems would be demobilized, and the ops sites would be repurposed to support other military training or retrofitted with future systems to meet the need of the American Warfighter. These ops sites would represent adversary SAM batteries, utilize radars and decoys, and be remotely operated. Gravel operating pads linked by gravel roads to established roadways would provide the ability to rearrange the radar and decoys on a regular basis to diversify training. Each ops site would be approximately 20-acres and would require the removal of vegetation and other obstacles to provide unobstructed LOS for the radar. The new access roads and electrical feeders would require additional clearing, dictated by the distance of vegetation to existing roads and power grids. All nine ops sites would share some similar components:

- Equipment used for construction would include hydro-axes, bulldozers, rock trucks, loaders, graders, and compactors;
- All roads and pads would be built with gravel from existing, established material sites;
- Gravel extraction and hauling equipment storage would occur at the material sites;
- New access roads would be single lane, 14-foot-wide surface roads with a 2:1 side slope (20-foot-wide toe-to-toe embankments) and minimum horizontal curve radius of 140 feet;
- Roads would be 2 feet of compacted pit run gravel with a 6-inch E1 surface course;
- Roads would be built to accommodate a 40,000-pound trailer and a 30,000-pound tow vehicle;
- All transformer pads and utility vaults would be precast concrete;
- Vegetation would be cleared at the ops sites to the minimum extent required to achieve LOS requirements;
- Vegetation would be cleared up to approximately 15-feet on both sides of the electrical alignment to provide a 30-foot-wide corridor;
- Staging areas are not anticipated;
- Up to two radars would be operated at each ops site;
- Up to four inert decoy targets (wheeled vehicles about 8.5-feet wide and 53-feet long and about 24,000 pounds) would be staged at each ops site to mimic real-world targets;

- The inert decoy targets would be positioned on the gravel pads or ring-road between 100 to 200 feet from the radar and periodically repositioned within their respective site.

Unique features will be described for each ops site.

Engineer Hill Ops Site

This site is approximately located at 64.7353 °N., -147.0112 °W. on land owned by the Air Force. A new access road approximately 2-miles long would be constructed on existing road (i.e., paved and unpaved paths intended to support on-highway vehicle traffic) and trail (i.e., a path not necessarily intended to support on-highway vehicle traffic) alignments. Approximately 0.7-miles of the distal end of the new access road is aligned with an existing trail and would require vegetation clearing for the 50-foot-wide right-of-way (ROW). Approximately 26.2-acres of vegetation would be cleared to satisfy LOS requirements, and salvaged timber would be temporarily stockpiled near the terminus of the new access road. Three operating pads connected by the new access road would be constructed at the site: two 40-foot by 100-foot pads and one 200-foot by 200-foot pad. Electricity would be provided by a new electrical feeder and 0.7-miles of installed aerial powerline along the distal end of the new access road in the same ROW that tie into the existing power grid.

The Engineer Hill Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-5.

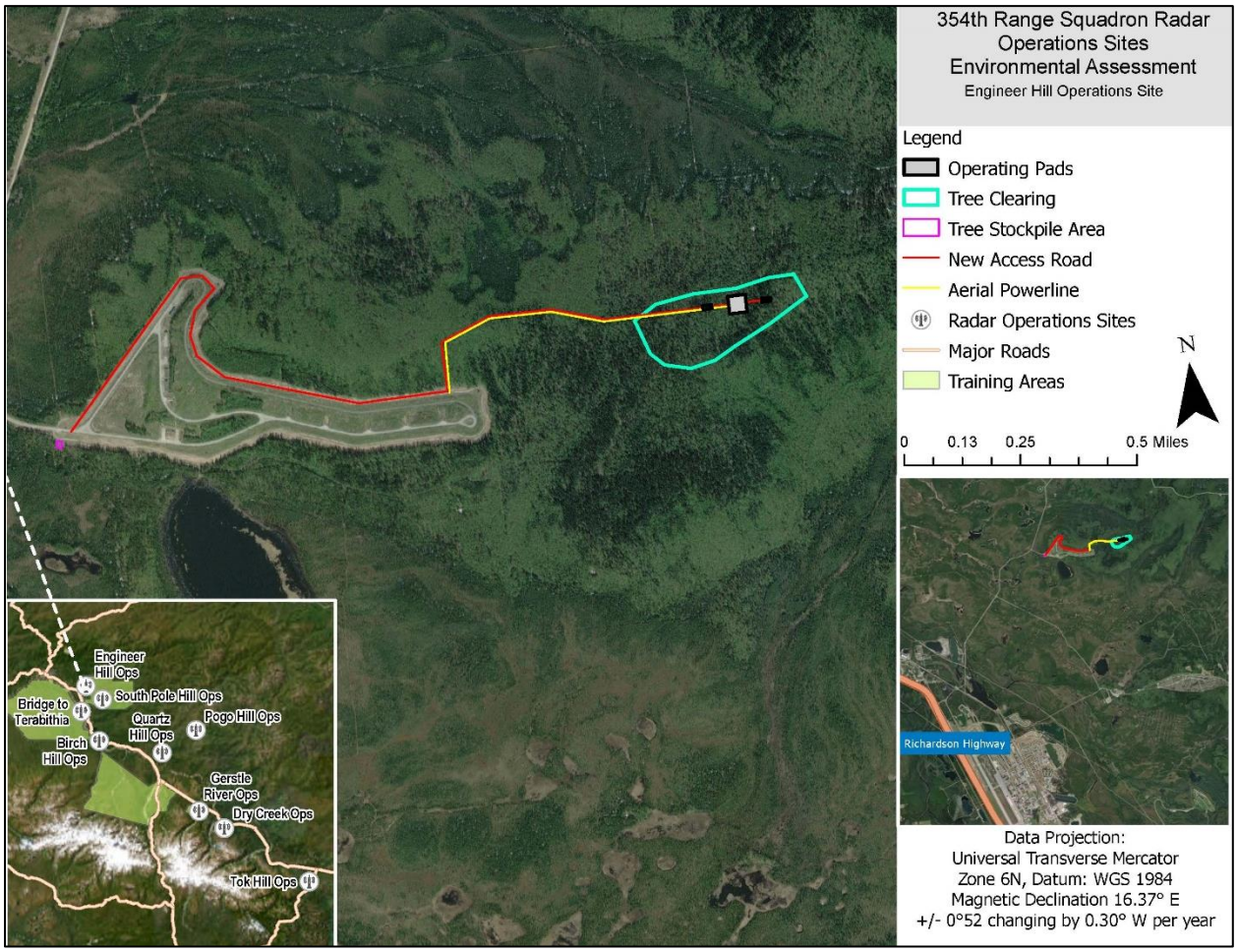

Figure 2-5. Engineer Hill Ops Site

South Pole Hill Ops Site

This site is located approximately at 64.6400 °N., -146.7112 °W. on USAG Alaska training land. A 0.5-mile-long new access road would be constructed along an existing trail. Approximately 17.4-acres of vegetation clearing would be required to satisfy LOS requirements, and salvaged timber would be temporarily stockpiled at an existing location along Quarry Road, approximately 2.5-miles north of the ops site. Three 100-foot by 100-foot operating pads connected by new access roads would be constructed at the site. Electricity would be provided by a new electrical feeder and 0.5-miles of installed aerial powerline in the new access road ROW that tie into the existing power grid.

The South Pole Hill Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-6.

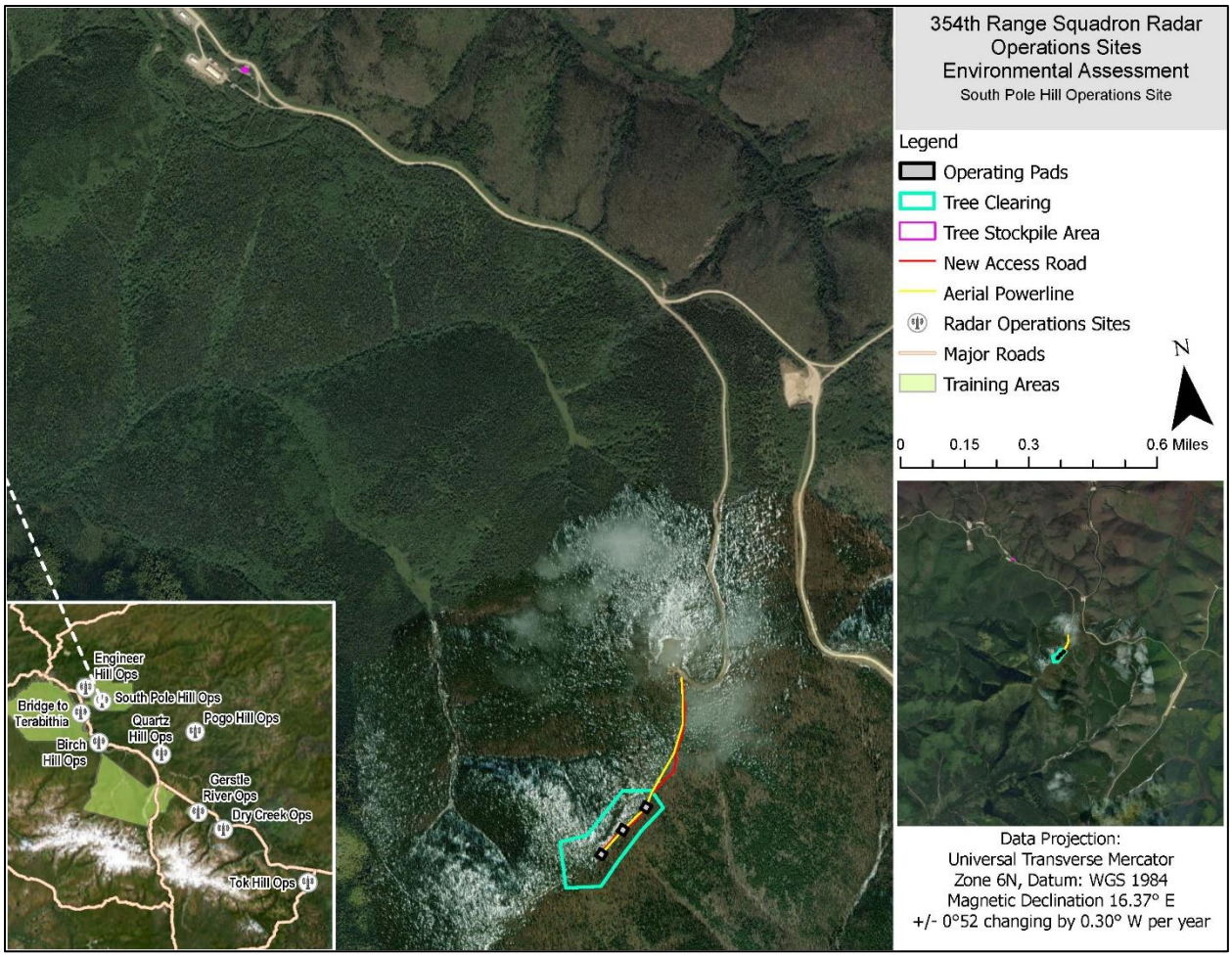

Figure 2-6. South Pole Hill Ops Site

Bridge to Terabithia Ops Site

This site is approximately located at 64.5435 °N., -147.0868 °W. on USAG Alaska training lands. A new 250-foot-long (approximately 0.05-miles) gravel access road would be constructed, tying into the existing road extending from the Tanana River Rail Bridge into the TFTA. Approximately 13.9-acres of vegetation clearing would be required to satisfy the LOS requirements, and salvaged timber would be temporarily stockpiled onsite in the eastern corner of the cleared area. The operating pad would consist of a 16-foot-wide road with 24-foot basal cross section that forms a 400-foot by 400-foot square with an additional 16-foot-wide road running from the northern corner to the southern corner. Electricity would be provided by a new electrical feeder and 2.1-miles of installed aerial powerline in the new access road ROW that would tie into the existing power grid in Salcha, Alaska. The powerlines would cross the existing bridge.

The Bridge to Terabithia Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-7.

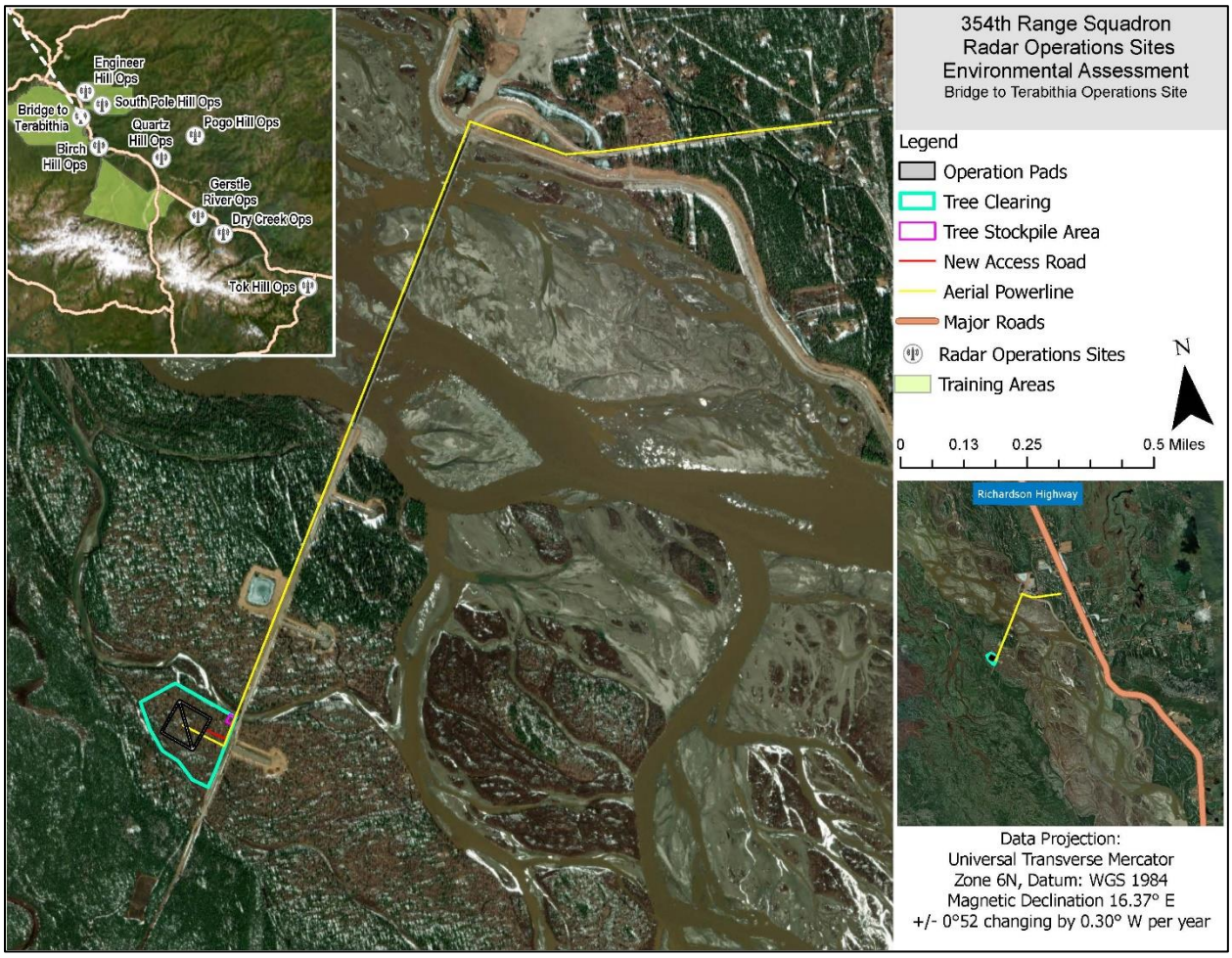

Figure 2-7. Bridge to Terabithia Ops Site

Birch Hill Ops Site

This site is approximately located at 64.3258 °N., -146.7757 °W. on land owned by the FNSB. A new access road approximately 0.76-miles long, tying into the Richardson Highway, would be constructed north of the ops site. Vegetation along the alignment is intact and a 30-foot-wide ROW would be cleared prior to road development. Approximately 28.9-acres of vegetation would be cleared to satisfy LOS requirements, and salvaged timber would be temporarily stockpiled onsite within the cleared area. The site would include three 100-foot by 100-foot operating pads connected by the new access road. Electricity would be provided by a new electrical feeder and 0.5-miles of installed aerial powerline that tie into the existing power grid to the north of the site. The powerline alignment is separate from the new access road and would follow the most direct route to the existing power grid.

The Birch Hill Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-8.

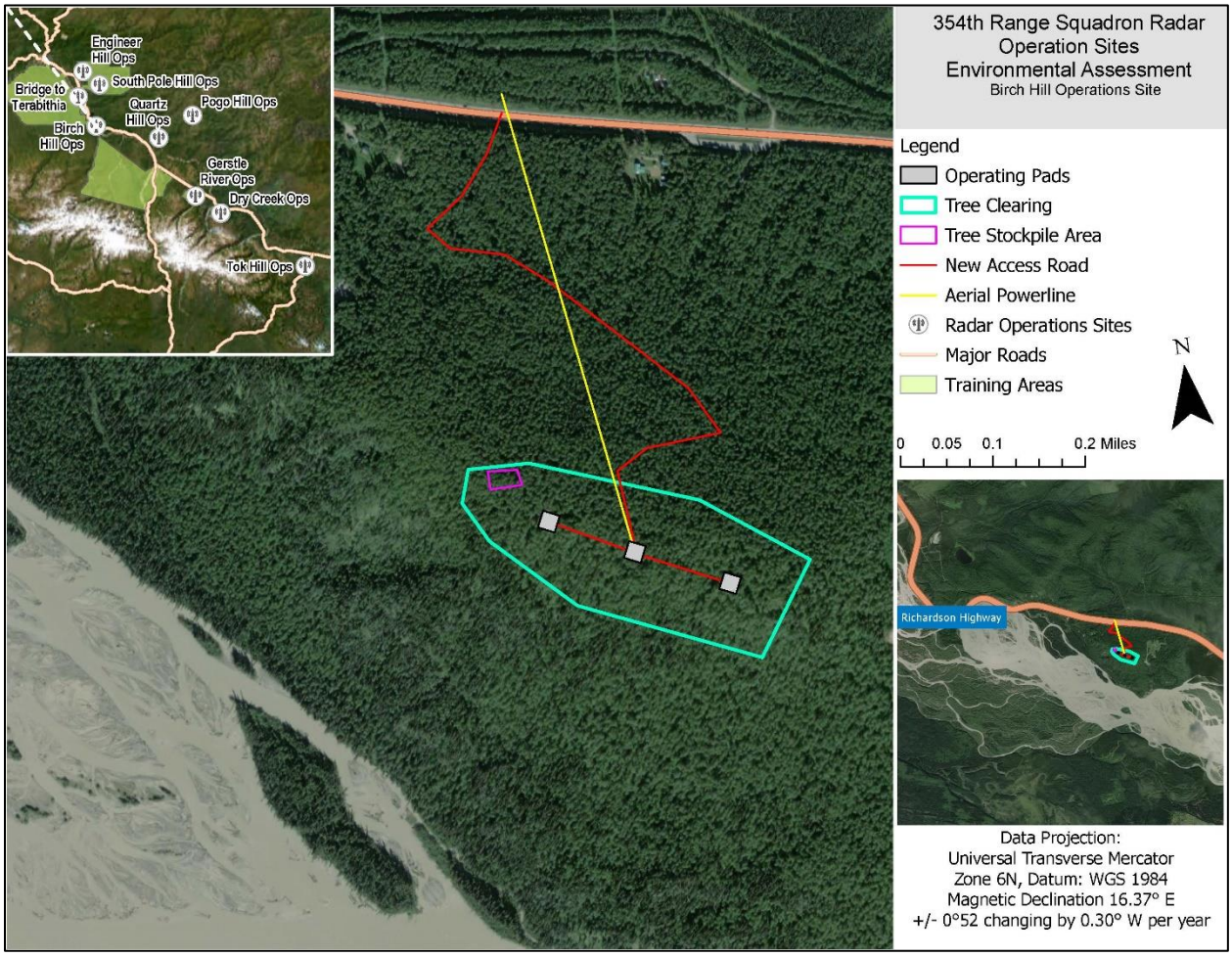

Figure 2-8. Birch Hill Ops Site

Pogo Hill Ops Site

This site is approximately located at 64.4065 °N., -145.0888 °W. on land owned by the SOA. A new access road approximately 1.4-miles long would be constructed along an existing unimproved road alignment. *Unimproved road* is defined as a road that can at most support Off-Highway Vehicle (OHV) traffic due to inadequate aggregate surface material. Potentially up to 14.1-acres of vegetation would be cleared at the site to satisfy LOS requirements, and salvaged timber is not expected to be generated from site clearing. One 150-foot by 150-foot operating pad would be constructed at the site. Electricity would be provided by a new electrical feeder and 1.6-miles of installed aerial powerline that tie into the existing power grid southwest of the ops site. The powerline alignment extends from the existing power grid west of Pogo Mine Access Road before following the alignment of an unnamed unimproved road to the op site.

The Pogo Hill Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-9.

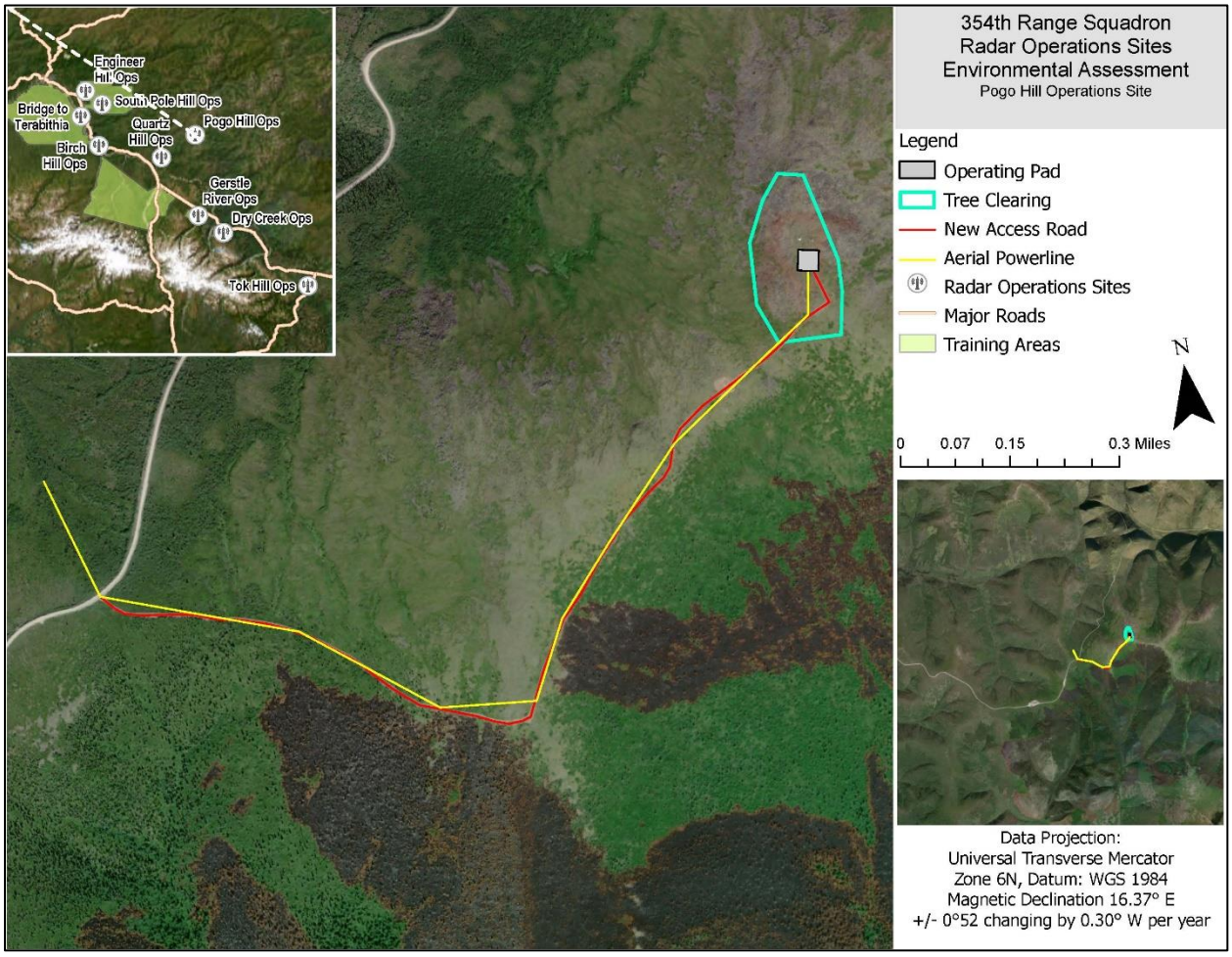

Figure 2-9. Pogo Hill Ops Site

Quartz Hill Ops Site

This site is approximately located at 64.2363 °N., -145.6720 °W. on land owned by the SOA. A 6.3-mile-long new access road would be constructed along the unimproved Quartz Lake Extension Forest Road with the last portion spanning across a previously undisturbed alignment that was minimize to the extent practicable. Approximately 17-acres of vegetation clearing would be required to satisfy LOS requirements and salvaged timber would be temporarily stockpiled in the southern part of the cleared area. A single 150-foot by 150-foot operating pad would be constructed. A diesel generator supplied by a 5,000-gallon aboveground storage tank (AST) would produce the electricity required to operate the radar. During winter, when necessitated by low temperatures, a small gasoline generator would be used to warm up the diesel generator prior to operations.

The Quartz Hill Ops Site layout, new access road, cleared area, and attendant features are shown in Figure 2-10.

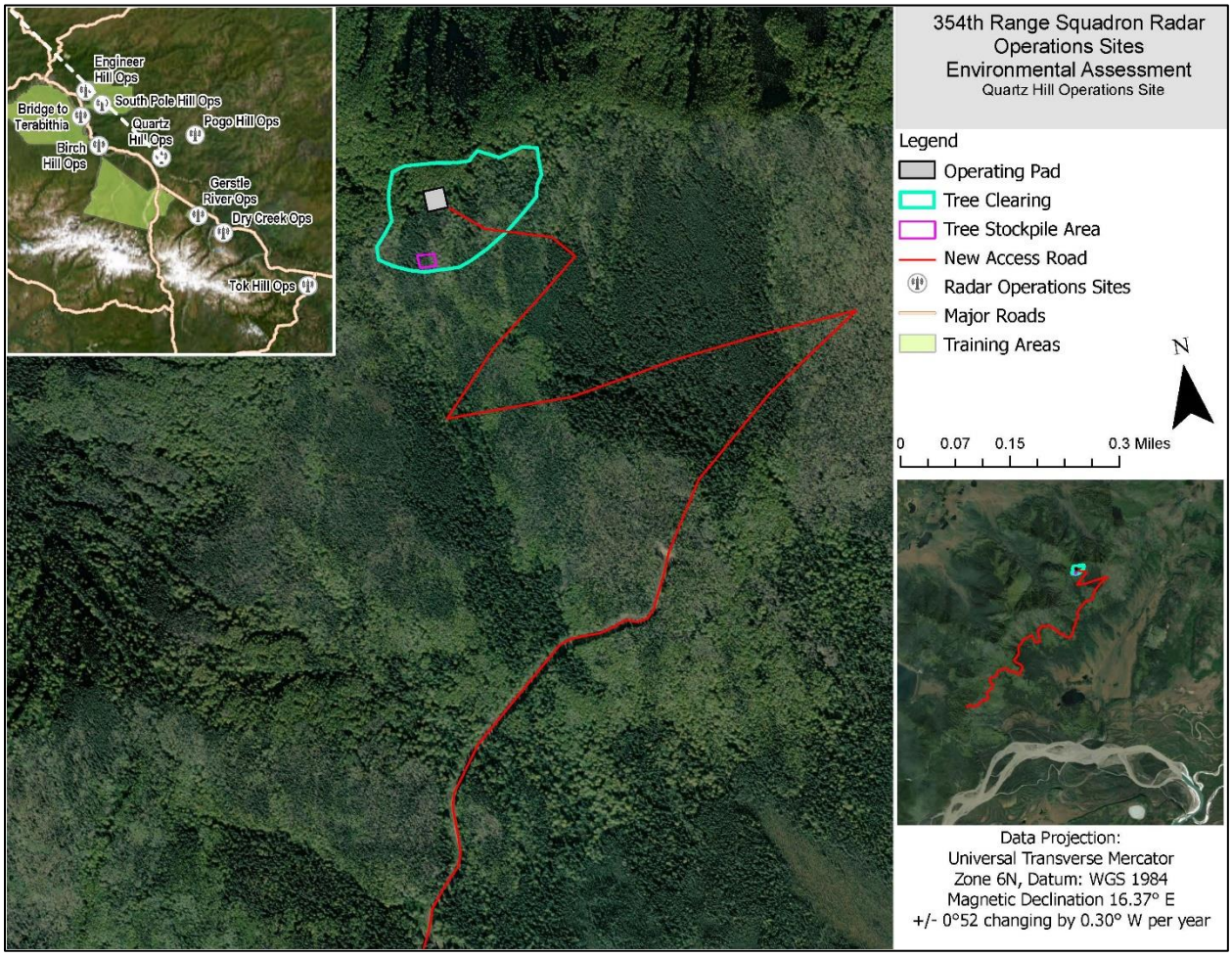

Figure 2-10. Quartz Hill Ops Site

Gerstle River Ops Site

This site is located approximately at 63.7901 °N., -145.0362 °W. on USAG Alaska training land. A 0.2-mile-long new access road would be constructed, tying into the existing Tower Road. Approximately 20.5-acres of vegetation would be cleared to satisfy the LOS requirements, and salvaged timber would be temporarily stockpiled at an existing location adjacent to the new access road. The operating pad would consist of a 16-foot-wide road with 24-foot basal cross section in a 400-foot by 400-foot square configuration with an additional 16-foot-wide road running from its northern corner to the southern corner. Electricity would be provided by a new electrical feeder and approximately 1.1-miles of installed powerline (0.9 miles aerial powerline and 0.2 miles of underground powerline) in the new access road ROW that tie into the existing power grid northeast of the ops site. The underground segment of the powerline would extend across a helicopter landing zone from the western end of the aerial powerline to complete the link to the ops site.

The Gerstle River Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-11.

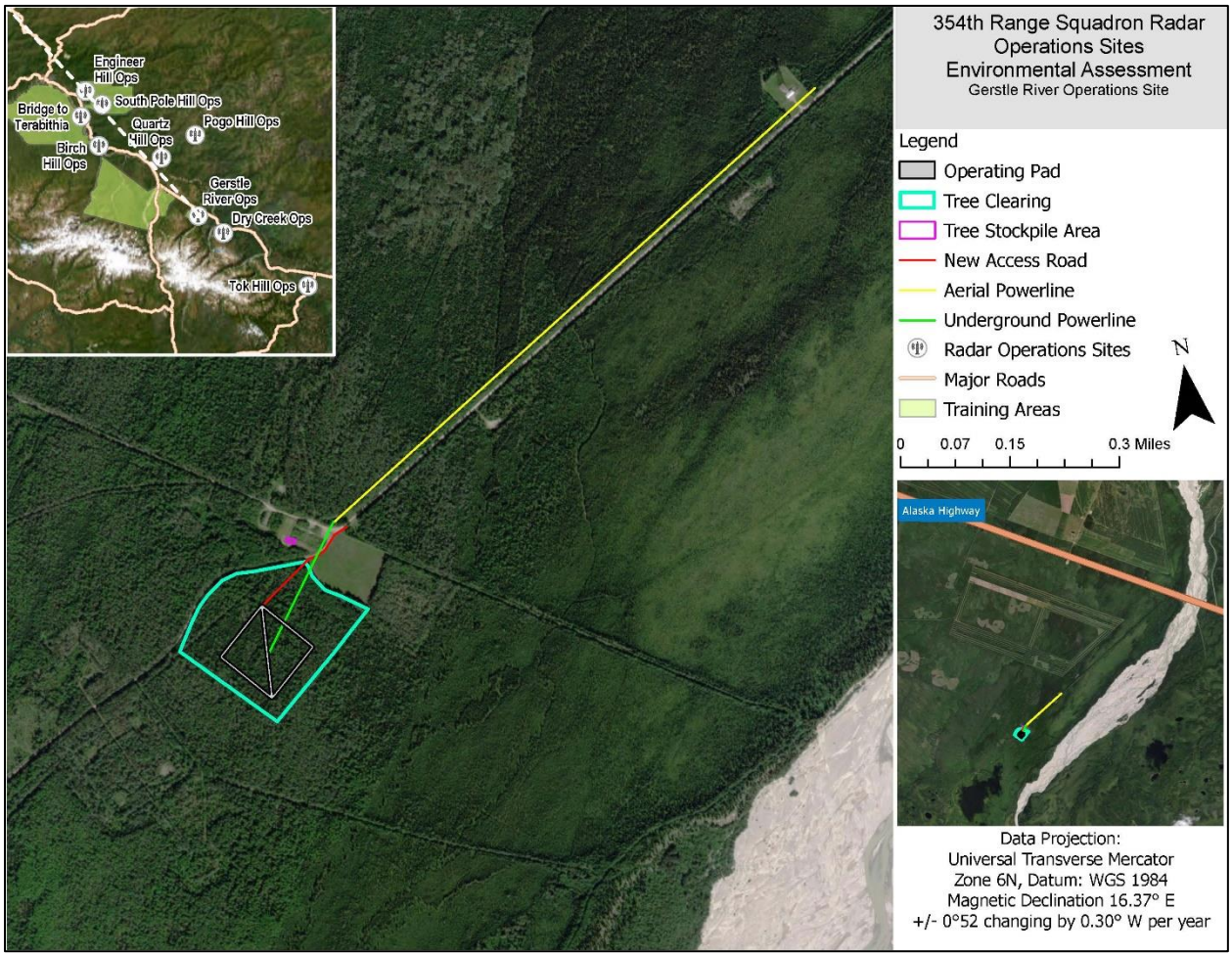

Figure 2-11. Gerstle River Ops Site

Dry Creek Ops Site

This site is approximately located at 63.6554 °N., -144.6032 °W. on land owned by the SOA. A 2.9-mile-long new access road would be constructed along a previously undisturbed alignment and a 50-foot-wide ROW would be cleared along the new access road alignment. Approximately 4.8-acres of vegetation clearing would be required to satisfy LOS requirements, and salvaged timber would be temporarily stockpiled in the southern part of the cleared area. Three operating pads connected by the new access road would be constructed at the site: two 40-foot by 100-foot pads and one 200-foot by 200-foot pad. A diesel generator supplied by a 10,000-gallon AST would produce the electricity required to operate the radar. During winter, when necessitated by low temperatures, a small gasoline generator would be used to warm up the diesel generator prior to operations.

The Dry Creek Ops Site layout, new access road, cleared area, and attendant features are shown in Figure 2-12.

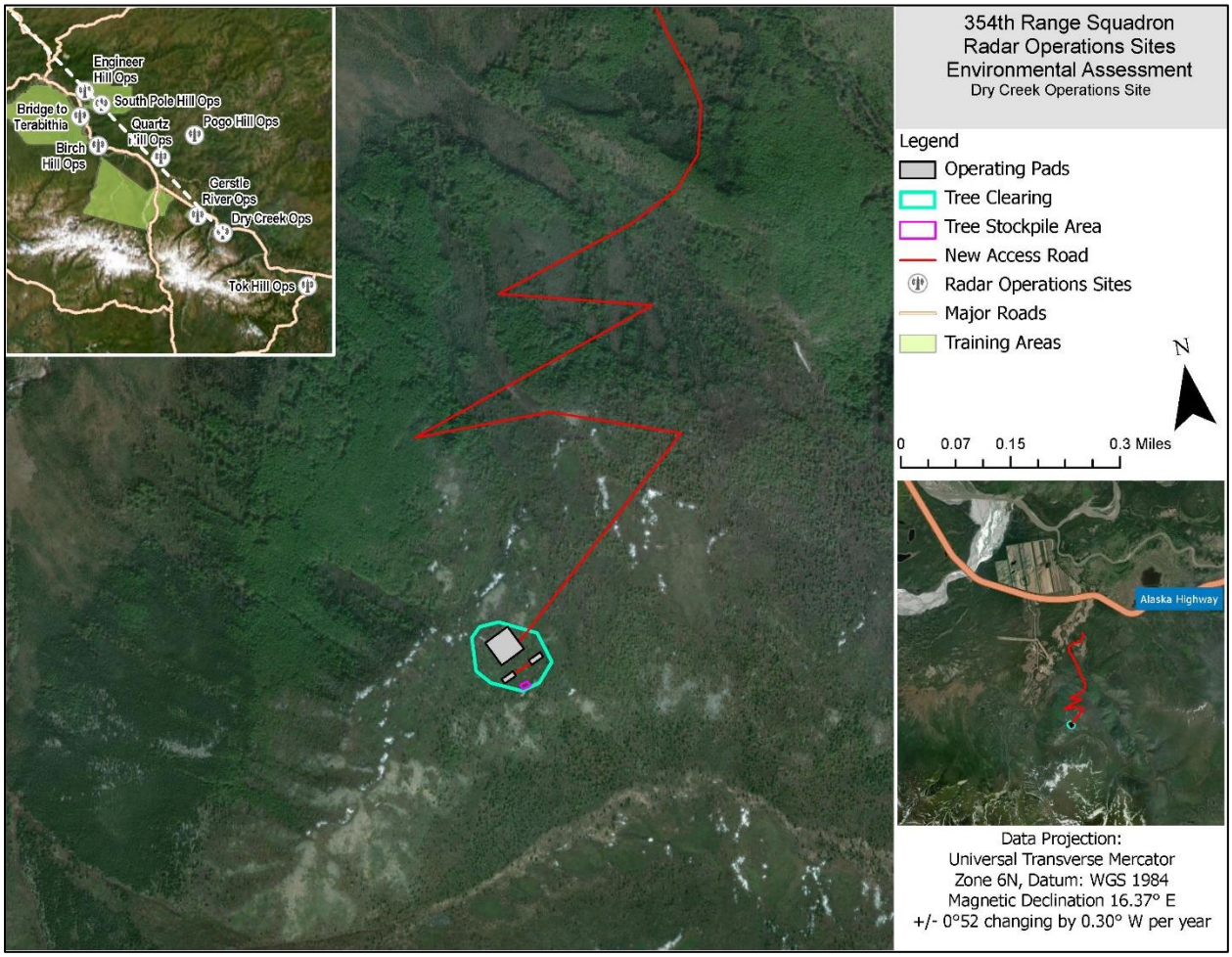

Figure 2-12. Dry Creek Ops Site

Tok Hill Ops Site

This site is approximately located at 63.2423 °N, -143.1156 °W. on land owned by the SOA. A new access road approximately 3.9-miles long would be constructed along an existing trail alignment. Approximately 10.2-acres of vegetation would be cleared to satisfy LOS requirements. Salvaged timber, including timber salvaged for electrical and road development, would be temporarily stockpiled in the southern part of the cleared area. Three ops pads connected by the new access road would be constructed at the site: two 40-foot by 100-foot pads and one 200-foot by 200-foot pad. Electricity would be provided by a new electrical feeder and 3.1-miles of installed aerial powerline that tie into the existing power grid northeast of the ops site. The powerline alignment is separate from the new access road and would follow the most direct route between the ops site and existing power grid. A diesel generator may temporarily power the radar until the powerline would be installed. There would be no permanent fuel storage.

The Tok Hill Ops Site layout, new access road, powerline alignment, cleared area, and attendant features are shown in Figure 2-13.

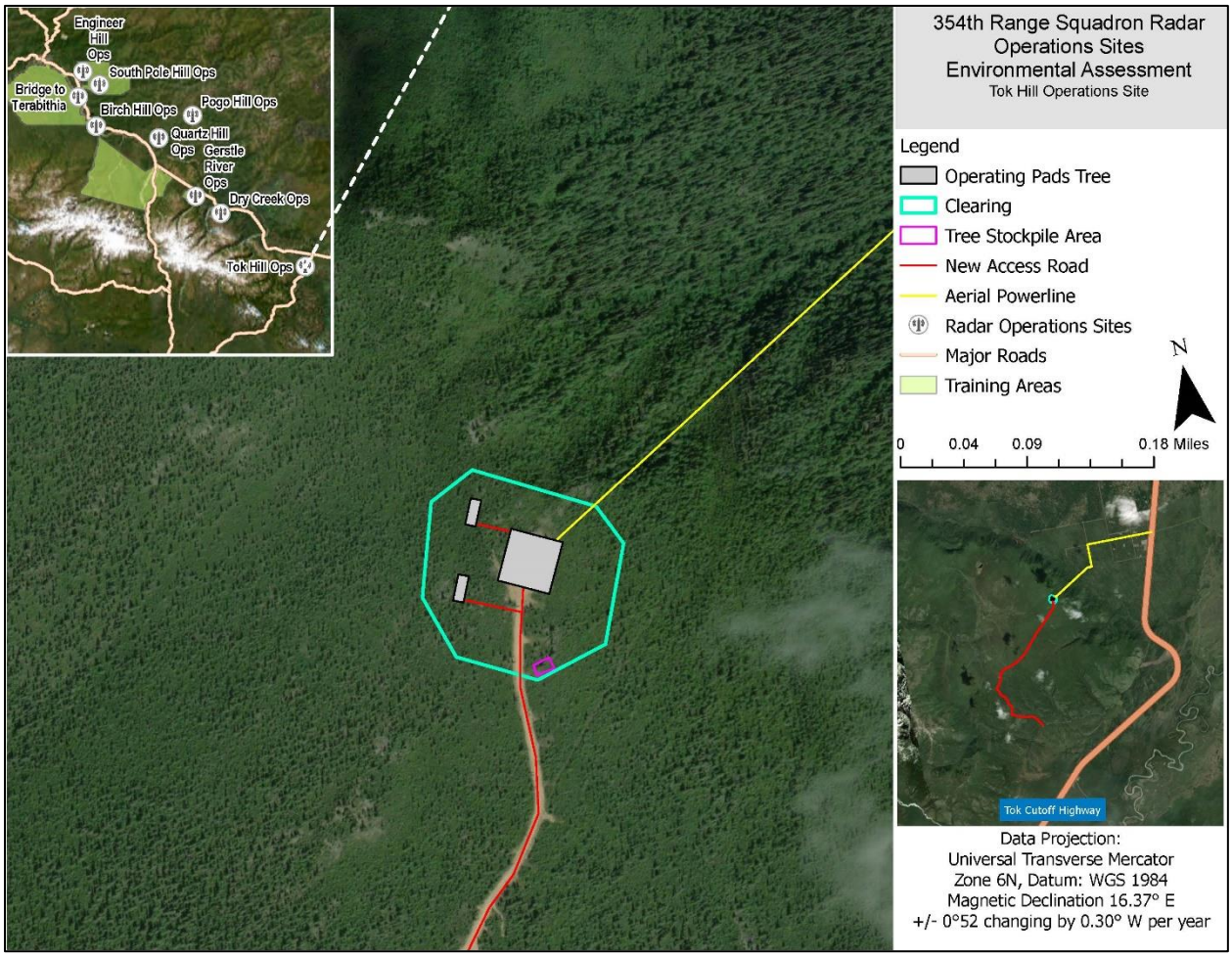

Figure 2-13. Tok Hill Ops Site

2.4.2 No-Action Alternative

The Air Force would take no action towards improving 5th and 6th generation fighter training effectiveness in the North Pacific operational theater. The Air Force would continue to operate two radars from six temporary ops sites in the YTA. Training would continue to be limited and inadequate to replicate a modern threat environment.

2.5 SUMMARY OF ALTERNATIVES AND RESOURCES

For the Proposed Action to be accomplished, the Preferred Alternative would be implemented. No other alternatives would support adequate, realistic training for 5th and 6th generation aircraft as directed by the COMACC in the 2020 *Enterprise Range Plan* to meet the Air Force's unique mission of national security.

This section will summarize the Preferred Alternative and No-Action Alternative resource impact determinations (Table 2-3).

Table 2-3. Summary of Air Force Resource Impact Determinations

Resource Area	Preferred Alternative – Develop Radar Operations Sites on Mixed-Ownership Lands	No-Action Alternative
Airspace Management and Use	Minor permanent adverse impacts	No impact
Land Use	Minor permanent adverse and beneficial impacts	Negligible impacts
Hazardous Materials and Waste	Minor permanent adverse impacts	Minor permanent adverse impacts
Safety and Occupational Health	Minor temporary and permanent adverse impacts	Minor permanent adverse impacts
Noise	Minor temporary and permanent adverse impacts	Minor permanent adverse impacts
Air Quality	Minor temporary and permanent adverse impacts	Minor permanent adverse impacts
Water Resources	Minor temporary and permanent adverse impacts	Minor permanent adverse impacts
Earth Resources	Minor temporary and permanent adverse impacts	Negligible impacts
Biological / Natural Resources	Minor temporary and permanent adverse impacts	Minor permanent adverse impacts
Cultural Resources	No adverse effect on historic properties	No impact to cultural resources
Socioeconomic Resources and Environmental Justice	Moderate to severe temporary and permanent adverse local impacts for the Dry Creek Ops Site, minor temporary and permanent adverse regional impacts and local impacts for the other eight ops sites, and temporary and permanent beneficial impacts regionally and locally for all the ops sites.	Negligible impacts
Transportation	Minor temporary and permanent adverse impacts and permanent beneficial impacts	Negligible impacts
Utilities	Minor permanent adverse impacts	Minor permanent adverse impacts

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Per revised CEQ regulations (July 2020), this EA will include the discussion of both the Affected Environment and Environmental Consequences for succinctness and clarity. The Region of Influence (ROI) for the Proposed Action is the portion of Interior Alaska shown in Figure 1-1 unless otherwise specified.

This chapter describes the current conditions of the environmental resources, both anthropogenic and natural, that would be affected by alternatives of the Proposed Action. The alternatives being considered and analyzed are the Preferred Alternative and the No-Action Alternative. The potential environmental consequences described in this chapter that are likely to occur from the implementation of the alternatives are evaluated in terms of:

- Type (Positive/Beneficial or Adverse);
- Context (Setting or Location);
- Intensity (None, Negligible, Minor, Moderate, Severe); and,
- Duration (Short-term/Temporary or Long-term/Permanent).

The type, context, and intensity of an impact are explained under each resource area. Unless otherwise noted, short-term/temporary impacts are those that would result from the activities associated with construction activities that would end upon the completion of that phase. Long-term impacts are generally those resulting from the operation associated with an alternative.

3.1 AIRSPACE MANAGEMENT AND USE

3.1.1 Affected Environment

Airspace within the ROI supports military, commercial, personal, and general aviation activities. These activities have been reasonably compatible due to airspace structuring and management through the Air Traffic Control (ATC) system and coordination between the military and the Federal Aviation Administration (FAA). Airspace within a region is identified on FAA Visual Flight Rules (VFR) charts. The Anchorage (FAA 2023a) and Fairbanks (FAA 2023c) Sectional Aeronautical VFR Raster Charts inform the airspace within the ROI and are updated every 56 days.

The specific types of airspace relevant to the Proposed Action are described in Table 3-1. Air Traffic Control Assigned Airspace (ATCAA) is vertically and laterally assigned by the ATC and controlled by applicable Air Route Traffic Control Center (ARTCC). ATCAAs provide air traffic segregation between the activities being conducted within the assigned airspace and other traffic. Special Use Airspace (SUA) is assigned based on the need to confine or limit certain aircraft operations due to certain hazardous activities (e.g., military training). ATCAA generally overlies and extends beyond SUA. The SUA Information Service (SUAIS), an Alaska-specific resource, provides daily status of the Alaska SUAs. It is operated by the military and provides 24-hour service to civilian pilots flying VFR with information regarding military flight operations in a Military Operations Area (MOA) and/or Restricted Area.

Table 3-1. Airspace Applicable to the Proposed Action

ATS Classification	Type	Class	Altitude (Feet MSL)	Description
Regulatory	ATCAA	A	18,000 – 600,000	Extends over terrain and coastal waters within 12 nautical miles of the continental US and beyond within where domestic procedures apply.
	ATCAA	D	Up to 2,500	Generally, surrounds airports with an operational control tower.
	ATCAA	E	14,500 – 17,999	Serves various terminal or en route purposes.
	SUA	Restricted Area	Varies[1]	Confines an activity to a specific area and/or imposes limitations on aircraft operations.
Non-Regulatory	SUA	MOA	Up to 17,999	Separates non-hazardous military activities from IFR air traffic to minimize impacts and meet mission training requirements.
	SUA	MTR	Up to 10,000	Specifically, represents a flight corridor that supports high speed, low altitude DoD flight training.
	SUA	Alert Area	Varies[1]	Informs pilots of an area where there is a high volume of pilot training or an unusual type of aeronautical activity.
	SUA	CFA[2]	Varies[1]	Contains activities considered hazardous to other aircraft and that require a controlled environment.

Sources: (FAA 2023b)
Notes:
[1] Designated altitude of the airspace is determined by the type(s) of activities within the area.
[2] Controlled Firing Areas (CFAs) are not depicted on aeronautical charts since activities are suspended and/or terminated when other aircraft are within range (e.g., a live fire range would suspend operations if an aircraft was approaching the surface danger zone). Nonparticipating aircraft do not need to modify operations.
Key: ATS = Air Traffic System; CFA = Controlled Firing Area; IFR = Instrument Flight Rules; MSL = Mean Sea Level; MTR = Military Training Route.

The EAFB airfield is where based aircraft and other participating aircraft using the Proposed Action ops sites would arrive and depart. *Based aircraft* are aircraft home stationed at EAFB. This airfield is within the EAFB MOAs and Class A and D airspace, and it has a control tower with Instrument Flight Rules (IFR) operation capabilities but is strictly used for military purposes. The ATCAA of EAFB airfield is controlled by the Anchorage ARTCC, and EAFB approach and departure services are supported by the Fairbanks Terminal Radar Approach Control (TRACON) facility. Air Force operations, to include joint Air Force military operations, are exempted from 14 CFR § 91 by the FAA for conducting lights-out air operations training. These operations require a prior Notice to Airmen (NOTAM).

EAFB airfield supports approximately 45,059 annual air operations each year, and air traffic is typically highest during April through October due to major flying exercises. The number of annual air operations varies year to year due to various circumstances including but not limited to, (1) the number of major flying exercises and combat and training aircraft deployments, and (2) annual fiscal constraints (Air Force 2016). The term *air operations* applies to activities that take place at an airfield and within the airspace. Total air operations includes based and transient aircraft at EAFB. *Transient aircraft* are aircraft that visit on a temporary basis (e.g., to participate in a major flying exercise or travel through the area).

3.1.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would develop new radar ops sites and replace JPARC training radar systems with modern radars to implement a long-term modernization of the JPARC in accordance with direction received from the COMACC. This would improve the effectiveness of Air Force training operations within the JPARC. The impacts on airspace management and use from the Preferred Alternative are consistent with the consequences assessed for "Airfield and Airspace Operations and Management" in the *United States Air Force F-35A Operational Beddown – Pacific, Final Environmental Impact Statement*, dated February 2016. Thus, the Air Force determined that the Preferred Alternative would, at most, have minor permanent adverse impacts to airspace management and use.

The radars would replicate the modern threat environment, and the new ops sites would expand training scenarios by optimizing use of existing airspace, predominately airspace within the JPARC, at the current operating pace (i.e., number and frequency of air operations). The Preferred Alternative aligns with the purpose of the JPARC airspace, and it is not anticipated to exceed its capability. Rather, it would enhance the JPARC capabilities by enabling concurrent training for over a 100 flight crews. The structure and management of JPARC restricted areas, MOAs, overlying ATCAAs, and other designated airspaces would not be modified under this alternative. Scheduling frequency of a particular airspace as a result of the Preferred Alternative would be consistent with yearly variation in air operations to enhance training. This would occur regardless of the Preferred Alternative being implemented as new, varied training scenarios are required to maintain force readiness. Training aircraft associated with the Preferred Alternative would normally operate above 18,000 feet AGL for practicing combat like maneuvers against the radar threat systems. Sonic booms may occur. However, pilots are restricted to altitudes above 30,000 feet AGL to reduce the noise hazard associated when reaching those speeds as outlined in environmental studies and agreements made with the FAA and State agencies. Thus, impacts to the current airspace would generally relate to the change in the frequency of use for a particular airspace, but this would be consistent with yearly variation throughout the airspace.

Each ops site underlies Class A airspace, and, aside from the Tok Hill Ops Site, beneath an MOA. Military air operations are prioritized over other air operations in an MOA unless airspace is needed to support an emergency operation (e.g., firefighting aircraft employed to fight a wildfire). The MOAs above the ops sites are also Alert Areas due to the high volume of military air training and operations. Military Training Routes (MTRs) and Class E airspace Federal airways and low−altitude air area navigation (RNAV) routes run throughout the ROI near the ops sites. Class E RNAV routes T 232 and T 417 run near the Tok Hill Ops Site that is adjacent to the Tok Airport's Class E airspace. The Engineer Hill Ops Site is within EAFB airfield Class E airspace. The Engineer Hill and South Pole Hill Ops Sites are beneath Restricted Area airspace, specifically R-2205 B & G, which only allows military training and operations (e.g., artillery and mortar live fire and air operations) and as necessary, emergency operations.

Under the Preferred Alternative, the Air Force would continue to coordinate air operations with the appropriate entities like the FAA, public, and local and regional airspace users. This will ensure safe air operations within the ROI multi-user airspaces. Coordination would include notification to other airspace users, as appropriate, and may include the Air Force issuing a NOTAM or updating the SUAIS.

No-Action Alternative

The No-Action Alternative would have no impact on existing airspace management and use. Under the No-Action Alternative, air operations would continue to use the established, outdated JPARC training radar systems and two radars that would rotate between six temporary ops sites within the YTA. The Air Force would coordinate with and notify the appropriate entities when conducting air operations to ensure safe use of the established MOA and restricted airspace at the current training pace. Although, training would continue to be limited and inadequate to replicate a modern threat environment.

3.2 LAND USE

3.2.1 Affected Environment

Land uses are discussed by ops site in this section. Each ops site township, range, section, meridian and nearest census designated place (CDP) is described in Table 3-2.

Table 3-2. Ops Site Location Information

Ops Site	Section	Township	Range	Meridian	Nearest CDP	
					Name (Population[1])	Approximate Distance & Direction from Ops Site
Engineer Hill	18	2 South	4 East	Fairbanks	EAFB (2,610)	Occurs within CDP
South Pole Hill	22	3 South	5 East	Fairbanks		
Bridge to Terabithia	26	4 South	3 East	Fairbanks	Salcha (977)	~1.5 miles East
Birch Hill	9	7 South	5 East	Fairbanks	Harding-Birch Lakes (253)	Occurs within CDP
Pogo Hill	12	6 South	13 East	Fairbanks	Big Delta (444)	~23.3 miles Southwest
Quartz Hill	12	8 South	10 East	Fairbanks		~2.5 miles Southwest
Gerstle River	16	13 South	14 East	Fairbanks	Deltana (2,359)	Occurs within CDP
Dry Creek	35	14 South	16 East	Fairbanks	Dry Creek (61)	Occurs within CDP
Tok Hill	21	17 North	12 East	Copper River	Tok (1,243)	Occurs within CDP

Notes:
[1] Population data was retrieved data collected for the 2020 Decennial Census (USCB 2020).

Engineer Hill Ops Site

The Engineer Hill Ops Site is located near the Engineer Hill munitions storage and maintenance area at EAFB on an isolated hill in the Yukon-Tanana Uplands. An individual must have access to EAFB to reach this site. Engineer Hill Road extends into the gated munition storage and maintenance area from Transmitter Road. An unnamed, dirt unimproved road surrounds the perimeter of the fenced area. An unnamed trail on the northeast side of the Engineer Hill storage and maintenance area extends from the unnamed unimproved road to the proposed Engineer Hill Ops Site at a trail crossroads.

The site is on military land where military training and operations are prioritized over other land uses. However, the Engineer Hill Ops Site is a multi-user site that supports recreational activities like hiking and hunting as well as fishing in nearby streams. Each year, EAFB allows only one individual to trap within the area. Bait stations, martin (*Martes americana*) traps, and trapping signs were observed along the trail during a July 2023 survey. The hunting and fishing activities are subject to State and EAFB regulations. Furthermore, natural resources (e.g., land use) are managed in accordance with the EAFB's Integrated Natural Resources Management Plan (INRMP; EAFB 2017). An INRMP is an installation-specific plan developed in cooperation with applicable stakeholders pursuant to the Sikes Act.

South Pole Hill Ops Site

The South Pole Hill Ops Site is located within the Yukon-Tanana Uplands in YTA. Quarry Road, a gravel road, extends from EAFB to the ops site. Quarry Road is gated at the boundary of EAFB to restrict access onto the base. Johnson Road, a gravel road, extends to the ops site from the Richardson Highway. YTA is a controlled-access area: only military personnel, contractors, and permitted individuals are allowed entry. When used to describe a roadway or ground-based area, *controlled-access* means user access is limited but not prevented by a physical barrier (e.g., gate). An unnamed gravel road diverges from Quarry Road and extends to an unnamed trail that follows a narrow ridgeline to the South Pole Hill Ops Site. During a July 2023 survey, the trail lacked evidence of frequent use, indicating low usage of the area for recreational purposes.

The site is on military land where military training and operations are prioritized over other land uses. However, the South Pole Hill Ops Site is within a multi-user area that supports recreational land uses. A Sikes Act Permit (SAP) is required for individuals of the general public that are 16 years old or older to access the YTA for recreational purposes. The most likely recreational activities to occur in this area are hiking and hunting. Bear baiting is not allowed at the South Pole Hill Ops Site and the adjacent areas to its north, east, and southeast. However, it is allowed southwest of the site (DPW-ENV 2023). Hunting and fishing activities within YTA are subject to State and USAG Alaska regulations. Furthermore, natural resources (e.g., land use) are managed in accordance with the USAG Fort Wainwright's INRMP (FWA USAG 2013).

Bridge to Terabithia Ops Site

The Bridge to Terabithia Ops Site is located within the USAG Alaska TFTA. The ops site is adjacent to an unnamed gravel road that extends west from the Richardson Highway across from Tom Bear Trail and crosses the Tanana River Rail Bridge into the TFTA, a controlled-access area. A Tanana River Rail Bridge Permit from the Alaska Railroad Corporation (ARRC) is required to cross the Tanana River Rail Bridge. This bridge was constructed to serve as a crossing for the ARRC and provide year-round military access to the TFTA. This bridge has an established ARRC private easement.

A SAP is also required for individuals of the general public who are 16-year-old or older to recreate at the TFTA. Although the TFTA is a multi-user area that supports recreational land uses, it is military land, and military training and operations are prioritized over other land uses. Hunting and fishing in the TFTA are subject to both State and USAG Alaska regulations. Furthermore, natural resources (e.g., land use) are managed in accordance with the USAG Fort Wainwright's INRMP (FWA USAG 2013).

Birch Hill Ops Site

The Birch Lake Ops Site is situated on top of a hill near Milepost 310 between Birch and Harding Lakes within the Yukon-Tanana Uplands. The Richardson Highway extends along the northern side of the hill whereas the Tanana River spans the southern side. Approximately over ten miles north and 43 miles north of the ops site are the Birch Lake State Recreation Site and Birch Hill Recreation Area, respectively, which are not to be confused or associated with the Birch Hill Ops Site described in this EA. The new access road alignment avoids two private property parcels on the south side of the Richardson Highway. During a July 2023 survey, a faint trail to and through the proposed ops site location was observed and indicates hiking and small-motorized vehicle recreational activities occur within the area.

Pogo Hill Ops Site

The Pogo Hill Ops Site is located within the Yukon-Tanana Uplands near the Pogo Mine. The predominant land uses within the proximity of the Pogo Hill Ops Site are associated with mining. There are numerous active mines and mining claims in the area (ADNR 2023). Specifically, at the proposed ops site there is a Pogo Mine telecommunications facility that signals to Delta Junction, Alaska.

The new access road to the Pogo Hill Ops Site would extend from the Pogo Mine Access Road and align with an existing unimproved road to the site. The Pogo Mine Access Road is a single lane, gravel road under a private easement (ADNR 2023). Access along this road is restricted by a gate due to road and mining hazards. To access the road, permission must be attained from the Northern Star Resources Limited.

Although the Pogo Mine Access Road has access restrictions, there are various recreational activities that may occur in or near the area. The North Fork of Fortymile-Big Delta and Goodpaster River Trails are approximately 5 miles east of the site. Nearby the trails are the Goodpaster River and its tributaries that are open to certain kinds of fishing. State regulations apply to hunting and fishing activities in this area.

Quartz Hill Ops Site

The Quartz Lake Ops Site is located within the Yukon-Tanana Uplands in an area designated as Tanana Valley State Forest by Alaska Statute (AS) 41.17.400. From the Richardson Highway, Quartz Lake Access Road connects with the Quartz Lake Extension Forest Road. Both are gravel roads, and a portion of the Quartz Lake Extension Forest Road is unimproved. The access route aligns with the unimproved portion of the Quartz Lake Extension Forest Road before extending to the ops site via switchbacks on undeveloped terrain. Quartz Lake Access Road and a portion of the Quartz Lake Extension Forest Road are under an Alaska Department of Transportation and Public Facilities (DOT&PF) public easement (ADNR 2023). The Quartz Lake Extension Forest Road was constructed for logging truck access to timber in the area.

The Quartz Lake State Recreation Area is about 5 miles southwest of the ops site and supports various recreational activities (e.g., hiking, hunting, fishing, kayaking, camping, etc). Goodpaster River Trail and the North Fork of Fortymile-Big Delta Trail are near this site. State regulations apply to hunting and fishing activities in this area.

During a July 2023 survey, cut wood, sawmills, and trucks along Quartz Lake Access Road and the Quartz Lake Extension Forest Road were observed. This was likely related to the Alaska Department of Natural Resources (ADNR) Division of Forestry & Fire Protection (DOF) sale of white spruce sawtimber from State lands in the Quartz Lake area (DOF 2022).

Gerstle River Ops Site

The Gerstle River Ops Site is located within an area designated as Tanana Valley State Forest and the Gerstle River Training Area (GRTA) of USAG Alaska DTA, a controlled-access area. The Delta Junction Bison fields are immediately to the north with agricultural land further north of the area on the other side of the Alaska Highway. Tower Road extends to the site south from the Alaska Highway. There is a public easement on Tower Road, which is popular with sheep hunters accessing the Alaska Department of Fish and Game (ADF&G) Delta Controlled Use Area (ADNR 2023).

On August 13, 1953, the Federal Register (FR) Volume 18, Number 158, published and enacted Public Land Order (PLO) 910 that withdrew approximately 20,000 acres from public lands for military purposes (i.e., the GRTA). Army chemical warfare testing occurred in the GRTA,

previously called the Gerstle River Test Site (GRTS), from 1954 through 1967, but the area has since been used for military training and recreational purposes. The GRTA is surrounded by the Gerstle River Expansion Area (GREA) except on the eastside where the Gerstle River flows (Brice 2022). The GREA, approximately 80,000 acres, is a Formerly Used Defense Site that was reverted back to SOA land once clean-up was completed.

A SAP is required for individuals of the general public 16 years old and older to access and recreate at the DTA. Hunting is authorized within the area, which falls within both the ADF&G Gerstle Field Bison Range Controlled Use Area and Delta Controlled Use Area. Other recreational activities (e.g., hiking, hunting, fishing, etc) may occur within the area as well. During a July 2023 survey, there was extensive evidence of frequent moose occurrence. State and, as applicable, USAG Alaska regulations apply to hunting and fishing activities in this area. Furthermore, natural resources (e.g., land use) are managed in accordance with the USAG Fort Wainwright's INRMP (FWA USAG 2013).

Dry Creek Ops Site

The Dry Creek Ops Site is located on top of the Macomb Plateau plain within the Alaska Range. The Dry Creek Airstrip and the Dry Creek residential area are over 1 mile north of the proposed ops site. Furthermore, there is a small expanse of agricultural land on the other side of the Alaska Highway (ADNR 2023).

The new access road to the ops site aligns with an unnamed gravel road with a public easement (ADNR 2023). This road extends south from the Alaska Highway near Milepost 1378 and was crossed by the military aboveground Haines-Fairbanks Pipeline (HFP). The HFP segment between Tok and Eielson was deactivated in 1973 and has been removed and/or salvaged since (Hollinger 2003). The new access road lies outside of privately-owned real estate and crosses a Dry Creek tributary (ADNR 2023).

Potential recreational activities near the site include hunting, fishing, and hiking. Hunting and fishing are allowed in surrounding areas pursuant to State hunting and fishing regulations. The Dry Creek Ops Site is within the ADF&G Macomb Plateau Controlled Use Area. Fishing would most likely occur in nearby rivers or creeks. For hiking, the Hajdukovich-Macomb Plateau Trail is west of the site at the base of the plateau.

Tok Hill Ops Site

The Tok Hill Ops Site is located within an area designated as Tanana Valley State Forest in the Alaska Range. Tok, Alaska, is the nearest community. An unnamed unimproved road extends west from the Glenn Highway Tok Cutoff between Mileposts 116 and 117 that can support OHV traffic. This road was previously part of the original Tok Cutoff Highway (discussed in Section 3.10.1. An unnamed trail diverges north from this road and Eagle Trail to the proposed ops site location. Further south on the Eagle Trail is the Eagle Trail State Recreation Site. During a July 2023 survey, degraded infrastructure, debris, and other evidence of camping were present along the unnamed trail and at the proposed site location. It appeared that site visitors may also use the proposed ops site for parking. This indicates the site may serve as a camping location for site users. To the west of the ops site are various active State mining claims and Native allotment areas. From the ops site, the closest State mining claim is approximately 2.7 miles and Native allotment area is 1.7 miles (ADNR 2023). The Tok Hill Ops Site is also located within the Alaska Highway Formerly Used Defense Site that has no known sites of contamination.

Although subject to State regulations, hunting is allowed in the area that is part of the ADF&G Tok Management Area, and open to sheep hunting by permit only. Along the route to the site during the July 2023 survey, there was evidence of frequent moose occurrence.

3.2.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would have permanent minor beneficial impacts by providing improved vehicular access to remote sites within Interior Alaska, but it would also have permanent minor adverse impacts to land uses on SOA and FNSB lands due to installation of barriers and powerlines at the ops sites. Except for the Engineer Hill Ops Site, which is on Air Force-owned land, other ops site landowners would be consulted with to evaluate impacts to natural and biological resources, to include other land uses, and to ensure compliance with applicable landowner policies. Authorization (e.g., a lease) would be attained from the applicable landowner prior to construction for an ops site.

The proposed ops sites are generally in remote areas far away from residential and industrialized areas. In remote areas of the ROI, military, recreational, and mining activities are the predominant land uses. The ops sites would be used to facilitate military training and operations using the radars and would not change existing Federal land use designations on military lands (Engineer Hill, South Pole Hill, Bridge to Terabithia, and Gerstle River Ops Sites) wherein such actions would be prioritized over other land uses. However, the ops sites on SOA and FNSB lands (Birch Hill, Pogo Hill, Quartz Hill, Dry Creek, and Tok Hill Ops Sites) would permanently change existing land use designations. Ops sites on SOA and FNSB lands would become a Federal land use.

The Air Force has consulted landowners (i.e., SOA, USAG Alaska, and FNSB) about the land use compatibility of the Preferred Alternative with other land uses. It was determined that the development and operation of the ops sites on SOA and USAG Alaska land would likely be compatible with allowable land uses, pursuant to all applicable site-specific management plans, closure requirements, and other specifications. The FNSB did not provide an initial determination in the scoping process for the EA. However, the lease agreement would be finalized by the Air Force and FNSB Real Estate Offices prior to the construction of the Birch Hill Ops Site, and the completion of the lease agreement would confirm land use compatibility.

The Preferred Alternative would establish new infrastructure (e.g., gravel roads, powerlines, and gravel operating pad(s) and objects (e.g., barrier and gates as appropriate, decoys, generators, and radars). Infrastructure would be minimized to the extent practicable to minimize impacts to the viewsheds and environmental resources. New gravel access roads would enable and/or improve accessibility to the remote ops sites' locations and generally enhance other land uses associated with these sites like recreational activities (e.g., hiking, fishing, hunting, and wildlife viewing) along new access roads. Powerlines would also improve accessibility to the power grid in these remote areas. Conversely, barriers installed around the operating pads may limit the movement of site users at and around the ops sites. These barriers would only be implemented around the radar operating pads and do not include the new access roads. Any barrier to access of the new access roads would be determined in conjugation with the landowner and applicable laws and regulations. Access around or through constructed barriers would be considered to minimize adverse impacts to potential site user movement and enhance compatibility with other existing and future land uses to the extent practicable. Sufficient turnaround space at such barriers would also be a consideration for final ops site design.

A few potential considerations and topics for consultation with applicable landowners would be (1) vehicle access around and/or through the Pogo Hill Ops Site due to the collocated Pogo Mine telecommunications infrastructure, (2) vehicle access around and/or through the South Pole Hill Ops Site to allow access to undeveloped YTA training areas, (3) establishing an area for parking and camping area outside the Tok Hill Ops Site.

No-Action Alternative

Under the No-Action Alternative, land uses would be compatible. The YTA temporary ops sites are on military land where military training takes priority over other land uses. The Air Force would continue to coordinate its activities with the USAG Alaska when operating sites on USAG Alaska land to ensure no conflicts with Army training and other activities. Thus, the No-Action Alternative would be consistent with current land uses and impacts would be negligible.

3.3 HAZARDOUS MATERIALS AND WASTE

3.3.1 Affected Environment

This section focuses on the types of hazardous materials and hazardous waste with potential to be associated with the Proposed Action. The Air Force manages hazardous materials and hazardous waste in accordance with AFMAN 32-7002 “Environmental Compliance and Pollution Prevention”. For the purposes of this EA, the definitions for hazardous materials and waste are as follows:

- *Hazardous material* is any material or substance in the form or quantity that is capable of posing an unreasonable risk to life, property, or the environment.
- *Hazardous waste* is a solid waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment and not specifically excluded as a solid or hazardous waste by regulation.

Spill and leak reporting, per- and polyfluoroalkyl substances (PFAS), ASTs, and contaminated sites will be further discussed under this resource.

Spill and Leak Reporting

Leaks and/or spills of a hazardous material or waste, to include Petroleum, Oil, and Lubricants (POL), that occur within the ROI should be reported to the appropriate emergency services and, if applicable, military base wherein it took place to initiate proper response actions with the appropriate agencies (e.g., Alaska Department of Environmental Conservation [ADEC], Environmental Protection Agency [EPA], and others). This includes reporting spills of hazardous material or waste by calling 1-800-478-9300 or online at ReportSpills.alaska.gov.

PFAS

An emerging environmental issue at many Air Force installations is the past release of PFAS. PFAS is a large class of human-made chemical compounds used since the 1950s in various products, to include Aqueous Film Forming Foam (AFFF), a firefighting agent, used by the Air Force and others. AFFF contains two PFAS compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) and is highly efficient at extinguishing petroleum-based fires. Air Force AFFF stocks are being replaced and use is limited for actual firefighting when other means are insufficient (AFCEC 2021a and 2021b). The water-soluble PFAS components can infiltrate groundwater from outdoor release.

The Air Force began a comprehensive evaluation process in 2010 to identify locations at installations where PFAS may have been released due to the growing evidence of its toxicity and persistence in the environment. Current ADEC regulations (18 Alaska Administrative Code [AAC] 75) include risk-based soil and groundwater cleanup levels for PFAS.

ASTs

ASTs are commonly used to store the fuels required to efficiently operate certain equipment and/or support infrastructure. ASTs may develop leaks and/or be involved in spills that result in

POL-contamination of soil or water. Routine maintenance, monthly and annual inspections, and periodic third-party inspection of ASTs are required to prevent leaks and/or spills, and when necessary, ensure prompt response actions.

ASTs must comply with Federal and State regulations. Facilities and/or single ASTs holding 10,000 pounds of product (e.g., 1,200 gallons of diesel) must send a complete Tier II Emergency and Hazardous Chemical Inventory to the Alaska's State Emergency Response Commission. AST facilities with an effective storage capacity of 420,000 gallons (10,000, 55-gallon barrels) or greater of refined petroleum product, or over 210,000 gallons of crude oil are regulated by ADEC under 18 AAC 75, "Oil, and Hazardous Substances Pollution Control." Furthermore, an AST with a storage capacity of 1,000 gallons and above must be included in a facility's plan and storage capacity determination. EAFB records additions or removals of ASTs and other oil-filled equipment with a capacity of 55 gallons or more in its Oil Discharge Prevention and Contingency Plan and revises its Spill Prevention and Countermeasure Plan as appropriate. These plans focus on spill and leak prevention and response actions.

Contaminated Sites

This section will focus on contaminated sites that are (1) within approximately 1,500 feet of ops site infrastructure (i.e., new access roads, operating pads, and powerlines) and (2) are designated as active or clean-up complete with land use controls (LUCs), institutional controls (ICs), and/or engineering controls (ECs). Engineer Hill and Gerstle River Ops Sites are the only ops sites within 1,500 feet of applicable contaminated sites.

Engineer Hill Ops Site

Ten of the contaminated sites (Figure 3-1 and Table 3-3) within 1,500 feet of the Engineer Hill Ops Site infrastructure are part of the Engineer Hill munitions storage and maintenance area located to the northwest of EAFB's industrial and residential area. They were designated as contaminated sites due to historic and current site activities and infrastructure-initiated POL contamination investigations. The other site is a Military Munitions Response Program (MMRP) Site named at Lily Lake just south of the Engineer Hill munitions storage and maintenance area (Figure 3-1 and Table 3-3).

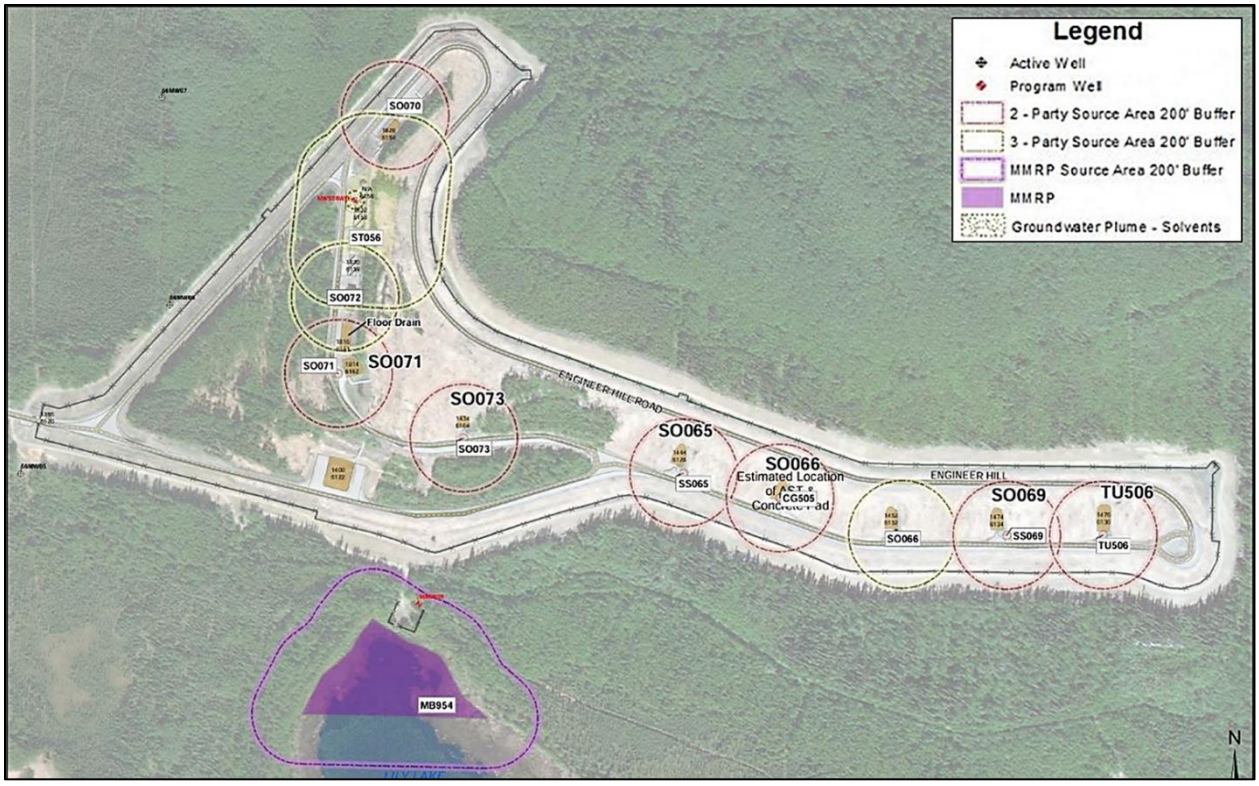

Figure 3-1. Engineer Hill Ops Site Active Contaminated Sites (Modified from Air Force 2023a)

Table 3-3. Active Contaminated Sites within 1,500 feet of the Engineer Hill Ops Site

AFCEC Site ID, ADEC Hazard ID	Site Descriptions	COC / Potential MEC
Sites Regulated under the Federal Facility Agreement under CERCLA Section 120		
SO072, 26510	EAFB Building 6163 Igloo[3]: Assumed contamination sources are a former AST and IRP Site ST056, north of this site. Interim LUCs are in place until remedial actions are completed to remove POL-contaminated soil to the extent practicable.	Benzo(a)pyrene, PCE, and metals
SER-2/ST056, 384	EAFB Engineer Hill[3]: Assumed contamination sources are from a diesel fuel spill at the boiler plant and contamination was identified in the old and new water-supply wells from an unknown source. There are active LUCs and site groundwater monitoring to prevent use of contaminated groundwater.	PCE, TCE, and BTEX
Sites Regulated under the State-Eielson Petroleum Site Restoration Agreement		
CG505, 1658	EAFB Building 6128 T–133 R[2,3]: Assumed contamination sources were a former UST that contained unregulated heating oil and its piping. No POL contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended and no further action pending evaluation of site wide evaluation of PAH exceedances.	Metals
SO065, 26492	EAFB Building 6126 Igloo[3,4]: Assumed contamination sources were a former AST and a condensate drain. No POL-related contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended.	Benzo(a)pyrene and metals

AFCEC Site ID, ADEC Hazard ID	Site Descriptions	COC / Potential MEC
SO066, 26493	EAFB Building 6132 Igloo[2,3]: Assumed contamination sources are a former UST containing unregulated heating oil and its piping. No POL-related contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended. No further action pending evaluation of base-wide evaluation of PAH exceedances.	Arsenic and low levels of SVOCs. PAH at site not associated with fuel source area
SO069, 26507	EAFB Building 6134 Igloo[3,4]: Assumed contamination sources are a former UST and a condensate drain. No POL-related contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended.	Benzo(a)pyrene and metals
SO070, 26508	EAFB Building 6154 Vehicle Op Heated Parking[3,4]: This site is adjacent to ST056. Assumed contamination sources are vehicle exhaust, a diesel AST, and a condensate drain. No POL-related contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended.	Benzo(a)pyrene and metals
SO071, 26509	EAFB Building 6162 Igloo[3,4]: Assumed contamination sources are former USTs, ASTs, tank piping, and a condensate drain. POL contamination exceeding cleanup levels present at site. Interim LUCs are in place until remedial actions are completed to remove POL-contaminated soil to the extent practicable.	Benzo(a)pyrene and metals
SO073, 26516	EAFB Building 6164 Igloo[3,4]: Assumed contamination sources are floor drains, former ASTs, and IRP Site ST056. No POL-related contamination exceeding applicable cleanup levels are present. Site closure for POL has been recommended.	Methylene chloride, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene
TU506, 26965	EAFB Building 6136 Engineer Hill[3,4]: Assumed contamination source is a former UST. Interim LUCs are in place until remedial actions are completed to remove POL-contaminated soil to the extent practicable.	Benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and metals
Sites Regulated under the Military Munitions Response Program		
MB954/TM973b, 26596	EAFB Lily Lake MMRP[1]: This site is located at Lily Lake, south of the Engineer Hill munitions storage and maintenance area, and regulated by both the ADEC and EPA. Initially designated an MMRP site based off anecdotal evidence, there were 310-anomalies identified in 2.4 acres of the lake during 2019 site remedial investigations. Munition debris and small arms ammunition were found. The site's Record of Decision is under review by the ADEC and EPA.	Munition debris

Sources: (ADEC 2023a and Air Force 2023a)
Notes:
The groundwater surrounding the west and north boundary of the Engineer Hill munitions storage is presumed to range from approximately 46.2 feet and deeper below ground surface (bgs) based on the wells 56MW05, 56MW06, 56MW07, and NWS56WH groundwater depth identified in Air Force 2023a and the general topography of the new access road alignment going up in elevation.
[1] (Air Force 2022)
[2] (Air Force IRP 2019)
[3] (EA EST 2021)
[4] (Air Force IRP 2021)
Key: AFCEC = Air Force Civil Engineer Center; BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; COC = Contaminant of Concern; IRP = Installation Restoration Program; MEC = Munitions and Explosives of Concern; PAH = Polycyclic Aromatic Hydrocarbon; PCE = Tetrachloroethylene; SVOC = Semivolatile Organic Compound; TCE = Trichloroethylene; UST = Underground Storage Tank.

Although polycyclic aromatic hydrocarbons (PAHs) and metals are listed as potential contaminants of concern (COCs) for eight of these contaminated sites, the sites themselves were determined not to be the source. The metals concentrations at the active contaminated sites are attributed to natural soil background concentrations (Air Force IRP 2021).

Gerstle River Ops Site

Extensive remedial actions have been completed at the GRTA and have led to the closure of numerous contaminated sites. However, there is an active contaminated site and a cleanup complete contaminated site with ICs within 1,500 feet of the Gerstle River Ops Site (Table 3-4).

Table 3-4. Contaminated Sites within 1,500 feet of the Gerstle River Ops Site

ADEC Hazard ID	Site Descriptions	COC
866	Gerstle River Test Site[1]: This includes the GRTA Administrative Area and fifteen areas of concern that fall under one of three categories: test grids, debris burial areas outside of the Administration Area, and other miscellaneous sites. The contamination source for the Administrative Area of the GRTA was chemical warfare material testing at the chemical testing facility, which tested various chemical and conventional munitions and chemical agents, to include but not limited to, riot control munitions and agents, nerve agent munitions, flame munitions, and bulk fuel kits. All munitions were made inert or removed from GRTA, and equipment was decontaminated and removed or disposed in on-site landfills by the 1970s. In place LUCs include ICs and ECs.	*See ADEC Hazard ID 24980 COCs*
24980	Gerstle River Test Site-UST #450 and #451[2,3]: Two 500-gallon USTs, #450 and #451, were associated with a GRTA fueling station. One UST contained gasoline, and the other contained diesel. Both were removed in 1994. Contaminated soil remains between 11 to 15 feet bgs that does not pose a risk to human and ecological health if it remains in place and is not exposed. Spread of contamination to groundwater (at approximately 458 feet bgs) is not suspected. USAG Alaska has implemented a long-term management plan that established ICs to eliminate potential exposure of these contaminants.	1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, xylenes, and PAHs

Sources: (ADEC 2023a)
Notes:
[1] (Brice 2022)
[2] (ADEC 2014)
[3] (FES 2015)

3.3.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would have minor permanent impacts to hazardous materials and waste due to the installation of ASTs at two ops sites and potential for leaks and/or spill associated with this alternative. The Preferred Alternative would adhere to the applicable landowner, local, State, and Federal regulations and management plans pertaining to the use, management, and disposal of hazardous materials and waste for each ops site. There are also no activities anticipated to take place within direct soil or groundwater contamination footprints.

Potential PFAS contamination is linked to areas where past AFFF use occurred on EAFB (e.g., airfield and/or fire suppressed areas) and contaminated groundwater. AFFF use is not

suspected to have occurred at or near any of the proposed ops sites. Furthermore, groundwater is unlikely to be impacted by the Preferred Alternative.

An AST would be installed to support permanent diesel generator operation at the Quartz Hill and Dry Creek Ops Site to provide an onsite fuel source. ASTs would comply with Federal and State regulations. EAFB would submit a Tier II Emergency and Hazardous Chemical Inventory to Alaska's State Emergency Response Commission for the installation of the ASTs and would also update its Oil Discharge Prevention and Contingency Plan and Spill Prevention and Countermeasure Plan accordingly.

Potential fuel leaks and/or spills related to the Preferred Alternative (e.g., ASTs, refueling operations, and potential accidents) would be reported and cleaned-up in accordance with applicable laws and regulations. Furthermore, regular inspections and maintenance would occur to prevent and minimize leaks and/or spills associated with the construction (e.g., construction equipment and fueling operations) and operations (e.g., radar, generator, and ASTs) under the Preferred Alternative. This would include required routine maintenance, monthly and annual inspections, and periodic third-party inspection of ASTs to ensure prompt leak and spill response to limit the extent of potential contamination. A tank custodian would be appointed to perform required inspections and coordinate third-party inspections. A leak and/or spill of hazardous material or waste would be reported to emergency services at 911 and the EAFB Fire Dispatch at 907-377-2216. The EAFB Spills Program Manager would then report to and coordinate with the appropriate agencies (e.g., ADEC, EPA, and others) for proper response actions.

Minimal hazardous waste is expected to be generated during Preferred Alternative construction and operations, and there would be minimal change to existing waste streams when construction is completed. Generated waste would be disposed of in accordance with applicable regulations, laws, and landowner policies. A Hazardous Waste Determination would be completed to assess if Resource Conservation and Recovery Act (RCRA) hazardous waste would be produced from maintenance activities. If such waste is produced, the quantity is expected to be consistent with the designation of a "Very Small Quantity Generator" and be brought back to EAFB prior to transportation to a proper disposal facility.

The Engineer Hill and Gerstle River Ops Sites are within 1,500 feet of known contaminated sites that are either active and/or have active LUCs, ICs, or ECs. The two ops sites and their associated infrastructure are located outside of and generally on ground higher than the contaminated soil footprints of the contaminated sites. Although the Preferred Alternative's construction activities would not occur within the direct footprint of known contaminated site, a portion of the Engineer Hill Ops Site new access road would be "downhill" from contaminated sites at the Engineer Hill munitions storage and maintenance area and within the buffer for the contaminated sites ST056 and SO070 (Figure 3-1). For this reason, coordination would be completed with the Air Force Civil Engineer Center (AFCEC) Remedial Project Manager (RPM) and ADEC contaminated site remedial managers of these two contaminated prior to construction activities at the Engineer Hill Ops Site to ensure there is no unintentional exposure or spread of contaminated soils. This would include completion of a Base Civil Engineering Work Clearance and receiving approval before any work is conducted at the site. The Gerstle River Ops Site installation of the underground powerlines within the GRTA would require coordination with the contaminated site's ADEC remedial manager and USAG Alaska Environmental Office prior to construction efforts at the Gerstle River Ops Site to avoid spreading and/or exposing contaminated soil. Furthermore, potential contaminated groundwater at the Engineer Hill and Gerstle River Ops Sites is unlikely to be encountered during ground disturbing activities. Both ops sites have groundwater at depths well below the potential depths

of ground disturbing activities that are unlikely to exceed that of a trench (i.e., 15 feet as discussed in Section 3.8).

No-Action Alternative

No ground disturbing activities within a known contaminated site would occur under the No-Action Alternative. However, radars operated at the temporary YTA ops sites would continue to require diesel generators for power. Gasoline generators would also be used to warm the diesel generator in winter when required due to low temperatures. Generator fueling operations would be a potential source of contamination. Proper handling and protocols (e.g., Oil Discharge Prevention and Contingency Plan and Spill Prevention and Countermeasure Plan) for fueling operations and reporting minimize the potential leak and/or spill risk. Thus, the No-Action Alternative would have minor permanent adverse impacts to Hazardous Materials and Waste.

3.4 SAFETY AND OCCUPATIONAL HEALTH

3.4.1 Affected Environment

In accordance with EO 12196, “Occupational Safety and Health Programs for Federal Employees” issued February 26, 1980, and 29 CFR § 1960, “Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters,” military personnel and uniquely military equipment systems and operations are specifically excluded from OSHA coverage. However, the Air Force often implements OSHA-equivalent or more stringent safety and health protocols. In accordance with the Air Force Policy Direction (AFPD) 91-2, the Air Force has robust safety program that establishes policy, assigns responsibilities, and provides procedures and guidance for protecting protect working personnel from various potential work hazards. Furthermore, Alaskan employers under the jurisdiction of Alaska Occupational Safety and Health (AKOSH) jurisdiction must comply with State occupational safety and health laws and regulations.

This section will describe the medical care available to address potential injuries to working personnel and the general public within the ROI. Thus, this section will also include a description of the hazards associated with the ROI and Proposed Action. The hazards assessed will include excavation activities, COC and/or munitions and explosives of concern (MEC) exposure, military activity, electromagnetic field radiation (EMFR), Pogo Mine Access Road, natural disaster, and wildlife encounter.

Medical Care

Personal injuries during construction activities can result from increased noise levels, operation of heavy equipment, vehicle collisions, fueling operations, and more. Should an individual need medical care, the nearest Level IV trauma centers are the Fairbanks Memorial Hospital and Bassett Army Community Hospital (Figure 3-2). The Fairbanks Memorial Hospital is a civilian hospital that services the public. Whereas the Bassett Army Community Hospital is an Army hospital that provides services to military service members at Fort Wainwright but may provide treatment to civilians requiring urgent care when no other feasible options are available.

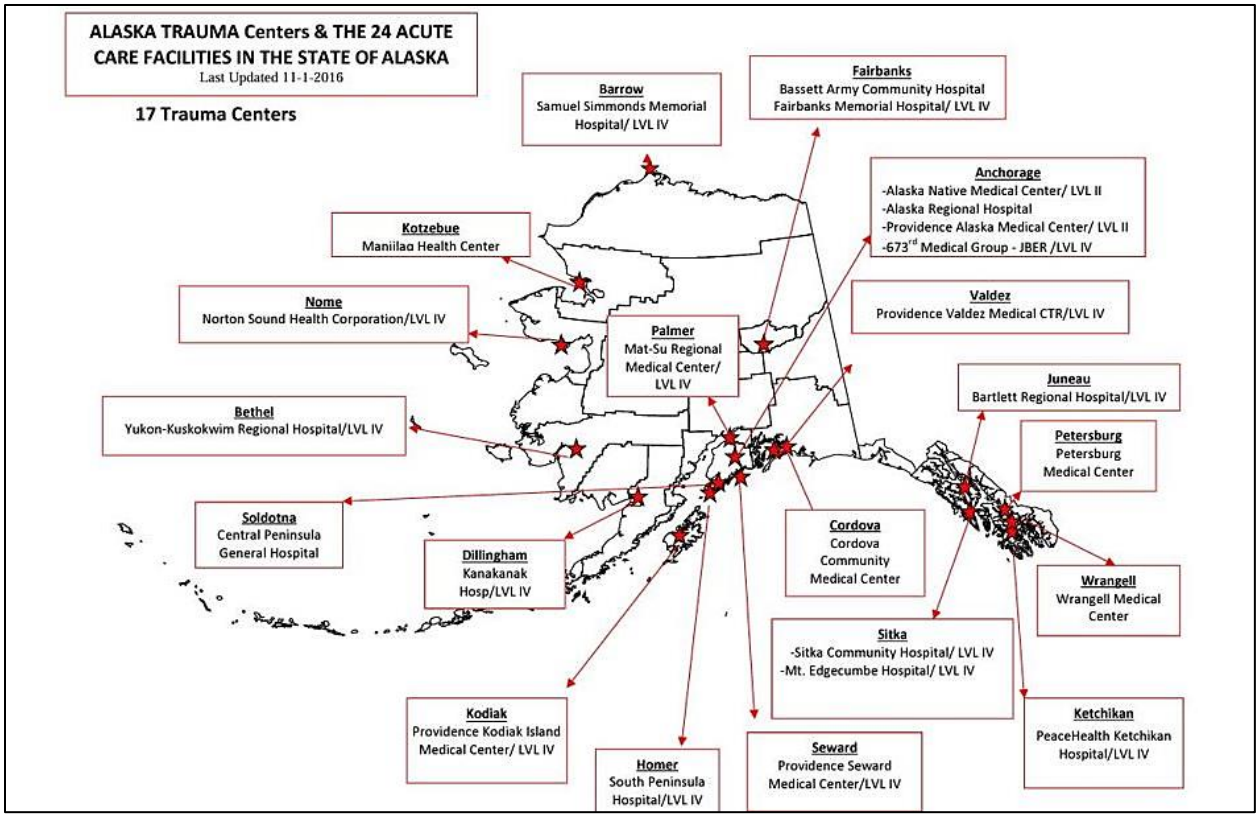

Figure 3-2. Alaska Trauma Centers (DPH 2016)

Both hospitals are approximately 20 miles straight-line distance from the Engineer Hill Ops Site, the nearest site, and 175 miles from the Tok Hill Ops Site, the furthest site. The Alaska Department of Health (ADH) defines a Level IV trauma center as a (DPH 2023):

> *"small rural facilit[y] that provide[s] initial evaluation and assessment of injured patients prior to transfer to a larger referral facility."*

Patients requiring higher level care than a Level IV trauma center would be transferred to a Level II trauma center in Anchorage, Alaska, approximately 255 miles straight-line distance southwest of Fairbanks . The ADH defines a Level II trauma center as a center that (DPH 2023):

> *"provides comprehensive trauma care and serves as a lead trauma facility for a geographical area."*

Excavation Activity

Agency coordination and permits to protect the health and safety of working personnel and the general public and safeguard the property of others during excavation activities is described in Section 3.8.

Cave-ins are of particular concern during excavations. Other potential safety hazards associated with excavation include falling loads, equipment operation, and air pollutant emissions (OSHA 2015). Working personnel must wear and utilize applicable personal protective equipment (PPE) and adequate worker protections are required to prevent and minimize potential cave-ins. Furthermore, for an excavation equal to or greater than 4 feet in depth, personnel protections must be provided to working personnel in accordance with OSHA excavation safety standards (29 CFR 1926, Subpart P).

COC and/or MEC Exposure

The Engineer Hill and Gerstle River Ops Sites that occur within 1,500 feet of contaminated sites is described in Section 3.3. When an action is within 1,500 feet of a contaminated site, there is an increased risk of COC or MEC exposure. LUCs, ICs, and ECs would apply to any activities occurring within the boundaries of contaminated sites. Furthermore, coordination with the contaminated site's ADEC Remedial Manager and the landowner would be required.

Military Activity

Military activities take priority on military land (e.g., EAFB, DTA, TFTA, and YTA) and within military airspace (e.g., MOAs, MTRs, and certain Controlled Firing Areas [CFAs], alert areas, and restricted areas) within the ROI, except under specific cases of emergency. However, all military activities adhere to applicable military base, local, State, and Federal laws and regulations. This includes coordination and notification with the public and/or other local, State, and Federal agencies for military activities as required by the type of activity. The military unit conducting the activity is responsible for ensuring their actions are compliant with applicable laws and regulations relating to the safety and health of working personnel and the general public.

Electromagnetic Field Radiation

AFPD 91-2 addresses electromagnetic field (EMF) hazards by implementing DoDI 6050.05, "DoD Hazard Communication (HAZCOM) Program" and DoDI 6055.11, "Protecting Personnel from Electromagnetic Fields." In accordance with DoDI 6055.11 and AFI 48-109, "Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program," the Air Force adheres to the US Institute of Electrical and Electronics Engineers (IEEE) Standard C95-1-2345 for maximum permissible exposure (MPE) limits. C95-1-2345 is the IEEE Standard for military workplaces wherein force health protection is required due to personnel exposure to electric, magnetic, and EMFs ranging 0 to 300 gigahertz (GHz). If there is a validated operational need, the DoD or IEEE standards may be modified for military-unique EMF systems. The microwaves emitted by the radars are short wavelength frequencies within the S-band (2 to 4 GHz) and C-band (4 to 8 GHz) ranges in accordance with IEEE C95-1-2345 Standard (Belov *et al*. 2012).

Radio frequency (RF) radiation poses a safety and health risk to living organisms and can interfere with electronic devices and signals. The high-intensity radiated field (HIRF) of the radar is the area where emitted microwaves have the strength to adversely affect living organisms or electronic devices and signals. The Air Force coordinates with relevant agencies and implements EMF mitigations through its RF and Microwave Safety Program to reduce and/or eliminate RF radiation impacts to living organisms and electronic devices and signals.

Health and Safety

The radars emit high frequency radio waves termed microwaves, a type of non-ionizing RF radiation, into the environment. Non-ionizing radiation does not have enough energy to break chemical bonds. RF radiation effects on health occurs when it is absorbed and varies based on the wavelength, frequency, intensity, and duration. Absorbed RF radiation has the potential to cause localized heating within body tissues that can damage the tissue (AKOSH 2023). The World Health Organization (WHO) states that to produce an adverse health effect, RF radiation exposure must occur above a threshold level that can increase tissue temperature above at least 1 degree Celsius (°C; WHO 1999 and 2007). RF frequencies ranging from 0.001 to 10 GHz have potential to penetrate exposed tissues and produce heating due to energy absorption (WHO 2007).

The Air Force MPE limits defined in AFI 48-109 for operators is 100 watts per meter squared (W/m^2) for frequencies between 0.01 to 100 GHz over a 6-minute averaging time. This is consistent with AKOSH (AKOSH 2023) and OSHA (29 CFR 1910.97) standards. The MPE limit for non-operators (i.e., the general public) in accordance with AFI 48-109 is 10 W/m^2 for frequencies between 2 to 100 GHz over a 30-minute averaging time (ARRL 2021). The Specific Absorption Rate (SAR) measures the absorption of RF radiation within tissue in watts per kilogram (W/kg) and is used to measure the dose of RF radiation within the frequency range of 0.001 to 10 GHz.

Heat damage to tissues is caused by high level RF radiation exposure over short periods of time. Research on the health effects from low-level microwave exposure over long periods of time is limited. Although available scientific information does not indicate that (1) multiple exposures to RF radiation below threshold levels causes any adverse health effects or (2) damage to tissues accumulates from repeated low level RF exposure, the WHO has concluded that further studies are required (WHO 1999 and 2007). Nonetheless, suspected health effects that may occur and/or be worsened from RF radiation exposure include, but are not limited to psychological changes, headaches, nervous system abnormalities, hormonal changes, miscarriage, birth defects, male infertility, altered immunity, and leukemia. These include relatively common ailments that occur in individuals who have not had excessive exposure to RF radiation as well (AKOSH 2023).

EMF site surveys are conducted to quantify the RF radiation extending from a radar and determine a protective stand-off distance. Within this EA, *stand-off distance* is the distance beyond which an individual would receive no more than applicable MPE limits for radar RF radiation (i.e., the boundary of the HIRF for living organisms). Other protective measures implemented to eliminate or reduce human RF radiation exposure below acceptable thresholds (i.e., MPE limits) were also based on EMF site surveys results. In public areas where measurements are not easily attained, ECs (e.g., interlocks, shielding, and the orientation of the system) and administrative controls (e.g., audible or visual alarms, warning signs, and use of physical barriers) are generally implemented to prevent both working personnel and the general public from entering areas where RF radiation levels are above applicable MPE limits. PPE (e.g., conductive suits, gloves, and safety shoes) may also be required to reduce exposure and ensure compliance with exposure standards. Emplacing RF radiation sources away from areas with permanent populace(s) and/or heavy traffic of non-operators also would assist in reducing potential and duration of exposure.

The American Radio Relay League (ARRL) indicated the simplest means of controlling exposure to high RF radiation is by restricting access through fencing, posting signage, and/or by locking out unauthorized individuals when practical (Hare 1998). AKOSH also requires posting signage to ensure non-operators stay away from radiation sources. Air Force DoDI 6050.05 requires adherence to 29 CFR 1910.1200, “Hazard Communication.” Based on 29 CFR 1910.1200 and 8 AAC 61.1110, “Additional Hazard Communication Standards,” the following must be implemented to address a RF radiation hazard:

- Posting at the worksite and making readily accessible the most recent Safety Data Sheet of a physical agent (i.e., the RF radiation hazard);
- Displaying the provisions of Alaska Statute 18.60.065 - 18.60.068 at the worksite; and,
- Providing operators with information and training on the RF radiation hazard in their work area at the time of their initial assignment.

Electronic Device and Signal Interference

The IEEE Committee on Man and Radiation (COMAR) identified that high levels of RFs can interfere with other electronic equipment and signals like those associated with aircrafts, radios, televisions, medical devices, and cellular communications. Such interference may interrupt, obstruct, or degrade the effective performance of the other electrical devices and signals and is more likely to occur with pulsed energy (COMAR 2000). Electronic devices and signals that operate in the ROI within S-band frequencies include but are not limited to current JPARC radar simulators, airport air traffic control radars and weather radars. ROI C-band frequency electronic devices and signals include but are not limited to various communication services like the Pogo Mine communication infrastructure and other cellular towers (MDA 2020). Most modern routers use multiple bands with dual-band routers (most common) operating at 2.4 GHz and 5 GHz frequency bands or tri-band routers that also include the 6 GHz frequency band.

The FAA has HIRF certification standards for aircraft electrical and electronic systems. The FAA's HIRF certification standards for aircraft are in 14 CFR, "Aeronautics and Space," and the FAA Advisory Circular (AC) 20-158A, "The Certification of Aircraft Electrical and Electronic Systems for Operation in the High-intensity Radiated Fields (HIRF) Environment." Aircraft and airfield radio and radar capabilities are essential to ensure flight safety of all aircraft and military operations within the ROI.

Pogo Mine Access Road

Pogo Mine Access Road is a single-lane, gravel road associated with the proposed Pogo Hill Ops Site. Safety hazards related to this road are (1) two-way traffic on a single-lane road and (2) mining-associated activities throughout the area. Due to these hazards, a security gate is used to restrict road access and permission must be granted by Northern Star Resources Limited to use the road. Northern Star Resources Limited provides a briefing and requires drivers pass a test to ensure road safety protocols are fully understood and implemented accordingly. This includes drivers maintaining radio contact and announcing their position about every 5 miles. A radio, strobe, and other safety protocol materials are supplied to the drivers.

Natural Disaster

Potential natural disasters within the ROI are flooding, earthquakes, and wildfires.

Flooding

Various types of flooding may occur within the ROI. The Bridge to Terabithia Ops Site is the within a mapped floodplain (discussed further in Section 3.7). The potential flood hazards within the ROI are flash floods, river floods, burn scar and debris flows, snowmelt, and/or ice and debris jams.

Earthquakes

Earthquakes result from tectonic plate movement along fault lines. The Tintina Fault is north of the ROI, and the Denali Fault is south of the ROI (Figure 3-3). Both these faults are strike-slip faults where tectonic plates are parallel to one another and move in opposite directions. The largest earthquake to date from the movement at either of these faults occurred in 2002. A 7.9 magnitude earthquake resulted from slippage of the Denali Fault at approximately 2.6 miles below ground surface (bgs; AEC 2002) that caused landslides, damaged roads, and more.

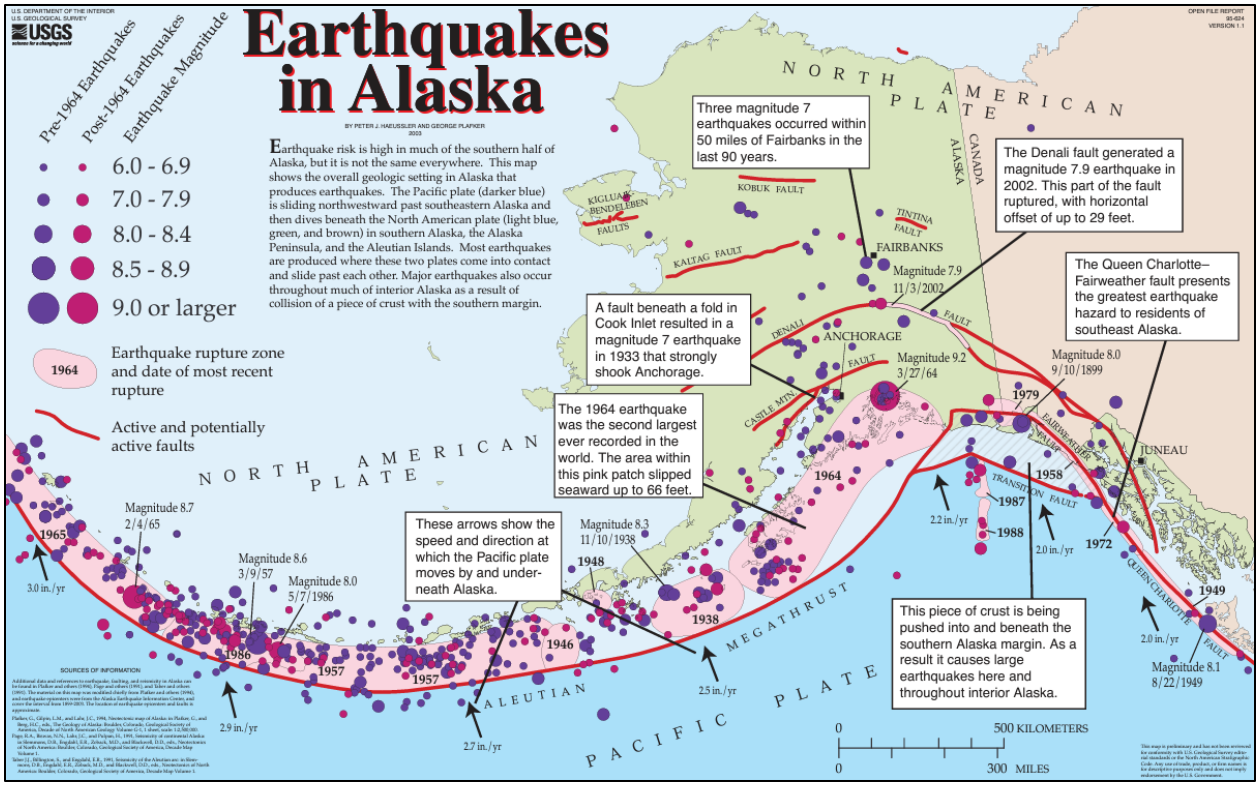

Figure 3-3. Alaska Active Faults with Earthquake Information (USGS 2003)

Wildfires

Interior Alaska is characterized by frequent and extensive wildfires, including stand-replacing ground, surface, and crown fires (Abrahamson 2014). A *wildfire* is an unplanned fire and triggers may include natural forces (e.g., lightning), human accidents (e.g., escaped fires from prescribed burn projects), or human intention (e.g., arson; CRS 2023).

In 2013 to 2022, 3.1 million acres were burned in Alaska from wildfires (CRS 2023). Prescribed burns are sometimes used in Alaska to reduce the number and severity of potential wildfires. Although human-caused wildfires occur in Alaska, wildfires are a natural process in Interior Alaska, where they occur frequently and impact vast areas. The fire season in Alaska typically begins in late May, peaks in late June, and ends in late July (Moore *et al*. 2020). Due to the extent of wildfires throughout Alaska, wildfire suppression efforts focus on areas where the most lives, infrastructure, and valuable cultural and natural resources reside. Section 3.9 describes wildfire impacts specific to wildlife.

The *Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement* was signed between the SOA and agencies of the US Department of the Interior (DOI) and US Department of Agriculture (USDA). This agreement defines the management strategy for wildfire management between the agencies responsible for suppressing wildfires (herein, suppression agency) within Alaska (Figure 3-4).

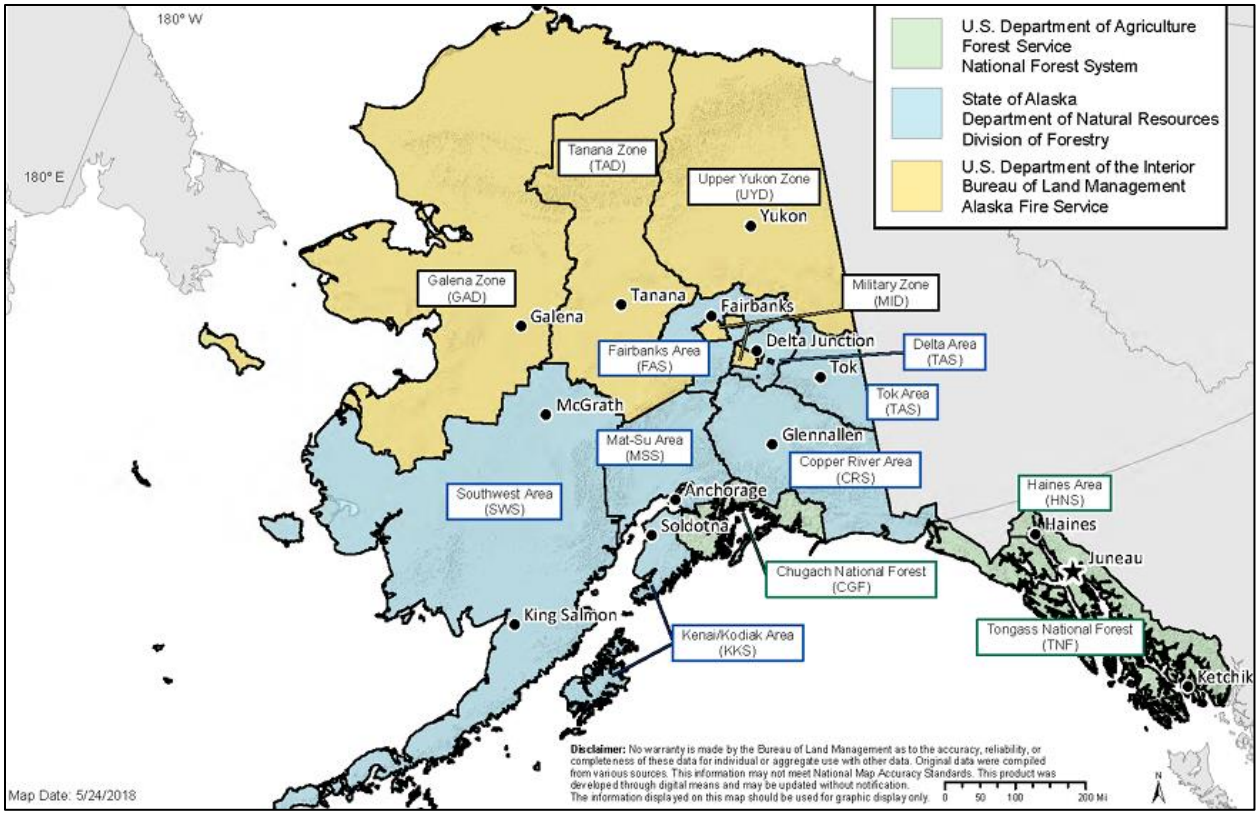

Figure 3-4. Wildfire Protection Area Jurisdictions (DOI, USDA, and SOA 2023)

Suppression agencies support wildfire jurisdictional agencies to implement the 2021 Alaska Statewide Operating Plan (DOI, USDA, SOA 2023) and wildfire response plans. Where the wildfire begins determines the jurisdictional and suppression agency responsible for suppressing it. The Air Force and USAG Alaska are not part of this agreement. However, the USAG Alaska co-manages the Military Zone (includes the DTA, TFTA, and YTA) with the DOI Bureau of Land Management (BLM) Alaska Fire Service (AFS) under a Memorandum of Agreement (DOI, USDA, and SOA 2023). Thus, wildfires beginning on EAFB would be managed by the Air Force, and potential wildfires that begin on USAG Alaska land in the Military Zone would be co-managed by the BLM AFS and USAG Alaska. Although co-managed BLM AFS and USAG Alaska, the GRTA is a "Limited" designated area for fire management options, and the BLM AFS would not suppress a wildfire at GRTA. Rather, a wildfire in the GRTA would be only monitored. Wildfires within the ROI and not within the Military Zone are managed by the SOA.

Wildlife Encounter

Wildlife within the ROI could pose a threat to working personnel and the general public if encountered. Of particular concern are black bear (*Ursus americanus*), brown bears (*Ursus arctos*), and moose (*Alces alces*). Vigilance and precautions are necessary when operating in more remote locations, and attractants (e.g., food) should be sealed and disposed of properly. Barriers, bear spray, and other means can provide protection if avoidance and safe retreat are not possible.

3.4.2 Environmental Consequences

Preferred Alternative

An adverse impact would occur if the Preferred Alternative were to appreciably increase the risk to workers and general public health and safety beyond the regulatory standards and/or acceptable limits. However, with the implementation of protective best management practices (BMPs), the Preferred Alternative would have temporary and permanent minor adverse impacts to safety and occupational health. The impacts from construction of the ops sites would be localized, temporary impacts generally contained within the construction footprints. Post-construction impacts would be localized, permanent impacts related to site infrastructure and the operation of the radars.

The available medical care and the hazards associated with the construction and operations of the Preferred Alternative were considered when assessing the impacts to safety and occupational health. During and post-construction, site safety and health hazards would be properly communicated (e.g., briefed and documented in sites plans or signage) and coordinated (e.g., permitted and providing the proper notification) to working personal and the general public. Specific to construction, working personnel would be required to wear and utilize PPE and implement BMPs that are required and/or appropriate for the type of activity taking place. Construction health and safety hazards would be temporary and cease when construction is completed.

Post-construction, ops site infrastructure and operations would result in health and safety hazards. Ops site infrastructure (e.g., powerlines) would limit the tactical flexibility of wildfire suppression efforts in and around the ops site, because it would hinder the safe use of the full spectrum of suppression tactics (aerial resources, heavy equipment) and use of prescribed fires to lower uncontrolled wildfire risk within proximity ops site infrastructure. The site infrastructure would also develop roads into remote areas wherein there would be potential for vehicle-wildlife collisions. However, the risks associate with these specific hazards would be minimized by ops site design, which would include minimizing infrastructure to the extent practicable, constructing infrastructure that act as a fire break (i.e., roads), and implementation of best management practices (e.g., low speed limits).

The radars are designed to emit RFs that simulate potential adversary radars. Thus, the radars would increase the EMFR hazard within the ROI in both controlled (ops sites on military lands and within military airspace) and uncontrolled (ops sites on SOA and FNSB land and outside military airspace) environments. Existing JPARC operational system requirements and procedures would be adapted to include the radar operations at the various locations throughout the ROI. Furthermore, the EMFR hazard would be addressed by the Air Force RF and Microwave Safety Program. This program would compel the Air Force to coordinate with the relevant agencies (e.g., the FAA) to implement protective measures and mitigations under the Preferred Alternative to reduce and/or eliminate the RF radiation impacts to living organisms and electronic devices to the greatest extent practicable.

The EMFR of the radars would be the predominant health hazard during post-construction operations. Safety guidelines and standards for non-ionizing EMFR in IEEE Standard C95.1 considers the potential hazards of EMFR to all personnel, including pilots, in both controlled and uncontrolled environments. Although these standards may not be fully protective with respect to individuals using medical devices. The remote nature of the ops sites would generally minimize the potential and duration of exposure to the general public. Protective measures and mitigations to address the EMFR hazard of the Preferred Alternative would include:

- Installation of a physical barrier that would prevent unauthorized access of non-operators within the radar's HIRF;
- Implementation of requirements specified by communication standards stipulated by 29 CFR 1910.1200 and 8 AAC 61.1110;
- Routine RF radiation monitoring and assessment of the radars; and,
- Operators that are properly trained, informed of site hazards, and wear appropriate PPE.

Identifying the boundary of the HIRF (i.e., the protective stand-off distance) and compliance with all applicable RF radiation safety standards for DoD and Air Force land-based radars is standard operating procedure for Air Force actions. The Air Force Bioenvironmental Engineering (BE) performed Electromagnetic Frequency Surveys for the radars to determine operator and general public protective stand-off distances. The radars' S- and C-band frequency range extends from 2 to 8 GHz. Subsequently, the MPE limits applied were 100 W/m^2 over a 6-minute averaging time for operators and 10 W/m^2 over a 30-minute averaging time for the general public. Electromagnetic Frequency Surveys applied normal and worst-case scenario analysis to determine adequate stand-off distance based on applicable MPE limits defined in AFI 48-109, which is consistent with AKOSH and OSHA Standards for operators. The identified protective stand-off distance was 89 feet for operators and 200 feet for the general public. Thus, the physical barrier (e.g., fence and/or gates) to prevent non-operator access within the radar HIRF would be installed 200 feet from the perimeter of the operating pads, as allowed by the terrain.

The EMFR within the radar HIRF could interfere with other electronic devices and signals. However, the heights of most ground-based commercial and private telecommunication infrastructure within the ROI are generally below the floor of the radar HIRF. The Air Force would coordinate with owners of telecommunication infrastructure above the floor of the HIRF to avoid interference. This would apply to the Pogo Hill Ops Site where the radar would be co-located with the Pogo Mine telecommunication infrastructure. The Air Force would coordinate with Northern Star Resources Limited to identify appropriate measures to avoid signal interference issues. There is potential for radar interference of unlicensed, commercial off-the-shelf products, like the one used by the Dry Creek Community near the proposed Dry Creek Ops Site. However, due to the multi-band nature of most modern routers and extent of RF energy needed to cause such interference to these types of products are unlikely to cause interference given the (1) separation, terrain, and vegetation between known telecommunication devices, (2) the small side lobes of the radars Actively Electronically Scanned Array, and (3) the main beam rarely directed to and never below zero degrees elevation from the position of the radar.

The radars also have potential to interfere with aircraft communication devices and signals. To ensure safe flight operations within the ROI, the Air Force would provide proper notification via the SUAIS and coordinate with the ATC when necessary to issue a NOTAM. The Air Force would also ensure potential aircraft within the ROI do not encounter the HIRF of the radars that exceeds the FAA's HIRF certification standards for aircraft electrical and electronic systems. The adaption of existing safety policies implemented for the current JPARC would predominately impact radar operators and other military personnel within existing, restricted, and/or controlled-access military lands and airspace.

No-Action Alternative

The main safety and health hazard under the No-Action Alternative would be potential operator exposure to radar RF radiation. The operators and other military personnel would be trained on how to limit exposure and safety and health concerns as it relates to this hazard, and marking standards (e.g., fencing and signage) would be applied in accordance with applicable State and Air Force regulations, policies, and standards. Thus, the No-Action Alternative would have permanent minor adverse impacts to operators and other military site users.

3.5 NOISE

3.5.1 Affected Environment

The EPA recommended a 70 A-weighted decibels (dBA) over 24-hour or 75 dBA over 8-hour average exposure limit for environmental noise in 1974. These thresholds represent sound exposure limits that are protective of 96% of the general population from developing hearing loss and the public's health and welfare (EPA 1974). Such sound level exposure is unlikely to occur at the ops sites where ambient background sound levels are expected to be relatively low.

Noise is a sound that may disturb human and/or wildlife. The predominant noise sources throughout the ROI caused by nature (e.g., wind and wildlife). However, anthropogenic noise from military and commercial sources (e.g., aircraft, or vehicle traffic) can temporarily increase sound levels within this area. The locations of the proposed ops sites that are located closer to anthropogenic infrastructure (e.g., airfields), populations (e.g., cities and communities), and/or activities (e.g., military training and recreation) would typically have higher ambient background sound level and be more likely to experience temporary increases in sound levels from existing sources.

3.5.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would cause minor temporary and permanent adverse impacts due to the addition of new noise sources during and post construction to include transient noise from aircraft using the radars for training.

Generally, the greatest impacts would occur at the more remote sites due to their greater distance from anthropogenic noise sources leading to lower ambient background sound levels. associated with greater distance from anthropogenic sources. Construction activities at all the ops sites and the use of a temporary diesel generator at the Tok Hill Ops Site would be new noise sources that persist only for the duration of the construction phase, and lead to temporary, higher than ambient background sound levels at the ops sites. Post-construction, the operation of the radars at all the ops sites and generators at the Quartz Hill and Dry Creek Ops Sites would be new permanent anthropogenic noise sources. The greatest point source of noise after construction would be the diesel generators, which would likely produce a sound level of approximately 75 dBA or less 23 feet away. 75 dBA is equivalent to the noise produced by a vacuum cleaner (EHS 2023). The sound level would attenuate with distance from the generator, and the potential generator noise heard beyond the physical barrier (a minimum of 200 feet away from the operating pad perimeter) would unlikely extend more than 8 hours in any single day (electrical power selection standard description in Section 2.2). Thus, the Preferred Alternative would not cause sound exposure that would cause hearing loss, temporary area displacement, or permanent area abandonment of site users and wildlife.

Training aircraft overflight using existing airspace would also temporarily increase sound levels while the aircraft is operating within the area but would very unlikely reach a level and duration

that would cause hearing loss. To minimize potential noise impacts to users (e.g., wildlife and public) from overflight, the Air Force would avoid conducting training below 10,000 feet for normal flight operations and 30,000 feet for sonic booms, and the Air Force would adhere to agreements with the FAA and State agencies. Furthermore, within the ROI, this would not be a new source of noise and the frequency of Air Force air operations would be consistent with previously assessed Air Force actions (see Section 1.4) due to the Preferred Alternative (Section 3.1).

No-Action Alternative

Under the No-Action Alternative, the operation of generators, aircraft, and radars would cause temporary local noise level increases within the YTA during radar operations. Although, other site users and wildlife may be temporarily disturbed during active operation of the generators at these temporary ops sites, they would unlikely permanently abandon the area. Thus, noise impacts under the No-Action Alternative would be permanent minor adverse impacts.

3.6 AIR QUALITY

3.6.1 Affected Environment

Air pollutant emissions can occur because of anthropogenic activities and natural processes. Impacts of such emissions vary depending on a pollutant source's emission rate, type, and proximity to other emission sources as well as the local and regional weather and climate characteristics. Inert pollutants (e.g., fugitive dust and carbon monoxide [CO]) generally lead to localized impacts that may extend a few miles downwind from a source while reactive (e.g., ozone [O_3]) pollutants may extend much further.

National and State Air Quality Standards

The ops sites are within the Northern Alaska Intrastate Air Quality Control Region. National Ambient Air Quality Standards (NAAQSs) and State Ambient Air Quality Standards (SAAQSs) are used to assess if there are significant concentrations of air pollutants that decrease air quality and are used to protect public health and welfare by managing air pollutants. These standards include a reasonable margins of safety to protect the more sensitive individuals within the population. The EPA established NAAQSs regulate air pollutants. Alaska State Ambient Air Quality Standards (SAAQSs) also apply to regulate air quality within Alaska.

Air pollutant concentrations are compared to NAAQS and SAAQS (Table 3-5) to determine if an area is in "attainment" or "nonattainment." If air quality is better than air quality standards, the area is designated as an attainment area. If air quality is worse than air quality standards, the area is designated a nonattainment area. Former nonattainment areas that have attained air quality standards are designated as maintenance areas. None of the ops sites are within a nonattainment or maintenance area. The nearest nonattainment and maintenance areas are the FNSB "Particulate Matter Less than or Equal to 2.5 Microns in Diameter ($PM_{2.5}$) Nonattainment Area" and "CO Maintenance Area." The FNSB $PM_{2.5}$ Nonattainment Area was established in 2009 (ADEC 2023c). The two State Implementation Plans (SIPs) for this area are (1) the Moderate SIP established in 2015 and amended in 2016 and 2017, and (2) the Serious SIP adopted in 2019 and amended in 2020. There was a FNSB CO Non-attainment Area established in 1990, but it was re-designated as the FNSB CO Maintenance Area in 2004. The Limited Maintenance SIP for this area was adopted in 2013 (ADEC 2023b).

Table 3-5. NAAQS and Alaska SAAQS

Pollutant	Averaging Time	SAAQS	NAAQS	
			Primary	Secondary
CO	8-hour[1]	10 mg/m^3	9 ppm (10 mg/m^3)	---
	1-hour[1]	40 mg/m^3	35 ppm (40 mg/m^3)	---
NH_3	8-hour[1]	2.1 mg/m^3	---	---
NO_2	Annual (Arithmetic Average)	100 µg/m^3	53 ppb (100 µg/m^3)	Same as Primary
	1-hour[2]	188 µg/m^3	100 ppb (188 µg/m^3)	---
O_3	8-hour[3]	0.070 ppm	0.070 ppm	Same as Primary
PM_{10}	24-hour[4]	150 µg/m^3	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual (Arithmetic Average)[5]	12 µg/m^3	9.0 µg/m^3	15.0 µg/m^3
	24-hour[6]	35 µg/m^3	35 µg/m^3	Same as Primary
Pb	Rolling 3-month Average[7]	0.15 µg/m^3	0.15 µg/m^3	Same as Primary
SO_2	Annual (Arithmetic Average)[7]	80.0 µg/m^3	---	---
	24-hour[1]	365 µg/m^3	---	---
	3-hour[1]	1,300 µg/m^3	---	0.5 ppm (1,300 µg/m^3)
	1-hour[8]	196 µg/m^3	75 ppb (196 µg/m^3)	---

Sources: 18 AAC 50.010(4) and (EPA 2023)
Notes: *Applies to annotations in column "Averaging Times."*
[1] Standard not to be exceeded more than once per year.
[2] 3-year average of the 98th percentile of the daily maximum 1-hour average not to exceed standard.
[3] Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years not to exceed standard.
[4] Standard not to be exceeded more than once per year on average over 3 years.
[5] Annual mean averaged over 3 years not to exceed standard.
[6] 98th percentile, averaged over 3 years not to exceed standard.
[7] Standard not to be exceeded.
[8] 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years not to exceed standard.
Key: NH_3 = Ammonia; NO_2 = Nitrogen Dioxide; ppm = parts per million; Pb = Lead; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter; SO_2 = Sulfur Dioxide.

Existing Emissions Sources

Prevention of Significant Deterioration (PSD) applies to new major sources or modifications to existing pollutant sources within attainment areas or when NAAQS are unclassifiable. The nearest PSD Class I area is the Denali National Park and Preserve, located approximately 75 miles or more westerly from the ops sites. The ops sites are designated as PSD Class II areas that allow moderate deterioration of air quality.

The Air Force would be the owner and operator of the ops sites and associated operations. Thus, the Proposed Action would contribute to the total emissions of EAFB emissions. EAFB is a stationary emission source that requires a Title V Operating Permit (TVOP). Currently, EAFB is operating under a Permit Shield in accordance with AS 46.14.275. Modifications to EAFB air emissions would require a New Source Review (NSR) under Clean Air Act (CAA) Title I Parts C and Section 110(a)(2)(C) to ensure good air quality is maintained.

Four ops sites; Engineer Hill, South Pole Hill, Bridge to Terabithia, and Birch Hill; are within the FNSB. The remaining five ops sites; Pogo Hill, Quartz Hill, Gerstle River, Dry Creek, and Tok Hill; are within the Southeast Fairbanks Census Area. Table 3-6 summarizes the 2020 estimates of the annual emissions generated from stationary and mobile sources within the FNSB and Southeast Fairbanks Census Area (EPA 2020). The anthropogenic emission sources within the two boroughs generally include: (1) on-road vehicles, non-road equipment, and locomotive mobile sources, (2) prescribed fires, (3) residential wood fuel combustion, (4) waste disposal, (5) fugitive dust (i.e., Particulate Matter Less than or Equal to 10 Microns [PM_{10}]), and (6) solvent/surface coating usages. The predominant anthropogenic emission sources are (1),

(2) and (3). Wildfires and vegetation and soil biogenics are major existing natural emission sources.

Table 3-6. FNSB and Southeast Fairbanks Census Area 2020 Emissions

Source Category	Criteria Air Pollutant (Tons)								GHG (mt)	HAP[1] (Tons)
	CO	NH_3	NO_X	PM_{10}	$PM_{2.5}$	Pb[1]	SO_2	VOCs	CO_2e	---
Fairbanks North Star Borough										
Non-Mobile	1,284,861	19,861	11,911	131,031	110,292	0.266	6,902	321,225	11,041,375	56,168
Mobile	11,910	29	966	107	63	--	3	1,105	563,346	333
Total	1,296,771	19,890	12,877	131,138	110,355	0.266	6,905	322,330	11,604,721	56,501
Southeast Fairbanks Census Area										
Non-Mobile	19,737	51	3727	2,173	1,211	0.001	40	57,704	26,739	5,794
Mobile	1,582	5	145	10	7	--	0.260	122	70,316	36
Total	21,320	56	3,872	2,183	1,217	0.001	41	57,826	97,055	5,830

Sources: (EPA 2020)
Notes:
Quantity values were rounded to the nearest whole number except for values less than one. Values less than one were rounded to the nearest thousandth.
[1] Includes Lead Compounds.
Key: CO_2e = Carbon Dioxide Equivalent; GHG = Greenhouse Gas; HAP = Hazardous Air Pollutant; mt = Metric Ton; NO_x = Nitrogen Oxide and Nitrogen Dioxide; VOC = Volatile Organic Compound.

In rural Alaska, elevated PM_{10} (fugitive dust) is of particular concern based on monitoring data throughout rural Alaska. There is also anecdotal local information indicating health problems and medical visits increase during reported periods of heavy dust conditions (Sierra 2006). The predominant source of fugitive dust in rural Alaska is unpaved (e.g., gravel) roads.

Climate and Climate Change

An ecoregion is an ecologically distinct area based on holistic results of interactions between geologic, landform, soil, vegetative, climatic, wildlife, water, and human factors present within an area. Each ops site is within one or more ecoregions (Table 3-7. These ecoregions express a continental climate and extreme seasonal variation that is typical within Interior Alaska (Table 3-8). Summers are short and warm while winters are long and very cold within the ROI. This leads to short growing seasons and long-lasting snow. Although impacted by terrain, winds tend to be highest in May and June with an average speed of 7 to 8 miles per hour.

Table 3-7. Ops Site Ecoregion(s)

Ops Site	Transitional Area?	Interior Forested Lowlands and Uplands	Interior Highlands	Interior Bottomlands	Alaska Range
Engineer Hill	Yes		X	X	
South Pole Hill	Yes		X	X	
Bridge to Terabithia	No			X	
Birch Hill	No			X	
Pogo Hill	No		X		
Quartz Hill	Yes		X	X	
Gerstle River	No	X			
Dry Creek	No				X
Tok Hill	No				X

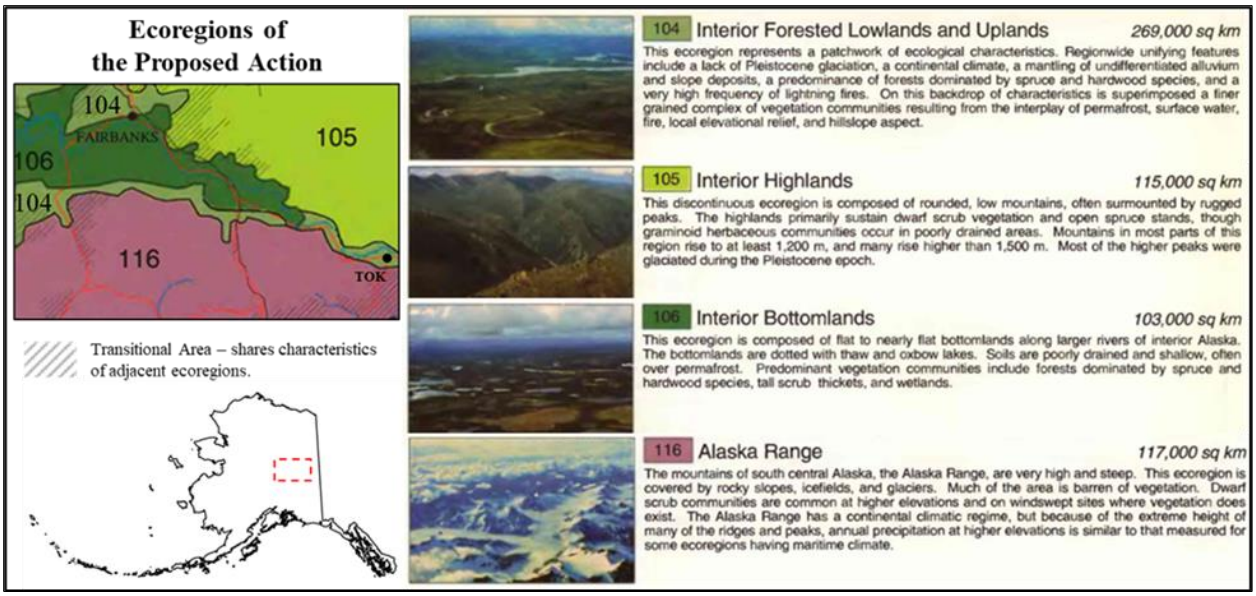

Figure 3-5. Proposed Action Ecoregions (Developed using Plate 1 in USGS 1995)

Table 3-8. Ecoregion Annual Weather Parameters

Ecoregion	Annual Weather Parameters
Interior Forested Lowlands and Uplands	**Summer Temperatures:** Averages lows of 8 to 11 °C to highs of 11 to 17 °C. **Winter Temperatures:** Averages low of -35 °C to a high of -22 °C. Inversions occur due to low sun angle and corresponding long-wave radiation cooling. **Precipitation:** Ranges from 250 to 550 mm and increases with elevation. Most precipitation occurs during summer due to convective storms. **Snowfall:** Ranges from 125 to 205 cm and increases with elevation. Will tend to linger in the higher altitudes, on the north-facing slopes, and shaded features.
Interior Highlands	**Summer Temperatures:** Decreases with elevation. **Winter Temperatures:** Steep and persistent temperature inversions at lower elevations. **Precipitation:** Orographic effect - highlands receive more precipitation than lower elevation areas. **Snowfall:** Likely receives snow in similar ranges as the Alaska Range.
Interior Bottomlands	**Summer Temperatures:** Lows of 7 °C and highs of 22 °C that remain above freezing. **Winter Temperatures:** Average lows of -33 to -26 °C with range from -22 to -17 °C. **Precipitation:** Ranges from 280 mm to 400 mm. **Snowfall:** Ranges from 95 cm to 205 cm.
Alaska Range	**Sumer Temperatures:** Lows average about 2 °C and highs average about 18 °C **Winter Temperatures:** Lows average about -25 °C and daily highs about -3 °C. **Precipitation:** 380 mm at lower elevations and 2030 mm for higher mountain peaks. **Snowfall:** 150 to 306 cm at lower elevations and 1015 cm for higher mountain.

Sources: (USGS 1995)
Key: °F = Fahrenheit; cm = centimeter; mm = millimeter.

Scientific evidence has indicated a correlation between increasing global temperatures and worldwide proliferation of greenhouse gas (GHG) emissions. GHGs trap heat in the atmosphere

by absorbing infrared radiation and occur from natural processes and anthropogenic activities. Total GHG emissions from a source are often expressed as carbon dioxide equivalent (CO_2e) and measured in metric tons (mt). Table 3-6 summarized the most recent estimates of annual GHG emissions generated from stationary and mobile sources within the FNSB and Southeast Fairbanks Census Area in 2020.

The accelerated rate of warming at high latitudes is causing climate change in Alaska. This climate change may lead to various impacts on various ecoregions to include, but not limited to expanded periods of drought, lengthened fire season, increased frequency and severity of wildfires, shifted species and vegetation composition, and altered carbon budget (Foster *et al*. 2019).

3.6.2 Environmental Consequences

Preferred Alternative

Air quality would be reduced by the Preferred Alternative that would cause temporary and permanent minor adverse impacts. The air pollutant emissions from the Preferred Alternative were below Insignificant Indicators meaning the action is unlikely to cause or contribute to an exceedance of one or more NAAQSs and unlikely to have significant impacts to air quality. Furthermore, the increase in GHG emissions from the Preferred Alternative would be minor and unlikely to measurably contribute to climate change.

The construction activities of the Preferred Alternative and the operation of a temporary generator at the Tok Hill Ops Site would have localized, temporary adverse impacts to air quality. Air quality would be temporarily impacted by the Preferred Alternative's construction activities due to the use and operation of heavy equipment, vehicles, and generators. The effects to air quality would be highly localized during construction activities and generally dissipate and return to ambient air quality condition after such activities are completed. Air pollutant emissions from the temporary generator utilization at the Tok Hill Ops Site would also cease once the radars are connected to the existing power grid via installed powerlines.

For post-construction radar operations, permanent generators (i.e., the two permanent diesel generators and their associated gasoline generators) at the Quartz Lake and Dry Creek Ops Sites would be new sources of air pollutant emissions, and would have localized, permanent adverse impacts to air quality. The Air Force conducts an Air Conformity Applicability Model (ACAM) that estimates air pollutant increases of new source(s) from an Air Force action (e.g., newly installed permanent generators). An ACAM based on concept-level data was conducted for the temporary generator at the Tok Hill Ops Site, although this would not be a permanent new source of air pollutant emissions. Air pollutant emissions from the new sources of the Preferred Alternative were determined to be minor based on the ACAM Report (Appendix B) results. A NSR and an update to the EAFB TVOP would be required under the CAA for the permanent generators, and any deviations from the concept-level data used to conduct previous modeling.

The Preferred Alternative ACAM Report and Record of Air Analysis (ROAA) estimated the total net direct and indirect emissions associated with the Preferred Alternative. Estimations were based on a calendar-year and begun from the start of the action through the "steady state" (i.e., when the emissions are stabilized). The Preferred Alternative ACAM Report compared air pollutant emissions from the permanent generators against the following Insignificance Indicators:

- PSD major source threshold within “Clearly Attainment” areas of 250 tons per year; and,
- General Conformity Rule (GCR, 40 CFR 93 Subpart B) *de minimis* values of 25 tons per year for lead and 100 tons per year for all other criteria pollutants

The Insignificance Indicators provide a threshold to identify actions that are insignificant or that may cause and/or contribute to an exceedance of one or more NAAQSs. The results of the ACAM Report demonstrated that the Preferred Alternative air pollutant emissions from the operations of the temporary diesel generator and permanent generators would not cause an exceedance of any air pollutant Insignificance Indicator.

Fugitive dust caused by the Preferred Alternative would predominantly be generated by construction activities; dust from vehicles operating on existing and newly constructed unpaved surfaces; and the transfer, transport, or stockpiling of dust-producing materials. This would reduce local air quality. However, increases in fugitive dust would be minimized to the greatest extent practicable, highly localized, and generally dissipate quickly. To minimize the amount of fugitive dust generated at the construction site, along haul routes, and in and around the post construction gravel roads and ops sites, the Preferred Alternative would implement the following BMPs and mitigations of the EAFB Fugitive Dust Emission Plan unless prohibited by contaminated soil requirements:

- Spraying water within compliance of stormwater permit requirements when necessary;
- Limiting traffic speeds to 15 miles per hour or less on unpaved road surfaces; and,
- Daily cleaning of uncontaminated dirt and/or mud that is tracked onto paved roads.

Generally, the paved roadways would be watered before cleaning. If a street sweeper is used to clean away dirt and/or mud from paved roadways, it would have a water system that controls dust around the sweeper during operation.

The CEQ published interim guidance addressing EO 13990 “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis,” on January 9, 2023. Pursuant to the guidance, the Air Force assessed:

1. The potential effects of a Preferred Alternative on climate change by assessing the GHG emissions of the action (Appendix B); and,
2. The effects of climate change on the Preferred Alternative and its environmental impacts.

The total GHG related to the Preferred Alternative were based on the permanent diesel generators that would be implemented at the Quartz Hill and Dry Creek Ops Sites. Since the Preferred Alternative would not increase the number of EAFB’s air operations, GHG emissions associated with such activity was not included in the project-specific GHG emission estimates. Based on the ACAM, the GHG emissions resulting from the Preferred Alternative would at most cause minor impacts air quality and climate change. GHG emissions under the Preferred Alternatives were minimized by limiting the implementation of permanent diesel generators only at the ops sites wherein powerlines were deemed infeasible.

Other, non-air resource, climate change considerations under the Preferred Alternative are incorporated in applicable sections within this EA, including discussion on the Bridge to Terabithia Ops Site location within a floodplain under Section 3.7 and potential permafrost impacts to ops site infrastructure in Section 3.8.

No-Action Alternative

Under the No-Action Alternative, radars used at temporary YTA ops sites would continue to be powered by diesel generators. Gasoline generators would be utilized when necessary to warm up the permanent generators during low temperatures. The generators emit air pollutant emissions that would temporarily decrease air quality. Impacts to air quality would be highly localized. Air pollutant emissions produced under the No-Action Alternative would unlikely exceed Insignificance Indicators, NAAQSs, or SAAQSs, and fugitive dust would be controlled in accordance with EAFB's Fugitive Dust Emission Plan. Thus, the No-Action Alternative would have minor permanent adverse impacts to air quality within the local environment.

3.7 WATER RESOURCES

3.7.1 Affected Environment

There are numerous water quality monitoring locations throughout the ROI. While there are localized water quality issues, water quality of both surface and groundwater is generally assumed to be within Alaska Water Quality Standards (WQSs) with higher quality water further away from developed areas, past historical activities linked to contamination, and stormwater outfalls. Furthermore, the groundwater can tend to have high concentrations of naturally occurring iron, manganese, and arsenic that are common treatment problems in Interior Alaska groundwater systems (Callegary *et al*. 2013).

Garrison Slough is an impaired water. *Impaired waters* are waters that persistently do not meet WQSs, and use of these waters are restricted. The closest ops site to Garrison Slough is the Engineer Hill Ops Site, approximately 6 miles northeast of the waterbody. It was listed as an impaired water in 1996 due to polychlorinated biphenyls (PCBs) contamination above Alaska WQSs. A 1996 EPA-approved recovery plan established under the Clean Water Act (CWA) Section 303(d) addresses the nonpoint source loading of PCBs into Garrison Slough and prescribes the removal of 80 percent of the PCBs through implementation of a phased Total Maximum Daily Load (TMDL) to restore the water's quality (EPA 1996).

AFI 32-1067, "Water and Fuel Systems" and other Air Force regulations require plans and procedures to be developed and implemented to minimize pollutant contributions to the environment through stormwater contact and flow from Air Force infrastructure and operations. Pursuant to minimizing stormwater environmental impacts, EAFB has established a Stormwater Pollution Prevention Plan (SWPPP, EAFB 2020). Changes in EAFB operations or findings identified during inspection can lead to an update of this living document or require a separate SWPPP. The EAFB SWPPP supports the base's Alaska Pollutant Discharge Elimination System (APDES) discharge Multi-Sector General Permits (MSGPs).

ADEC also issues APDES Construction General Permits (CGPs) for stormwater discharges from large and small construction-related activities that result in a total land disturbance of equal to or greater than 1 acre and where associated discharges enter waters of the US (WOTUS) or a municipal separate storm sewer system leading to WOTUS. A CGP also authorizes stormwater discharges from certain construction support activities and non-stormwater discharges commonly associated with construction sites. A Notice of Intent (NOI) to ADEC and submission of a new or modified SWPPP is required for a new or modified CGP or MSGP.

Under CWA Section 401, a State Water Quality Certification (WQC) from ADEC is required for actions that would result in a discharge of pollutants into WOTUS to ensure the action complies with all applicable WQSs, limitations, and restrictions. Furthermore, Under CWA Section 404, a permit must be acquired from US Army Corps of Engineers (USACE) Regulatory Division for actions within WOTUS involving fill for development, infrastructure development, and more.

Groundwater

In 2008, approximately 83 percent of Alaska's public drinking water systems and 90 percent of rural Alaskans used groundwater as a drinking water source (ADEC 2008). The Yukon River Basin encompasses the entirety of Interior Alaska and is the largest hydrologic region within Alaska. It also has the greatest extent of unconsolidated aquifer material in Alaska (Callegary *et al*. 2013). The low-lying and mountainous areas of the ROI generally consist of unconfined alluvial aquifers composed of unconsolidated materials derived from glaciers, rivers, and/or streams (ADEC 2008, USAG FWA 2013, EAFB 2017). Ephemeral streams and rivers flowing out from mountain ranges (e.g., Alaska Range and Yukon-Tanana Uplands) in Alaska often diminish significantly or disappear into permeable glacial unconsolidated sediments prior to reappearing downslope where increases in fine-grained landscape features tend to occur. These landscape features promote groundwater accumulation that result in groundwater discharge that recharges various surface waterbodies in Interior Alaska (Callegary *et al*. 2013).

Surface Water

Groundwater is a major factor in surface water recharge of the various creeks, streams, ponds, and lakes throughout Interior Alaska. Within the ROI, varying extents of freezing generally between October and May will limit or stop surface water recharge from groundwater and other sources (e.g., snowmelt and precipitation). In March through April, snowmelt will typically begin and continue until July. The snowmelt contributes greatly to the high surface water flows in June and July. These surface waters will be recharged and sustained by precipitation until it begins to refreeze. The Tanana River, which is a major waterbody extending throughout the region of the Proposed Action, is fed by meltwater from glaciers and the snowmelt from the Alaska Range (NPG 1987, USAG FWA 2013).

Table 3-9 identifies specific surface waters within the footprint the ops sites and their associated new access roads based on the US Geological Survey (USGS) National Water Dashboard and includes potential ephemeral runoffs from higher ground.

Table 3-9. Surface Water along New Access Roads and/or Ops Sites.

Ops Site	Surface Water	Relevance to Site
Engineer Hill	Lily Lake	New access road around the perimeter of the Engineer Hill munitions storage and maintenance area lies north of Lily Lake.
Bridge to Terabithia	Tanana River	New access road lies within the Tanana River floodplain.
	Tanana River Anabranches	New access road and ops pad lie between two anabranches of the Tanana River.
Quartz Hill	Ephemeral Streams	New access road extends through potential ephemeral streams that would drain into Indian Creek.
Dry Creek	Dry Creek Tributary	New access road extends through an unnamed tributary that connects to Dry Creek.
	Ephemeral Streams	New access road extends through potential ephemeral streams that would drain into Dry Creek.
Tok Hill	Ephemeral Streams	New access road extends through potential ephemeral streams that would drain into springs at the base of the mountain.

Sources: (USGS 2023b.)

Floodplain

Within the ROI, the FNSB is the only community that participates in the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP). Flood Insurance Rate Maps (FIRMs) can be used to identify a Special Flood Hazard Area (SFHA) within a mapped area. A SFHA is an area subject to inundation by 1 percent-annual-chance-flood and

considered a 100-year floodplain. FNSB Code 15.04, “Floodplain Management Regulations,” requires a Floodplain Permit for actions relating to new infrastructure development, substantial existing infrastructure improvements, or movable structure placement within a FNSB regulated SFHA or within 250 feet of the Tanana Levee Structure centerline. The FNSB Department of Community Planning is the issuing authority for the Floodplain Permit.

The main flood seasons or the Tanana River and Chena River in the ROI are the spring and summer and generally caused when there is rapid melting of above-normal snowfall from a preceding winter that causes a heavy spring runoff. Such flooding can be exacerbated by ice jams and by extreme rainfall within a short period of time (i.e., 2 or more inches in a 24-hour period). The Tanana River Levee System and Moose Creek Dam protect most of Fairbanks area from inundation by the 1 percent annual chance flood (FEMA 2020).

EO 11988, “Floodplain Management,” applies to actions that occur within the 100-year floodplain (i.e., SFHA). Pursuant to this EO, Federal agencies ensure their actions reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains. Thus, the Air Force would be required to design or modify its action to minimize potential harm to or within the floodplain and publish a notice (i.e., EPN). The purpose of the notice is to inform the public the Air Force’s action would potentially impact a 100-year floodplain.

Furthermore, actions occurring within a floodplain must comply with EO 13690, “Federal Floor Risk Management Standard.” The purpose of this EO is to ensure resiliency against potential future flood events with consideration to climate change. The three approaches Federal agencies may pursue to establish the flood elevation and corresponding hazard area for an action’s siting, design, and construction are:

1. *Climate Informed Science Approach*: uses the best-available, actionable hydrological and hydraulic data and methods that integrate current and future changes in flooding based on climate science;
2. *Freeboard Value Approach*: adds an additional 2 feet for non-critical actions and 3 feet for critical actions to base flood elevation(s); and,
3. *500-year Floodplain Approach*: includes the area subjected to flooding by the 0.2 percent-annual-chance-flood (i.e., 500-year floodplain) in floodplain assessment.

Wetlands

Special aquatic sites are waters possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general environmental health or vitality of the entire ecosystem of a region. Wetlands are considered a special aquatic site under CWA and are 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 § 328.3[b]). Wetlands are among the most productive ecosystems in the world and are a source of substantial biodiversity (EPA 2021).

Wetlands occur more frequently at higher latitudes largely because the cooler climate provides less opportunity for evaporation and wetlands cover approximately 43 percent of Alaska’s surface area. Of the 175 million acres of Alaskan wetlands, two-thirds are classified as palustrine shrub/scrub, as described in the Classification of Wetlands and Deepwater Habitats of the US (Cowardin *et al*. 1979).

The National Wetland Inventory (NWI) mapping performed by the US Fish and Wildlife Service (USFWS) provides reconnaissance level information on the location, type, and size of aquatic resources. The maps are prepared from the analysis of high-altitude imagery and wetlands are identified based on vegetation, visible hydrology, and geography. For an area to be recognized as wetland as defined by the CWA, the parameters of appropriate vegetation, hydrology, and hydric soils must be satisfied. Impacts to wetlands mapped by the NWI would require a formal jurisdictional wetland delineation to determine the presence and extent of aquatic resources. These delineations will be performed during the application for a Department of the Army permit from the USACE Alaska District's Regulatory Division under Section 404 of the CWA, and in accordance with the 1987 *US Army Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the 2007 *Regional Supplement to the USACE Wetland Delineation Manual: Alaska Region (Version 2.0)* (USACE 2007). Wetlands occur within the footprint of the Pogo Hill and Dry Creek Ops Sites.

EO 11990, "Protection of Wetlands," applies to actions that occur within wetlands. Pursuant to this EO, Federal agencies ensure their actions minimize the destruction, loss or degradation of wetlands, and preserve and enhance the natural and beneficial values of wetlands. Thus, the Air Force would be required to design or modify its action to minimize potential harm to or within wetlands and publish a notice (i.e., EPN) to notify the public that its action may impact wetlands.

Pogo Hill Ops Site

A small section of the Pogo Hill powerline alignment would pass through wetlands mapped by the NWI as palustrine forested/shrub wetlands. These wetlands are typically dominated by black spruce (*Picea mariana*) in the tree and scrub stratum, with Labrador tea (*Rhododendron groenlandicum*) and various ericaceous species rounding out the scrub stratum. Black spruce and Labrador tea wetlands in Interior Alaska generally have a thick layer of sphagnum moss (*Sphagnum* spp.) covering the ground and deep organic soils that are susceptible to seasonal ice in the upper part and potential permafrost in alpine areas and north-facing slopes.

Palustrine forested/shrub wetlands in the powerline footprint are likely to perform production of organic matter, sediment removal, general habitat suitability, and native plant richness functions.

Dry Creek Ops Site

There are no wetlands on the hilltop where the ops pads would be constructed, but the new access road would cross several wetland palustrine scrub/shrub communities. The wetlands are typically dominated by resin birch (*Betula glandulosa*) and dwarf birch (*Betula nana*), with a few scattered black spruce saplings and ericaceous plants like western blueberry (*Vaccinium uliginosum*) and lingonberry (*Vaccinium vitis-idaea*). There is cottongrass (*Eriophorum vaginatum*) in the herb stratum and a robust layer of sphagnum moss across much of the ground surface.

Palustrine scrub/shrub wetlands in the new access road footprint are likely to perform flood flow alteration, production of organic matter, and general habitat suitability. These wetlands are very common in Interior Alaska, and do not contain or support rare or threatened species.

3.7.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would have temporary, minor adverse impacts to surface water, the Tanana Floodplain, and wetlands due construction activities and permanent, minor adverse impacts to wetlands and surface waters post-construction. Furthermore, stormwater discharges

of fill material placement would be required for the Preferred Alternative's construction activities. Groundwater impacts at the various ops sites would be negligible and discountable because the Preferred Alternative and its construction activities are not anticipated to contaminant or interrupt the movement of groundwater within the ROI.

The Preferred Alternative would require the development of an action specific SWPPP for each ops site to comply with the CGP from ADEC unless the site's ground disturbing and fill activities during construction would not exceed the *de minimis* threshold and not result in stormwater and non-stormwater discharges entering WOTUS (i.e., the Tanana River, wetlands, and Dry Creek tributary). A NOI issued to ADEC would be required for a complete CGP application. A CWA 401 WQC from ADEC and CWA 404 Permit from USACE Regulatory Division would be required for the Preferred Alternative's fill activities and discharges during construction as well.

Surface Water

Surface water impacts would be minimal and predominately effect ephemeral streams caused by snowmelt and mountain runoff at various sites. A perennial surface water that would be impacted by the Preferred Alternative is a tributary of Dry Creek that the new Dry Creek Ops Site access road alignment would cross. Impacts to the tributary would be temporary and would occur during construction. The construction of the Dry Creek new access road would limit and/or prevent water flow in the tributary until a culvert is emplaced. The culvert would allow water flow to occur while simultaneously preventing destabilization of the newly constructed access road. Once the culvert and overlaying road infrastructure is constructed, the impacts to this tributary would be negligible. As for the ephemeral streams, culverts and drainage design considerations would be incorporated to minimize impacts to the constructed infrastructure and ephemeral streams to retain the hydrology and minimize indirect impacts down-gradient. Culvert design would adhere to the 2016 ADNR DOF Forest Road and Bridge Standards culvert specifications pursuant to compliance with the Alaska Forest Resources and Practices Act (AS 41.17) statutory intent of water quality protection.

Floodplain

Pursuant to EO 11988 and EO 13690, the 500-year Floodplain approach was implemented in the Air Force's floodplain analysis for the Preferred Alternative. The Bridge to Terabithia Ops Site is within the SFHA of the Tanana River floodplain (i.e., within a 100- and 500-year floodplain). The applicable FIRM for this is Panel 6425J (NFIP 2014) and the ops site area has a determined base flood elevation. To minimize potential flood loss during a flood event, base flood elevation and climate change considerations would be incorporated during the design of the site. In accordance with FNSB Code 15.04, a Floodplain Permit would be required for the Bridge to Terabithia Ops Site's construction activities. The permit would be issued if the Bridge to Terabithia Ops Site design is sound and not anticipated to heighten flood impacts on human safety, health, and welfare nor prevent the natural and beneficial values served by the Tanana Floodplain. However, during the construction of the site, there would be a temporary increased risk of flood loss due to instability of unfinished infrastructure. Upon completion of construction efforts, ops site infrastructure would be stabilized and able to withstand floodplain conditions resulting in negligible impacts to and from the floodplain.

Wetlands

The Pogo Hill and Dry Creek Ops Sites would impact wetlands.

Impacts to wetlands are typically divided between direct and indirect impacts. *Direct impacts* are caused by the placement of fill material directly into the wetland and generally result in the loss of all wetland function due to the destruction of vegetation, loss of water storage capacity,

reduction in flood flow desynchronization, conversion of habitat, etc. *Indirect impacts* are usually caused by alterations to the hydrology in action-adjacent areas and can sometimes induce a change to the wetlands type by increasing or decreasing the amount of water the wetland receives or retains.

Both direct and indirect impacts are often quantified by acreage of impact, and sometimes the acreage is modified by a multiplier derived by a "functional assessment." Functional assessments are protocols used to quantitatively describe wetland function by giving wetland communities or polygons a score based on how well the wetland performs a given function, such as general habitat suitability, flood flow alteration, production of organic material, etc.

Pogo Hill Ops Site

The Pogo Hill Ops Site new access road improvement and powerline installation would cross a palustrine forested/shrub wetland (Figure 3-6).

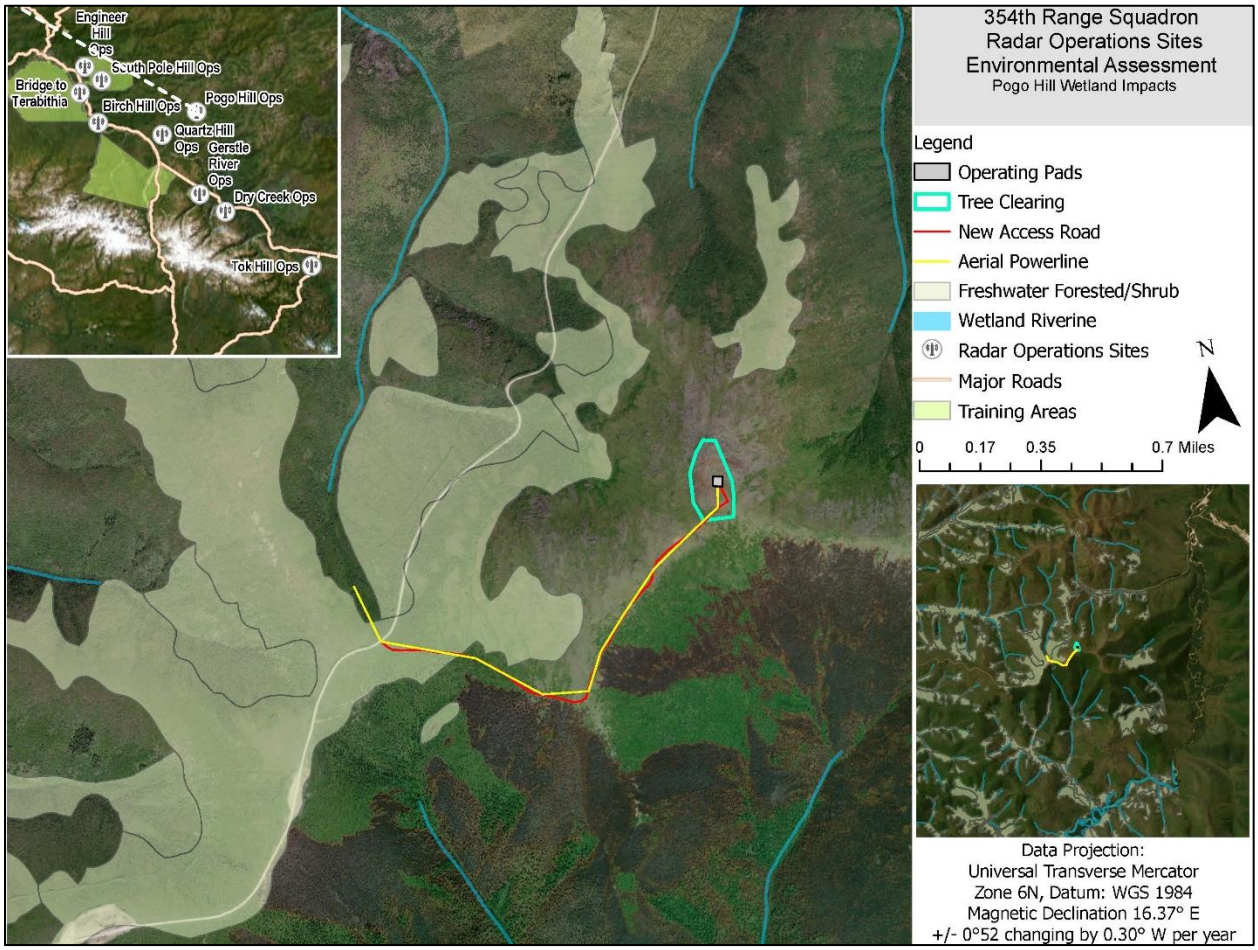

Figure 3-6. Pogo Hill Wetland Impacts

The new access road improvement is not expected to cause wetland impacts because the improvement work would be contained within the footprint of the existing unimproved road. A 30-foot-wide ROW would be cleared for the powerline. The Pogo Mine Access Road is within the wetland boundary and vegetation clearing for the powerline would extend approximately 300 feet west of the road before leaving the wetland boundary. Powerline installation would require clearing approximately up to 0.2 acres of wetland vegetation. The powerline alignment was

designed to avoid wetlands to the extent practicable. The vegetation clearing would be a temporary impact to wetlands because the vegetation would begin growing back soon after construction and operation of equipment along the ROW would not cause permanent changes to the soils, hydrology, or vegetation.

Utility poles installation would require equipment operation in wetlands north of the Pogo Mine Access Road to drill holes in the ground for setting the poles and anchors. The utility work south of this road is expected to be conducted from the existing unimproved road to the top of the Pogo Hill. Each utility pole would displace a small amount of wetland soil, and the hole drilled to set the utility pole would be backfilled with native soil. The installation of the utility poles would cause minor permanent impacts corresponding to the area occupied by the base of the utility pole and any anchors. The number of poles required to be set in wetlands would be dictated by terrain, existing utility infrastructure (e.g., substations), and equipment requirements. Wetland impacts associated with utility pole installation are expected to total less than 0.10 acres.

Dry Creek Ops Site

Construction of the Dry Creek new access road would cross multiple slope-discharge wetlands on its path up the north slope of the hillside (Figure 3-7).

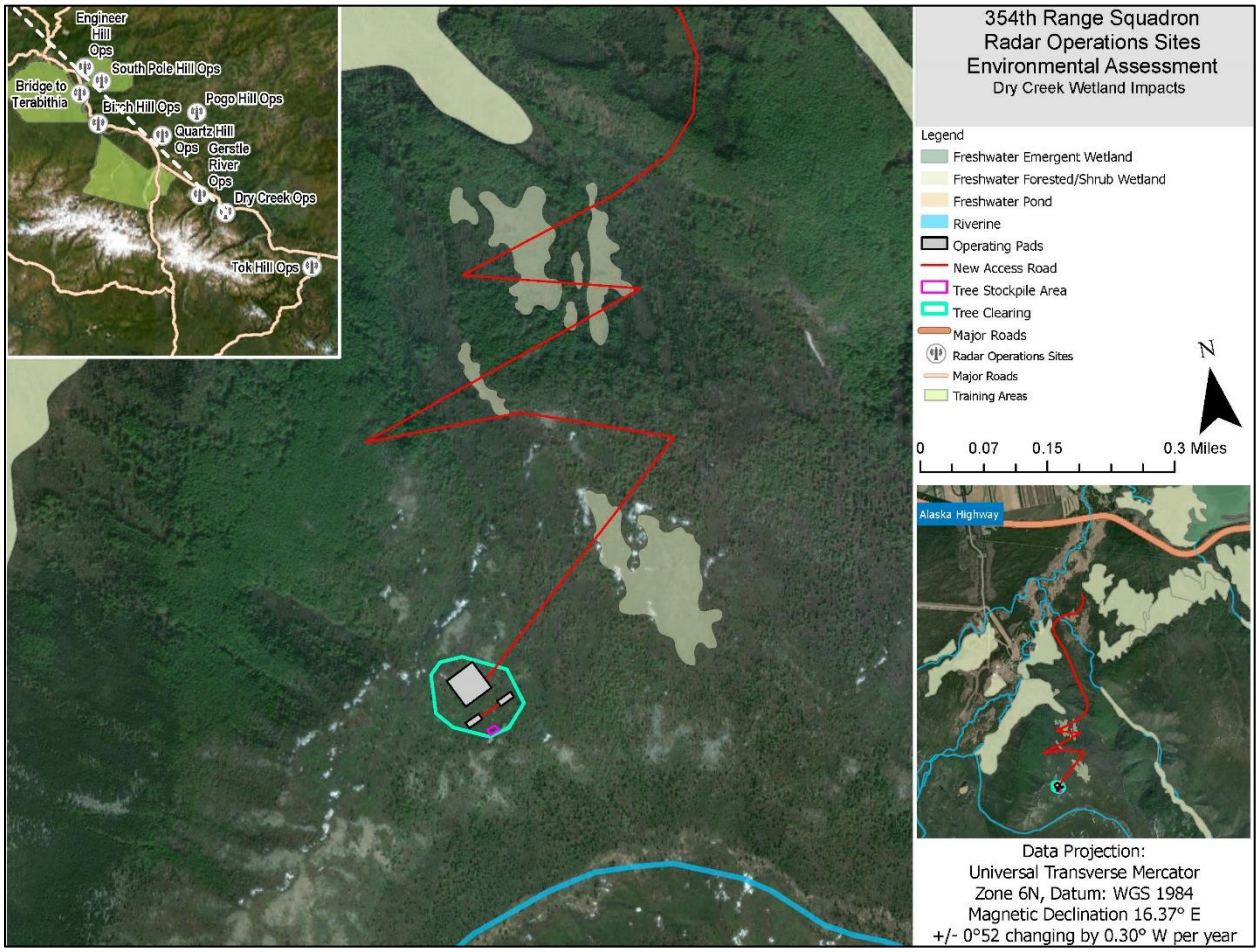

Figure 3-7. Dry Creek Wetland Impacts

The new access road would require a 50-foot-wide cleared ROW and the toe-to-toe width of the road embankment would be 20 feet. The total length of the new access road within the

boundaries of the wetland communities would be approximately 1,325 feet, which would cause 0.9 acres of temporary impacts due to the vegetation clearing for the ROW and 0.6 acres of permanent, direct wetland impact associated with the placement of fill for road construction. The wetlands that would be impacted by the road construction are common palustrine forested/scrub wetlands and isolated from surface water. They do not provide substantial general habitat, fish habitat, organic material export, or filtration functions due to their position in the watershed and homogeneity.

The Air Force would install culverts as appropriate to retain the hydrology and minimize indirect wetland impacts down-gradient from the Dry Creek Ops Site. Wetlands were avoided to the extent practicable during new access road design, but the topography of the site presents significant road design constraints and requires the incorporation of several switchbacks to achieve practical grades.

No-Action Alternative

There would be no fill or discharges associated with the use of temporary YTA ops sites for radar training. However, potential spills and/or leaks could contaminant local water resources due to water run-off or migration of contaminants to groundwater. The Air Force would implement the appropriate leak and spill response if a leak and/or spill occurred to minimize the extent of contamination of such an event. Thus, impacts to water resources from the No-Action Alternative would be permanent minor adverse impacts.

3.8 EARTH RESOURCES

3.8.1 Affected Environment

Extensive Pleistocene glaciation occurred in the Alaska Range and the higher peaks within the Yukon-Tanana Uplands (USGS 1995). Climatic fluctuations during the Quaternary Period caused glacial expansion and recession that impacted the terrain of the ROI with several hundred feet of glacial silt, sand, and gravel flowing from various rivers into the Tanana River and Yukon valleys. This resulted in an extensive loess layer that can range over hundreds of feet thick in these valleys and gravel deposits up to approximately 150 feet thick along the Tanana River (NPG 1987, USAG FWA 2013). The valleys are generally flat beyond the base of the Alaska Range and Yukon-Tanana Uplands. The bedrock in the Tanana Valley can be hundreds of feet deep below these sediments. Whereas the alpine areas generally have exposed weathered bedrock and/or bedrock under a thin soil surface layer (EAFB 2017).

Discontinuous permafrost dominates the ROI. Isolated masses or continuous thin layers of permafrost may occur at the ops sites within the Interior Bottomlands Ecoregion or Transitional Areas adjacent to the Interior Bottomlands. Ops site soil, geology, and topography is informed by the characteristics of its ecoregion(s) and described in Table 3-10.

Table 3-10. Ops Site Soil, Geology, and Topography Informed by Ecoregion Characteristics

Ops Site	Ecoregion	Soils	Geology	Topography
Bridge to Terabithia	Interior Bottomlands	Pergelic and Histic Pergelic Cryaquepts; Aquic and Typic Cryochrepts; and Typic Cryofluvents.	Unconsolidated surficial deposits, undivided (Quaternary); and floodplain alluvium (Quaternary).	New access road and ops pad at about 600 feet ASL within the Tanana Flats.
Birch Hill			Gneiss, schist, and quartzite (Mississippian, Devonian, and older); and Gneiss and Quartzite (Paleozoic or Precambrian).	New access road extends to the ops pad from about 1,000 feet to 1,466 feet ASL.
Engineer Hill	Transitional Area – Interior Bottomlands and Interior Highlands	Pergelic and Histic Pergelic Cryaquepts; Aquic and Typic Cryochrepts; Pergelic Cryumbrepts; Lithic Cryorthents; Typic Cryorthods; and Typic Cryofluvents.	Unconsolidated surficial deposits, undivided (Quaternary) and Fairbanks loess (Quaternary) transitions into keevy peak formation and similar rocks (early Paleozoic) and calcareous phyllite, marble and phyllite (Paleozoic).	New access road extends to the ops pads from about 500 feet to 1,000 feet ASL. Terrain transitioning from flat lowlands to the Yukon-Tanana Uplands.
South Pole Hill			Totatlanika schist (Early Mississippian to Late Devonian) and Cataclastic rocks (Paleozoic).	New access road and ops pads at about 2,400 feet ASL. Terrain transitioning from flat lowlands to the Yukon-Tanana Uplands.
Quartz Hill			Unconsolidated surficial deposits, undivided (Quaternary) and loess (Quaternary) transitions into augen gneiss and orthogneiss (Early Mississippian and Late Devonian).	New access road extends to the ops pad from about 1,000 feet to 2,000 feet ASL. Terrain transitioning from flat lowlands to the Yukon-Tanana Uplands.
Pogo Hill	Interior Highlands	Histic Pergelic Cryaquepts; Typic Cryochrepts; Pergelic Cryumbrepts; Lithic Cryorthents; and Typic Cryorthods.	Gneiss, schist, and quartzite (Mississippian, Devonian, and older) and gneiss and quartzite (Paleozoic or Precambrian).	New access road extends to the ops pads from about 3,100 feet to 4,000 feet ASL within the Yukon-Tanana Uplands.
Gerstle River	Interior Forested Lowlands and Uplands	Pergelic and Histic Pergelic Cryaquepts; Aquic, Pergelic, and Typic Cyrophrepts; Typic Cryorthents; and Pergelic Cryumbrepts.	Unconsolidated surficial deposits, undivided (Quaternary) and Glaciofluvial deposits of Wisconsin glaciation (Holocene and Pleistocene).	New access road and ops pad at about 1,600 feet ASL.
Dry Creek	Alaska Range	Lithic Cryorthents; Pergelic Cryaquepts and Pergelic Ruptic-Histic Cryaquepts; Typic Cryochrepts; Pergelic Cryumbrepts, and Typic Cryumbrepts.	Unconsolidated surficial deposits, undivided (Quaternary) and colluvial deposits (Holocene) transitions into granitic rocks of central and southeast Alaska (Cretaceous, Coniacian, Albian) and granite of Macomb Plateau (Late Cretaceous).	New access road extends to the ops pads from about 1,300 feet to 2,600 feet ASL in the Macomb Plateau of the Alaska Range.
Tok Hill			Orthogneiss and amphibolite of igneous origin (Mississippian, Devonian, and older), Biotite gneiss and schist unit (Precambrian and/or Paleozoic).	New access road extends to the ops pads from about 2,000 feet to 3,000 feet ASL in the Alaska Range.

Sources: (USGS 1995 and USGS 2023a.)
Key: ASL = Above Sea Level.

Permits and coordination are required prior to ground disturbance activities, like excavation activities discussed in Section 3.4. On military bases, a Dig Permit is required prior to break ground more than 6 inches in depth. Furthermore, in accordance with the Alaska Dig Law (AS 42.30.400 – 490), a proponent must call 811 for a “locate request” to inform excavation activities

and avoid damaging "underground facilities" and/or harming the public. *Locate requests* are requests for underground facility owners to identify and mark the location of their facilities within the confines of a planned excavation. AS 42.30.490(10) defines an *underground facility* as:

> *"a pipe, sewer, conduit, cable, valve, line, or wire, including attachments and those parts of poles or anchors that are below ground, for use in connection with the storage or conveyance of water, sewage, telecommunications, cable television, electricity, petroleum, petroleum products, hazardous liquids, or flammable, toxic, or corrosive gas."*

The use of mineral resources may also require agency coordination and/or permits depending on the owner of the mineral resource. The use of mineral resources on military lands by the military does not require coordination with the BLM. However, use of mineral resources, such as gravel, from public lands for construction purposes and road building, are subject to the Materials Act of 1947. Under this Act some "common variety" minerals, such as gravel, are subject to sale and require coordination with the appropriate BLM office. The appropriate BLM office for the ROI is the Fairbanks District Office. Regulations governing contracts and permits for mineral materials are contained in Title 43 CFR Subparts 3601, 3602, 3603, and 3604.

3.8.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would adversely impact earth resources by exposing earth resources to erosional forces and using available earth material (i.e., gravel) in permanent infrastructure. However, by limiting the footprint of infrastructure and implementing erosion considerations during design would minimize adverse impacts to these resources. The Preferred Alternative would have minor temporary and permanent adverse impacts to earth resources by developing minimal, stable infrastructure and stabilizing disturbed ground to the extent practicable after construction is completed.

For this EA analysis, ops site conceptual designs and best professional judgement were used to determine appropriate baseline metrics to inform potential impacts to earth resources. These metrics were used to determine ground disturbance estimations for the construction activities (i.e., new access road and operating pad(s) construction and powerline installation; Table 3-11).

Table 3-11. Estimated Ground Disturbance from Ops Site Construction Activities

Ops Site	Operating Pad(s) (Acres)	New Access Road[1] (Acres)	Powerline Installation[2] (Acres)	Total (Acres)
Engineer Hill	1.01	5.33	< 0.00[3]	6.34
South Pole Hill	0.69	1.33	< 0.00[3]	2.02
Bridge to Terabithia	0.47	0.13	< 0.00[3]	0.60
Birch Hill	0.69	2.03	< 0.00[3]	2.72
Pogo Hill	0.52	3.73	< 0.00[3]	4.25
Quartz Hill	0.52	16.80	*Not Applicable*	17.32
Gerstle River	0.47	0.53	0.10[3]	1.10
Dry Creek	1.01	7.73	*No Applicable*	8.74
Tok Hill	1.01	10.40	< 0.00[3]	11.41
Feature Total	6.39	48.01	0.10	54.50

Notes:
[1] See Table 3-23.
[2] Estimated using best professional judgment associated with powerline installation activities. Assumptions used were: (1) 9.4 miles of aerial powerlines would be installed, (2) 0.2 miles of underground powerlines would be installed, (3) an utility pole would be emplace every 300 feet of powerline, (4) a utility pole would disturb a 2 square foot area of soil, (5) an electrical transformer pads and utility vaults would disturb a 25 square foot area, (6) the width of the trench for an underground powerline would be 4 feet; (7) the
[2] Estimated utility pole installation was less than 0.00 acres for all ops sites with aerial powerlines.

Estimated total ground disturbance from the Preferred Alternative would be approximately 54.50 acres and ground disturbing activities associated with site infrastructure construction would generally not extend beyond the surface layer (approximately 5 feet bgs). However, specific site conditions (e.g., depth of bedrock, sediment characteristics, and permafrost conditions) and coordination with utility providers and landowners would dictate the required design and safety compliance standards impacting final design dimensions and depths of each ops site. Specific site conditions would be incorporated in the final ops sites' designs. This includes the delineation of permafrost within an ops site's footprint prior to a final design. Specific to permafrost, final designs would build in resiliency through BMPs and incorporating risk-based decisions making against potential instability of permafrost relating to climate change. As research and the field of climate change resiliency develops, the Air Force and its contractors would consider incorporating risks into the ops sites' final designs and implementing BMPs and measures to the extent practicable to enhance infrastructure resiliency. This could include, but would not be limited to, avoidance measures (e.g., re-routing or locating infrastructures away from permafrost) and minimization measures (e.g., methods addressing potential instability from permafrost thawing). Subsequently, final ops site designs may vary from those proposed in this EA.

Infrastructure (e.g., gravel roads and operating pads) would build on top of existing surface layers to the extent necessary to stabilize the infrastructure. New access roads and operating pads would be built of compacted soil and pitrun on top with a compacted E1 gravel surface. Each site would resource its gravel for its new access road and operating pad(s) from the nearest, active established gravel source (e.g., community gravel pits) to the extent practicable. Generally, an active gravel source is within 15 miles of each ops site. Using established gravel sources would avoid impacts associated with opening a new gravel pit. However, minor permanent adverse impacts would occur from permanent conversion of earth resources into infrastructure and cause minor changes in topography.

The installation of the utility poles would cause minor permanent impacts to the earth resources within the corresponding area occupied by the base of the utility pole and any anchors. 5 feet bgs is a typical utility pole depth. However, the dimensions, number, and depth of utility poles at each ops site would be dictated by the earth resources and other conditions at the site. These factors would also determine the extent of ground disturbance as each utility pole would displace a small amount of soil. Impacts to earth resources from these activities and the trenching at the Gerstle River Ops Site for underground powerlines would be minimized by backfilling holes with the native soil to the extent practicable. Underground powerline trenching also varies based on site conditions but is not anticipated to extend more than 4 feet wide or bgs. A trench is defined as (OSHA 2015):

> "*A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth of a trench is greater than its width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m[eters]).*"

The Air Force and/or its contractor would request "locates" to inform excavation activities and avoid damage to "underground facilities" and harm to the general public in accordance with the Alaska Dig Law (AS 42.30.400 – 490) for the Preferred Alternative. Furthermore, Dig Permits would be acquired for such actions on military lands.

The Pogo Hill Ops Site is within an area of multiple active, proposed, and claimed mining sites. Coordination would be conducted with owners of these mining sites within the construction footprint of the Pogo Hill Ops Site.

Vegetation within the ROI protects earth resources in the existing environment from erosion. *Vegetation clearing* are the activities that cut trees off at ground level and masticate shrubs and is not considered a ground disturbing activity within this EA, but vegetation clearing would further expose earth resources to erosion from weathering, wind, and water. Culverts and ditches would be incorporated into the Preferred Alternative design to divert and funnel water to minimize erosion to the surrounding environment and Preferred Alternative infrastructure.

No-Action Alternative

Impacts to earth resources would be negligible under the No-Action Alternative, because no ground disturbing activities would be required to operate radars at the temporary YTA ops sites and earth resources would not be further exposed nor used.

3.9 BIOLOGICAL / NATURAL RESOURCES

3.9.1 Affected Environment

This section will cover important habitat areas; terrestrial mammal, bird, and fish species and habitat; invertebrates; invasives species; vegetation; subsistence; and wildfires as they apply to the ROI. A species list was retrieved from the USFWS Information for Planning and Consultation (IPaC) online tool to inform the wildlife and habitat resources within the ROI (Appendix A). No Endangered Species Act (ESA) listed species or habitat are anticipated to occur within the ROI. Because Interior Alaska is far removed from marine waters, no species or habitat under the jurisdiction of the National Marine Fisheries Service (NMFS) would occur within the ROI.

Important Habitat Areas

Conservation Areas

Conservation Areas are protected lands and waters that are important to wildlife at a State to international level. Conservation Areas may require a Special Area Permits for certain activities from ADF&G. Many of these protected lands and waters provide opportunities for hunting, trapping, fishing, gathering of wild resources, photography, and wildlife viewing. The Conservation Areas applicable to the Proposed Action are identified in Table 3-12.

Table 3-12. Conservation Areas within the ROI that Apply to the Ops Sites

Area	Description	Applicable Ops Site(s)
Delta Junction Bison Range	Supports the Delta Bison Herd and mitigates damage to nearby agricultural lands.	Gerstle River
Anadromous Waters	Protected waterbodies that support anadromous fish (i.e., fish that live in saltwater except reproducing in freshwater habitats)	Not Applicable
Controlled Use and Management Areas	Areas where harvesting means and methods are restricted for one or more game species.	Gerstle River, Dry Creek, Tok Hill
Northern Region State Parks	Areas that protect wildlife while supporting related recreational opportunities like wildlife viewing, hiking, and camping.	Quartz Hill, Tok Hill
Important Bird Area	An area designated using standardized criteria for identifying habitats with a significant proportion of a population of one or more bird species.	Gerstle River, Dry Creek, Tok Hill
Tanana Valley State Forest	ADNR managed area for sustaining resource yield (e.g., timber management) while (1) providing beneficial uses of public land and resources and (2) providing protected wildlife habitat.	Quartz Hill, Gerstle River, Tok Hill

Ecological Connectivity and Wildlife Corridors

"Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors" was published on March 21, 2023. This guidance requires the consideration of potential impacts to and protection of ecological connectivity and wildlife corridors. Within the ROI where the Proposed Action infrastructure and activities occur, there are large game habitats that support ecological connectivity and/or wildlife corridors. Prominent amongst such habitat potentially impacted by the Proposed Action are the those associated with the migration and habitat use of plains bison (*Bison bison bison*) and caribou (*Rangifer tarandus granti*) herds within the ROI, which are discussed further under "Terrestrial Mammals and Habitat."

Terrestrial Mammals and Habitat

Table 3-13 lists species that may be present in appropriate habitats throughout the ROI.

Table 3-13. Terrestrial Mammals in the ROI

Scientific Name	Common Name
Alces alces	Moose
Bison bison bison	Plains Bison
Canis latrans	Coyote
Canis lupus	Wolf
Castor canadensis	Beaver
Erethizon dorsatum	North American Porcupine
Glaucomys sabrinus yukonensis	Northern Flying Squirrel
Gulo gulo	Wolverine
Lepus americanus	Snowshoe Hare
Lutra canadensis	River Otter
Lynx Canadensis	Lynx
Marmota caligata	Hoary Marmot
Marmota monax	Woodchuck
Martes americana	American Marten
Microtus pennsylvanicus	Meadow Vole
Mustela erminea	Ermine
Myotis lucifugus	Little Brown Bat
Neovison vison	American Mink
Ochotona collaris	Collared Pika
Ondatra zibethicus	Muskrat
Ovis dalli	Dall Sheep
Rangifer tarandus granti	Caribou
Spermophilus parryii	Arctic Ground Squirrel
Tamiasciurus hudsonicus	Red Squirrel
Ursus americanus	Black Bear
Ursus arctos	Brown Bear
Vulpes vulpes	Red Fox

Source: (ADF&G 2023d)

The Gerstle River Ops Site resides within the 90,000-acre Delta Junction Bison Range (Figure 3-8). The primary land manager of this area is the ADNR, but the ADF&G manages the wildlife and habitat within it. This Conservation Area was predominantly established to mitigate plains bison damage on nearby agricultural lands, but it is also used for a variety of public uses to include hunting, wildlife viewing, educational events, and more. The ADF&G states that the best viewing on the range is from mid-July to mid-September (ADF&G 2023b). This coincides with the Delta Bison Herd's migration to the Delta Junction Bison Range in July, August or September. The herd resides at the range and/or moves onto private agricultural lands north of

the Alaska Highway for the duration of winter. In early spring (mid-February to early March), the herd will migrate back to their summer range in the Delta River area west of the Delta Junction Bison Range (ADF&G 2009).

Anthropogenic infrastructure (e.g., farms and roads) can impact the Delta Bison Herd. Private agricultural lands provide tempting forage opportunities for bison resulting in conflict between agricultural land owners and the bison. The Delta Junction Bison Range was developed for the purposes of mitigating this conflict. Road infrastructure can also provide an opportunity for bison although there is an associated risk. When a bison transverses a road, the risk is potential collision between the crossing bison and road users. However, under certain conditions, the road can act as a path of less resistance. For example, in 2022 heavy snow topped with a layer of ice led to an increase in bison use of private agricultural lands and road infrastructure due to the better conditions they presented (Ellis 2022). To mitigate the problem, ADF&G and DOF cleared paths and areas on the Delta Junction Bison Range to encourage bison use of the area instead of the road infrastructure and agricultural land within the area. As the bison have demonstrated crossing of the Alaska and Richardson Highways, road infrastructure is not assumed to preclude ecological connectivity of wildlife corridors for bison.

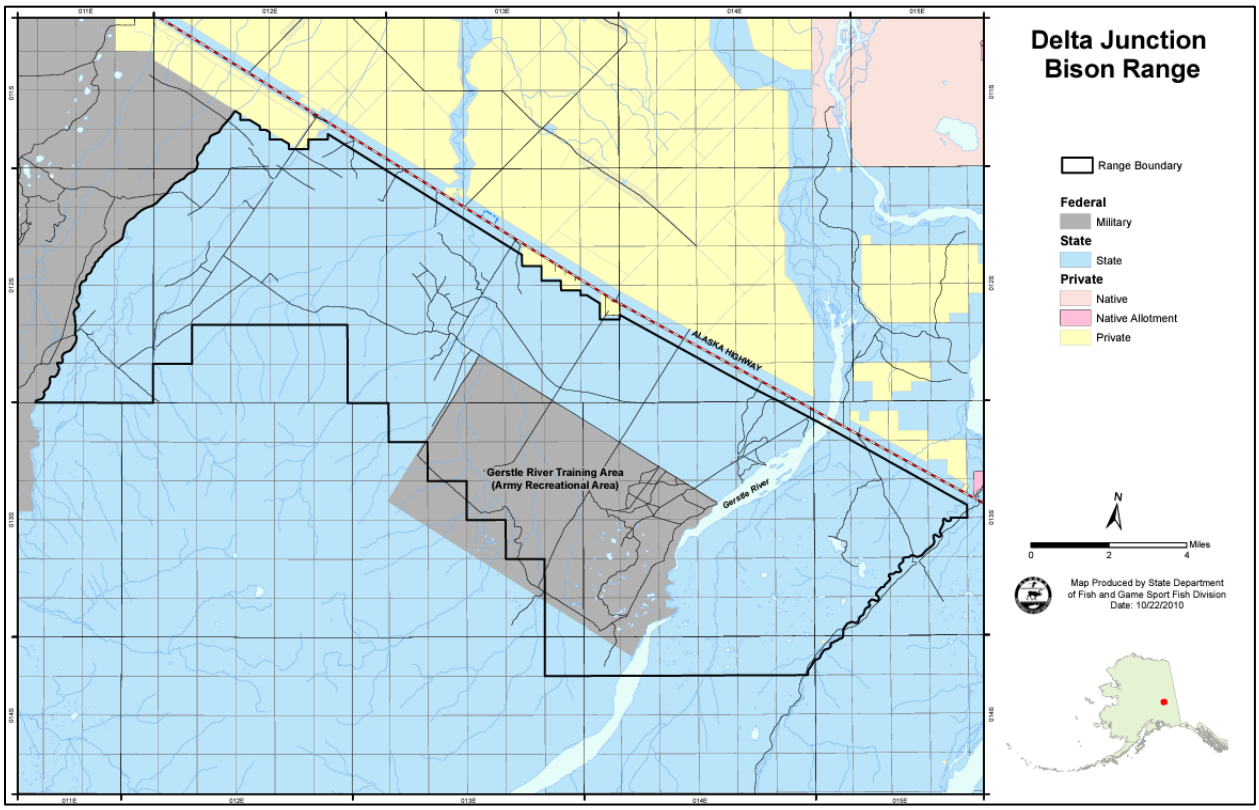

Figure 3-8. Delta Junction Bison Range
(ADF&G 2010)

Five ops sites' footprints are within or near ranges of caribou herds in Alaska. Table 3-14 summarizes relative location with regards to applicable caribou herds' ranges and summering, wintering, and migration. Figure 3-9 depicts the 31 Alaska caribou herd ranges.

Table 3-14. Ops Sites in Relation to Caribou Herds

Caribou Herd	Ops Site(s) within Caribou Herd's Range	Description of Caribou Herd's Seasonal Timing and Important Activities in Proximity of Ops Site
Macomb[1]	Dry Creek	Ops site is within the core range and primary calving grounds of the herd on the Macomb Plateau. Caribou are most likely present in area during the summer and when migrating in spring and fall.
Macomb[1]	Gerstle River	Ops site is near the border of the herd's range. Caribou are most likely present in area during winter.
Fortymile[2]	Pogo Hill	Ops site is near the border of the herd's range. Caribou are most likely present in area during winter.
Fortymile[2]	Quartz Hill	Ops site is near the border of the herd's range. Caribou are most likely present in area during winter.
Mentasta[3]	Tok Hill	Ops site is near the border of the herd's range. Caribou are most likely present near Ops Site during winter.
Nelchina[4]	Tok Hill	Ops site is near the border of the herd's range. Caribou are most likely present near Ops Site during spring and fall migrations.

Sources:
[1] (Schmidt 2021)
[2] (ADF&G 2016)
[3] (Hatcher 2020)
[4] (ADF&G 2023e)

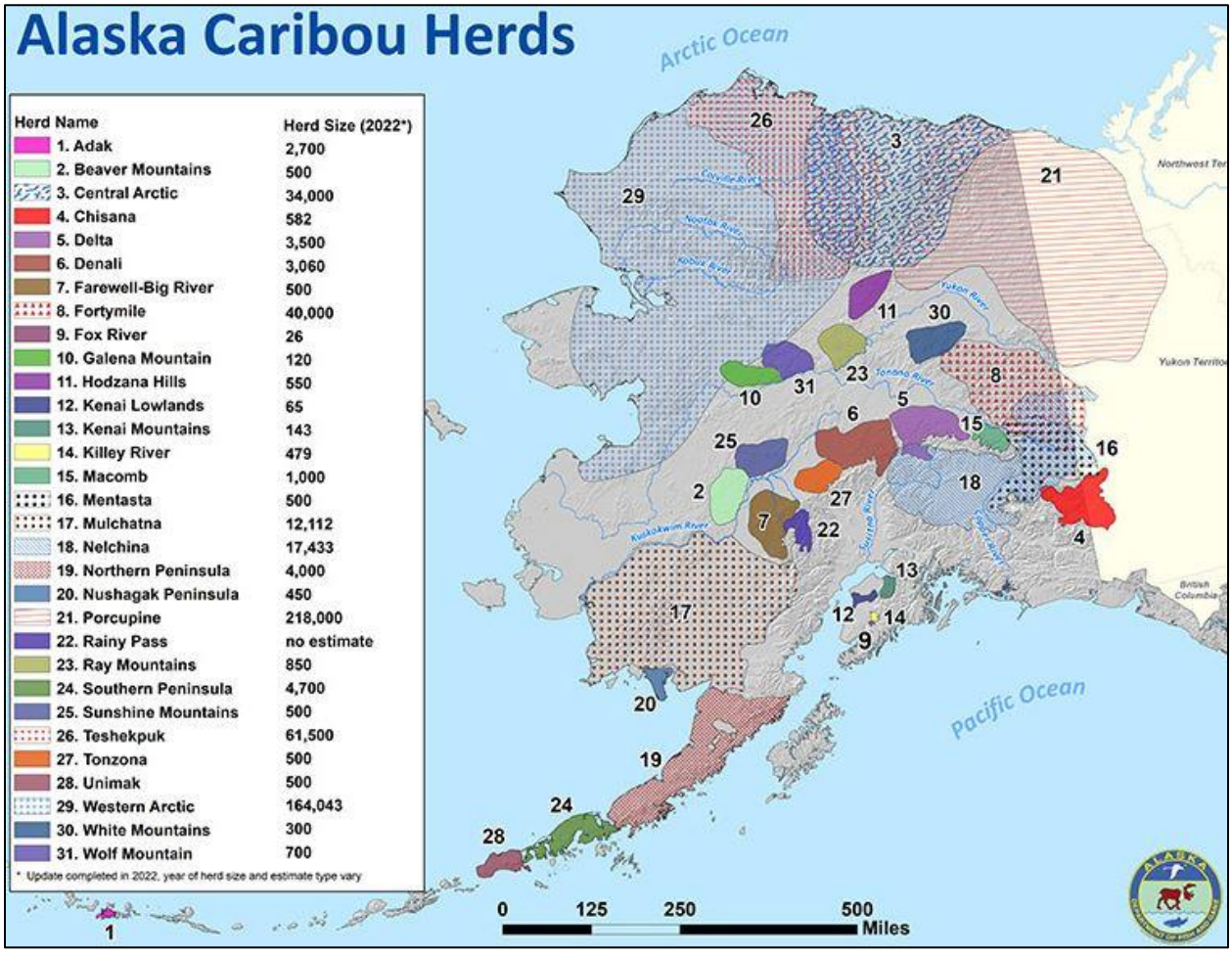

Figure 3-9. Alaska Caribou Herd Ranges (ADF&G 2022)

Research has shown varied results to anthropogenic infrastructure (e.g., roads) and activities (e.g., overflight) effects on caribou. There is a general indication that road infrastructure may disrupt the migration and movement of individual caribou and herds with stronger responses to roads with higher traffic. As for overflight operations, caribou appear to demonstrate relatively mild responses in the short-term, and there is a lack of evidence that significant long-term responses occur from overflight operations.

In Wilson *et al*. 2016, individual caribou were identified as normal crossers (i.e., no impact to movement from road infrastructure) and slow-movers (i.e., showed movement impacts to road infrastructure) with respect to female caribou of the Western Arctic and Teshekpuk caribou herds. Slow-movers were individual caribou that slowed their rate of travel and/or delay crossing when encountering road infrastructure. This increased the distance traveled between habitat spaces for certain individuals. Although, it appeared slow-movers would increase their rate of travel post-crossing of the road infrastructure. Behavior of migrating caribou in relation to road infrastructure may be closely link to individuals with subsequent social cues and interactions impacting other individuals within a migrating herd (Wilson *et al.* 2016). Nonetheless, while there were impacts from road infrastructure on caribou, the connection between migration corridors persisted.

Severson *et al.* 2023 assessed the effect of traffic volume on habitat use and movements with respect to female caribou of Central Arctic Herd and informed potential impacts of road infrastructure and its associated activities (i.e., vehicle traffic) on caribou. The study found that caribou displayed responses in their habitat use even where traffic was approximately 0–5 vehicles per hour. However, while the footprint of road infrastructure influenced caribou behavior, the traffic volume mediated the severity and type of caribou responses to roads. Specifically, the study found the probability of a caribou crossing a road generally declined as a continuous function of increasing traffic. This was supported by caribou reduced habitat use near all roads during the post-calving and mosquito harassment seasons but reduced habitat use near high-traffic roads in all seasons. The individual and herd response to road infrastructure and traffic is also likely affected by experience (i.e., less response is anticipated in areas where drivers are instructed to stop when caribou approach roads). Furthermore, while road infrastructure impacted caribou movement and habitat use, the connections between wildlife corridors were not precluded as caribou in the study area were found to still routinely cross road infrastructure. This was especially evident during the insect harassment seasons when traffic volumes were lower. Caribou responses to anthropogenic infrastructure dampened (i.e., increased road crossings) during periods of greater insect harassment (i.e., periods of additional stress). The Smith and Johnson 2023 study on the Bathurst, Bluenose East, Beverly, and Ahiak caribou herds showed behaviors consistent with the Severson *et al.* 2023 findings.

Maier *et al*. 1998 assessed low-altitude overflight impacts on the Delta Caribou herd during the winter, post-calving, and insect harassment seasons. The impacts to caribou from overflights were determined through comparison of caribou not subjected to overflights and summarized as follows for each season:

- During late winter, caribou resting bouts were interrupted, and subjected caribou consequently engaged in a greater number of resting bouts.
- Post-calving, caribou were more active and moved farther.
- During the insect harassment season, caribou responded by becoming more active.

When comparing these responses, caribou demonstrated the mildest response in late winter, intermediate response during insect harassment season, and the strongest response during

post-calving (Maier *et al*. 1998). Maier *et al.*1998 concluded that females with calves were the most sensitive to aircraft disturbance, i.e., overflights.

Magoun *et al*. 2003 also studied the overflight impacts on caribou. Specifically, this study assessed the short-term impacts of military jet overflights on the Fortymile caribou herd during calving season and concluded that such overflights did not cause direct deaths of caribou calves during the calving period or result in increased movements of female calves with their young over the 24-hour period following exposure. Furthermore, although caribou short-term responses to overflight operations were variable, they were milder than caribou responses to predator or perceived predators. It was found that generally, responses generally increased in severity as slant distances decreased and jet speeds increased. However, Magoun *et al.*2003 determined that maintaining a floor of 2,000 feet (625 meters) AGL for all military jet aircraft over the calving grounds would eliminate most of the stronger-level responses (e.g., startle reactions, trotting, and running) of caribou to military jet aircraft. This included speed considerations of the aircraft, with speeds for F-15s and F-16s not exceed exceeding 500 knots between 2,000 and 5,000 feet (625 to 1562 meters) AGL and avoidance of maneuvers that would require changes to higher power settings (Magoun *et al.* 2003).

Other species of ungulates and carnivores have exhibited negative behavioral responses to low levels of traffic with reduced road crossing and changes in habitat uses (Severson *et al*. 2023). For example, like caribou, avoidance of human infrastructure by black bears similarly wanes during poor food years when animals are presumably experiencing additional stress. Thus, while the focus was on plains bison and caribou, it is important to consider the application of these responses to road infrastructure across the various terrestrial mammals within the ROI. There is also potential for responses to overflight operations from wildlife other than those assessed here, i.e., plains bison and caribou).

Bird Species and Habitat

There are various migratory birds that occur within the ROI. With the exception of the State-managed ptarmigan (*Lagopus* spp.) and grouse species, native migratory birds and their associated active nests, eggs, and nestlings are protected under the Migratory Bird Treaty Act (MBTA). Furthermore, the Bald and Golden Eagle Protection Act (BGEPA) specifically prohibits taking of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos)*. Thus, construction activities that interfere with the breeding, feeding, or sheltering of these protected bird species are regulated.

The Gerstle River, Dry Creek, and Tok Hill Ops Sites are within the 2,459,850-hectare (approximately 60.769 billion acres) Upper Tanana River Valley Important Bird Area (IBA). While this IBA is not afforded additional land or water protections, it has been identified as an area of global importance because it meets the criteria of holding congregations of more than or equal to 1 percent of the global populations for trumpeter swan (*Cygnus buccinator*) and sandhill crane (*Grus canadensis*), on a regular and/or predictable basis.

The USFWS has developed regional nesting windows throughout Alaska and recommended land disturbing and vegetation clearing activities take place outside these windows to avoid taking protected bird species. The USFWS Alaska Interior Region’s nesting windows are applicable to the Proposed Action and are defined in Table 3-15.

Table 3-15. Alaska Interior Region Nesting Windows by Habitat Type

Habitat Type	Description	Nesting Window	
		Begins	Ends
Forest or Woodland	Trees present.	May 1[1,2]	July 15
Shrub or Open	Shrub cover or marsh, pond, tundra, gravel, or other treeless shrubless ground habitat.	May 1[1,2]	July 15
Terns and Gulls	Includes cliff and burrow colonies.	May 1	July 20
Eagles	--	March 1	August 31

Source: (USFWS 2017)
Notes:
The Interior Region is defined as the area north of Talkeetna, Alaska, to the south slope of the Brooks Range with the western boundary extending to the west tree line.
[1] Raptors may nest as early or earlier than March.
[2] Canada geese and swans nest beginning April 20.

Fish Species and Habitat

A multitude of rivers, lakes, and streams in the ROI support fish. Anadromous waters support anadromous fish and receive special protections in Alaska to preserve abundant fish runs. In accordance with AS 16.05.871 - .901, prior notification and permit approval from the ADF&G is required before affecting or modifying specified anadromous waterbodies identified in the Anadromous Waters Catalog (AWC). The Tanana River, a specified anadromous stream (AWC Code 334-40-11000-2490), follows the general route of the Richardson-Alaska Highway corridor within the ROI. Arctic lamprey (*Lethenteron camtschaticum*), chum salmon (*Oncorhynchus keta*), chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), sockeye salmon (*Oncorhynchus nerka*), and humpback whitefish (*Coregonus pidschian*) are anadromous fish species present within the Tanana River (ADF&G 2023a). Many other anadromous waters within the ROI near the various ops sites are tributaries to the Tanana River. The Fish Passage Act (AS 16.05.841) requires the ADF&G to be notified about activities within or across a stream used by fish if the activities could impede fish passage. ADF&G issues permits for certain types of construction activities with potential to impact fish and fish passage.

The ADF&G manages amphibians that are included in ADF&G's broad definition of "fish." Based on its range, the wood frog (*Rana sylvatica*) is likely to occur within the ROI. It inhabits a wide range of habitats to include grassy meadows, open forest, muskeg, and tundra within Interior Alaska (Gotthardt 2005). Although it breeds in shallow bodies of permanent water in spring after hibernating in compacted forest litter under snow during winter, it can be found far from such waterbodies.

Invertebrates

Earthworms (*Lumbricus* spp.), insects, and spiders are invertebrates within the ROI and can contribute or degrade the health of an ecosystem, be considered pest, and/or carry disease. For example, earthworms contribute to the health of the ecosystem where they occur through aeration and enriching the soil, but spruce beetle (*Dendroctonus rufipennis*) kill numerous spruce trees that can degrade the health of the ecosystem in Interior Alaska. Mosquitos are also a prominent insect that occurs throughout Interior Alaska during summer. They may carry disease that can impact humans and other wildlife and considered a pest to many.

Invasive Species

Invasive species can have devastating impacts on the natural ecosystems of Alaska. Presidential EO 13112 defined "invasive species" as a species that is (1) nonnative to the ecosystem under consideration; and (2) whose introduction causes or is likely to cause

economic or environmental harm or harm to human health. The ADF&G is responsible for receiving invasive species reports in Alaska (ADF&G 2023c).

An invasive specie's pathway of introduction to an area may be intentional and/or unintentional transport from human activities (e.g., ballast water, recreational, and transportation activities) or natural processes (e.g., climate change). Invasive animal species of particular concern within the ROI are listed in Table 3-16. Non-native plant species within the ROI are listed in **Table 3-17**. These lists are not all-inclusive.

Table 3-16. Notable Invasive Animal Species within the ROI

Scientific Name	Common Name
Terrestrial Mammal	
Rattus norvegicus	Norway Rat
Bird	
Sturnus vulgaris	European Starling
Columba livia	Rock Pigeon
Invertebrate	
Lymantria dispar	Gypsy Moth

Sources: (ADF&G 2023c) and (PMC 2023)

Table 3-17. Non-Native Plant Species within the ROI

Scientific Name	Common Name
Terrestrial Plant	
Alopecurus pratensis	Meadow foxtail
Artemisia biennis	Biennial wormwood
Atriplex hortensis	Garden orache
Brassica napus	Rape
Bromus inermis	Smooth brome
Capsella bursa-pastoris	Shepherd's purse
Caragana arborescens	Siberian peashrub
Cerastium fontanum	Mouse-ear chickweed
Cerastium glomeratum	Sticky chickweed
Chenopodium album	Lambsquarters
Chenopodium simplex	Mapleleaf goosefoot
Cirsium arvense	Canada thistle
Collomia linearis	Tiny Trumpet
Convolvulus arvensis	Field bindweed
Crepis tectorum	Narrowleaf hawksbeard
Descurainia sophia	Herb sophia
Elymus repens	Quackgrass
Eschscholzia californica	California poppy
Fallopia convolvulus	Black bindweed
Galeopsis bifida	Splitlip hempnettle
Galeopsis tetrahit	Brittlestem hempnette
Helianthus annuus	Common sunflower
Hieracium umbellatum	Narrowleaf hawkweed
Hordeum jubatum	Foxtail barley
Hordeum vulgare	Common barley
Impatiens capensis	Ornamental jewelweed
Lappula squarrosa	European stickseed
Lepidium densiflorum	Common pepperweed
Leucanthemum vulgare	Oxeye daisy
Linaria vulgaris	Common toadflax

Scientific Name	Common Name
Lolium perenne	Italian ryegrass
Matricaria discoidea	Pineappleweed
Medicago sativa ssp. falcata	Yellow alfalfa
Melilotus albus	White sweetclover
Melilotus officinalis	Yellow sweetclover
Papaver nudicaule	Iceland poppy
Phalaris arundinacea	Reed canarygrass
Phleum pratense	Timothy
Plantago major	Common plantain
Poa annua	Annual bluegrass
Poa compressa	Canada bluegrass
Poa pratensis	Kentucky bluegrass
Polygonum aviculare	Prostrate Knotweed
Prunus padus	European bird cherry
Prunus virginiana	Chokecherry
Scorzoneroides autumnalis	Fall dandelion
Senecio flaccidus	Desert ragwort
Senecio vulgaris	Common groundsel
Silene vulgaris	Maidenstears
Sinapis arvensis	Charlock mustard
Sonchus arvensis	Moist sowthistle
Sonchus arvensis	Field sowthistle
Sorbaria sorbifolia	False spiraea
Sorbus aucuparia	European mountain ash
Stellaria media	Common chickweed
Tanacetum vulgare	Common tansy
Taraxacum officinale	Common dandelion
Thlaspi arvense	Field pennycress
Trifolium hybridum	Alsike clover
Trifolium pratense	Red clover
Trifolium repens	White clover
Tripleurospermum inodorum	Scentless false mayweed
Vicia cracca	Bird vetch
Viola tricolor	Johnny jumpup
Aquatic Plant	
Elodea spp.	Elodea

Source: (ACCS 2023)

Vegetation

Vegetation is an important biological resource, because plants form the basis of the food chain by providing primary productivity, converting energy from the sun into chemical energy that can be used by animals and fungi. Plants also stabilize the soil, which can reduce erosion, and some plants can enrich the soil through decomposition and nitrogen fixation. Additionally, plant communities create habitat for animals, move water from the soil into the atmosphere through evapotranspiration, and sequester carbon.

There is a vast amount of carbon within the soil and vegetation of Interior Alaska. Covered extensively by boreal forests, Interior Alaska is dominated by black spruce that reside on poorly drained acidic soils in valley bottoms and on northern mountain slopes. On well-drained, warmer south-facing mountain slopes, white spruce, trembling aspen, and birch are dominant. (Calef *et al*. 2023). Due to rising temperatures leading to potential increases in extent, frequency, and

severity of wildfires, vegetation composition within Interior Alaska may shift away from spruce-dominated landscapes (Calef *et al*. 2023, Foster *et al*. 2019). Although, there is evidence spruce abundance is increasing in cool, moist areas and higher elevation range boundaries (Foster *et al*. 2019).

The vegetation at the proposed ops sites is typical for Interior Alaska and varies based on topography, elevation, and soils (Figure 3-10). This section provides specific descriptions and classification of vegetation communities according for each ops site.

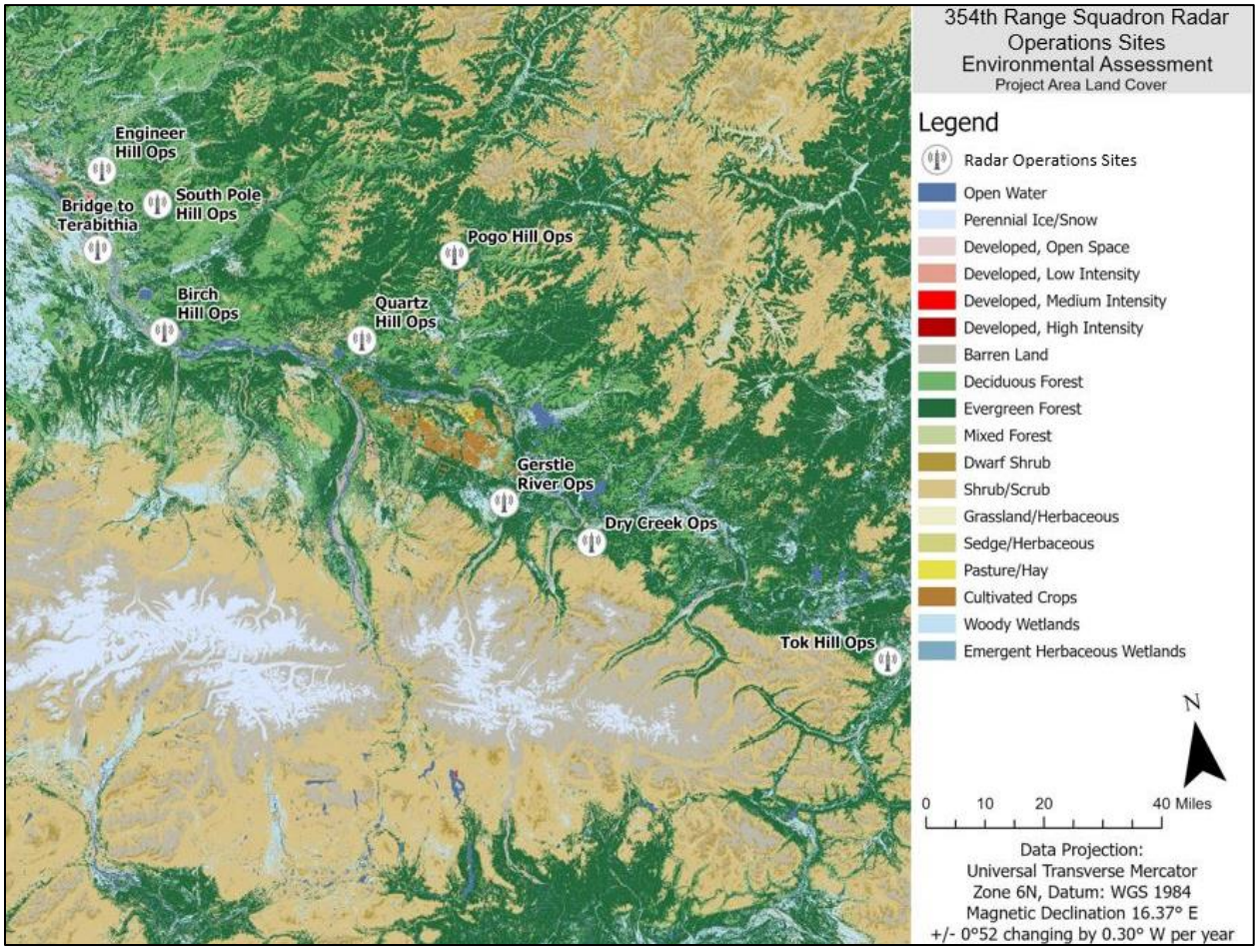

Figure 3-10. Affected Environment Land Cover

Engineer Hill Ops Site

The entire ops site footprint is in upland forests; classified as closed mixed forest (Figure 3-11). Canopy coverage varies but is generally between 40 and 80 percent. The tree community is dominated by white spruce (*Picea glauca),* balsam poplar (*Populus balsamifera),* Alaska birch (*Betula neoalaskana),* and quaking aspen (*Populus tremuloides).* The western part of the site contains a higher percent cover of deciduous trees like quaking aspen, while the eastern portion has more needleleaf trees like white spruce. The understory contains white spruce and birch saplings, and green alder (*Alnus viridus),* high bush cranberry (*Viburnum edule),* baneberry (*Actea rubra),* prickly rose *(Rosa acicularis),* tall blue bells *(Mertensia paniculata),* bunchberry (*Cornus canadensis),* wood fern (*Gymnocarpium dryopteris*), and horsetail *(Equisetum* spp.*)*. There is evidence of early-stage spruce beetle infestation in the western parts of the ops site's footprint.

Figure 3-11. Closed Mixed Forest

South Pole Hill Ops Site

The South Pole Hill Ops Site and its associated new access road and powerline would extend along a northeast-aligned ridge. The south-facing slope is closed mixed forest dominated by Alaska birch, quaking aspen, and black spruce in the tree stratum, and high bush cranberry, speckled alder (*Alnus incana),* lingonberry*,* western blueberry*,* wood fern, prickly rose, bunchberry, mountain larkspur (*Delphinium glaucum),* and bluejoint reedgrass *(Calamagrostis canadensis)* in the understory.

The north facing slope is an open needleleaf forest (Figure 3-12) dominated by black spruce in the tree stratum. The canopy is open and there is a robust shrub stratum containing black spruce saplings, Scouler's willow (*Salix scouleri),* Alaska birch, and resin birch. The understory is composed of western blueberry, bearberry (*Arctostaphylos uva-ursi),* and crowberry (*Empetrum nigrum)*. There is a thick layer of sphagnum moss ground cover. The northern slope appears to be cooler and wetter due to the reduced sunlight it receives compared to the southern slope.

Figure 3-12. Open Needleleaf Forest

Bridge to Terabithia Ops Site

The Bridge to Terabithia Ops Site would be constructed in a floodplain adjacent to a slough along the Tanana River. The site is an open mixed forest (Figure 3-13) dominated by balsam poplar and white spruce in the tree stratum. The understory is composed of high bush cranberry, speckled alder, prickly rose, Bebb's willow (*Salix bebbiana),* bunch berry, fireweed (*Epilobium angustifolium),* clubmosses (*Lycopodium spp.),* tall bluebells, and bluejoint reedgrass.

Figure 3-13. Open Mixed Forest

Birch Hill Ops Site

The Birch Hill Ops Site would be constructed on a hilltop adjacent to the Tanana River. The hilltop is closed mixed forest dominated by broadleaf species such as Alaska birch with white spruce mixed throughout. The understory includes prickly rose, speckled alder, bunch berry, salmonberry (*Rubus spectabilis)*, high bush cranberry, lingonberry, and Arctic sweet coltsfoot (*Petasites frigidus).*

The north facing hillside is also closed mixed forest, but the trees are generally smaller along the hillside and the needleleaf composition reduced compared to the hilltop community. The hillside contains more alder and reedgrass, and less white spruce, than the hilltop.

Pogo Hill Ops Site

The Pogo Hill Ops Site would be constructed at the end of an existing road above tree line elevation on a hilltop. The vegetation community on the hilltop and hillside is Dryas dwarf scrub Figure 3-14) dominated by mountain avens (*Dryas octopedala)* and alpine bearberry (*Arctostaphylos alpina).* There is a small amount of scattered arctic lupine (*Lupinus arcticus),* monkshood *(Aconitum delphiniifoliumis),* dwarf birch (*Betula nana),* Bebb's willow, white spruce, and mountain larkspur on the hilltop as well, but the area is dry with thin soils and exposed rocks.

Figure 3-14. Dryas Dwarf Scrub Community

Quartz Hill Ops Site

The Quartz Hill Ops Site would be constructed on a hilltop and the new access road would switchback up a south-facing hillside. The hilltop is closed mixed forest dominated by Alaska birch, quaking aspen, and some white spruce in the tree stratum. The shrub stratum includes prickly rose, speckled alder, high bush cranberry, and soapberry (*Shepherdia canadensis).* The herb stratum contains bunchberry, wintergreen (*Pyrola* spp.*),* tall bluebells, and bluejoint reedgrass.

The hillside contains most of the same species in various compositions. The southeast flank of the slope is a closed needleleaf forest made primarily of white spruce trees in the canopy, while the draw immediately south of the hilltop is a closed mixed forest dominated by aspen and birch with significant amounts of speckled alder. Further down the slope the closed mixed forest has a more even split between needleleaved and broadleaved trees.

Gerstle River Ops Site

The Gerstle River Ops Site would be constructed on elevated terrain west of the Gerstle River. The vegetation community is closed mixed forest dominated by black spruce with white spruce, Alaska birch, and quaking aspen mixed in the tree stratum. Most of the trees are fairly small diameter. The understory includes prickly rose, fireweed, Labrador tea*,* Bebb's willow, lingonberry, and bunchberry. Some areas include sphagnum moss ground cover.

Dry Creek Ops Site

The Dry Creek Ops Site would be constructed on a hilltop near tree line elevation and the new access road would traverse the north slope of the hillside. The hilltop is a closed tall shrub (Figure 3-15) community dominated by resin birch, dwarf birch, Alaska birch saplings, western blueberry, and crowberry. There is also lingonberry, bearberry, black spruce saplings, and Labrador tea scattered across the hilltop.

The hillside is composed of several plant communities including open low shrub, closed tall shrub, closed mixed forest, open broadleaved forest, and open needleleaved forest.

Figure 3-15. Closed Tall Scrub Community

Tok Hill Ops Site

The Tok Hill Ops Site would be constructed near the tree line elevation at the end of an existing road to the hilltop. The area has been partially cleared and there is evidence of human uses, like hunting and camping. The vegetation community is closed low shrub (Figure 3-16) and dominated by resin birch, dwarf birch, speckled alder. There is a significant amount of Bebb's willow, western blueberry, Labrador tea, lingonberry, and crowberry at the site, as well as some Canadian lousewort (*Pedicularis canadensis*), fireweed, and bearberry.

Figure 3-16. Closed Low Scrub Community

Subsistence

Subsistence is defined in Alaska state law as "customary and traditional uses" of fish and wildlife. Under Alaska state law, the Board of Fisheries (BOF) and the Board of Game (BOG) have the authority to adopt regulations governing the use of fish and game resources in Alaska

(See AS 16.05.251 for BOF and AS 16.05.255 for BOG authority). Alaska state law also directs the Board of Fisheries and Board of Game to identify fish stocks and game populations that are customarily and traditionally used for subsistence in Alaska. Once the Board of Game or the Board of Fisheries has made a customary and traditional use determination for a fish stock or game population, they must set the amount reasonably necessary for subsistence uses keeping in mind the sustained yield principle. The boards must then adopt subsistence regulations that provide a reasonable opportunity for subsistence uses first before providing for other uses of any harvestable surplus of a fish stock or game population [AS 16.05.258 (b)]. This is referred to as the "subsistence priority."

In Alaska, Nonsubsistence Use Areas are designated in accordance with AS 16.05.258(c). Nonsubsistence Use Areas are regions where the dependence upon subsistence (customary and traditional uses of fish and wildlife) is not a principal characteristic of the economy, culture, and way of life. In these areas, subsistence hunting or fishing is not specifically authorized and the subsistence priority does not apply. Subsistence activities may still be permissible under sport fishing or hunting regulations, but there are not additional allowances for subsistence-only methods (such as dipnetting, fish wheels, or extended seasons) that can be allowed outside the Nonsubsistence Areas. The Fairbanks Nonsubsistence Use Area overlaps the majority of the ROI and ops sites (Figure 3-17). Dry Creek and Tok Hill Ops Sites reside outside the Fairbanks Nonsubsistence Use Area.

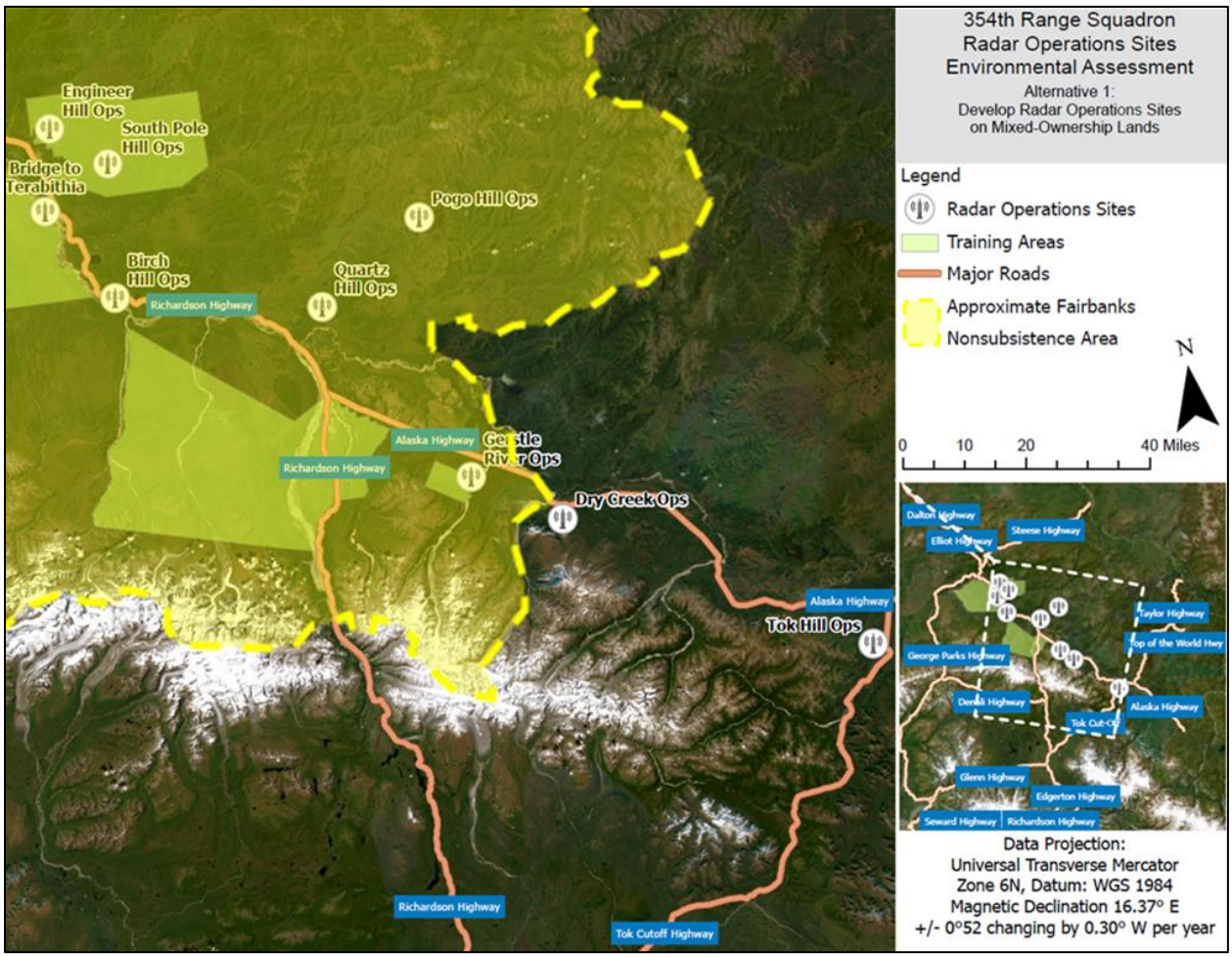

Figure 3-17. Fairbanks Nonsubsistence Use Area in Relation to the Ops Sites

The proposed ops sites lie within Game Management Units (GMUs) 20 and 12. GMU 20 runs substantially east-west from Denali National Park to the Canadian border. GMU 12 is much smaller and extends from the Robertson River southwest along the Alaska Highway to the Canadian border. Both GMUs contain multiple big game species, including black bear, brown bear, caribou, Dall sheep (*Ovis dalli*), moose, wolf (*Canis lupus*), and wolverine (*Gulo gulo*). In addition to these species, GMU 20 also contains bison.

Wildfires

Wildfires are integral to Interior Alaska's ecosystem, because the wildfires rejuvenate the region by thawing underlying permafrost, providing nutrients, and resetting forest succession. Crown fires within Interior Alaska boreal forests are predominately fueled by black spruce. The area burned varies year to year but is generally a result of: (1) availability of dry fuels, (2) cause(s) of ignition, and (3) occurrence of conducive weather (Calef *et al*. 2023).

Although many native plant and animal species within Interior have adapted and/or evolved in response to frequent wildfires, the severity and frequency of wildfires dictate the rate and potential of a burned area's recovery. Graminoids and herbaceous plant growth generally leads recovery of an area that are trailed by deciduous shrubs and trees (e.g., quaking aspen) and then slower-growing evergreen trees. Severe wildfires that remove much of the organic layer and nutrients of the soil and more frequent wildfires appear to inhibit recovery of evergreen trees (e.g., black spruce) and lead to a greater abundance of deciduous shrubs and trees (Foster et al. 2019). Animals caught in or near a wildfire event may die, flee to places of refuge (e.g., burrows in the soil), or beyond the fire line. In high-severity fires, the chance of animal casualties is much higher (Bonde and Keane 2017). During post-burn recovery, a non-native and/or invasive plant and/or animal species may establish itself within the area wherein it could have not otherwise (Snow 2022).

3.9.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would have temporary and permanent minor adverse impacts to species that may occur within the ops sites' footprints with the implementation of BMPs. The Preferred Alternative would also permanently convert wildlife habitat to anthropogenically modified lands of lower quality and productivity. However, these adverse impacts to habitat would be minor due to the quantity and quality of adjacent habitat where impacts from the Preferred Alternative would be negligible.

There are no Federal or State ESA-listed species within the ROI. Migratory birds under the protection of the MBTA use the ops site footprints to varying degrees for at least some part of the year. Bald eagles under the protection of the BGEPA may be present and/or nest at some of the sites, but no eagle nests were detected in the July 2023 survey. The Air Force would adhere to the current USFWS guidance regarding land disturbance for the Interior Region of Alaska (USFWS 2017) to minimize impacts to migratory birds. If land disturbing activities must be conducted within Interior Alaska bird nesting windows, thorough nest and bird area surveys would be conducted to ensure no individuals, nests, and/or eggs of eagles and/or migratory birds are impacted by vegetation clearing activities. Any disturbance from construction activities to birds would be highly localized and temporary in nature, and birds are not anticipated to permanently abandon the area. If necessary to remove an eagle nest and/or take an eagle, the applicable would acquire a permit from USFWS prior to such an action taking place.

Other wildlife with potential to be impacted by the Preferred Alternative are non-anadromous fish and terrestrial animals. There are no specified anadromous waters within the construction

footprints of the ops sites. However, fish within an unnamed Dry Creek tributary would be temporarily impacted by the construction of the new access road for the Dry Creek Ops Site. A Fish Habitat Permit will be required from the ADF&G for the construction of the road to the Dry Creek Ops Site. Adverse impacts to potential fish in this tributary would be temporary, minor, and highly localized, and persist for the duration of culvert construction. The culvert would allow water movement and fish passage underneath the road infrastructure. Similarly, if a fish-bearing waterbody is identified that was not captured in this EA, the Air Force would acquire a Fish Habitat Permit prior to construction action taking place. Wood frogs have also potential to occur throughout the ROI but would most likely be encountered closer to water and where there is sufficient underbrush.

For terrestrial mammals, those with habitat that would be cleared, impeded, or disturbed by the Preferred Alternative are of particular interest. Terrestrial mammal species (e.g., caribou, bison, moose, small burrowing mammals) that would occur at or near the ops sites would likely demonstrate variable responses to construction, infrastructure, overflight operations, and radar operations of the ops sites. There is potential for these activities and infrastructure of the Preferred Alternative to impact movement, habitat use, and other activities of terrestrial mammals. Small, burrowing mammals would most likely be impacted by the Preferred Alternative's vegetation clearing and habitat conversion to anthropogenic infrastructure due to potential burrows, brush, or other habitat features (e.g., prey resources) predominately used by these species within the ops sites' footprints. Although displacement of these species from the area may occur and be permanent, impacts would likely be no more than minor due to the abundance of nearby similar and/or better-quality habitat. For larger game and other terrestrial mammals, through the implementation of BMPs, temporary displacement and other mild responses to the Preferred Alternative are anticipated at most based on the assessment of caribou (i.e., a sensitive species) responses to anthropogenic infrastructure and overflight operations. The severity of impacts would be unlikely to result in strong responses, area abandonment, or disconnection of wildlife corridors with the implementation adaptive management with consideration of the following when practicable:

- Ops site location and design (e.g., road alignments and bypass space around infrastructure) with regards to ecological connectivity and wildlife corridors.
- Overflight and radar operation constraints, including but not limited to, training aircraft speeds, overflight minimum elevation, and timing restrictions with regards to specific species activities and locations (e.g., avoidance of overflight above caribou calving areas during calving and post-calving windows).
- Road and op site access constraints, including but not limited to, implementation of low road speed limits and installation of gates or other barriers to restrict site and road use.
- Implementation of wildlife and site monitoring to inform potential adaptive management needs.

The above is not an all-inclusive list but highlights the overarching considerations for the Preferred Alternative. Furthermore, the Preferred Alternative current designs were developed with the intent of balancing between minimizing ops site footprints while avoiding adverse impacts of environmental resources to the extent practicable. Thus, new access road and operating pad infrastructure were limited to the extents necessary to construct an operational radar site and overlap with existing disturbed areas (e.g., trails) to the extent practicable.

The Preferred Alternative would increase access to remote areas within the ROI, and subsequently increase local anthropogenic presence and activity, predominantly including

recreational activities (e.g., off-roading), radar operations, and potentially local overflight operations. These activities have potential to disturb the subsistence activities and local wildlife and vegetation beyond the footprints of the ops sites. However, due to the expanse and abundance of adjacent similar resources and the anticipated extent of increase of the aforementioned presence and activities, such is not anticipated to exceed minor impacts to subsistence, wildlife, and habitat.

During construction, disturbed areas would potentially destabilize native vegetation and species and make the area more susceptible to the introduction and/or spread of invasive species, especially potential invasive terrestrial plant species. White sweetclover and bird vetch are of particular concern, because their introduction and spread are often associated with gravel construction activities like those that would take place under the Preferred Alternative. To reduce the introduction and spread of potential invasive species, the following mitigations and BMPs would be implemented:

- Inspect equipment and vehicles between construction activities at different ops sites;
- Use clean equipment and vehicles, free from debris (e.g., plant fragments and soil);
- Decontaminate equipment and vehicles between construction at different ops sites; and,
- Use weed- and seed-free gravel and erosion control products when use of native soil is not feasible.

Direct impacts to habitat would be closely tied to the vegetation impacts incurred from vegetation clearing to meet radar LOS requirements to construct and/or emplace infrastructure. Shrubs and brush would be mechanically cleared, masticated, and the woody debris would be discharged onsite. Trees larger than 6-inches diameter breast height (DBH) would be cut at ground level and stockpiled for salvage. The salvaged timber from the Preferred Alternative would be managed in accordance with the policies of the landowner for each ops site. For timber salvaged from ops sites on State-owned lands, the 2017 ADNR DOF BMPs for timber harvest operations (DOF 2017) would be implemented, and harvest operations would be compliant with applicable management plans (e.g., the Tanana Valley State Forest Management Plan and Delta Junction Bison Range Management Plan intent for salvaging timber). AS 41.17.083 would apply to the clearance of forest on State-land for non-timber purposes, and AS 16.20.310 would apply to any work conducted on State land within the legislatively-designated Delta Junction Bison Range for the Gerstle River Ops Site. For the other ops sites on non-State-land, the ADNR DOF BMPs would be implemented to extent practicable when compatible with the applicable landowner's policies and BMPs. Vegetation clearing would reduce the likelihood of wildfires occurring within the immediate area by and spreading by creating additional firebreaks and potentially remove insect (e.g., spruce beetle) infested trees. Cleared areas would be converted to anthropogenically modified lands containing gravel roads and low herbaceous vegetation. The conversion would degrade the overall productivity of the site by modifying the habitat, reducing the production of organic matter, and removing established vegetation communities.

Total vegetation clearance by ops site and for the overall Preferred Alternative are described in Table 3-18.

Table 3-18. Estimated Vegetation Clearing Impacts

Ops Site	Vegetation Clearing				
	Operating Pad(s) LOS Requirements		New Access Road and Powerline Infrastructure		Total
	Vegetation Type(s)	Acres	Vegetation Type	Acres	Acres
Engineer Hill	Closed Mixed Forest	26.2	Closed Mixed Forest	3.4	29.6
South Pole Hill	Closed Mixed Forest and Open Needleleaf Forest	17.4	Closed Mixed Forest	1.7	19.1
Bridge to Terabithia	Open Mixed Forest	13.9	*Not Applicable*		13.9
Birch Hill	Closed Mixed Forest	30.0	Closed Mixed Forest	4.1	35.6
Pogo Hill	*Not Applicable*		Open Needleleaf Woodland	0.6	0.6
Quartz Hill	Closed Mixed Forest	17.0	Closed Needleleaf Forest and Closed Mixed Forest	8.4	25.4
Gerstle River	Closed Mixed Forest	20.5	*Not Applicable*		20.5
Dry Creek	Closed Tall Shrub	4.8	Open Low Shrub, Closed Tall Shrub, Closed Mixed Forest, Open Broadleaved Forest, and Open Needleleaf Forest	9.8	14.6
Tok Hill	Closed Low Shrub	10.2	Closed Mixed Forest	3.5	13.7
Total	*Not Applicable*				*158.4*

The total impacts anticipated from the Preferred Alternative vegetation clearance activities is approximately 158.4 acres. This includes approximately up to 74.8 acres wherein salvaged timber would fall under the SOA's jurisdiction for management. The estimated total acreage under the SOA's jurisdiction includes vegetation clearing estimates for the Quartz Hill, Gerstle River, Dry Creek, and Tok Hill Ops Sites. Although the Gerstle River Ops Site's total estimated acreage for vegetation clearing was used for the SOA total estimate, the SOA jurisdiction applies only to the portions of vegetation clearing that would occur on State land. Specific vegetation impacts will be further discussed by ops site.

Engineer Hill Ops Site

Up to 29.6 acres of closed mixed forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area is heavily vegetated with mature trees and is presumed to be in a climax successional stage. There is indication of early-stage spruce beetle infestation, and the removal of this vegetation may have a minor impact on reducing the spread of spruce beetles, but there are likely many host trees outside the clearing area and the full infestation of the region is unavoidable. The new access road and powerline would follow an existing trail, but vegetation clearing would be required to provide access for equipment and require approximately 3,000 feet of clearing along the new access road and powerline alignment within the same closed mixed forest community. The Engineer Hill munitions storage and maintenance area perimeter, unimproved road is already cleared, and no additional clearing would be required in this area.

Vegetation clearing at this site would likely generate a substantial quantity of salvageable timber due to the species composition and maturity of the forest. Timber salvaged from Preferred Alternative activities at the Engineer Hill Ops Site would be turned over to the EAFB Natural Resources Office.

South Pole Hill Ops Site

Up to 19.1 acres of closed mixed forest and open needleleaf forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area is heavily vegetated with mature trees and is presumed to be in a climax successional stage. The new access road

and powerline would follow an existing trail, but vegetation clearing would be required to provide access for equipment and require approximately 1,500 feet of clearing along the new access road and powerline alignment within the same closed mixed forest community.

The clearing would likely generate a moderate quantity of salvageable timber because much of the area on the north slope is dominated by small diameter black spruce, and the south slope may be so steep that minimal tree clearing is required to achieve the LOS requirements. The north slope would likely regenerate with ericaceous species due to the presumed acidity of the soil, additional shade, and higher moisture content.

Bridge to Terabithia Ops Site

Up to 13.9 acres of open mixed forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area is dynamic and mid-successional due to its position in the floodplain, with many dead and fallen balsam poplar trees throughout the area. The new access road and powerline footprints are contained within the operating pad vegetation clearing footprint.

The clearing would likely generate a moderate quantity of salvageable timber because the canopy is open and there are substantial amounts of brush at the site that would be masticated.

Birch Hill Ops Site

Up to 30 acres of closed mixed forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area is heavily vegetated with mature trees and is presumed to be in a climax successional stage. The new access road and powerline would also occur in a closed mixed forest and required require clearing along an alignment approximately 3,600 feet long for the new access road (4.1 acres) and 2,180 feet long for the powerline (1.5 acres).

The clearing would likely generate a substantial quantity of salvageable timber because much of the area is dominated by mature trees.

Pogo Hill Ops Site

Up to 0.6 acres of open needleleaf woodland would be cleared to achieve LOS requirements and construct site infrastructure. No vegetation clearing would be required for the development of the operating pads at the site because the hill is dominated by a dwarf dryas community that would not interfere radar LOS requirements. The new access road would follow an existing road and would not require any vegetation clearing as well. Minor clearing may be required to connect the powerline to the existing power grid 900 feet north of the Pogo Mine Access Road. The vegetation in this area is low and may not interfere with the powerline. Thus, the impact of developing the Pogo Hill Ops Site on vegetation would be minor as the area within the powerline alignment would be temporarily affected before regeneration would occur.

Maintenance clearing may be required periodically, but the black spruce inhabiting the site are slow growing and rarely reach heights that would require maintenance.

Quartz Hill Ops Site

Up to 25.4 acres of closed needleleaf forest and closed mixed forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area is heavily vegetated with mature trees and is presumed to be in a climax successional stage. The new access road would pass through 3,000 feet of closed needleleaf forest (3.4 acres) and 4,400 feet of closed mixed forest (5.0 acres) between the end of the existing road and the edge of the site development clearing.

The clearing would likely generate a substantial quantity of salvageable timber because much of the area is dominated by mature trees.

Gerstle River Ops Site

Up to 20.5 acres of closed mixed forest would be cleared to achieve LOS requirements and to construct site infrastructure. This operating pad area appears mid-successional. The new access road and powerline footprints are contained within the operating pad vegetation clearing footprint.

The clearing would likely generate a moderate quantity of salvageable timber because much of the area is dominated by small diameter black spruce and birch trees.

Dry Creek Ops Site

Up to 14.6 acres of closed tall shrub, open low shrub, closed mixed forest, open broadleaved forest, and open needleleaf forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area appears to be a very near tree line elevation and successionally stable. The new access road would extend 8,500 feet beyond the limits of the operating pad area to the end of the existing road, and it would cross several vegetation communities.

The clearing would likely generate a moderate quantity of salvageable timber because much of the hilltop area is dominated by shrub, but the slope that would be cleared for the new access road has pockets of mature forest.

Tok Hill Ops Site

Up to 13.7 acres of closed low shrub and closed mixed forest would be cleared to achieve LOS requirements and construct site infrastructure. The operating pad area appears to be a very near tree line elevation and successionally stable. The new access road would follow an existing road and additional vegetation clearing for the new access road is not expected. The powerline would extend approximately 5,150 feet from the edge of the ops site clearing to the end of a road northeast of Tok Hill and require an additional clearing.

The clearing would likely generate a moderate quantity of salvageable timber because much of the hilltop area is dominated by shrub, but the slope that would be cleared for the powerline has substantial amounts of mature forest.

No-Action Alternative

The No-Action Alternative has no construction or habitat modification activities that would impact wildlife and/or habitat. Species within the area would unlikely permanently abandon the area from the presence of and/or activities relating to the use and operation of the radars at temporary ops sites within the YTA. Although, temporary displacement of wildlife and vegetation clearing to maintain LOS requirements may occur. Thus, anticipated impacts to biological and natural resources would be permanent minor adverse impacts.

3.10 CULTURAL RESOURCES

The proposed radar ops sites are located in the traditional territories of the Lower Tanana, Middle Tanana, Tanacross, and Upper Tanana Northern Dene peoples (Smith 2022). A description of the history of human occupation in the region can be found in CRC (2024; see Appendix D). Following the Alaska Purchase in 1867, the Tanana Valley saw few incursions from outsiders. Although direct contact with Euro-Americans did not occur until the end of the nineteenth century, Alaska Native trade networks had facilitated the diffusion of western trade

goods into the area decades earlier (Smith 2022). The 1885 expedition of Lieutenant Henry Allen, who ascended the Copper River, descended the Tanana River, and ventured up the Koyukuk River before traveling to Norton Sound, constituted the first investigation into the region by the US government. Gold strikes in the Fairbanks area in 1902 soon changed that isolation as more outsiders traveled into the Interior. The US military built the Washington-Alaska Military Cable and Telegraph System (WAMCATS) through the Tanana Valley in 1905 and diverted the Valdez-Eagle Trail to Fairbanks (Schneider 2018). More in-depth ethnographic overviews of the region's ethnography and history can be found in Haynes and Simeone (2007), Schneider (2018), and Smith (2022).

3.10.1 Affected Environment

The term *cultural resources* refers to tangible remains and material evidence resulting from past human activity and/or specific locations of traditional importance. Cultural resources include prehistoric and historic archaeological sites, structures, buildings, districts, landscapes, or other locations or objects determined important for scientific, traditional, religious, or societal reasons. This includes Alaska Native sacred sites and TCPs.

Potential cultural resource impacts are addressed by NHPA Section 106 (54 USC 300101 et seq.) and its implementing regulations (36 CFR § 800), which require Federal agencies to consider effects to "historic properties" from an undertaking. In 54 USC 300308, historic properties are defined as cultural resources that are either listed, or eligible for listing, in the National Register of Historic Places (NRHP).

The cultural resources discussed in this section include those that meet the definition of the NHPA and associated regulations. The Section 106 process is set forth in 36 CFR § 800, "Protection of Historic Properties." In accordance with AFI 32-7065, "Cultural Resources Management," and 36 CFR § 800, the Air Force coordinates NEPA compliance with its NHPA responsibilities to ensure that historic properties and cultural resources are given adequate consideration during project planning.

Areas of Potential Effect

As defined under 36 CFR § 800.16(d), the *area of potential effect* (APE) is the geographic area within which an undertaking may directly or indirectly cause changes in the character or use of historic properties. An APE is determined by the scale and nature of the undertaking and may vary for different kinds of effects caused by project activities. The proposed undertaking is comprised of nine discontinuous APEs.

The Air Force has defined the APEs for direct and indirect effects associated with proposed construction of access routes and gravel pads, installation of aerial and/or underground powerlines, and respective vegetation clearing at each of the nine radar ops sites associated with the Preferred Alternative. The APEs include a 100-foot buffer on either side of the proposed access and powerline route centerlines.

Cultural Resources

APEs for seven of the nine proposed radar ops sites had never been investigated for cultural resources. The two locations that have been previously investigated are the South Pole Hill and Engineer Hill Ops Sites. The South Pole Ops Site is within an area previously surveyed by the USAG Fort Wainwright. Consultation with Fort Wainwright and review of the Alaska Historic Resources Survey (AHRS) database indicated that no cultural resources are known within the South Pole Ops Site project area (Pers. Comm., Dr. Julie Esdale, November 16, 2022; CEMML 2014, 2021; AHRS 2023).

The Engineer Hill Ops Site on EAFB was surveyed by Northern Land Use Research, Inc. (NLUR) in 1995. Their survey design was based on a predictive model, and the site was identified as a high-probability area for non-military cultural resources. The survey did not identify surface or subsurface archaeological sites. While the purpose of the 1995 survey was not to identify military cultural resources, NLUR did report "recent use sites" in an appendix. Within the Engineer Hill Ops Site APE, NLUR identified Recent Use Site 4A, which G. Von Reuden told them was known locally as the "Trapper's Cabin." They stated that it was "unclear as to whether this site is military related, [but] based upon the c-ration cans and MRE packets this area has been used by military personnel for recreational purposes" (NLUR 1996:I-11). Recent Use Site 6A was also identified within the APE. This site was comprised of 17 features which NLUR interpreted as foxholes. Each of these foxholes were measured; however, as the site was of "recent military origin, no site map was drawn" (NLUR 1996:I-13).

In 2023, in an effort to identify any potential historic properties within the APEs (36 CFR § 800.4[b]), the Air Force had eight of the proposed ops sites investigated by archaeologists who meet the Secretary of the Interior's Professional Qualification Standards (36 CFR § 800.2[a][1]). The eight APEs surveyed in 2023 included all previously unsurveyed locations as well as a resurvey of the Engineer Hill Ops Site APE as due diligence to identify any archaeological, military and/or non-military historic materials (Table 3-19).

Table 3-19. Ops Site APE Surveys and Identified Cultural Resources

Ops Site	Applicable Survey Efforts		Cultural Resources Identified?
	Prior to 2023	In 2023	
Engineer Hill	NLUR 1996	CRC 2024	Recent use features of military origin
South Pole Hill	CEMML 2014, CEMML 2021	*Not Applicable*	None
Bridge to Terabithia	*Not Applicable*	CEMML 2023	None
Birch Hill	*Not Applicable*	CRC 2024	None
Pogo Hill	*Not Applicable*	CRC 2024	None
Quartz Hill	*Not Applicable*	CRC 2024	None
Gerstle River	*Not Applicable*	CEMML 2023	None
Dry Creek	*Not Applicable*	CRC 2024	None
Tok Hill	*Not Applicable*	CRC 2024	Tok-Cutoff Highway Segment, Eagle Trail

Sources: (CEMML 2014, 2021 and 2023; CRC 2024; NLUR 1996)

The Center for Environmental Management of Military Lands (CEMML) conducted pedestrian cultural resources surveys at the Bridge to Terabithia and the Gerstle River Ops Sites. Two subsurface tests (round shovel tests, approximately 30 centimeters in diameter) were excavated at high-probability areas within each APE. Excavated soils were screened with 1/4-inch screen. A mapping-grade global positioning system (GPS) unit was used to collect geospatial data during the surveys. No cultural features or cultural materials were identified (CEMML 2023).

Cultural Resource Consultants, LLC (CRC) conducted pedestrian cultural resources surveys of six of the proposed ops sites (Appendix D). In general, the survey team walked each area in transects with 10-meter spacing. Exceptions to this method were made on a judgmental basis in the field, including widening the transect spacing to up to 30 meters along existing road corridors. Slope areas above 10 degrees were excluded from pedestrian survey due to the low probability of cultural resources on such steep terrain. Multiple subsurface tests (square shovel tests, 50 x 50 centimeters) were excavated at high-probability areas within each APE. Excavated soils were screened with 1/8-inch screen, except during certain field conditions (e.g.,

saturated and sticky matrices) where 1/4-inch screen was used. A mapping-grade GPS unit was used to collect geospatial data during the surveys.

CRC did not identify any cultural features or cultural materials during cultural resources surveys of the Birch Hill, Dry Creek, Pogo Hill, and Quartz Hill Ops Sites (CRC 2024). The boundaries of the Shaw Creek Basin Archaeological District encompass part of the APEs for the Pogo Hill and Quartz Hill Ops Site. However, pedestrian cultural resources surveys and subsurface shovel-testing of these APEs did not identify any cultural features or cultural materials associated with the archaeological district.

The CRC's survey of the Engineer Hill Ops Site resulted in the identification of recent cultural resources. The only cultural material identified in the shovel tests was an extremely friable foil-like substance, likely from a cigarette or food package, recovered from a shovel test excavated in a defensive fighting position (DFP) feature (CRC 2024). Ground-surface disturbances identified in the APE included clearing and dozing for roads and other purposes, explosives detonation craters, and DFP features. A total of 36 DFP features were documented within the APE (CRC 2024). These DFP features appear to be modern, and it is likely that they are associated with the 17 "foxholes" identified as Recent Use Site 6A in 1995 (NLUR 1996:I-13). The CRC also relocated the "Recent Use Site 4A" cabin complex identified in 1995 (NLUR 1996:66, I-11; CRC 2024). This cabin complex was found within the APE, north of an existing access road to the top of Engineer Hill. It consists of a multi-part cabin, an outhouse, and remnants of a small metal mobile radio shelter. Examination of historical aerial imagery revealed that the cabin complex was not built before 1974. CRC also identified a small can dump comprised of three knife-opened coffee cans and a Welch's grape juice can. The coffee cans were too degraded to determine the brand or manufacture date, but the Welch's likely dates to the 1960s (CRC 2024).

CRC's cultural resources survey of the Tok Hill Ops Site resulted in the identification of several surface isolates were documented throughout the APE, including 1960s-era pull tab soda cans, six culturally-modified trees consisting of bark-stripped birch ranging from 15–24 centimeters DBH (indicating less than 50 years of growth), a small scatter of car parts and oil cans which could not be definitively dated, and a World War II-era wooden crate containing several blocks of trinitrotoluene (TNT). The TNT was packaged in cans labeled: "HIGH EXPLOSIVE / TNT / ½ POUND NET / CORPS OF ENGINEERS / DANGEROUS" (CRC 2024). Due to the hazard the crate of TNT represented to public safety, it was reported to the SOA Emergency Operations Center, USACE Emergency Operations Department, Alaska State Troopers, and EAFB. At the request of the Alaska State Troopers, and in accordance with 40 CFR § 264.1(g)(8)(i)(D), the EAFB Explosive Ordinance Disposal Team responded to the discovery and conducted a controlled demolition of the TNT on site.

Approximately 3 miles of the original Tok-Cutoff Highway would be used to reach the Tok Hill Ops Site proposed new access road. The Tok-Cutoff Highway was built by USACE in 1943 during World War II. Historical aerial imagery shows a later realignment of the Tok-Cutoff Highway bypassed this original section of the road, leaving it relatively intact (CRC 2024).

Based on the AHRS Mapper, the Tok Hill Ops Site proposed powerline route was expected to cross the previously identified Moose/Caribou Fence (TNX-00118). However, archaeologists were unable to relocate it within the APE. The proposed powerline will intersect the historical Eagle Trail, which appears to continue to be frequently used by both vehicle and four-wheeler traffic. The Eagle Trail preceded the construction of the Tok-Cutoff Highway, and historically ran between the communities of Valdez and Eagle, Alaska. The historical trail is more than 400

miles long. Approximately 200 feet of the trail (where the aerial powerline crosses plus a 100-foot buffer on either side) lies within the APE (CRC 2024).

Traditional/Alaska Native Resources

Six Federally Recognized Tribes may attach cultural significance to cultural resources within the Proposed Action locations: (1) Healy Lake Village; (2) Mentasta Traditional Council; (3) Native Village of Tanacross; (4) Native Village of Tetlin; (5) Northway Village; and (6) Village of Dot Lake. In accordance with DoDI 4710.02 and AFI 90-2002, the Air Force offered Tribal governments the opportunity to consult on both a Government-to-Government basis and as part of the Section 106 process. Additional Alaska Native organizations also offered the opportunity to consult were the following: (1) Doyon, Ltd; (2) Cook Inlet Region, Inc.; (3) Tanana Chiefs Conference; (4) Dot Lake Native Corporation; (5) Fairbanks Native Association; (6) Mendas Cha-ag Native Corporation; (7) Northway Natives, Inc.; (8) Tanacross, Inc.; (9) Tetlin Native Corporation; and (10) Tok Native Association. Consultation correspondence is provided in Appendix A. No TCPs, sacred sites, or sites of traditional cultural importance have been identified within the APEs for this undertaking at this time.

3.10.2 Environmental Consequences

Impacts to cultural resources can occur by physically altering, damaging, or destroying a resource or by altering characteristic of the surrounding environment that contribute to the resource's significance. Direct impacts entail physical changes to a historic property. Indirect effects usually occur through increased use, visual disturbance, or noise.

To evaluate impacts, the criteria of adverse effect (36 CFR § 800.5[a][1]) are applied to the historic properties within the APEs. An adverse effect to a historic property occurs when an undertaking alters, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish its integrity. Adverse effects can include:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including repair and maintenance, that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR § 68);
- Removal of the property from its historic location;
- Change of character in the property's use or change of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration; and,
- Transfer, lease, or sale of property out of Federal ownership or control.

Adverse effects can also include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

Preferred Alternative

The Preferred Alternative would result in no direct or indirect adverse effects on historic properties. There are four known cultural resources located within the APEs (Table 3-20; AHRS 2023). Of these, one is a historic property eligible for listing in the NRHP: the Shaw Creek Basin

Archaeological District (XBD-00455). Both the Pogo Hill and Quartz Hill Ops Sites are within the boundaries of the Shaw Creek Basin Archaeological District. In consultation with the Alaska SHPO, Air Force has agreed to treat the Tok-Cutoff Highway Segment (TNX-00293) as eligible for the purposes of this project. No ops sites are within the Tok-Cutoff Highway Segment, but this cultural resource would be used to facilitate access the Tok Hill Ops Site. No cultural resources associated with the Shaw Creek Basin Archaeological District were identified during cultural resources surveys of these Ops Sites' APEs.

Table 3-20. Known Cultural Resources in Vicinity of the Preferred Alternative

AHRS Number	Site Name	National Register Status	In APE?
FAI-01766	Engineer Hill Munitions Area Historic District	*Pending (Eligible)*	No
TNX-00118	Moose/Caribou Fence	Unevaluated	**Yes**
XBD-00409	Richardson Highway	Unevaluated	No
XBD-00455	Shaw Creek Basin Archaeological District	**Eligible**	**Yes**
XMH-01164	Gerstle River Testing Site	Not Eligible	No
XMH-01473	Haines-Fairbanks Pipeline Corridor	Not Eligible	No
TNX-00293	Tok-Cutoff Highway Segment	**Treated as Eligible for Purposes of this Undertaking[1]**	**Yes**
TNX-00174	Eagle Trail	Unevaluated	**Yes**

Note:
[1] In accordance with consultation with Alaska SHPO.

The Moose/Caribou Fence (TNX-00118) is supposedly within the APE of the Tok Hill Ops Site. However, a pedestrian survey of the location was not able to relocate it.

Three miles of the 7-mile-long Tok-Cutoff Highway Segment is within the Tok Hill Ops Site APE. The Air Force intends to use this section of the Tok-Cutoff Highway Segment for access to the Tok Hill Ops Site. The current gravel road is well-built. There is no planned modification or improvements to this road under the Preferred Alternative and use of the road by military vehicles is consistent with its original purpose as a military transportation route. The Tok-Cutoff Highway Segment is significant under Criterion A for its association with World War II. However, analysis of the integrity of the entire 7-miles of the Tok-Cutoff Highway Segment is outside the scope of this undertaking. Upon consultation with the Alaska SHPO, it was determined that, due to the uncertainty of the Tok-Cutoff Highway Segment's integrity, it should be treated as eligible for listing on the National Register of Historic Places for the purposes of this undertaking. The Alaska SHPO concurred that activities associated with the Preferred Alternative will have no adverse effect on the Tok-Cutoff Highway Segment on January 30, 2024 (SHPO 2024).

Approximately 200 feet of the more than 400-mile-long Eagle Trail lie within the Tok Hill Ops Site APE. The proposed new aerial powerline would cross over the trail. No physical disturbance to the trail or restriction of current traffic is anticipated.

The Air Force has reviewed the existing cultural resources information and conducted cultural resources investigations within the APEs, making a reasonable and good faith effort to identify historic properties. On November 28, 2023, the Air Force determined that the Preferred Alternative would result in no adverse effect on historic properties (Air Force 2023b). The SHPO concurred with this assessment on January 30, 2024 (SHPO 2024).

No-Action Alternative

The No-Action Alternative would have no construction or ground-disturbance activities that could affect historic properties or other cultural resources. There would be no impact to cultural resources under this alternative.

3.11 SOCIOECONOMIC RESOURCES AND ENVIRONMENTAL JUSTICE

3.11.1 Affected Environment

Socioeconomic resources are anthropogenic resources that provide community services, places to live, and other infrastructure or features that make a community livable. This section will focus on the public's access to and use of land, materials, services, and job opportunities. Use of site resources requires coordination with landowners and/or applicable managing agencies to ensure proper use of such resources and adherence to the landowner's policies (e.g., management of salvaged timber).

Construction projects provide local and regional economic opportunities. These opportunities include the investment of project money in the local and regional economy through use and buying of nearby resources and providing local and regional job opportunities to individuals and organizations. Other benefits beyond the purpose and intent of projects may also be provided by a construction project. For example, a road built in a remote area would give the public better access to the area for recreational activities (e.g., hiking, hunting, trapping, fishing, and foraging) and to available resource (e.g., timber, wild game, fish, mushrooms, and berries). Section 3.2 describes various recreational activities associated with the ops sites and Section 3.9 describes wildlife and vegetation associated with the ops sites and ROI.

Environmental Justice (EJ) is a consideration under socioeconomic resources. The following EOs are associated with EJ:

- *EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,"* was issued in 1994 (59 Federal Register [FR] 7629) directs Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of their actions on low-income, minority, and Tribal populations, to the greatest extent practicable and permitted by law.
- *EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks,"* was issued in 1997 (62 FR 19885). directs Federal agencies to identify and address environmental health and safety risks that may disproportionately affect children, to the greatest extent practicable and permitted by law.
- *EO 14096, "Revitalizing our Nation's Environmental Justice for All,"* was issued in 2023 (88 FR 25251). It directs Federal agencies to advance EJ by implementing and enforcing the Nation's environmental and civil rights laws as well as investing in communities. This EO builds upon EO 12898 and reaffirms the Federal government's commitment to EJ. Federal guidance on implementation of this EO is anticipated in 2024.

3.11.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative Dry Creek Ops Site would have moderate to severe temporary and permanent adverse local impacts and the other eight ops sites would have minor temporary and permanent adverse local impacts to socioeconomics and environmental justice due to potential increases in EJ Indices and human health and environmental effects from the Preferred Alternative. On a regional level there would be minor temporary and permanent adverse impacts for similar reasons. However, the Preferred Alternative would also have minor temporary and permanent beneficial impacts to local and regional socioeconomics by providing economic opportunities and improving recreational and resource access around the ops sites. The Dry Creek Community, considered a disadvantaged community, would likely experience

disproportionate impacts from the construction of the proposed Dry Creek Ops due to the proximity of the ops site's infrastructure to the community and the impact to their local resources. There are no anticipated disproportionate impacts anticipated to disadvantaged communities (i.e., minorities or low-income), Federally-recognized Tribes, and children are from implementation of other eight ops sites predominately due to the extent of potential impacts and the ops sites being generally far removed from population centers .

The CEQ's Climate and EJ Screening Tool (CEJST) and the EPA's EJ Screening and Mapping Tool (EJScreen) were used to develop an EJ Analysis for the Preferred Alternative (Appendix C) that was supplemented by local and State information. The analysis provided determinations for the potential increases to the EJ Indices and human health and environmental risks potentially from the Preferred Alternative using the CEJST and EJScreen Methodologies pursuant to EO 12898 and EO 13045 by:

- Identifying any minority and/or low-income status in the areas of the Preferred Alternative ops sites;
- Identifying any adverse environmental or human health impacts anticipated from the Preferred Alternative; and,
- Determining whether those impacts would disproportionately affect minority and/or low-income communities (i.e., disadvantaged communities) and/or children.

Additional details are provided in the EJ Analysis (Appendix C) for what informed the Air Force's EJ determinations in Table 3-21.

Table 3-21. Summary of Air Force Environmental Justice Determinations

Tract Determinations			Preferred Alternative Determinations		
Name	**CEJST Assessment of Presence Disadvantaged Community**	**EJScreen Assessment of Potential EJ Concern(s)**	**Ops Site**	**Potential Adverse Environmental or Human Health Impacts?**	**Impacts have Potential to Disproportionately Affect a Disadvantaged Community?**
FNSB Tract Numbers 02090001800 and 0209098010	Partially Disadvantaged wherein Federally Recognized Tribe Land Occurs	With Regards to State Only: • Superfund Proximity • Hazardous Waste Proximity	Engineer Hill	Yes	No
			South Pole Hill	Yes	No
FNSB Tract Number 02090001100	Fully Disadvantaged	With Regards to Nation and State: • Air Toxics Respiratory Hazard Index • Superfund Proximity With Regards to State Only: • Toxic Releases to Air • Hazardous Waste Proximity	Bridge to Terabithia	Yes	No
FNSB Tract Number 02090001700	Partially Disadvantaged wherein Federally Recognized Tribal Land Occurs	None	Birch Hill	Yes	No
Southeast Fairbanks Census Tract Number 02240000400	Partially Disadvantaged wherein Federally Recognized Tribal Land Occurs	None	Pogo Hill	Yes	No
			Quartz Hill	Yes	No
			Gerstle River	Yes	No
Southeast Fairbanks Census Tract Number 02240000100	Fully Disadvantaged	None	Dry Creek	Yes	Yes
			Tok Hill	Yes	No

In the EJ analysis, the Southeast Fairbanks Census Tract Number 02240000100 has been identified as a fully disadvantaged community due to a category of burden and due to the presence of a Federally Recognized Tribe via the CEJST methodology. The Dry Creek Ops Site is the closest under the Preferred Alternative to a population center wherein the population predominately resides and works. Specifically, the ops site's operating pad is approximately 1 to 1.5 miles horizontal distance and an estimated 1,300 feet vertical distance from the Dry Creek Community consisting of 61 people (USCB 2020), and the new access road would extend from the road going to the community from the Alaska Highway and run adjacent to the community to reach the ops site operating pad location. The distance of the ops site with regards to the Dry

Creek Community and its active use of the resources wherein the proposed ops site is located is a predominate factor in the determination the ops site would have potential disproportionate impacts to the community. Thus, the Air Force determined that the Dry Creek Ops Site would cause moderate to severe adverse impacts to the Dry Creek Community if constructed. In order to avoid and minimize significant socioeconomic and environmental justice impacts to the Dry Creek Community, the Air Force would conduct further coordination with the Dry Creek Community to identify potential management or design measures to reduce impacts to the community prior to the construction of the Dry Creek Ops Site.

There are various parcels of land of a Federally-recognized Tribe within the Southeast Fairbanks Census Tract Number 02240000100. The closest parcel to the Dry Creek Ops Site is approximately 2.25 miles and the closet parcel to the Tok Hill Ops Site is approximately 4 miles. In relation to land of a Federally Recognized Tribe, these ops sites are generally disconnected and removed horizontally and laterally and unlikely to impact the Tribal lands.

For the other eight ops sites under the Preferred Alternative, it was determined that the Preferred Alternative would not have any significant adverse environmental or human health impacts nor adverse disproportionate impacts to minority and/or low-income communities and/or children due to the remote nature of the sites that are generally disconnected and removed from population centers and the generally temporary and/or localized nature of impacts with potential to adversely increase EJ Indices and poise human health and environmental risks.

The Preferred Alternative construction activities would have the greatest potential to impact local and regional socioeconomics and to increase EJ concerns with nearby population centers. Use of local and regional resources for the Preferred Alternative would require coordination with the landowners and/or managing agencies to ensure proper use of such resources and adherence to the landowner's policies. This can result in both beneficial and adverse impacts. For example, the timber salvaged on State land would be made available for use by the public but also reduce the State land available for timber management. The goal is to use local small businesses to the extent practicable during construction and for post-construction maintenance requirements. For example, construction materials would likely be acquired from local or regional sources, which would invest money within those economies. Thus, the Preferred Alternative would provide economic opportunities (e.g., jobs, income, and timber) to local and regional communities, to include disadvantaged communities which would provide some offset to EJ and socioeconomic concerns. There would also be minor socioeconomic benefits and adverse impacts associated with the ops sites wherein new access roads would improve access to and around the ops sites' and nearby areas that would otherwise be difficult to reach. The improved access would enhance recreational opportunities and access to resources (e.g., foraged goods or wild game) for some, but increase the competition to such resources for others. Furthermore, due to the barriers that would be installed around the operating pads, the Preferred Alternative may also impose minor permanent adverse impacts to access specifically at the operating sites. Whether an ops site access is more beneficial than adverse varies between each ops site and is highly dependent on the current access, current use, and proposed location of an ops site. Quartz Hill Ops Site is further removed from existing access infrastructure (e.g., roads and trails), and there are no known land uses specific to the proposed ops site location. Improved access would be highly beneficial for this ops site. Conversely, the Tok Hill Ops Site is relatively accessible via OHV and there is evidence at the proposed location of camping and potentially parking. Improved access would not contribute much value at this ops site where the barrier would prevent use of the area for camping and parking.

Construction and post-construction operation of generators to support radar operations also have potential to increase EJ Indices predominantly due to air pollutant emissions, increased

traffic, and potential wastewater discharge. However, no EJ Index is anticipated to increase over the 80th percentile due to the Preferred Alternative and would be minor at most due to the remoteness of the ops sites and the frequency and amount of air pollutant emission, traffic, and potential wastewater discharge that would be introduced into the environment with the application of best management practices and adherence to regulatory requirements.

No-Action Alternative

The No-Action Alternative would limit radar operations to temporary YTA ops sites (i.e., USAG Alaska land). Military personnel, contractors, and/or individuals with appropriate permits and/or permissions are authorized access in YTA, a controlled-access military training area. Thus, impacts to socioeconomic resources and EJ would be negligible.

3.12 TRANSPORTATION

3.12.1 Affected Environment

Air transportation was covered in Section 3.1. Thus, this section will focus on roads and trails. The 2016 ADNR DOF Forest Road and Bridge Standards for a secondary road would apply to the ops sites' access roads on State land. A *secondary road* would be moderate to low use, year-round, permanent road with the following characteristics (DOF 2016):

- Minimum 14-foot-wide running surface;
- Single lane;
- Maximum favorable vertical grade of 10% and maximum adverse grade of 8%;
- Minimum horizontal curve radius of 140 feet; and,
- Design speed of 25 miles per hour.

Existing roads capable of accommodating a 30,000-pound tow vehicle and 40,000-pound trailer are herein termed a *qualifying road transportation system*. The nearest, named qualifying road transportation system to each proposed ops site and existing, less developed roads and trails overlapped by new access roads are included in Table 3-22.

Table 3-22. Road and Trail Transportation Systems Associated with New Access Road

Nearest, Named Qualifying Road Transportation System		Overlapped Roads and Trails	
Name	**Traffic Description**	**Name**	**Traffic Description**
Engineer Hill Ops Site			
Transmitter Road	Restricted gravel road predominantly used for military purposes. Must have EAFB access to use road.	Unnamed Road	Restricted unimproved dirt road that can support OHV traffic.
		Unnamed Trail	Restricted trail that can support all-terrain vehicle traffic.
South Pole Hill Ops Site			
Quarry Road and/or Johnson Road	Quarry Road is a gravel road that is controlled-access in YTA and restricted in EAFB. Johnson Road is a controlled-access, gravel road. Predominately used for military purposes.	Unnamed road	Controlled-access gravel road that is a qualifying road transportation system.
		Unnamed Trail	Controlled-access trail that follows the ridgeline to the site that can support small recreational vehicle traffic.
Bridge to Terabithia Ops Site			
Richardson Highway	Public developed road where an unnamed gravel road extends west between Mileposts 331 and 332 to the Tanana River Rail Bridge.	Unnamed Road	Controlled-access gravel road extending across the Tanana River Rail Bridge into the TFTA.
Birch Hill Ops Site			
Richardson Highway	Public developed road where new access road would begin near Milepost 310.	Unnamed trail	Public trail that can support recreational vehicle traffic.
Pogo Hill Ops Site			
Pogo Mine Access Road	Restricted gravel road accessible to individuals with permission from Northern Star Resources Limited.	Unnamed road	Restricted unimproved gravel road that can support recreational vehicle traffic.
Quartz Hill Ops Site			
Quartz Lake Access Road	Public gravel road extending east off the Richardson Highway.	Quartz Lake Extended Forest Road	Public gravel road. A portion of it is considered unimproved but would be able to support OHV traffic.
Gerstle River Ops Site			
Tower Road	Public gravel road extending southwest from the Alaska Highway.	---	---
Dry Creek Ops Site			
Alaska Highway	Public developed road where unnamed road begins near Milepost 1378.	Unnamed Road	A qualifying road transportation public gravel road extending south from the Alaska Highway.
Tok Hill Ops Site			
Glenn Highway Tok Cutoff	Public developed road where unimproved road begins between Mileposts 116 and 117.	Unnamed Road	A qualifying road transportation public unimproved gravel road that can support OHV traffic. It was part of the original Tok-Cutoff Highway prior to the highway's realignment. A portion of this road overlaps with Eagle Trail.
		Unnamed Trail	Public dirt trail that extends north from the unnamed road and can support OHV traffic.

3.12.2 Environmental Consequences

Preferred Alternative

The Preferred Alternative would cause minor temporary adverse impacts during construction and minor permanent beneficial impacts by increasing access and minor permanent adverse impacts by introducing traffic in remote areas post-construction to transportation resources.

The Preferred Alternative would construct new roads and/or improve existing roads and/or trails to accommodate 30,000-pound tow vehicle and 40,000-pound trailer access to the proposed ops sites. All ops sites' new access roads would meet the minimal design requirements of the 2016 ADNR DOF Forest Road and Bridge Standards. The construction and improvement of new road infrastructure was minimized by utilizing existing roads and trails before taking the shortest route to the ops site through new terrain. Existing trail and road connections to and crossing through new road alignments would be considered and incorporated into the final new access road designs to avoid preclusion of existing trail and road connections. Furthermore, route alignments considered other environmental resources and topography to avoid and/or minimize impacts to other resources and ensure drivable road grades (i.e., slope). Specific types of environmental resources avoided to the extent practicable when determining road alignments were water resources (e.g., wetlands) and private real estate parcels.

The new access routes depicted in ops site figures (Figure 2-5 to Figure 2-13) would either improve existing or construct at least a single lane, 14-foot drivable gravel road with a 4-foot toe on either side (i.e., 22 feet width total). Roads that are part of the operating pad configurations would be 16-foot single lane roadways with 4-foot toes (i.e., 24 feet width total). Table 3-23 describes the estimated length, widths, and total area of new access roads required for each ops site. Proposed new access road alignments would directly and permanently replace approximately 48.01 acres of existing roads, trails, and undisturbed land with road infrastructure to meet the Preferred Alternative operational requirements. However, it is important to note that the footprint of disturbance from vehicle traffic (e.g., off-roading) would extend beyond the 48.01 estimated from direct impacts.

Table 3-23. New Access Road Estimated Length, Width, and Area by Ops Site

Ops Site	Length of New Access Road	Width of New Access Road[1]	Total Area
Engineer Hill	2.0 miles	22 feet	5.33 acres
South Pole Hill	0.5 miles		1.33 acres
Bridge to Terabithia	0.05 miles		0.13 acres
Birch Hill	0.76 miles		2.03 acres
Pogo Hill	1.4 miles		3.73 acres
Quartz Hill	6.3 miles		16.80 acres
Gerstle River	0.2 miles		0.53 acres
Dry Creek	2.9 miles		7.73 acres
Tok Hill	3.9 miles		10.40 acres
Total	*18.01 miles*	*Not Applicable*	*48.01 acres[1]*

Note: Impacts from roads that are part of an ops site's operating pad configuration are considered part of the operating pad (see Table 3-11) and not included in the Table 3-23 calculations.
[1] Total of column.

Construction vehicles and equipment would temporarily increase traffic volume potentially cause traffic congestion and/or traffic movement restrictions at or near the ops sites for the duration of construction. To minimize potential congestion impacts, the Air Force would coordinate with landowners of impacted areas as practicable. For example, the Air Force would coordinate with ADNR Division of Parks and Outdoor Recreation to minimize impacts to recreational users of the Quartz Lake Recreation Area.

Post construction, new access roads would provide better access to the remote ops sites' areas. Thus, vehicle traffic volume would increase to and from these operating sites. However, as secondary road, the traffic is not anticipated receive more than low to moderate use throughout the year and predominately be associated with associated with the military use for radar operations and maintenance and public use for recreational purposes. Specific to the Preferred Alternative, the new access roads would be maintained year-around (e.g., require snowplowing). The radars would be remotely operated for training purposes, but there would still be traffic associated with ops sites, which is estimated as follows:

- Traffic from security checks and system inspections daily during operations;
- Radar and generator maintenance and refueling monthly;
- Brush and vegetation maintenance annually; and,
- Ops site infrastructure (e.g., operating pads and access roads) maintenance every three to five years or as needed.

Although there will be increased access and traffic into the remote areas of the ops sites, traffic congestion is not expected and the impacts to transportation resources are anticipated to be minor at most. Rather than lead to congestion, there is potential for the new access roads to alleviate potential congestion within areas of high use (e.g., Quartz Lake Recreation Area).

No-Action Alternative

Under the No-Action Alternative, existing road infrastructure would be used to access the temporary YTA radar ops sites. Traffic related to radar operations would include operators traveling to and from the ops sites for operation and maintenance purposes and would be very limited. Thus, anticipated impacts to transportation would be negligible.

3.13 UTILITIES

3.13.1 Affected Environment

The electrical utility providers within the ROI are the Alaska Power & Telephone (AP&T), Central Heat and Power Plant (CHPP), and Golden Valley Electric Association (GVEA). Pogo mine's electric grid is fed by GVEA. The GVEA connection and meter are at the transformer station and are located at Mile 3 of the Pogo access road (i.e., Shaw Creek Road). GVEA owns the transformer station, and Pogo owns all the infrastructure past that point all the way into and at the Mine. EAFB and YTA are serviced by the CHPP. Table 3-24 describes the source of energy and power grid capacity of each electrical utility provider.

Table 3-24. Electrical Utility Provider Energy Source and Power Grid Capacity within the ROI

Provider	Fuel Source(s)[1]	Power Capacity	Peak Demand	Available Capacity[2]
CHPP	Coal (100%)	~30 MW[3]	~17 MW	~13 MW
GVEA	Diesel (39%), Coal (24%), Natural Gas (15%), Naptha (13%), Hydro (4%), Wind (6%), Solar (>0%)	~479 MW	~206 MW	~273 MW
AP&T	Diesel (99%), Solar (1%)	~8 MW	~2 MW	~6 MW

Notes:
[1] Percentages were rounded to the nearest whole number.
[2] Available Capacity is *Power Capacity* minus *Peak Demand*.
[3] A 10 MW turbine installation is scheduled to be completed in 2024 for a total capacity of 30 MW.

Figure 3-18 depicts the AP&T and GVEA electrical utility systems within the ROI.

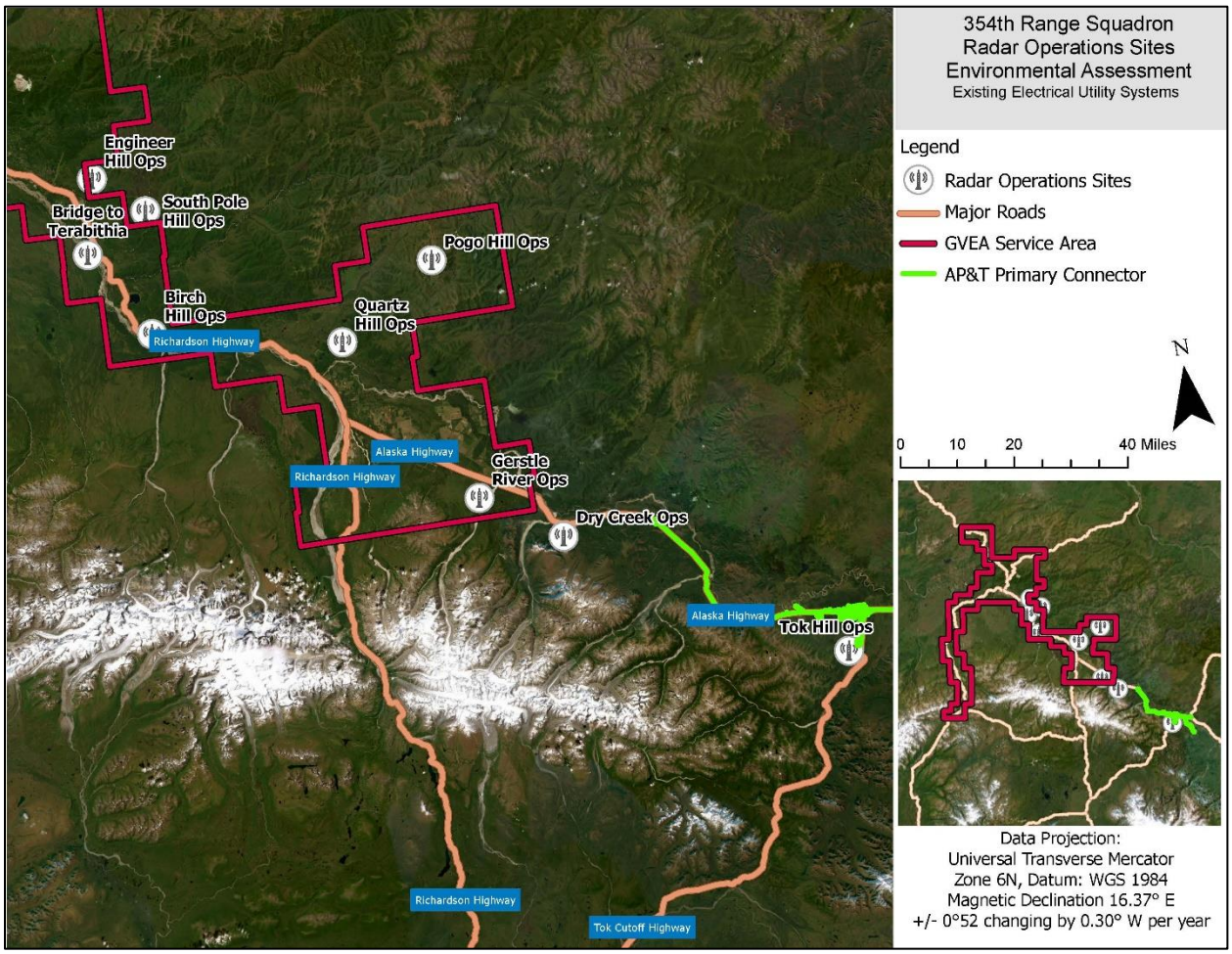

Figure 3-18. Existing Electrical Utility Systems of ROI Utility Providers

The utility providers, landowner, and land use of an area dictate the appropriate type of powerline (i.e., aerial and/or underground). An underground powerline would be required in areas where aerial powerlines would present a hazard to other land uses (e.g., aircraft landing or drop zone). On DOT&PF managed lands (e.g., Federal aid highway, non-Federal aid highway, airport, and others), utility permits are required to install, operate, and maintain utilities. These permits define utility ownership, type, size, location, construction methods, maintenance frequency, duration, and other information considered necessary by DOT&PF. Furthermore, the ARRC must authorized the installation of utilities on its property, to include its ROWs. To receive such authorization, a proponent must submit an application and received approval for an ARRC Utility Permit or ROW Use Permit from the ARRC Real Estate Department.

3.13.2 Environmental Consequences

Preferred Alternative

With proper coordination and permitting, the Preferred Alternative would have permanent minor adverse impacts to existing utilities.

The lower-draw radars require a maximum power demand of 0.4 MW while the higher-draw radars require 0.75 MW. The operation of each radar would average 3 hours per week for 42

weeks of the year, accumulating in approximately 126 hours each year. For the other 10 weeks of the year during large-scale air training exercises, maximum operations would range approximately 12 hours per week, accumulating in 120 hours each year. This equates to a potential of up to approximately 246 hours of radar operations at each ops site per year. To meet power requirements of the ops sites, the Preferred Alternative would install approximately 9.6 miles of permanent powerlines (0.2 miles of underground and 9.4 miles of aerial powerline), use a temporary diesel generator, and use two permanent diesel generators with associated gasoline generators to meeting radar power requirements.

Permanent powerlines would be installed for seven of the ops sites. Powerlines are annotated on applicable site figures in Section 2.3.1. New powerlines would extend from the nearest existing aerial powerline, and alignments would follow new access roads except for the Tok Hill Ops Site. According to the National Electrical Safety Code, the standard utility pole for an aerial powerline is 35 feet tall. The Air Force would assume responsibility to connect and maintain connection of the radars to the power grids but would coordinate with the utility provider as required. Powerline installation would require coordination, permissions, and/or permits from the applicable utility provider and/or, as appropriate, the Alaska DOT&PF. Specific to the Bridge to Terabithia Ops Site, an ARRC ROW Use Permit would be required from the ARRC to install aerial powerlines within their ROW along the Tanana River Rail Bridge.

Powerlines to two of the most inaccessible, remote sites (Quartz Hill and Dry Creek Ops Sites), were deemed infeasible due to costs and distance from existing power grids. These ops sites will use lower-draw systems and be powered by an appropriately rated diesel-powered generators owned by the Air Force to meet the ops site power requirements.

Permanent, diesel fuel storage tanks would be installed onsite to support generator operations at the Quartz Hill and Dry Creek Ops Sites. Gasoline generators would be used to warm diesel generators prior to radar operations when necessitated by low temperatures. November through April (a 24-week period) was used as a basis for when temperatures may require use of a gasoline generator. Gasoline generators would warm diesel generators for an hour prior to radar operations. There would be approximately two radar operations per week requiring 48 hours over the 24-week period. Tok Hill Ops Site would be temporarily powered by an appropriately rated diesel generator until the powerline can be installed. This site would not use a gasoline generator to warm the diesel generator or not install an AST on-site. Generators are not anticipated to cause impacts on other utility users.

Table 3-25 summarizes the generator utilities of the Preferred Alternative

Table 3-25. Preferred Alternative Generator and Fuel Storage

Ops Site	Generator Description[1]		On-site Diesel Fuel Storage
	Diesel	Gasoline	
Quartz Hill	456 Hp, Diesel, Permanent	13.4 Hp, Gasoline, Warm-up	5,000-gallon AST
Dry Creek	456 Hp, Diesel, Permanent	13.4 Hp, Gasoline, Warm-up	10,000-gallon AST
Tok Hill	456 Hp, Diesel, Temporary	Not Applicable	None

Note:
[1] Description reflects the anticipated generator characteristics. However, actual specifications may vary based on power demand requirements and available generators that could meet such demand.
Key:
Hp = Horsepower

Table 3-26 summarizes the powerline utilities of the Preferred Alternative.

Table 3-26. Preferred Alternative Powerline Installation

Ops Site	Existing Power Connection Point	Powerline			Is Power Grid able to Support Radar Power Demand?			
		Type	Length (Miles)	# of Utility Poles	Available Capacity	Maximum Demand Per Site[1]	Maximum Demand Total[1]	YES/ NO[2]
CHPP								
Engineer Hill	Powerline at Engineer Hill munitions storage and maintenance area.	Aerial	0.7	13	13 MW	1.5 MW	1.9 MW	YES
South Pole Hill	Powerline extending from Quarry Road in YTA.	Aerial	0.5	9		0.4 MW		
GVEA								
Pogo Hill	Powerline adjacent to Pogo Mine Access Road.	Aerial	1.6	29	273 MW	0.4 MW	2.0 MW	YES
Bridge to Terabithia	Powerline adjacent to Tom Bear Road.	Aerial	2.1	37		0.4 MW		
Birch Hill	Powerline adjacent to Richardson Highway.	Aerial	0.5	9		0.4 MW		
Gerstle River	Powerline adjacent to Tower Road.	Aerial	0.9	16		0.4 MW		
		Underground[3]	0.2	---		0.4 MW		
AP&T								
Tok Hill	Powerline adjacent to the Glenn Highway Tok Cutoff.	Aerial	3.1	55	5.82 MW	1.5 MW		YES

Notes:
Other projects in Interior Alaska have utility poles every 300 feet. This metric was applied.
[1] Maximum demand assumed the distal end ops sites would at most operate two higher-draw radars and all other sites would at most support a single lower-draw radar.
[2] Determined holistically based on all sites within a particular provider's service area.
[3] A helicopter landing zone requires powerline to be installed underground.

No-Action Alternative

Under the No-Action Alternative, Air Forced-owned, standalone generators would be used to power the radars at the temporary YTA op sites. Thus, the No-Action Alternative would have permanent minor adverse impacts at most.

3.14 OTHER NEPA CONSIDERATIONS

3.14.1 Protected Tribal Resources

The 1994 Executive Memorandum on "Government-to-Government Relations with Native American Tribal Governments," the 1998 DoD "American Indian and Alaska Native Policy," the AFI 90-2002 "Air Force Interaction with Federally Recognized Tribes," and the Air Force Manual (AFM) 32-7003 "Environmental Conservation" require the Air Force to assess the impact that Federal actions may have on Protected Tribal Resources and assure that the rights and concerns of Federally Recognized Tribes are considered during the development of such actions. Pursuant to AFI 90-2002, *Protected Tribal Resources* are defined by the Air Force as:

> *"Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by, or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or executive orders, including tribal trust resources."*

The Federal government's trust responsibility, deriving from the Federal Trust Doctrine and other sources, for these Protected Tribal Resources is independent of their association with Tribal lands.

This trust responsibility was discharged in this EA through compliance with multiple statutes affecting Protected Tribal Resources (Table 3-27) and through ongoing Government-to-Government consultation (Section 1.5.2). In this EA, Protected Tribal Resources are generally understood to include natural resources, cultural resources, and access to subsistence resources; no specific resource(s) have been identified by any Federally Recognized Tribe (list of Tribes consulted in Appendix A).

Table 3-27. EA Sections that Addressed Potential Protected Tribal Resources

Resource	Section	Relevant Resource Statutes	Potential Effects
Natural Resources	3.7, 3.9	– Migratory Bird Protection Treaty Act of 1918 – National Environmental Policy Act of 1970 – Clean Water Act of 1972	Insignificant
Cultural Resources	3.10	– National Historic Preservation Act of 1966 – National Environmental Policy Act of 1970	Insignificant
Subsistence Use	3.2, 3.9	– Alaska National Interest Lands Conservation Act of 1980	Insignificant
Environmental Justice	3.6, 3.11, Appendix C	– Clean Air Act of 1963 – National Environmental Policy Act of 1970 – EO 12898, Environmental Justice	Insignificant

3.14.2 Unavoidable Adverse Effects

This EA identifies any *unavoidable adverse impacts* that would be incurred by an alternative of the Proposed Action and the significance of the potential impacts to resources and issues. Title 40 CFR §1508.27 specifies that a determination of significance requires consideration of context and intensity. The Preferred Alternative's construction of gravel access roads and operating pads, and installation of powerlines, generators, and ASTs would impact the local areas of the various ops sites within Interior Alaska. The severity of potential impacts would be limited by regulatory compliance, proposed mitigations, and best management practices (Table 5-1) for the protection of the human and natural environments.

Unavoidable short-term adverse impacts associated with implementing the Preferred Alternative would include temporary construction impacts related to erosion and sedimentation, increases in fugitive dust and air pollution, intermittent noise, impacts to wetland vegetation, and alterations to traffic. However, these effects are considered minor and would be confined to the immediate area. Unavoidable, long-term, adverse impacts would include destruction of wetlands (0.6 acres) at the Dry Creek Ops Site, of wildlife habitat (175 acres) to anthropogenically modified lands, increases in fugitive dust, alterations to traffic, and air pollutant emissions from generators at the Quartz Hill and Dry Creek Ops Sites. Use of proposed environmental controls and implementing controls from required permits and approvals would minimize these potential impacts.

3.14.3 Relationship of Short-Term Uses and Long-Term Productivity

The relationship between short-term uses and enhancement of long-term productivity from implementation of the Preferred Alternative is evaluated from the standpoint of short-term effects and long-term effects. *Short-term effects* would be those associated the construction and installation activities of the Preferred Alternative. The *long-term enhancement of productivity* would be those effects associated with the ops sites' post-construction operation and maintenance.

The negative effects of the short-term construction activities would be minor compared to the positive benefits from implementing the Preferred Alternative that would modernize training radars and locations for realistic training representative of the current threat environment.

Immediate and long-term benefits would be realized for operation and maintenance after construction is completed for the Preferred Alternative.

3.14.4 Irreversible and Irretrievable Commitments of Resources

This EA identifies any irreversible and irretrievable commitments of resources associated with the implementation of the Preferred Alternative. An *irreversible effect* results from the use or destruction of resources (e.g., energy) that cannot be replaced within a reasonable time. An *irretrievable effect* results from loss of resources (e.g., endangered species) that cannot be restored as a result of an action. The short-term irreversible commitments of resources from the Preferred Alternative include planning and engineering costs, building materials and supplies and their cost, use of energy resources during construction, labor, generation of fugitive dust and other air pollutant emissions, and creation of temporary construction noise. If avoidance and minimization of impacts is not sufficient, replacement of impacted wetland areas may be required to obtain authorization under the CWA Section 401 and Section 404. No long-term irretrievable commitments of resources would result from the Preferred Alternative.

4.0 REASONABLY FORESEEABLE ACTIONS AND CUMULATIVE IMPACTS

This EA also considers the effects of cumulative impacts as required in 40 CFR 1508.7 and concurrent actions as required in 40 CFR 1508.25[1]. A cumulative impact, as defined by the CEQ (40 CFR 1508.1), which are:

> *"…effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."*

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Actions announced for the ROI that could occur during the same time period as the Proposed Action are included in Table 4-1 and herein collectively termed, "Other ROI Actions." For this EA, these announced actions are addressed from a cumulative perspective and would be evaluated under separate NEPA actions conducted by the appropriate involved Federal and State agencies. Based on the best available information on the Other ROI Actions, the Air Force cumulative impact analysis does consider them.

Table 4-1. Other ROI Actions for Consideration of Potential Cumulative Impacts

Other ROI Actions	Descriptions
Blair Lakes Radar Ops Site[1]	This action would repurpose a portion of previously developed land at the Blair Lakes Bombing Range within the USAG Alaska TFTA to support radar operations. A gravel operations pad would be developed, and radars would be staged at the site. Power would be supplied by a diesel generator. Total impacts to land use would be less than 1-acre, and there are no known protected resources that would be impacted.
ARRC Northern Rail Extension	There are four phases to this action. Phase one was completed and extended the Alaska Railroad across the Tanana River by constructing the dual-use Tanana River Rail Bridge. This bridge supports military access and railroad access into and activities within the TFTA. Phases two through four are not currently funded but would extend the railroad south, southeast.
Quartz Lake Spruce Timber Sale	The DOF proposed the sale of approximately 37.5 acres of white spruce timber from the Quartz Lake area (SOA land) as a single competitive bid contract for commercial use. The land covered by this action appeared in the 2022 Northern Region Five Year Schedule of Timber Sales. The sale has been completed, and the harvest of the white spruce is ongoing. The 2024 Five Year Schedule of Timber Sales is currently being drafted, with the intent to continue active timber management along the Quartz Lake Extended Forest Road.

Note:
[1] The Air Force completed an Air Force Form 813 for this action, which documented the application the of categorical exclusion A2.3.14 under 32 CFR Appendix B to § 989. A2.3.14 states an action is categorically excluded in absence of unique circumstances if it: "[i]nstall[s] on previously developed land, equipment that does not substantially alter land use (i.e., land use of more than 1 acre)."

4.2 ASSESSMENT OF CUMULATIVE IMPACTS BY RESOURCE

This section describes the cumulative effects for the resource areas assessed within this EA. Due to the remoteness of the Preferred Alternative ops sites, many resources are not discussed further due to lack of impacts. The resources not discussed further include Airspace

Management and Use, Hazardous Materials and Waste, Noise, Water Resources, and Cultural Resources.

4.2.1 Biological / Natural Resources

Preferred Alternative

The ARRC Northern Rail Extension action would permanently convert existing habitat to anthropogenically modified lands, and the Quartz Lake Spruce Timber Sale action would temporarily impact existing habitat through the harvesting of white spruce timber. These actions and the Preferred Alternative would cumulatively impact habitat (to include vegetation) within the ROI with the greatest impact occurring wherein actions are within close proximity (e.g., the Quartz Lake Spruce Timber Sale action and the Preferred Alternative Quartz Hill Ops Site). However, cumulatively, these impacts would at most cause minor adverse impacts due to the abundance of similar habitat throughout the ROI.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.2 Land Use

Preferred Alternative

The ARRC Northern Rail Extension action would impact land use designations within the ROI, and the Air Force would need to coordinate with ADNR to deconflict construction of the Quartz Hill Ops Site and active Quartz Lake White Spruce Timber Sale. The extension of the railroad would extend south, southeast through the ROI through Federal, State, and potentially FNSB and/or private lands from the distal end of the Phase one construction efforts. Unlike the Preferred Alternative, that would permanently convert land use designations to Federal or retain the Federal land use designation, the ARRC Northern Rail Extension action would permanently convert or retain land use designations as SOA land and/or require coordination and agreements for ROWs. Another consideration under land use is the cumulative impacts of the Preferred Alternative in relation to the existing radar ops sites at the JPARC. Should the Preferred Alternative be implemented, the existing radar ops sites would either be demobilized, used as-is, or modified to meet other training needs and requirements. The Federal land use designation of these existing sites would be retained. There is also potential for the increased access (via new access roads and railroad extension) to promote further development in Interior Alaska remote areas. However, the changes in land use designations and potential future development are anticipated to cause minor adverse impacts at most, because the activities would need to be generally compatible with other land uses and adhere to landowner policies and environmental laws and regulations.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.3 Safety and Occupational Health

Preferred Alternative

The construction activities and operations of the Other ROI Actions and the Preferred Alternative may overlap. The distance between these actions would generally avoid and/or minimize cumulative impacts to this resource. However, the Preferred Alternative Quartz Hill Ops Site construction activities and the Quartz Lake White Spruce Timber Sale harvesting actions may occur concurrently. If occurring concurrently, there would be additional hazards

during construction and/or post construction if one of the actions is ongoing. The Preferred Alternative would consider the other action's construction activities when assessing safety and health hazards and implement BMPs and risk responses accordingly. Thus, the cumulative impact to this resource would be minor at most.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.4 Air Quality

Preferred Alternative

The Blair Lakes Radar Ops Site and ARRC Northern Rail Extension actions would add new permanent sources of air pollutant emissions to the ROI. The generator used to support the Blair Lakes Radar Ops Site action would contribute air emissions within the ROI from point sources (i.e., generators). However, its generator emissions would be highly localized and far removed from the emissions produced from the Preferred Alternative and the ARRC Northern Rail Extension. The ARRC Northern Rail Extension would extend the existing railroad into new areas. Trains would become a new mobile source of air pollutant emissions wherein it is extended. Train emissions may decrease local air quality within the area of the Preferred Alternative's Dry Creek Ops Site, which would utilize a diesel generator and gasoline generator due to the proximity of the proposed railroad extension and the ops site. Emissions from these sources would only persist in the area for a short period of time. Generally, the decreases in air quality would generally be highly localized and separate from other actions, and the cumulative decrease in regional air quality from these actions is not anticipated to cause an exceedance of an SAAQS or NAAQS that would re-designate an attainment area to a near nonattainment or nonattainment area.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.5 Earth Resources

Preferred Alternative

The ARRC Northern Rail Extension action is anticipated to have ground disturbing activities and/or infrastructure made from earth resource materials. However, like the Preferred Alternative, this action's activities and infrastructure would likely be limited to surface soil layers and have minimal topography changes due minor increases and/or decreases in elevation. The ARRC Northern Rail Extension action and Preferred Alternative are anticipated to use similar earth resources (i.e., gravel) from local and regional sources (e.g., community gravel pits) to construct required infrastructure. If these actions occur concurrently, the required earth resource demand may stress local and regional sources' supply. Subsequently, this could reduce and/or exhaust the available earth resources at a particular source and require sourcing from options further away for these actions but also for other local users and needs. It may also introduce unanticipated delays. Consideration of the timing and earth resource requirements between these separate actions would be needed to minimize and avoid these potential cumulative impacts.

No-Action Alternative.

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.6 Socioeconomic Resources

Preferred Alternative

The Other ROI Actions and Preferred Alternative would provide jobs relating to construction and/or operations of these actions and/or provide valuable resources (e.g., timber and enhanced access) throughout the ROI. These actions are generally far removed from one another and population centers within the ROI. Thus, potential, and likely minor, increases in the EJ Indices are not anticipated to cumulatively impact any community or minority, low-income, or children population disproportionately. Cumulative impacts would be mostly beneficial due to the economic opportunities and/or access to resources these actions would provide locally and regionally. A specific example of a beneficial impact would be the availability of salvaged timber from the Preferred Alternative and Quartz Lake Spruce Timber Sale actions. The salvaged timber would be available for use and/or sale, depending on landowner policies, throughout the ROI.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.7 Transportation

Preferred Alternative

The Preferred Alternative and the Other ROI Actions would lead to minor increased localized traffic throughout the ROI permanently, especially during construction of the actions. Post-construction, the traffic associated with the Preferred Alternative would include routine traffic for purposes of inspecting and maintaining the ops sites but for the operation of the remotely-operated radars. However, due to the distance between the Other ROI Actions and Preferred Alternative, cumulative impacts are generally not anticipated to be concentrate heavily at one specific site or area. There would be two potential exceptions during construction (1) Pogo Hill Ops Site traffic and (2) Quartz Hill Ops Site construction if the Quartz Lake White Spruce Timber Sale action harvesting activities occur concurrently. To alleviate potential traffic conflicts (e.g., congestion), the Air Force and its contractor would coordinate with Northern Star Resources Limited to avoid and minimize traffic conflicts on Pogo Mine Access Road and with ADNR DOF to avoid and minimize traffic conflicts at the Quartz Lake area. Otherwise, the traffic associated with the Preferred Alternative is not anticipated to appreciably increase traffic along primary, heavily used existing roads (e.g., the Richardson and Alaska Highways) but would cause minor increases for secondary, low to moderately used roads used to access the ops sites.

No-Action Alternative.

There are no cumulative impacts anticipated under the No-Action Alternative.

4.2.8 Utilities

Preferred Alternative

The ARRC Northern Rail Extension action and Preferred Alternative would require power from existing ROI power grids. Coordination with utilities providers would be required to extend powerlines from the existing power grid for all actions, and the capacity of the current grid would be considered before implementation of such actions. If existing power grids cannot support one or more of these actions, then the construction of the action(s) would need to be reassessed and other methods of supplying energy would need to be considered. Otherwise, these actions

would cumulatively demand more power than separately. This would reduce the available capacity of existing power grids to meet power demands of future projects.

No-Action Alternative

There are no cumulative impacts anticipated under the No-Action Alternative.

5.0 SUMMARY OF ENVIRONMENTAL MANAGEMENT AND MITIGATIONS

The environmental management (e.g., BMPs) and mitigation measures that would be implemented to minimize, avoid, and/or compensation for potential adverse impacts of the Preferred Alternative are described in this section. This section does not include required consultation and coordination and/or permits and authorizations required for regulatory compliance that would add additional BMPs and mitigation measures to the actions that would be undertaken for the Preferred Alternative. Furthermore, BMPs and mitigations measures would be added and further developed during the final design of each ops site.

There are two overarching best management practices that were implemented under the Preferred Alternative with the ops sites' designs:

1. Ops sites are in remote areas at high latitudes wherein traffic is limited.
2. Designs are focused on utilizing existing, disturbed areas to the maximum extent practicable before taking the shortest route feasible with new infrastructure. The purpose of this BMP is to avoid and/or minimize impacts to other resources.

Specific resource BMPs and mitigations covered in this EA are summarized in Table 5-1.

Table 5-1. Summary of Environmental Management and Mitigation Measures

Resource	Environmental Management and Mitigations
Airspace Management and Use	• Established, existing airspace would be used for action-related air operations. • The Air Force would maintain its current operating pace within the ROI airspace.
Land Use	• The Air Force Real Estate would acquire necessary leases. • Design would incorporate other site user access considerations through and around the ops sites.
Hazardous Materials and Waste	• The Air Force would conduct regular inspections and maintenance of ASTs and radars.
Safety and Occupational Health	• Workers and operators would utilize and wear appropriate PPE during construction activities and radar operations. • Barriers protective of the general public would be constructed at each ops site to prevent non-operators (and certain wildlife) from uncontrolled access within MPE limits for EMFR.
Noise	• Workers and operators would utilize and wear appropriate PPE during construction activities and radar operations. • Ops site infrastructure (e.g., generators and radars) do not produce noise levels that would cause permanent hearing loss. • Noise impacts to other site users and wildlife would be minimized due to distance between noise sources and restrictive barriers that would be installed for EMFR.
Air Quality	• The Air Force would apply the EAFB Fugitive Dust Emission Plan's BMPs: a. Spray water when necessary and in compliance with stormwater permit requirements; b. Limit traffic speeds to 15 miles per hours on unpaved roads; and, c. Clean uncontaminated dirt and/or mud from paved roads daily.
Water Resources	• Road alignments were designed to avoid water resources (e.g., wetlands and surface waters) to the extent practicable. • Design considerations for culvert emplacement and drainage would be incorporated to minimize impacts to water flow. • Floodplain baseline elevations design considerations would be implemented for the Bridge to Terabithia Ops Site.

Resource	Environmental Management and Mitigations
Earth Resources	• Native soil would be used to backfill holes to the extent practicable. • The Air Force would attain required gravel from the nearest active established source for each site. • Erosion considerations would be incorporated for culvert emplacement and drainage designs.
Biological / Natural Resources	• Vegetation clearing activities would take place outside of USFWS bird nesting windows to the extent practicable. • The ops sites were designed to utilize disturbed, preexisting infrastructure to the maximum extent practicable to avoid and minimize impacts to environmental resources. • BMPs and adaptive management would be implemented to minimize and avoid impacts to species and habitat through ops site location and design, operation constraints, road constraints, and monitoring considerations. • BMPs and mitigation measures would be implemented to avoid and/or minimize invasive and non-native species introduction and spread: (1) Equipment and vehicles will be inspected, cleaned, and decontaminated between ops sites during construction. (2) Weed- and seed-free gravel and erosional control products would be used with native soil is not feasible. • Vegetation clearing would develop firebreaks and remove potential insect infested trees. • Timber from vegetation clearing activities would be salvaged.
Cultural Resources	• If buried cultural resources or human remains are inadvertent identified through ground disturbing activities, protocol for inadvertent discovery of cultural resources will be followed. Immediately following an inadvertent discovery, work will cease, and the Air Force Project Manager and Cultural Resources Manager will be contacted to assess the nature of the discovery.
Socioeconomic and Environmental Justice	• Economic opportunities would be provided to local and regional communities: (1) The Air Force would use local small businesses to the extent practicable during construction and for post-construction maintenance requirements. (2) Construction materials would be sourced locally and/or regionally to the extent practicable. • See Air Quality and Transportation.
Transportation	• Unimproved roads and trails within the new access route alignment would be improved and provide better access throughout the ROI.
Utilities	• Underground powerlines were limited to areas wherein aerial powerlines would pose a safety concern. • Appropriately rated generators were utilized wherein powerline installation would be infeasible due to distance from existing power grids and costs.

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7.0 LIST OF PREPARERS

This EA has been prepared under the direction of the US Air Force, PACAF, 11 AF, 354 FW. The individuals that contributed to the preparation of this EA are listed below (Table 7-1).

Table 7-1. List of Preparers

Name/Organization	Education	Resource Area	Years of Experience
Kayla Campbell USACE	BS, Molecular and Cellular Biology	Environmental Assessment Preparation, All Resources except Cultural	2
Kelly Eldridge USACE	MA, Anthropology	Cultural Resources	16
Tyler Teese, USACE	BA, Anthropology	Cultural Resources	8
Matthew Ferguson USACE	MS, Environmental Management	Section 1 and 2 Preparation, Vegetation, and Wetlands	7
Michael Rouse USACE	BA, Environmental, Population, and Organismic Biology	Natural Resources and Document Preparation Oversight	18
Camryn Robert-Capak USACE	BS, Marine Science, Safety, & Environmental Protection; Minor in Marine Biology	Socioeconomics and Environmental Justice	1

Key: BA = Bachelor of Arts; BS = Bachelor of Science; MA= Master of Arts; MS = Master of Science.

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APPENDIX A

Interagency/Intergovernmental Coordination and Public Participation

Early Public Notice

No public and agency comments were received in response to the Early Public Notice that was published in following newspapers and the Eielson AFB Environmental website:

- Fairbanks Daily News Miner, Fairbanks, Alaska
- Delta Wind, Delta Junction, Alaska
- https://www.eielson.af.mil/General-Information/Environmental/

AFFP
00069000 NOTICE FOR EARLY PUBL

Affidavit of Publication

STATE OF ALASKA }
COUNTY OF FAIRBANKS
NORTH STAR BOROUGH } SS

Kaira Lum, being duly sworn, says:

That she is Affidavit Clerk of the Fairbanks Daily News-Miner, a daily newspaper of general circulation, printed and published in Fairbanks, Fairbanks North Star Borough County, Alaska; that the publication, a copy of which is attached hereto, was published in the said newspaper on

August 11, 2023, August 12, 2023

That said newspaper was regularly issued and circulated on those dates.
SIGNED:

Affidavit Clerk

Subscribed to and sworn to me this 12th day of August 2023.

Jennifer M Robinson, Notary Public, Fairbanks North Star Borough County, Alaska
My commission expires: February 11, 2026

00008250 00069344

Matthew Ferguson
US Army Corps of Engineers
P.O. Box 6898
JBER, AK 99506

STATE OF ALASKA
NOTARY PUBLIC
Jennifer M. Robinson
My Commission Expires February 11, 2026

00069344
NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTION WITHIN THE 100-YEAR FLOODPLAIN AND WETLANDS NEAR EIELSON AIR FORCE BASE, ALASKA - UNITED STATES AIR FORCE

The U.S. Air Force (USAF) is inviting public input on any practicable alternatives for a proposed activity within wetlands and the 100-year floodplain near Eielson Air Force Base (AFB), Alaska. The purpose of the Proposed Action is to improve 5th and 6th generation aircraft training effectiveness in the North Pacific operational theater. The Proposed Action involves the construction and operation of nine radar simulator sites along the Richardson Highway corridor. Work would involve vegetation clearing, access road construction, electrical utility development, operation pad development, attendant activities, and radar simulator site operation after construction is completed.

Two of the proposed radar simulator sites would be constructed in areas containing potential wetlands or floodplains. The USAF determined, pursuant the development and application of selection standards in accordance with 32 Code of Federal Regulation (CFR) 989.8, that there are no practicable alternatives without wetland or floodplain impacts that would meet the purpose and need of the Proposed Action. The project footprint in wetlands or floodplains would be minimized to the extent practicable and the USAF would procure the necessary permits from the managing entities to ensure the proposed work would not be contrary to the public interest or cause unacceptable floodplain impacts.

The USAF is performing environmental analysis in accordance with the National Environmental Policy Act (NEPA) of 1969 to analyze the potential environmental impacts of the Proposed Action. This early public notice is required by Executive Order (EO) 11990, "Protection of Wetlands" and EO 11988, "Floodplain Management". The USAF prepared and made this notice available to the public in accordance with 32 CFR 989, USAF Manual 32-7064 for actions proposed within floodplains and wetlands. The USAF will also be coordinating with State and Federal regulatory agencies with special expertise regarding the Proposed Action, that may include United States Army Corps of Engineers, United States Fish and Wildlife Service, Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, Alaska Department of Natural Resources, and State Historic Preservation Officer. Subsequent public notice required by NEPA will be made once the Proposed Project NEPA document is available for review and comment.

The USAF requests advance public comment to determine if there are any public concerns regarding the project's potential to impact to the 100-year floodplain and wetlands. Comments and inquiries should be emailed within 30 days of this notice directly to 354th Fighter Wing Public Affairs at: 907-377-2116 or 354fw.pa.publicaffairs@us.af.mil.
Publish: 8-11
& 8-12-2023

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA
FOURTH JUDICIAL DISTRICT

Before me, the undersigned, a notary public, this day personally appeared, Denise Wilhelm who, being first duly sworn according to law, says that he represents TriDelta, Incorporated, publisher of Delta Wind, a newspaper of general circulation published in Delta Junction in said Fourth Judicial District and State of Alaska, and that the advertisement of which the annexed is a true copy, was published in said newspaper on the following day(s):

8/10/2023

and that the rate charged is not in excess of the rate charged private individuals, with the usual discounts.

Denise Wilhelm
Denise Wilhelm

Subscribed and sworn before me this 12th **day of** February **, 2024.**

"Official Seal"
Notary Public
T.P. Holoday
State of Alaska
Commission #290310005 Expires 3/10/2024

T.P. Holoday
Notary Public in and for the State of Alaska
My commission expires: March 10, 2024

Original and Amended
Notice of Availabilities

Draft Environmental Assessment and Proposed Finding of No Significant Impact and Finding of No Practicable Alternative

Public and agency comments received during the public and agency comment period are included in the Appendix A of the Final Environmental Assessment (EA). The original and amended Notice of Availabilities for the Draft EA and Proposed Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA) were published in following newspapers and the Eielson AFB Environmental website:

- Fairbanks Daily News Miner, Fairbanks, Alaska
- Delta Wind, Delta Junction, Alaska
- https://www.eielson.af.mil/General-Information/Environmental/

The Draft EA and Proposed FONSI and FONPA were made available electronically on the Eielson AFB Environmental website:

- https://www.eielson.af.mil/General-Information/Environmental/

The following persons and agencies were consulted and/or coordinated with in the preparation of the Environmental Assessment for the *354th Range Squadron Radar Operation Sites, Eielson AFB, Alaska*.

Federal Agencies	
Bureau of Land Management Fairbanks District Office 222 University Avenue Fairbanks, Alaska 99709	Environmental Protection Agency Region 10 Alaska Operations Office 222 West 7th Avenue, #19 Anchorage, Alaska 99513
Federal Aviation Administration Alaskan Region 222 West 7th Avenue, #14 Anchorage, Alaska 99513	United States Army Corps of Engineers Alaska District Regulatory Division Fairbanks Field Office 1046 Marks Road Fort Wainwright, Alaska 99703
United States Army Garrison Alaska Directorate of Public Works 1046 Marks Road #4500 Fort Wainwright, Alaska 99703	United States Fish and Wildlife Service Northern Alaska Fish & Wildlife Field Office 101 12th Avenue, Room 110 Fairbanks, Alaska 99701
State Agencies	
Alaska Department of Environmental Conservation P.O. Box 111800 Juneau, Alaska 99811	Alaska Department of Fish & Game 1300 College Rd Fairbanks, Alaska 99701
Alaska Department of Natural Resources 550 West 7th Avenue, Suite 1360 Anchorage, Alaska 99501	Alaska Department of Transportation and Public Facilities 2301 Peger Road Fairbanks, Alaska 99709
Alaska Occupational Safety and Health Consultation and Training 1251 Muldoon Road, Suite 109 Anchorage, Alaska 99504	Alaska Railroad Corporation P.O. Box 107500 Anchorage, AK 99510
Alaska State Historic Preservation Office Office of History and Archaeology 550 West 7th Avenue, Suite 1310 Anchorage, Alaska 99501	
Local Agencies	
Fairbanks North Star Borough Historic Preservation Commission P.O. Box 71267 Fairbanks, Alaska 99707	Fairbanks North Star Borough Natural Resources Development P.O. Box 71267 Fairbanks, Alaska 99707
Tanana-Yukon Historical Society P.O. Box 71336 Fairbanks, Alaska 99707	
Other Stakeholders	
Alaska Power & Telephone 1314 Alaska Highway Tok, Alaska 99780	Golden Valley Electric Association Delta Junction Office 1681 Richardson Highway Delta Junction, Alaska 99737
Golden Valley Electric Association Fairbanks Office 758 Illinois Street Fairbanks, Alaska 99701	Northern Star Resources Limited P.O. Box 2008 Subiaco WA 6904 Australia

Federally-Recognized Tribes	
Healy Lake Village 600 University Avenue, Suite 100 Fairbanks Alaska 99709	Mentasta Traditional Council P.O. Box 6019, Mentasta, Alaska 99780
Native Village of Tanacross P.O. Box 76009 Tanacross, Alaska 99776	Native Village of Tetlin P.O. Box 797 Tok, Alaska 99780
Northway Village P.O. Box 516 Northway, Alaska 99764	Village of Dot Lake P.O. Box 70488 Fairbanks, Alaska 99701
Alaska Native Corporations	
Cook Inlet Region, Inc. P.O. Box 93330 Anchorage, Alaska 99509	Dot Lake Native Corporation 615 Bidwill Avenue, Suite 407 Fairbanks, Alaska 99701
Doyon, Ltd. 1 Doyon Place, Suite 300 Fairbanks, Alaska 99701	Fairbanks Native Association 3830 Cushman Street, Suite 100 Fairbanks, Alaska 99701
Mendas Cha-ag Native Corporation P.O. Box 74983 Fairbanks, Alaska 99707	Northway Natives, Inc. P.O. Box 476 Northway, Alaska 99764
Tanacross, Inc. P.O. Box 76029 Tanacross, Alaska 99776	Tanana Chiefs Conference 122 First Avenue Fairbanks, Alaska 99701
Tetlin Native Corporation P.O. Box 657 Tok, Alaska 99780	Tok Native Association P.O. Box 372 Tok, Alaska 99780

AFFP

Notice of Availability

Affidavit of Publication

STATE OF ALASKA }
COUNTY OF FAIRBANKS } SS
NORTH STAR BOROUGH }

Kaira Lum, being duly sworn, says:

That she is Affidavit Clerk of the Fairbanks Daily News-Miner, a daily newspaper of general circulation, printed and published in Fairbanks, Fairbanks North Star Borough County, Alaska; that the publication, a copy of which is attached hereto, was published in the said newspaper on

March 14, 2024, March 15, 2024

That said newspaper was regularly issued and circulated on those dates.

SIGNED: Kaira Lum

Affidavit Clerk

Subscribed to and sworn to me this 15th day of March 2024.

Jennifer M. Robinson

Jennifer M Robinson, Notary Public, Fairbanks North Star Borough County, Alaska

My commission expires: February 11, 2026

PUBLIC NOTICE

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT AND PROPOSED FINDING OF NO SIGNIFICANT IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE FOR 354TH RANGE SQUADRON RADAR OPERATIONS SITES EIELSON AIR FORCE BASE, ALASKA

An Environmental Assessment (EA) has been prepared to analyze the impacts of the United States Air Force (Air Force) Proposed Action, *354TH Range Squadron Radar Operations Sites*. The purpose of this Proposed Action is to improve F-35 Lightning II Joint Strike Fighter training effectiveness in the North Pacific operational theater. The development of nine new operations sites with modern radars on Federal, State, and Fairbanks North Star Borough lands would modernize the Joint Pacific Alaska Range Complex and enable realistic training that is representative of the current threat environment. Thus, the Proposed Action is critical to the Air Force's readiness and mission capabilities. Eielson Air Force Base would operate radars at the Proposed Action operations sites at various sites throughout Interior Alaska.

The EA, prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality regulations, and Air Force instructions implementing NEPA; evaluates potential impacts of alternative actions on the environment including the No-action Alternative. Based on this analysis, the Air Force has prepared a Proposed Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA).

The Draft EA and Proposed FONSI and FONPA, dated March 2024, are available for review and can be access electronically on the Eielson Air Force Base Environmental website at:
https://www.eielson.af.mil/General-Information/Environmental/.

You are encouraged to submit comments through April 13, 2024. Comments should be provided to the Eielson Air Force Base Public Affairs Office by email at:
354FW.PA.PUBLICAFFAIRS@US.AF.MIL.

Accommodations for Individuals with disabilities will be made upon request. Individuals requesting accommodations should contact the Eielson Air Force Base Public Affairs Office at the aforementioned email or by phone at (907) 377-2116.

PRIVACY ADVISORY NOTICE
PUBLIC COMMENTS ON THIS DRAFT EA ARE REQUESTED PURSUANT TO NEPA, 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 THE FINAL EA 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.

Publish: 3-14 & 3-15-2024 00073633

00008250 00073633

Matthew Ferguson
US Army Corps of Engineers
P.O. Box 6898
JBER, AK 99506

STATE OF ALASKA
NOTARY PUBLIC
Jennifer M. Robinson
My Commission Expires February 11, 2026

AFFP

Amended Notice of Availability

Affidavit of Publication

STATE OF ALASKA }
COUNTY OF FAIRBANKS
NORTH STAR BOROUGH } SS

Kaira Lum, being duly sworn, says:

That she is Affidavit Clerk of the Fairbanks Daily News-Miner, a daily newspaper of general circulation, printed and published in Fairbanks, Fairbanks North Star Borough County, Alaska; that the publication, a copy of which is attached hereto, was published in the said newspaper on

April 11, 2024, April 12, 2024

That said newspaper was regularly issued and circulated on those dates.

SIGNED:

Kaira Lum

Affidavit Clerk

Subscribed to and sworn to me this 12th day of April 2024.

Jennifer M. Robinson

Jennifer M Robinson, Notary Public, Fairbanks North Star Borough County, Alaska

My commission expires: February 11, 2026

00008250 00074416

Matthew Ferguson
US Army Corps of Engineers
P.O. Box 6898
JBER, AK 99506

STATE OF ALASKA
NOTARY PUBLIC
Jennifer M. Robinson
My Commission Expires February 11, 2026

00074416
PUBLIC NOTICE
AMENDED NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT AND
PROPOSED FINDING OF NO SIGNIFICANT
IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE FOR 354TH RANGE
SQUADRON RADAR OPERATIONS SITES
EIELSON AIR FORCE BASE, ALASKA

The United States Air Force (Air Force) is issuing this Amended Notice of Availability of the continuing availability of the Draft Environmental Assessment (EA) and Proposed Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA) for the Air Force's Proposed Action 354TH Range Squadron Radar Operations Sites as part of the environmental planning process to improve F-35 Lightning II Joint Strike Fighter training effectiveness in the North Pacific operational theater. The Draft EA evaluates the development of nine new operations sites with modern radars on Federal, State, and Fairbanks North Star Borough lands that would modernize the Joint Pacific Alaska Range Complex and enable realistic training that is representative of the current threat environment.

The Draft EA and Proposed FONSI and FONPA, dated March 2024, are available for review and can be accessed electronically on the Eielson Air Force Base Environmental website at: https://www.eielson.af.mil/General-Information/Environmental/.

The comment period originally scheduled to end on April 13, 2024, is being extended until May 3, 2024. Comments received during the comment period on the Draft EA and Proposed FONSI and FONPA will be fully considered when evaluating the Air Force's Proposed Action. You are encouraged to submit comments through May 3, 2024, to the Eielson Air Force Base Public Affairs Office by email at: 354FW.PA.PUBLICAFFAIRS@US.AF.MIL.

Accommodations for Individuals with disabilities will be made upon request. Individuals requesting accommodations should contact the Eielson Air Force Base Public Affairs Office at the aforementioned email or by phone at (907) 377-2116.

PRIVACY ADVISORY NOTICE
PUBLIC COMMENTS ON THIS DRAFT EA ARE REQUESTED PURSUANT TO NEPA, 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 THE FINAL EA 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.

Publish 4-11 & 4-12-2024

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA
FOURTH JUDICIAL DISTRICT

Before me, the undersigned, a notary public, this day personally appeared, Denise Wilhelm who, being first duly sworn according to law, says that she represents TriDelta, Incorporated, publisher of Delta Wind, a newspaper of general circulation published in Delta Junction in said Fourth Judicial District and State of Alaska, and that the advertisement of which the annexed is a true copy, was published in said newspaper on the following day(s):

3/14/24

and that the rate charged is not in excess of the rate charged private individuals, with the usual discounts.

Denise Wilhel
Denise Wilhelm

Subscribed and sworn before me this 6TH **day of** September**, 2024.**

T. P. Holoday
State of Alaska
Notary Public
Commission No. 240310004
My Commission Expires March 10, 2028

T.P. Holoday
Notary Public in and for the
State of Alaska
My commission expires: March 10, 2028

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA
FOURTH JUDICIAL DISTRICT

Before me, the undersigned, a notary public, this day personally appeared, Denise Wilhelm who, being first duly sworn according to law, says that she represents TriDelta, Incorporated, publisher of Delta Wind, a newspaper of general circulation published in Delta Junction in said Fourth Judicial District and State of Alaska, and that the advertisement of which the annexed is a true copy, was published in said newspaper on the following day(s):

4/11/24

and that the rate charged is not in excess of the rate charged private individuals, with the usual discounts.

Denise Wilhelm
Denise Wilhelm

Subscribed and sworn before me this 10th **day of** September**, 2024.**

T. P. Holoday
State of Alaska
Notary Public
Commission No. 240310004
My Commission Expires March 10, 2028

T. P. Holoday
Notary Public in and for the State of Alaska
My commission expires: March 10, 2028

Comments were received from members of the public, State and Federal Agencies, and local government office. The comments were submitted in various formats, including email, letters, and phone calls. The Air Force has modified the Proposed Action to remove the Dry Creek and Quartz Hill sites and revised the Final Environmental Assessment pursuant to the comments received. The Air Force has enclosed a summary of comments and responses in the table below. Comments are identified by a code indicated by the initials of the commenter, or the Agency and a sequence number based on the order the comment was received. Duplicative comments were combined.

Comment Number	Summary of Comment	Summary of Response
ADFG_1	What are the locations of the proposed sites?	Location coordinates for the proposed sites can be found in each ops site description (Section 2.4.1).
WW_1	Consider another location due to the non-motorized status of the area.	The Dry Creek site has been removed from the Proposed Action. The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
JB_1	Concerned about road expansion near property in Delta Junction.	The Air Force does not propose to expand the road near the subject property
BM_1	Consider another location due to concerns about impacts to internet connection.	The Dry Creek site has been removed from the Proposed Action. Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health."
PB_1	Consider another location due to concerns about impacts to internet connection.	The Dry Creek site has been removed from the Proposed Action. Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health."
AB_1	Consider another location due to concerns about disturbance.	The Dry Creek site has been removed from the Proposed Action. More information about ecological connectivity and wildlife corridors was added to "Section 3.9 Biological / Natural Resources." Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health."

Comment Number	Summary of Comment	Summary of Response
SB_1	Consider another location due to concerns about impacts to internet and increased noise.	The Dry Creek site has been removed from the Proposed Action. Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health." Additional details about potential air operations related to the Preferred Alternative were incorporated into "Section 3.1.2 Airspace Management and Use".
BM_2	Concerned about noise and general disturbance.	The Dry Creek site has been removed from the Proposed Action. Information about air operations and noise is located in "Section 3.1 Airspace Management and Use" and "Section 3.5 Noise", respectively.
BB_1	The link provided to Dry Creek community residents is not current.	The Draft EA can be found at: https://www.eielson.af.mil/General-Information/Environmental/
KC_1	Consider another site due to concerns about water supply and internet connection.	The Dry Creek site has been removed from the Proposed Action. Information about spills is located in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about potential impacts to water quality in "Section 3.7 Water Resources". Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health."

Comment Number	Summary of Comment	Summary of Response
CA_1	Consider another location due to concerns about wildlife, access, noise, and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. Information about spills is located in "Section 3.3 Hazardous Materials and Waste". The EA has been revised to include additional information about potential impacts to water quality in "Section 3.7 Water Resources". Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health." The Final EA has been revised to include more information about ecological connectivity and wildlife corridors in "Section 3.9 Biological/Natural Resources". Additional details about potential air operations related to the Preferred Alternative were incorporated into "Section 3.1.2 Airspace Management and Use". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
FA_1	Consider another location due to concerns about caribou and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife corridors in "Section 3.9 Biological/Natural Resources". The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy.
MGE_1	Consider another location due to concerns about wildlife.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
PM_1	Flight simulators would satisfy the stated purpose and need.	The Final EA has been revised to clarify the screening of alternatives (Section 2.3.5)

Comment Number	Summary of Comment	Summary of Response
BM_3	Consider another location due to concerns about hydrologic impacts, generator exhaust, access, and soil impacts.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. Information about spills is located in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about potential impacts to water quality in "Section 3.7 Water Resources"
AE_1	Consider another location due to the non-motorized status of the area.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
DW_1	Consider another location due to concerns about non-motorized status of the area, caribou, and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.

Comment Number	Summary of Comment	Summary of Response
DR_1	Consider another location due to concerns about non-motorized status of the area, fuel spills, constructability, cost, and caribou.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. Information about spills is located in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additonal information about potential impacts to water quality in "Section 3.7 Water Resources"
LK_1	Consider another location due to concerns about caribou and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources".
BR_1	Consider another location due to concerns about impacts to hunting and recreation	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
BC_1	Consider another location due to concerns about disturbance.	The Dry Creek site has been removed from the Proposed Action. Viewshed was addressed in "Section 3.2.2 Land Use".
DK_1	Request extension of public notice	The public notice period was extended to May 3, 2024

Comment Number	Summary of Comment	Summary of Response
BL_1	Request extension of public notice and expressed concerns about caribou	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about traffic and transportation in "Section 3.12 Transportation" and "Section 4.2.7 Transportation". The EA contains information about access roads in "Section 4.2.2 Land Use"
JS_1	Consider another location due to concerns about soil, wildlife, access, noise, and public involvement.	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about viewshed in "Section 3.2.2 Land Use", noise in "Section 3.5 Noise", and spills in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".
PA_1	Consider another location due concerns about the non-motorized status.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.

Comment Number	Summary of Comment	Summary of Response
CA_2	Consider another location due to concerns about caribou and access.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
DCR_1	Consider another location due to concerns about wildlife, access, noise, fuel spills, and agency coordination.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about viewshed in "Section 3.2.2 Land Use", noise in "Section 3.5 Noise", and spills in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".
FNSB_1	Certain permits are required for development on FNSB lands and Flood Hazard Areas.	Thank you for your comment. The Air Force will obtain the required permits prior to construction.

Comment Number	Summary of Comment	Summary of Response
PR_1	Consider another location due to concerns about non-motorized status of the area, fuel spills, constructability, cost, and caribou.	The Dry Creek site has been removed from the Proposed Action. Sections 2.2 and 2.3 describe the selection standards and alternatives analysis. The EA has been revised to include additional information about air operations in "Section 3.1.2 Airspace Management". The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about viewshed in "Section 3.2.2 Land Use", noise in "Section 3.5 Noise", and spills in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".
PW_1	Consider another location due to concerns about caribou	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources".
FNSB_2	Consider changing the name of the Birch Hill site.	The names of all the operations sites will be changed upon construction (Section 3.2.1)
CM_1	Concerned about impacts to internet connection	The Dry Creek site has been removed from the Proposed Action. Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health."
NSRL_1	Expressed support for Proposed Action	Thank you for your comment.
RD_1	Consider another location due to concerns about disturbance.	The Dry Creek site has been removed from the Proposed Action

Comment Number	Summary of Comment	Summary of Response
AN_1	Consider another location due to concerns about caribou	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources".
DT_1	Consider locations currently unsupported by the National Weather Service.	The radar operation site locations are constrained by line of sight, geography, and other factors (Section 2.2)
DO_1	Expressed support for Proposed Action	Thank you for your comment.
CX_1	Consider another location due to concerns about internet connection and fuel spills.	The Dry Creek site has been removed from the Proposed Action. Radar interference with the Dry Creek Communities wireless network/routers is not anticipated and more information about interference was added to "Section 3.4 Safety and Occupational Health." The Final EA contains information about spills in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".
DR_2	Consider another location due to concerns about non-motorized status, disturbance, and wildlife.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.

Comment Number	Summary of Comment	Summary of Response
TJB_1	Consider another location due to concerns about visual impacts, disturbance, non-motorized status, and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about viewshed in "Section 3.2.2 Land Use". Requisite permits (including fish habitat permits) will be obtained prior to construction.
EB_1	Consider another location due to non-motorized status, constructability, caribou, access, disturbance, and solicitation of public input.	The Dry Creek site has been removed from the Proposed Action. The Air Force has extended the Public Notice period to provide additional opportunities for the submission of comments on the Proposed Action in accordance with Federal law and Air Force policy. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about spills in "Section 3.3 Hazardous Materials and Waste". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".

Comment Number	Summary of Comment	Summary of Response
BM_4	Consider another location due to concerns about community impacts, wildlife, visual impacts, erosion, noise, water quality, and fuel spills.	The Dry Creek site has been removed from the Proposed Action. The Air Force has prepared an Environmental Justice analysis (Appendix C) evaluating community impacts. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation. The Final EA contains information about spills in "Section 3.3 Hazardous Materials and Waste", viewshed in "Section 3.2.2 Land Use", and noise in "Section 3.5 Noise". The Final EA has been revised to include additional information about water quality in "Section 3.7 Water Resources".
RS_1	The EA does not describe the Air Force's alternatives analysis.	Sections 2.2 and 2.3 describe the selection standards and alternatives analysis.
RS_2	The Air Force should consult with Federally-recognized tribes	Appendix A contains the Tribal Correspondence matrix and documentation of Government-to-Government consultation
RS_3	Integrate historic and contemporary use-areas and ethnographic histories.	The cultural resources section has been revised to include ethnographic history information.
RS_4	Proposed road construction could affect historic properties	The road alignments have been surveyed and the SHPO has concurred with the Air Force's determination the Proposed Action would not adversely affect historic properties.
RS_5	Analysis under Alaska National Interest Lands Conservation Act (ANILCA), Section 810 is required.	The Federal lands associated with the Proposed Action have already been withdrawn and previously subjected to analysis under Section 810

Comment Number	Summary of Comment	Summary of Response
RS_6	Increased accessibility would accentuate user conflicts and trespass.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
RS_7	The EA does not describe the impact of additional hunting pressure on caribou and sheep.	The Dry Creek site has been removed from the Proposed Action. The Final EA has been revised to include more information about ecological connectivity and wildlife in "Section 3.9 Biological/Natural Resources". The implementation of the Proposed Action would not alter the Macomb Plateau Controlled Use Area designation.
RS_8	The EJ analysis should be based on consultation with affected Tribes.	Appendix A contains the Tribal Correspondence matrix and documentation of Government-to-Government consultation
ADNR_1	Roads on State lands should conform to DNR-DOT standards	Final road designs will conform to applicable standards.
ADNR_2	Work in fish-bearing waters would require fish habitat permits from ADFG	Permits required by the final design will be obtained prior to construction.
ADNR_3	Merchantable timber cleared from State lands should be harvested and decked in accordance with ADNR-DOF BMPs.	DNR-DOF salvage best practices will be implemented to the extent practicable
ADNR_4	Use of the Quartz Lake extension road could impact recreational users.	The Quartz Hill site has been removed from the Proposed Action. Coordination was addressed in "Section 3.12.2 Transportation"
ADNR_5	Protections for the Goodpaster Trail should be maintained	The Quartz Hill site has been removed from the Proposed Action. Trail and road connections to and crossing would be considered in the final design of new access roads. This was addressed in "Section 3.12.2 Transportation"

Comment Number	Summary of Comment	Summary of Response
ADNR_6	The Quartz Hill site access road is incompatible with the Tanana Valley State Forest Management Plan.	The Quartz Hill site has been removed from the Proposed Action. The Final EA has been revised to include additional information about the TVS Management Plan in "Section 4.2.2 Land Use".
ADNR_7	Multiple sources indicate a public value for the timber resource.	Legislative designation of area and DJBR Management Plan have been acknowledged (Section 3.9.2)
ADNR_8	Clearing requirements for electrical power supply would impact timber management and wildland fire suppression.	Revisions have been made to sections 3.4.2, 3.9.2, and 3.11.2 to account for impacts to timber management and wildland fire suppression.
ADNR_9	Discuss impacts of the proposed action on the Quartz Lake Extension Road's CWA Section 404(f) silviculture road exemption	The Quartz Hill site has been removed from the Proposed Action. The Final EA has been revised to include additional information in "Section 3.9.2 Biological/Natural Resources" and "Section 3.11.2 Socioeconomic Resources and Environmental Justice".
ADNR_10	Provide additional details regarding access road features and accessibility.	Revisions have been made to Section 3.2.2 to enhance the description of access roads.
ADNR_11	Reference applicable timber salvage requirements	Revisions have been made to Section 3.9.2 to incorporate applicable references
ADNR_12	Reference the ongoing development of the 2024 Five Year Schedule of Timber Sales and timber harvest operations.	Revisions have been made to Table 4-1 to reflect current status.
EPA_1	Discuss whether the Proposed Action would expand upon or replace existing systems.	The disposition of existing sites is described in Section 4.2.2.
EPA_2	Supplement the EJ analysis using the 80th percentile and the most recent guidance.	Revisions have been made to Appendix C and Section 3.11 to reflect the application of the 80th percentile and the most recent guidance.

Comment Number	Summary of Comment	Summary of Response
EPA_3	Acknowledge Traditional Ecological Knowledge integration.	Correspondence with Federally-recognized tribes is included in Appendix A.
EPA_4	Document engagement opportunities for communities with EJ concerns.	Revisions have been made to Appendix A to document engagement.
EPA_5	Acknowledge interim CEQ guidance on assessing and disclosing climate change impacts.	Revisions have been made to Section 3.6.2, 3.7, 3.8, and Appendix B to reflect the interim CEQ guidance.
EPA_6	Describe permafrost impacts and mitigation.	Revisions have been made to Section 3.8.2 to describe impacts to permafrost.
EPA_7	Review the 2023 Final Eielson Restoration Program Atlas (dated November 2023) and update discussion of groundwater depths accordingly	Revisions have been made to Section 3.3 to describe the depth of groundwater.
EPA_8	Review the Final Remedial Investigation/Feasibility Study Open Storage Area (a) (DA995a), AAA Site #7 (FR970), and Lily Lake (b) (TM973b) Munitions Response Sites Eielson Air Force Base, Alaska United States MMRP, November 2020 and update the status of the Lily Lake MMRP site accordingly	Revisions have been made to Section 3.3 to reflect the status of the Lily Lake MMRP site
EPA_9	Table 3-3 is missing information and contains inaccurate information	Revisions have been made to Table 3-3 to correct inaccuracies and provide complete information
EPA_10	Acknowledge and comply with CEQ guidance on ecological connectivity and wildlife corridors	Ecological connectivity and wildlife corridors were addressed in "Section 3.9 Biological / Natural Resources."

Tribal Correspondence

Summary Matrices

Tribal Consultation				
Tribe	*Consult Letters Sent (Yes/No, DATE)*	*Consult Phone Call (Yes/No, DATE)*	*Consult Email (Yes/No, DATE)*	*Response Received/Contact Made (Yes/No)*
Healy Lake Village Patricia MacDonald Tribal Manager and Council President	Sent: 27 October 2024 Delivered: 9 November 2023	15 November 2023; 26 February 2024	Sent G2G letter, 15 November 2023; Sent Section 106 summary letter, 26 February 2024 14 March 2024 NOA for EA sent 19 March 2024 EA hard copy requested by tribal administrator 21 March 2024 EA hard copy provided to village office address	Yes
Native Village of Tanacross Herbert Demit President	Sent: 27 October 2024	Chris Denny, 15 November 2024; Herbert Demit, Jerry Isaac 26 February 2024; Jerry Isaac 27 February 2024	Sent G2G letter, 15 November 2023; Sent Section 106 summary letter, summary of phone conversation, and resent G2G letter, 26 February 2024 14 March 2024 NOA for EA sent	Yes
Native Village of Tetlin Michael Sam President	Sent: 27 October 2024 Delivered: 7 November 2023	15 November 2023; 26 February 2024; 1 May 2025 & 7 May 2025	14 March 2024 NOA for EA sent to tetlinvillagecouncil@gmail.com 1 May 2024 NOA resent and Section 106 letter sent to tribal council and grant manager	Yes

Northway Village William C. Albert President	Sent: 27 October 2024 Delivered: 7 November 2023	15 November 2023; 26 February 2024	Sent G2G letter to 15 November 2023; sent Section 106 summary letter to 26 February 2024 14 March 2024 NOA for EA sent 14 March Nichol Rallo requested hard copy 15 March hard copy EA mailed 26 March hard copy EA bounced back 26 March hard copy EA resent	Yes
Village of Dot Lake Tracy Charles-Smith President	Sent: 27 October 2024 Returned to sender: 28 December 2023	17 November 2023; 26 November 2024	Sent G2G letter 17 November 2023; Sent section 106 summary letter 26 February 2024	Yes
Mentasta Traditional Council Suzie Martin First Chief	Sent: 27 October 2024 Delivered: 24 November 2023	17 November 2023; 26 February 2024	Sent G2G letter 17 November 2023; sent Section 106 Summary letter and resent G2G letter 26 February 2024 14 March 2024 NOA for EA sent	Yes
CIRI, Inc Sophie Minich President & CEO, President	Sent: 27 October 2024	17 November 2023; 27 February 2024	G2G and Section 106 Letter sent 27 February 2024 14 March 2024 NOA for EA sent	Yes
Doyon, Ltd Aaron M. Schutt President & CEO	Sent: 27 October 2024 Delivered:	17 November 2023 27	Sent Section 106 letter 27 February 2024 14 March 2024 NOA for EA sent	Yes

	6 November 2023	February 2024		
Fairbanks Native Association Dr. Jessica Black President	Sent: 27 October 2024 Delivered: 15 November 2023	17 November 2023 27 November 2024	No	No
Tanana Chiefs Conference Brian Ridley Chief/Chairman	Sent: 27 October 2024 Delivered: 9 November 2023	20 November 2024; 27 February 2024; 12 March 2024; 19 & 22 March 2024; 2 April 2024	Yes Section 106 emailed to Marna Sanford 29 February 2024 14 March 2024 NOA for EA sent 22 March 2024 received email 25 March 2024 sent a summary of the project to be included in the TCC newsletter May issue. 4 April 2024 3 May received comments on EA from Bob Sattler and responded with acknowledgement of receipt	Yes
Dot Lake Corporation Melanie Brenner President	Sent: 27 October 2024 Delivered: 10 November 2023	17 November 2023	Contact same as Village of Dot Lake	See above – same as Village or Dot Lake
Mendas Chaag Corporation Ada Chapman President	27 October 2024 Delivered: 8 November 2023	15 November 2023 1 March 2024	Received email and sent response 15 November 2023 1 March 2024 Section 106 email 14 March 2024 NOA for EA sent	Yes

Northway, Inc Lorraine Titus President	Sent: 27 October 2024 Delivered: 6 November 2023	Lorraine Titus 27 February 2024	No	No
Tanacross, Inc Bob Brean President	Yes Sent: 27 October 2024	Yes, 17 November 2023 28 February 2024	Sent G2G letter 17 November 2023 Sent section 106 letters 28 February 24	No
Tetlin Inc Gary David, Sr. President	Sent: 27 October 2024 Returned to sender: 27 November 2023	17 November 2023 27 February 2024	Sent G2G letter 17 November 2023 Sent Section 106 letter 27 February 2024 14 March 2024 NOA for EA sent 16 March 2024 David Flenaugh requested a hard copy of EA 21 March 2024 Eielson a hard copy was provided to the corporation address	Yes
Tok Native Association	Sent: 27 October 2024 Delivered: 7 November 2023	17 November 2023 27 February 2024	Sent G2G letter and Section 106 letter 27 February 2024 14 March 2024 NOA for EA sent	No

Government to Government Correspondence

Government-to-Government Correspondence List	
Federally-Recognized Tribes	
Healy Lake Village 600 University Avenue, Suite 100 Fairbanks Alaska 99709	Mentasta Traditional Council P.O. Box 6019, Mentasta, Alaska 99780
Native Village of Tanacross P.O. Box 76009 Tanacross, Alaska 99776	Native Village of Tetlin P.O. Box 797 Tok, Alaska 99780
Northway Village P.O. Box 516 Northway, Alaska 99764	Village of Dot Lake P.O. Box 70488 Fairbanks, Alaska 99701
Alaska Native Corporations	
Cook Inlet Region, Inc. P.O. Box 93330 Anchorage, Alaska 99509	Dot Lake Native Corporation 615 Bidwill Avenue, Suite 407 Fairbanks, Alaska 99701
Doyon, Ltd. 1 Doyon Place, Suite 300 Fairbanks, Alaska 99701	Fairbanks Native Association 3830 Cushman Street, Suite 100 Fairbanks, Alaska 99701
Mendas Cha-ag Native Corporation P.O. Box 74983 Fairbanks, Alaska 99707	Northway Natives, Inc. P.O. Box 476 Northway, Alaska 99764
Tanacross, Inc. P.O. Box 76029 Tanacross, Alaska 99776	Tanana Chiefs Conference 122 First Avenue Fairbanks, Alaska 99701
Tetlin Native Corporation P.O. Box 657 Tok, Alaska 99780	Tok Native Association P.O. Box 372 Tok, Alaska 99780

DEPARTMENT OF THE AIR FORCE
354TH FIGHTER WING (PACAF)
EIELSON AIR FORCE BASE, AK

25 September 2023

Colonel Paul P. Townsend
Commander
354th Fighter Wing
354 Broadway Street Unit 19A
Eielson AFB AK 99702

Tracy Charles-Smith
President
Village of Dot Lake
P.O. Box 70494
Fairbanks AK 99701

Dear President Charles-Smith

I am writing to invite your consultation on a proposed United States Air Force (USAF) Federal undertaking, in accordance with Section 161 of Public Law 108-199, Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments;* and Department of Defense Instruction (DoDI) 4710.02, *DoD Interactions with Federally Recognized Tribes*. The USAF is proposing to construct radar simulator infrastructure in the Joint Pacific Alaska Range Complex (JPARC) near Eielson Air Force Base (AFB), Alaska. The purpose of this Undertaking is to modernize radar threat system training. Radar threat simulators are used by the Air Force to represent adversary nation systems however, the current radar simulators are out-of-date and are located too close together to provide realistic or adequate training. The new proposed radar technology has extended range capabilities and must be operated at more distant locations than the current radar sites within United States Army Garrison Alaska's Yukon Training Area. The radar simulators which have been selected to modernize training and represent current threats are mobile trailer-mounted radar systems that require road access and electrical power to operate. The USAF proposes to construct nine radar simulator sites along an approximately 360-mile-long by 100-mile-wide corridor, roughly bisected by the Richardson Highway (Attachment 1).

The USAF is preparing an Environmental Assessment under the National Environmental Policy Act (NEPA) to evaluate potential environmental impacts associated with the proposed radar simulator site construction. Additionally, efforts to identify potential historic properties with the proposed site locations in accordance with Section 106 of the National Historic Preservation Act (NHPA) have begun. In accordance with NEPA, NHPA, Executive Order 13175, DoDI 4710.02, Department of Air Force Instruction 90-2002, and Air Force Manual 32-7003, the purpose of this letter is to engage with Tribal governments as the United States Air Force formulates this undertaking and formally offer government-to-government consultation.

As the Eielson AFB Installation Commander, I am offering to discuss the proposed construction of radar simulator infrastructure at these nine locations in detail with you, and

would like to hear from you regarding any comments, concerns, and suggestions you may have. This includes any concerns regarding actions associated with the proposed undertaking that may affect Protected Tribal Rights or Resources. If you determine that the proposed radar simulator site construction affects Protected Tribal Rights or Resources and wish to discuss or formally consult on this, we would appreciate your response within 30 days of receiving this consultation request; however, a lack of response does not preclude your ability to consult or request government-to-government consultation on this project at any time.

If you have any questions, please contact Captain Sarah Larson, JPARC Program Manager, by phone at 907-377-3023 or email at sarah.larson.7@us.af.mil. Thank you in advance for your assistance in this effort.

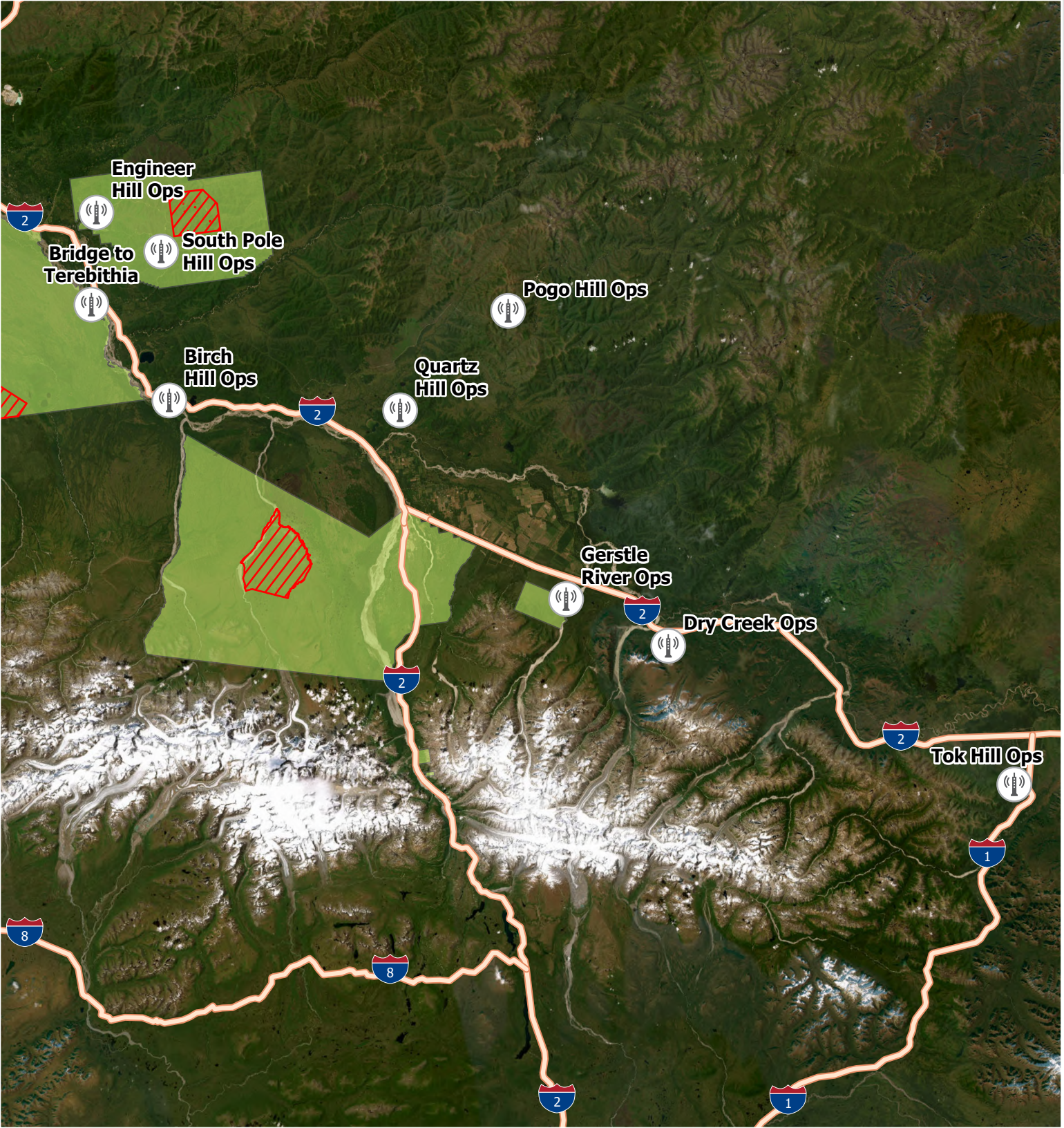
Sincerely

PAUL P. TOWNSEND, Colonel, USAF
Commander

1 Attachment:
1. Figure of Proposed Radar Simulation Site Locations, 11 Sep 23

354th Range Squadron (RANS)
Radar Operation Sites
Environmental Assessment

Alternative 1:
Develop Radar Operating Sites
on Mixed-Ownership Lands

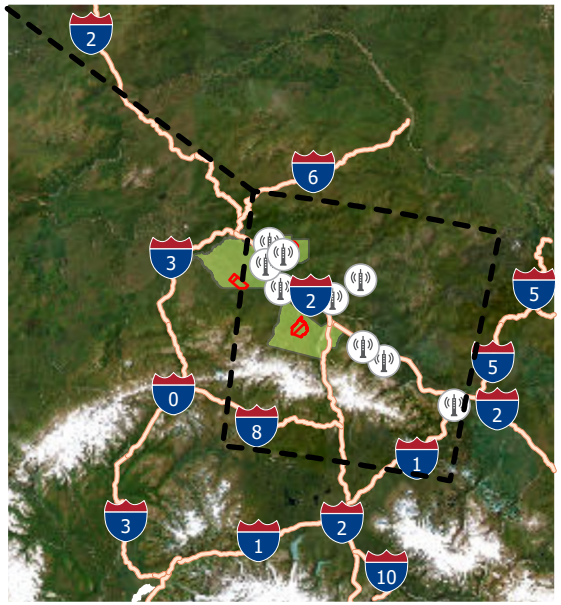


Legend

- Radar Operation Sites
- Impact Areas
- Training Areas
- Major Roads

N

0 10 20 40 Miles



Data Projection:
Universal Transverse Mercator
Zone 6N, Datum: WGS 1984
Magnetic Declination 16.37° E
+/- 0°52 changing by 0.30° W per year

National Historic Preservation Act
Section 106 Correspondence

National Historic Preservation Act of 1966, Section 106 Correspondence List	
State Agencies	
Alaska State Historic Preservation Office Office of History and Archaeology 550 West 7th Avenue, Suite 1310 Anchorage, Alaska 99501	
Local Agencies	
Fairbanks North Star Borough Historic Preservation Commission P.O. Box 71267 Fairbanks, Alaska 99707	Tanana-Yukon Historical Society P.O. Box 71336 Fairbanks, Alaska 99707
Federally-Recognized Tribes	
Healy Lake Village 600 University Avenue, Suite 100 Fairbanks Alaska 99709	Mentasta Traditional Council P.O. Box 6019, Mentasta, Alaska 99780
Native Village of Tanacross P.O. Box 76009 Tanacross, Alaska 99776	Native Village of Tetlin P.O. Box 797 Tok, Alaska 99780
Northway Village P.O. Box 516 Northway, Alaska 99764	Village of Dot Lake P.O. Box 70488 Fairbanks, Alaska 99701
Alaska Native Corporations	
Cook Inlet Region, Inc. P.O. Box 93330 Anchorage, Alaska 99509	Dot Lake Native Corporation 615 Bidwill Avenue, Suite 407 Fairbanks, Alaska 99701
Doyon, Ltd. 1 Doyon Place, Suite 300 Fairbanks, Alaska 99701	Fairbanks Native Association 3830 Cushman Street, Suite 100 Fairbanks, Alaska 99701
Mendas Cha-ag Native Corporation P.O. Box 74983 Fairbanks, Alaska 99707	Northway Natives, Inc. P.O. Box 476 Northway, Alaska 99764
Tanacross, Inc. P.O. Box 76029 Tanacross, Alaska 99776	Tanana Chiefs Conference 122 First Avenue Fairbanks, Alaska 99701
Tetlin Native Corporation P.O. Box 657 Tok, Alaska 99780	Tok Native Association P.O. Box 372 Tok, Alaska 99780

DEPARTMENT OF THE AIR FORCE
354TH FIGHTER WING (PACAF)
EIELSON AIR FORCE BASE, AK

28 November 2023

Ms. Brooks A Lawler
Cultural Resources Manager
354th CES/CEIE
2310 Central Avenue, Suite 100
Eielson AFB, AK 99702

Ms. Judith Bittner
State Historic Preservation Officer
Alaska Office of History and Archaeology
550 W. 7th Avenue, Suite 1310
Anchorage, AK 99501-3565

Dear Ms. Bittner

The United States Air Force (Air Force), 354th Range, Eielson Air Force Base (AFB) is proposing to construct radar simulator infrastructure in the Joint Pacific Alaska Range Complex (JPARC) at multiple locations in the vicinity of Eielson AFB, Alaska. To take into account various environmental concerns, the Air Force is engaging early with the appropriate resource and regulatory agencies as it formulates the undertaking. The Air Force is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with the proposed 354th Range Squadron Radar Operations Sites. In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force, Eielson AFB, is advising you of a proposed undertaking that has the potential to affect historic properties.

Description of Proposed Undertaking

The proposed undertaking consists of establishing radar operations (ops) sites at nine locations across the JPARC. The mission of the 354th Fighter Wing at Eilson AFB is to provide combat-ready airpower, advanced integration training, and a strategic Arctic basing option. Current JPARC threat radar systems represent adversary nation systems that are 30 to 40 years old and limited to locations within the United States Army Garrison Alaska's Yukon Training Area (YTA), as such these systems do not provide adequate or realistic training for the current threat landscape. The 354th Range Squadron proposes to modernize training with mobile trailer-mounted radar systems with extended range capabilities to support the Eielson AFB mission. The new proposed radar technology must be operated at more distant locations than the current radar sites within YTA to maximize training effectiveness and mission readiness.

The proposed radar ops sites will be located within a 360-mile long by 100-mile wide corridor roughly bisected by the Richardson and Alaska Highways in interior Alaska. Four of the proposed site locations are on State of Alaska (SOA) lands managed by the Department of Natural Resources, three locations are on lands managed by the U.S. Army Garrison Alaska, one

location is on lands managed by the Air Force, and one location is on Fairbanks North Star Borough (FNSB) lands. Each site will utilize existing infrastructure to the extent it will support the project, constructed single-lane gravel access roads will be 12-foot (ft) wide, electrical alignments will be cleared 30-ft wide and utilize the same corridor as the access roads where possible, and the 8-ft x 33-ft trailer-mounted radar system will be placed on a constructed gravel pad.

Area of Potential Effect

The proposed undertaking consists of nine discontinuous Areas of Potential Effect (APEs; Attachment 1 - 10). The APEs are comprised of new access routes, new powerline routes, and the area to be cleared of vegetation around where pads to support the radar will be installed (Table 1). Buffers 100-ft wide were included on either side of the access and powerline route centerlines. The APEs do not include existing commercial quarries from which material will be obtained to improve the new access routes, or existing well-maintained road infrastructure that will not be altered by the undertaking.

Table 1. Locations associated with the proposed undertaking.

Radar Ops Site	APE Acreage	Landowner	References
Bridge to Terabithia	22	U.S. Army, Fort Wainwright	CEMML 2023
Gerstle River	58	U.S. Army, Fort Wainwright	CEMML 2023
South Pole Hill	30	U.S. Army, Fort Wainwright	USAG et al. 2021
Engineer Hill	88	U.S. Air Force, Eielson AFB	CRC 2023, ES 2018, NLUR 1996
Birch Hill	53	Fairbanks North Star Borough	CRC 2023
Dry Creek	78	State of Alaska	CRC 2023
Pogo Hill	62	State of Alaska	CRC 2023
Quartz Hill	168	State of Alaska	CRC 2023
Tok Hill	253	State of Alaska	CRC 2023

Bridge to Terabithia Radar Ops

The proposed Bridge to Terabithia Radar Ops site is located in the eastern portion of Tanana Flats Training Area managed by the U.S. Army Garrison, Alaska (USAG Alaska), southwest of the Richardson Highway. A 250-ft access road would be constructed to access the site. Approximately 14 acres of vegetation would be cleared, and salvaged timber would be temporarily stockpiled within the cleared area. A 400-ft x 400-ft gravel pad would be constructed to support the radar system, and electricity would be provided by a new electrical feeder and 2.1 miles of new aerial powerline along the new and existing access routes. The Area of Potential Effect (APE) is approximately 22 acres (Attachment 2).

Gerstle River Radar Ops

The proposed Gerstle River Radar Ops site is located in the northeastern corner the Gerstle Training Area managed by USAG Alaska, south of the Alaska Highway. A 0.2-mile long

road would be constructed to access the site from the existing Tower Road. Approximately 20.5 acres of vegetation would be cleared, with salvaged timber temporarily stockpiled adjacent to the new access road. A 400-ft x 400-ft gravel pad would be constructed to support the radar system. Electricity would be provided by a new electrical feeder, about one mile of new aerial powerline, and 0.2 miles of new underground powerline along the access route. The APE is approximately 58 acres of flat terrain on an old terrace of the Gerstle River (Attachment 3).

South Pole Hill Radar Ops

The proposed South Pole Hill Radar Ops site is located in the Yukon Training Area managed by USAG Alaska, east of the Richardson Highway. A 0.5-mile long access road would be constructed along an existing trail. Approximately 17.5 acres of vegetation would be cleared, with salvageable timber temporarily stockpiled along the new access route. Three 100-ft x 100-ft gravel pads will be constructed for the radar system. Electricity would be provided by a new electrical feeder and 0.5 miles of a new aerial powerline along the access road. The APE is approximately 30 acres (Attachment 4)

Engineer Hill Radar Ops

The proposed Engineer Hill Radar Ops site is located on Eielson AFB, east of the Richardson Highway, near the northern edge of Air Force lands. An approximately 2-mile long access road would be constructed and about 26 acres of vetegation would be cleared. The salvageable timber would be temporarily stockpiled near the terminus of the new access road. Three gravel pads (two 40-ft x 100-ft pads and one 200-ft x 200-ft pad) would be constructed to support the radar system. Electricity would be provided by a new electrical feeder and approximately 1 mile of an aerial powerline along the access route. The APE is approximately 88 acres (Attachment 5).

Birch Hill Radar Ops

The proposed Birch Hill Radar Ops site is located southwest of the Richardson Highway and east of Delta Junction on FNSB lands. A new 0.75-mile long road would be constructed to access the site. Approximately 29 acres of vegetation would be cleared, and salvageable timber would be temporarily stockpiled within the cleared area. Three 100-ft x 100-ft gravel would be constructed to support the radar system. Electricity would be provided by a new electrical feeder and 0.5 miles of new aerial powerline. The APE is approximately 53 acres (Attachment 6).

Dry Creek Radar Ops

The proposed Dry Creek Radar Ops site is located south of the Alaska Highway near the Dry Creek community on SOA lands. A 3-mile long road would be constructed to access the site. Approximately 5 acres of vegetation would be cleared, and salvageable timber would be temporarily stockpiled within the cleared area. Three gravel pads (two 40-ft x 100-ft pads and one 200-ft x 200-ft pad) would be constructed to support the radar system. Additionally, a 10,000 gallon aboveground storage tank (AST) and diesel generator would be installed to provided electricity to the radar system. The APE is approximately 78 acres (see Attachment 7).

Pogo Hill Radar Ops

The proposed Pogo Hill Radar Ops site is located east of the Richardson Highway and Pogo Mine Road on SOA lands. A 1.4-mile long access road would be constructed along an existing unimproved road alignment. Up to 14 acres of vegetation would be cleared at the site; salvageable timber is not anticipated. One 150-ft x 150-ft gravel pad would be constructed to support the radar system. Electrictiy would be provided by a new electrical feeder and 1.6 miles of new aerial powerline. The APE is approximately 62 acres (see Attachment 8).

Quartz Hill Radar Ops

The proposed Quartz Hill Radar Ops site is located east of the Richardson Highway and north of Big Delta on SOA lands. A 6.3-mile long access road would be constructed primarily along the unimproved Quartz Lake Extension Forest Road. Approximately 17 acres of vegetation would be cleared, with salvageable timber temporarily stockpiled within the cleared area. One 150-ft x 150-ft gravel pad would be constructed to support the radar system. Additionally, a 5,000-gallon AST and diesel generator would be installed on site to supply electricity. The APE is approximately 168 acres (see Attachment 9).

Tok Hill Radar Ops

The proposed Tok Hill Radar Ops site is west of Highway A1, Tok Cutoff, and south of Tok on SOA lands. A 7.5-mile long road would be constructed along an existing trail to access the site. Approximately 10 acres of vegetation would be cleared, with salvageable timber temporarily stockpiled within the cleared area. Three gravel pads (two 40-ft x 100-ft pads and one 200-ft x 200-ft pad) would be constructed to support the radar system. Electricity would be provided by a new electrical feeder and 3.1 miles of new aerial powerline. The APE is approximately 253 acres (see Attachment 10).

Cultural Resources

Previous Cultural Resources Investigations

The proposed South Pole Hill Radar Ops site is in the Yukon Training Area, within an area previously surveyed by the USAG Fort Wainwright. Consultation with Fort Wainwright archaeologists indicates that no additional cultural resources survey is needed for the proposed location and that no cultural resources are known within the APE (Pers. Comm., Dr. Julie Esdale, November 16, 2022; CEMML 2023). The development of military infrastructure at this location is addressed under a Programmatic Agreement regarding the operation, maintenance, and development of Army-managed lands (USAG et al. 2021).

In 1995, Northern Land Use Research, Inc. (NLUR) was contracted to inventory and evaluate non-military cultural resources on Eielson AFB to satisfy NHPA Section 110 requirements. Their survey design was based on a predictive model and included pedestrian survey of 5,459.72 acres. The proposed Engineer Hill Radar Ops site is located within one of

NLUR's identified high-probability areas for non-military cultural resources. While the purpose of the 1995 survey was not to identify military cultural resources, NLUR did report "recent use sites" in an appendix. Within the Engineer Hill Radar Ops site APE, NLUR identified Recent Use Site 4A, which G. Von Reuden told them was known locally as the "Trapper's Cabin." They stated that it was "unclear as to whether this site is military related, [but] based upon the c-ration cans and MRE packets this area has been used by military personnel for recreational purposes" (NLUR 1996:I-11). Recent Use Site 6A was also identified within the APE. This site was comprised of 17 features which NLUR interpreted as foxholes. Each of these foxholes were measured; however, as the site was of "recent military origin, no site map was drawn" (NLUR 1996:I-13). The Engineer Hill APE was resurveyed by Cultural Resources Consultants, LLC (CRC) in 2023 as best practice to update the 1996 survey results.

In 2014 and 2015, CRC was contracted to survey the entirety of the Pogo Transmission Line corridor, part of which is adjacent to the proposed Pogo Hill Radar Ops site. CRC did not identify any cultural resources along the section of powerline in the high alpine area near the Pogo Hill APE (CRC 2016).

Cultural Resources Survey Results

Prior to this effort, archaeological investigations had only been conducted at one of the nine proposed radar ops sites. No known archaeological investigations had ever been conducted at seven of the proposed locations, and the 1996 archaeological investigation at the proposed radar ops site on Engineer Hill had been geared towards non-military cultural resource identification and evaluation. In order to identify potential historic properties in the APEs in accordance with 36 CFR § 800.4(b), cultural resources surveys were conducted at eight of the proposed radar ops sites between June and September of 2023. Two locations (Bridge to Terabithia, Gerstle River) were surveyed by Julie Esdale (PhD), Robert Nethken (BS), and Whitney McLaren (BA) of the Center for Environmental Management of Military Lands at Colorado State University (CEMML 2023). Six locations (Engineer Hill, Birch Hill, Dry Creek, Pogo Hill, Quartz Hill, Tok Hill) were surveyed by Aubrey Morrison (MA) and Haley McCaig (BA) of CRC. The surveys conducted by CRC on SOA lands were carried out under State Cultural Resources Investigation Permit 2023-71 (CRC 2023). Both CEMML and CRC documented their cultural resources surveys with mapping-grade GPS units.

Bridge to Terabithia Radar Ops

The proposed Bridge to Terabithia Radar Ops site is located on flat terrain in the Tanana River floodplain. Archaeologists investigated the APE on July 3, 2023, conducting a pedestrian survey and excavating two round shovel tests. Neither shovel test yielded cultural material, and no archaeological sites or historic structures were discovered during the survey (CEMML 2023).

Gerstle River Radar Ops

The proposed Gerstle River Radar Ops site is located on flat terrain on an old terrace of the Gerstle River. Archaeologists investigated the APE on June 14, 2023, conducting a pedestrian survey and excavating two round shovel tests. Neither shovel test yielded cultural

material. Two linear push-piles of unknown date were observed: one push-pile ran northeast-southwest and parallel to an anthropogenic clearing, while the second push-pile paralleled an old dirt trail running northwest-southeast. No archaeological sites or historic structures were discovered during the survey (CEMML 2023).

Engineer Hill Radar Ops

The proposed Engineer Hill Radar Ops site is located on a hill at an elevation just over 1,000-ft. The area is roughly 900-ft higher than the surrounding valley floor, and is about 1 mile northeast of Lily Lake. Archaeologists conducted a pedestrian survey of the APE in September 2023. Eighteen shovel tests were excavated in the APE. Shovel tests consisted of square excavations measuring 50 x 50 centimeters (cm); all excavated sediments were screened using 1/8-inch screen, except for certain field conditions (e.g., saturated and sticky matrices) where 1/4-inch screen was used. The only cultural material identified in the shovel tests was an extremely friable foil-like substance, likely from a cigarette or food package, recovered from a shovel test excavated in a defensive fighting position (DFP) feature (CRC 2023).

Ground-surface disturbances identified in the APE included clearing and dozing for roads and other purposes, explosives detonation craters, and DFP features. A total of 36 DFP features were documented within the APE (CRC 2023). These DFP features appear to be modern; it is likely that they are associated with the 17 "foxholes" identified as Recent Use Site 6A in 1995 (NLUR 1996:I-13). CRC also relocated the "Recent Use Site 4A" cabin complex identified in 1995 (NLUR 1996:66, I-11; CRC 2023). This cabin complex was found within the APE, north of an existing access road to the top of Engineer Hill. It consists of a multi-part cabin, an outhouse, and remnants of a small metal mobile radio shelter. Examination of historical aerial imagery revealed that the cabin complex was not built before 1974. CRC also identified a small can dump comprised of three knife-opened coffee cans, a Welch's grape juice can, and part of a wooden crate was identified southeast of the proposed radar pad. The coffee cans were too degraded to determine the brand or manufacture date, but the Welch's can likely dates to the 1960s (CRC 2023).

Birch Hill Radar Ops

The proposed Birch Hill Radar Ops site is located on a hill approximately 0.5 miles north of the Tanana River, roughly 800 ft above the surrounding valley floor. Archaeologists conducted a pedestrian survey of the APE in September 2023, permissions provided by Bryan Sehmel, Land Officer, FNSB. Multiple 50 x 50 cm shovel tests were excavated and screened; however, no cultural materials were recovered. No archaeological or historical sites were discovered during the survey (CRC 2023).

Dry Creek Radar Ops

The proposed Dry Creek Radar Ops site is located near the top of a hill at approximately 2,600-ft elevation. Archaeologists conducted a pedestrian survey of the APE in September 2023 under SCRIP# 2023-71. Multiple 50 x 50 cm shovel tests were excavated and screened;

however, no cultural materials were recovered. No archaeological o rhistorical sites were discovered during the survey (CRC 2023).

Pogo Hill Radar Ops

The proposed Pogo Hill Radar Ops site is located on a large, 4,000 ft elevation landform. Archaeologists conducted a pedestrian survey of the APE in September 2023 under SCRIP# 2023-71. Pogo Hill currently supports modern communication equipment associated with the nearby Pogo Mine, and the rocky ground surface shows evidence of large tracked heavy machinery being driven around the area. Due to the lack of sedimentation, only limited shovel testing was conducted. Erosian faces and rock outcroppings were closely examined for evidence of cultural resources. No cultural materials were identified, and no archaeological or historical sites were discovered during the survey (CRC 2023).

Quartz Hill Radar Ops

The proposed Quartz Hill Radar Ops site is located on a hill at an elevation of approximately 2,000 ft. The APE is about 3.75 miles northeast of Quartz Lake and 0.75 miles northwest of Indian Creek. Archaeologists conducted a pedestrian survey of the APE in September 2023 under SCRIP# 2023-71. Multiple 50 x 50-cm shovel tests were excavated and screened; however, no cultural materials were recovered. Ground disturbance in the APE included sawn tree stumps and a two-track access road. No archaeological or historical sites were discovered during the survey (CRC 2023).

Tok Hill Radar Ops

The proposed Tok Hill Radar Ops site is located on a heavily-disturbed hill approximately 6 miles northwest of the Tok River. Archaeologists conducted a pedestrian survey of the APE in September 2023 under SCRIP# 2023-71. The proposed radar pad locations are in a parking lot-style area strewn with modern hunting debris, including fire pits and a tipped-over outhouse. Modern marten traps and four-wheeler trails noted within the APE.

Multiple 50 x 50-cm shovel tests were excavated and screened; however, no subsurface cultural materials were recovered. Several surface isolates were documented throughout the APE, including 1960s-era pull tab soda cans, six culturally-modified trees consisting of bark-stripped birch ranging from 15–24 cm in diameter at breast height (indicating less than 50 years of growth), a small scatter of car parts and oil cans which could not be definitively dated, and a World War II-era wooden crate containing several blocks of trinitrotoluene (TNT). The TNT was packaged in cans labeled: “HIGH EXPLOSIVE / TNT / ½ POUND NET / CORPS OF ENGINEERS / DANGEROUS” (CRC 2023). Due to the hazard the crate of TNT represented to public safety, it was reported to the State of Alaska Emergency Operations Center, the U.S. Army Corps of Engineers Emergency Operations Department, the Alaska State Troopers, and Eielson AFB. At the request of the Alaska State Troopers, and in accordane with 40 CFR § 264.1(g)(8)(i)(D), the Eielson AFB Explosive Ordinance Disposal (EOD) Team responded to the discovery and conducted a controlled demolition of the TNT on site.

In addition to the scattered historical surface isolates, approximately 3 miles of the proposed access road was found to follow a portion of the original Tok Cutoff Highway. The Tok Cutoff Highway was built by the U.S. Army Corps of Engineers in 1943 during World War II. Historical aerial imagery shows a later realignment of the Tok Cutoff Highway bypassed this original section of the road, leaving it relatively intact (CRC 2023).

Based on the Alaska Heritage Resources Survey (AHRS) Mapper, the proposed powerline route was expected to cross the previously-identified Moose/Caribou Fence (TNX-00118); however, archaeologists were unable to relocate it within the APE. The proposed powerline will intersect the historical Eagle Trail, which appears to continued to be frequently used by both vehicle and four-wheeler traffic (Attachment 10). The Eagle Trail preceeded the construction of the Tok Cutoff Highway, and historically ran between the communities of Valdez and Eagle, Alaska. The historical trail is more than 400 miles long, and only 200 feet of the route — where the aerial powerline crosses the trail plus a 100-ft buffer on either side of it — lies within the APE (CRC 2023).

Evaluation of Eligibility for the National Register

The surveys conducted in support of the proposed undertaking identified one previously-unrecorded cultural resource older than fifty years: the Tok Cutoff Highway Segment (AHRS No. *forthcoming*). The Tok Cutoff Highway Segment was identified within the Tok Hill Radar Ops site APE. CRC provided a recommendation on the eligibility of the property for listing in the National Register of Historic Places (NRHP) in their survey report (CRC 2023), on which the below analysis is based. CRC (2023) has recommended that the Eagle Trail be evaluated as a whole linear feature; however, less than 0.01% of Eagle Trail lies within the Tok Hill Radar Ops site APE, and it is beyond the scope and authority of this undertaking to conduct additional surveys outside of the APEs.

Tok Cutoff Highway Segment

Historic Context and Period of Significance

An appropriate historic context within which to evaluate the significance of the Tok Cutoff Highway Segment was produced by the Alaska Department of Transportation and Public Facilities in 2014 (Mead & Hunt and CRC 2014). The modern Tok Cutoff is considered part of a Glenn Highway and is designated as interstate highway A-1, beginning at Gulkana and ending at Tok, Alaska. The southern half of the Tok Cutoff includes a branch off the Richardson Highway from Gulkana to Nabesna, Alaska which was originally constructed in the early 1930s (Mead & Hunt and CRC 2014:65). By 1934, half of the 107-mile road was improved for automobile traffic. It was not until World War II, during the construction of the Alaska Highway, that the 97th Regiment of the U.S Army Corps of Engineers, a segregated Black unit, constructed a road from Slana to the Tanana River, completing the Tok Cutoff Highway in 1943 (Mead & Hunt and CRC 2014:186). The Alaska Road Commission reconstructed and paved the Tok Cutoff Highway in the early 1950s to provide year-long access to the Alaska Highway for communities and military bases in Valdez, Fairbanks, and Anchorage (Mead & Hunt and CRC 2014:88). The

State of Alaska Department of Highways repaired the road after the 1964 earthquake (Mead & Hunt and CRC:107).

The Tok Cutoff Highway Segment surveyed in September 2023 comprises 3 miles of a 7-mile section of the original World War II-era highway that was bypassed during a later realignment of the Tok Cutoff, sometime before 1954. The period of significance for this segment of the highway is 1943–1945.

Application of National Register Criteria for Evaluation

The Alaska Department of Transportation and Public Facilities has produced a methodology for evaluating the National Register significance of historical Alaskan roads (Mead & Hunt 2014). They note that it is important to first consider the significance of the entire road, followed by an evaluation of the integrity of the segment of road that would be impacted by a proposed project (Mead & Hunt 2014:11). The segment of road that would be impacted by the proposed Tok Hill Radar Ops site is part of the northern half of the Tok Cutoff Highway, which was constructed by the military in 1943.

Criterion A: Association with events that have made a significant contribution to the broad patterns of history. To meet the significance requirements of Criterion A, an Alaskan road must have a "direct and important association with single events, a pattern of events, repeated activities, or historic trends" (Mead & Hunt 2014:12). A road significant for its association with transportation must also be associated with agriculture, community planning and development, entertainment/recreation/conservation, industry, military, and/or politics/government. A road is considered to be directly associated with military significance if it "established or improved access to a mission critical military facility" and/or "facilitated specific activities or strategic access deemed critical for national defense" (Mead & Hunt 2014:20).

The northern segment of the Tok Cutoff **is significant under Criterion A** for its direct association with World War II military transportation in Alaska. The Tok Cutoff Highway Segment was constructed by the U.S. Army and, in tandem with new and existing roads, established a direct overland route from the contiguous United States to mission-critical military installations in Alaska. Overland access to interior Alaska was considered important at the time for national defense.

Criterion B: Association with the lives of significant persons. To meet the significance requirements of Criterion B, an Alaskan road must "best exemplify a person's contributions to history; mere association with a road, such as involvement in design or construction, would not render a road significant under Criterion B" (Mead & Hunt 2014:12). The north Tok Cutoff Highway Segment **is <u>not</u> significant under Criterion B**. Although the 97th Regiment constructed the road, their completion of the Tok Cutoff was a side project and the unit's greatest contribution to history was the Alaska Highway.

Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represents a significant and

distinguishable entity whose components may lack individual distinction. To meet the significance requirement of Criterion C, an Alaskan road must "reflect design features or construction practices that were the result of uncommon, early, or specific contributions or advances in the application of engineering principles" (Mead & Hunt 2014:22). The Tok Cutoff Highway Segment **is <u>not</u> significant under Criterion C** because the road does not embody distinctive characteristics, represent the work of a master, or possess high artistic value.

Criterion D: Having yielded, or having the potential to yield, information important in prehistory or history. The Tok Cutoff Highway Segment is a dirt road with no unique physical characteristics or associated artifacts. It is unlikely to provide important information about the past and is therefore **<u>not</u> significant under Criterion D**.

Consideration of Integrity

According to Mead & Hunt (2014:27), "assessing integrity is usually focused more narrowly on the segment of road within the APE. In assessing historic integrity, a road or segment of road with significance needs to convey the essential physical features and be of a distance long enough to provide a sense of time and place and travel experience related to the period(s) of significance." The 3-mile section of the original Tok Cutoff Highway within the APE has a very narrow period of significance; the road served a critical purpose during World War II. By 1954, the modern alignment of the Tok Cutoff Highway had been constructed, completely bypassing the Tok Cutoff Highway Segment.

In the intervening years, the Tok Cutoff Highway Segment has been used recreationally for hunting and logging. The total bypassed segment is 7 miles long, but the 3-mile section within the APE is the most heavily-trafficked and modified. Based on descriptions of the original Tok Cutoff Highway constructed during World War II, the 3-mile section of the road within the APE has had culverts installed, pullouts constructed, and embankments bulldozed since its period of significance.

According to Mead & Hunt (2014:32), the most important aspects of integrity for a historical road that is significant under Criterion A are *location*, *design*, and *association*. The Tok Cutoff Highway Segment is within its original alignment and retains integrity of *location*. But the modern alterations to the road, including the pullouts, embankments, and culverts, have negatively affected its integrity of *design* and *association*, making it no longer expressive of its period of significance.

Eligibility for Listing in the National Register

For a property to qualify for the National Register "it must meet one of the National Register Criteria for Evaluation… *and* retain historic integrity of those features necessary to convey its significance" (NSP 1997:3). Although the Tok Cutoff Highway Segment meets the requirements of National Register Criterion A with its direct association with World War II military transportation in Alaska, it does not retain sufficient integrity to demonstrate its historic

significance. The Air Force has therefore determined that the Tok Cutoff Highway Segment is **not eligible for listing in the NRHP**.

Assessment of Effect

Prior to the surveys conducted in 2023, two cultural resources were known to be located within the proposed undertaking's APEs (AHRS 2023). Archaeological investigations in support of this undertaking have identified additional properties within the APEs (Table 2).

Table 2. Known cultural resources in the vicinity of the proposed undertaking.

AHRS No.	Site Name	National Register Status	In APE?
FAI-01766	Engineer Hill Munitions Area Historic District	*Pending (Eligible)*	No
TNX-00118	Moose/Caribou Fence	Unevaluated	**Yes**
XBD-00409	Richardson Highway	Unevaluated	No
XBD-00455	Shaw Creek Basin Archaeological District	**Eligible**	**Yes**
XMH-01164	Gerstle River Testing Site	Not Eligible	No
XMH-01473	Haines-Fairbanks Pipeline Corridor	Unevaluated	No
forthcoming	Tok Cutoff Highway Segment	*Pending (Not Eligible)*	**Yes**
forthcoming	Eagle Trail	Unevaluated	**Yes**

Both the Pogo Hill and Quartz Hill Radar Ops sites are within the boundaries of the Shaw Creek Basin Archaeological District (XBD-00455); however, no cultural resources associated with the Shaw Creek Basin Arcaheological District were identified during cultural resources surveys of their APEs.

The Moose/Caribou Fence (TNX-00118) is supposedly within the APE of the Tok Hill Radar Ops site; however, a pedestrian survey of the location was not able to relocate it.

Three miles of the 7-mile long Tok Cutoff Highway Segment is within the Tok Hill Radar Ops APE. The Air Force intends to use this section of the Tok Cutoff Highway Segment for access to the proposed Tok Hill Radar Ops site. The current dirt road is well-built and will likely require little improvements to support the Eielson AFB mission. Additionally, use of the road by military vehicles is keeping with its historic purpose as a military transportation route.

Approximately 200-ft of the more than 400-mile long Eagle Trail lie within the Tok Hill Radar Ops APE. The proposed new aerial powerline will cross over the trail; no physical disturbance to the trail or restriction of current traffic is anticipated.

Conclusion

Eielson AFB has reviewed existing information on historic properteis with the proposed undertaking's APEs and has made a reasonable and good faith effort to identify historic properties by conducting cultural resources surveys within the APEs. The Air Force has determined that the Tok Cutoff Highway Segment (AHRS No. *forthcoming*) is not eligible for

the National Register of Historic Places. There is one historic property within the undertaking's APEs: the Shaw Creek Basin Archaeological District (XBD-00455). However, Eielson AFB has reviewed the Criteria of Adverse Effect and have determined that none apply to the activities that would be carried out in this undertaking.

Purusant to 36 CFR § 800.5(b), the Air Force has determined that there would be no adverse effect to historic properties by the 354th Range Squadron Radar Operations Sites. Attached for your review are relevant figures supporting the Air Force's findings and determinations.

We request your comment and/or concurrence on both the determination that the Tok Cutoff Highway Segment is *not eligible* for the National Register and on the finding of *No Adverse Effect*. If we do not receive your comments and/or concurrence within the required 30 days we will assume concurrence and proceed with the undertaking as described.

Please contact Ms. Brooks Lawler, Cultural Resources Manager, by phone at 907-377-4253 or email at brooks.lawler@us.af.mil, if you have any questions.

Sincerely,

Brooks Ann Lawler

BROOKS A. LAWLER, GS-12, DAF
Cultural Resources Manager,
354th CES/CEIE

Attachments:
1. Figure 1: Overview of Proposed Radar Locations and Vicinity
2. Figure 2: Bridge to Terabithia Radar Ops APE
3. Figure 3: Gerstle River Radar Ops APE
4. Figure 4: South Pole Hill Radar Ops APE
5. Figure 5: Engineer Hill Radar Ops APE
6. Figure 6: Birch Hill Radar Ops APE
7. Figure 7: Dry Creek Radar Ops APE
8. Figure 8: Pogo Hill Radar Ops APE
9. Figure 9: Quartz Hill Radar Ops APE
10. Figure 10: Tok Hill Radar Ops APE

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Engineer Hill

South Pole Hill

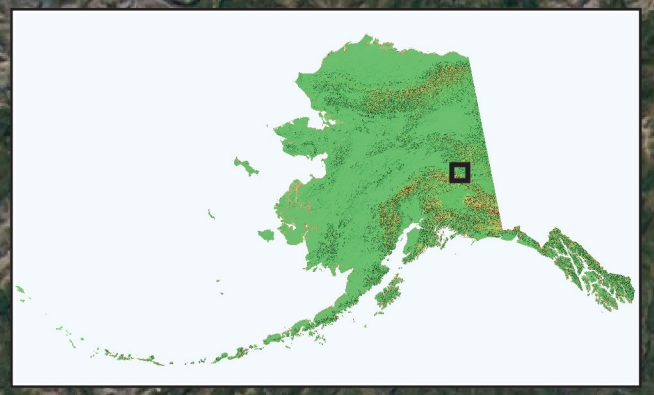
Richardson Highway

Bridge to Terabithia

Birch Hill

Pogo Hill

Quartz Hill



354th Range Squadron Radar Operation Sites

Radar Ops Sites

Highways

20 miles

Alaska Highway

Gerstle River

Dry Creek

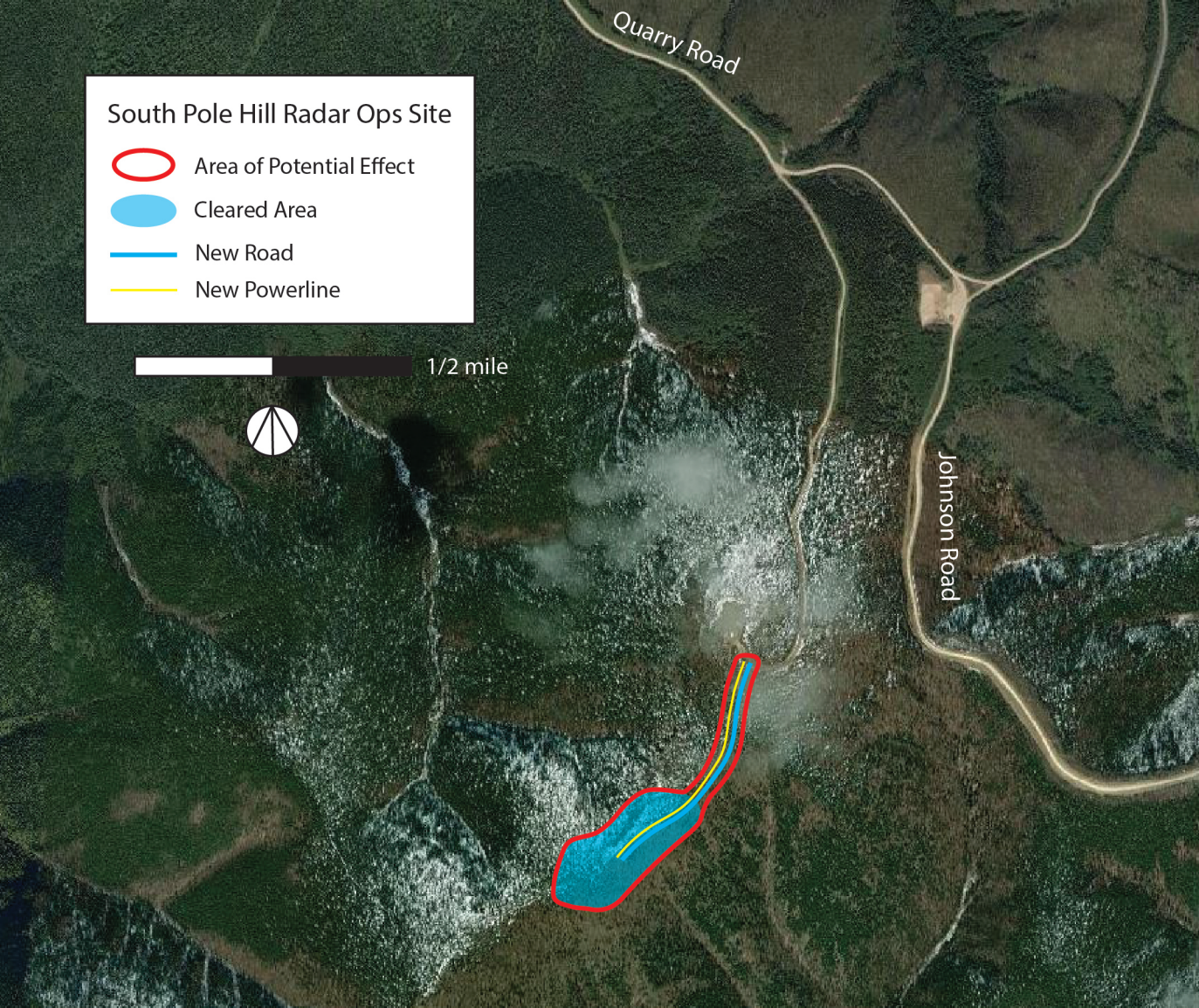
Tok Hill

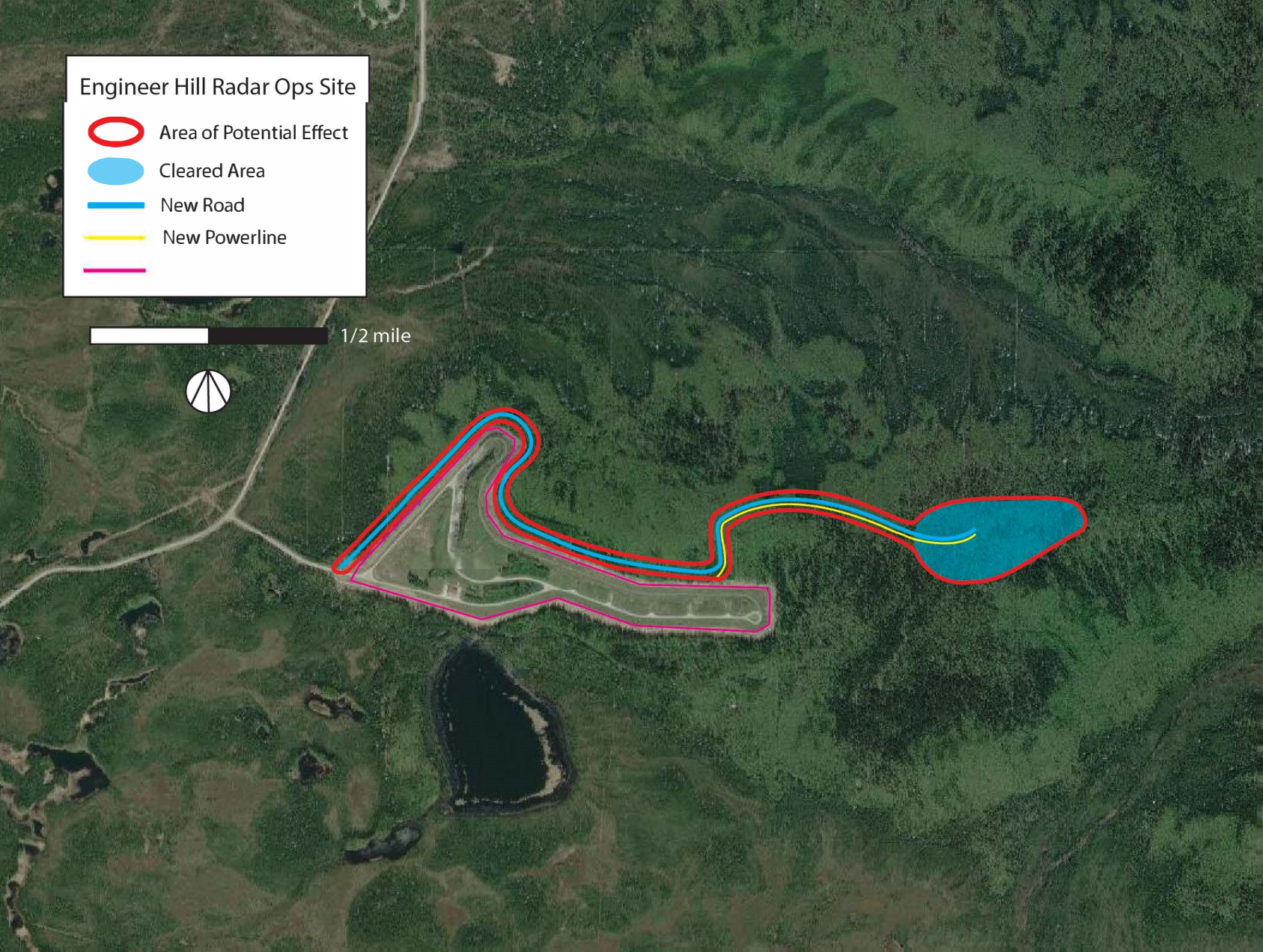
Tok Cut-Off Highway

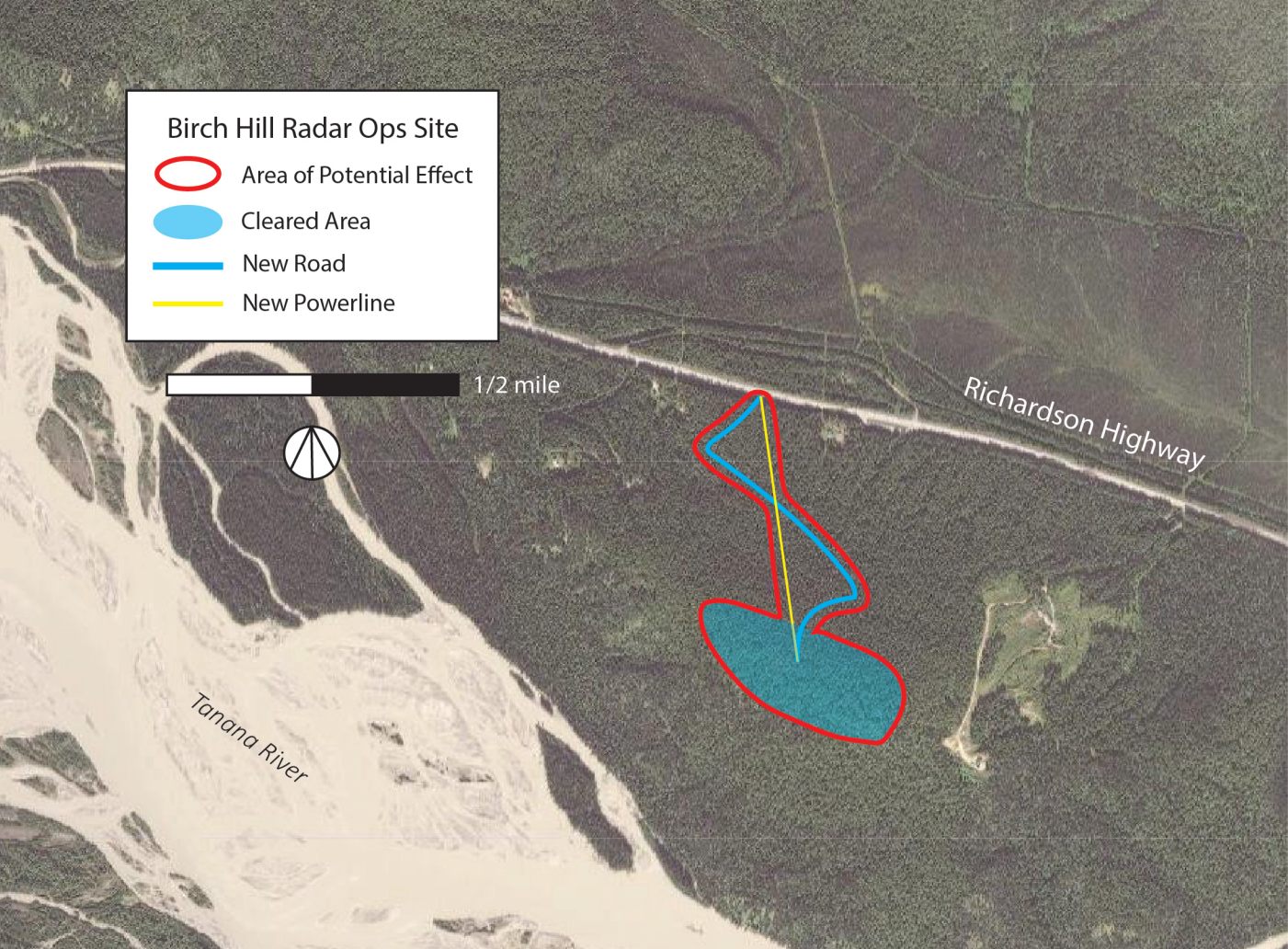
Image Landsat / Copernicus

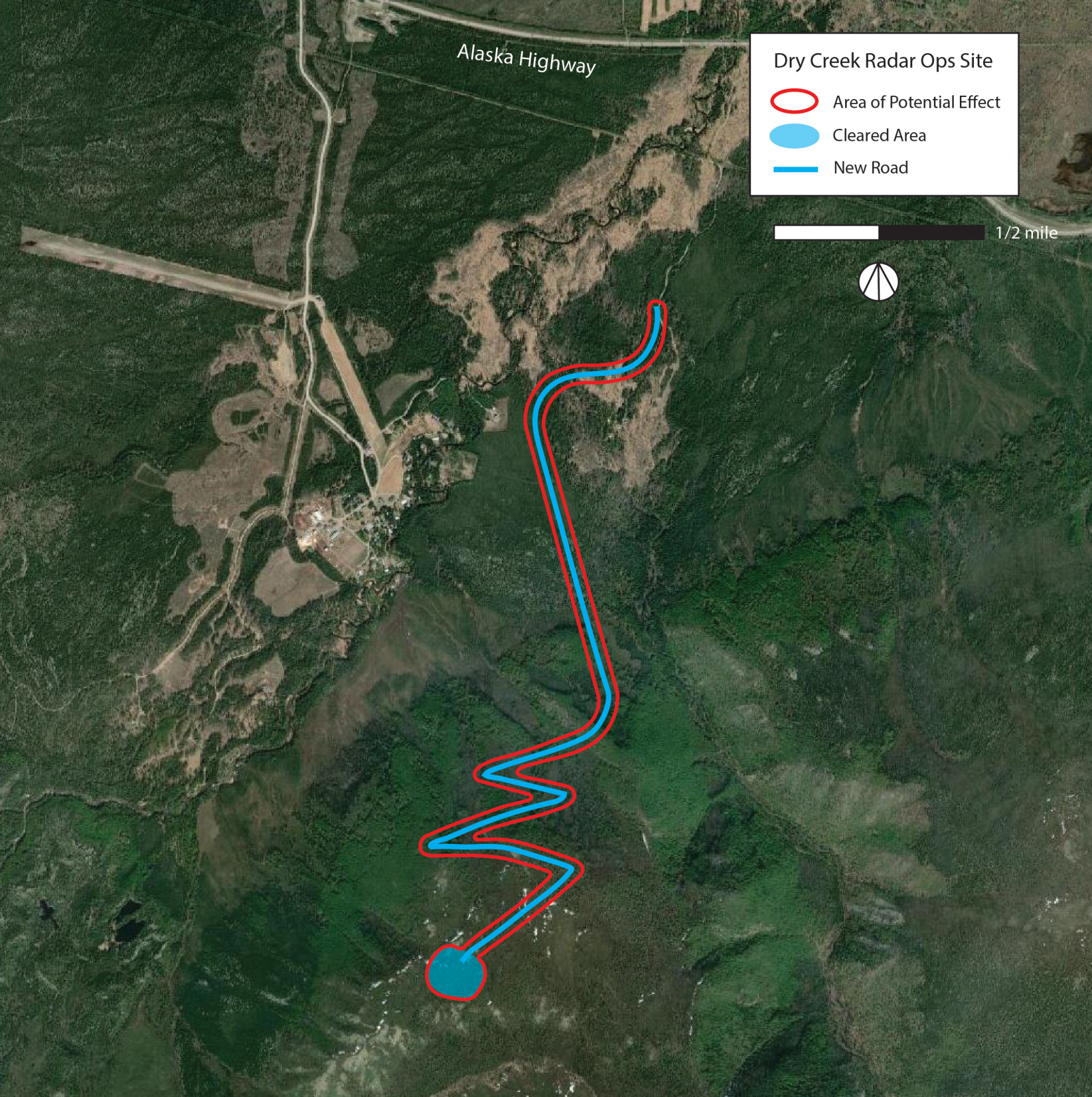

Bridge to Terabithia
Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
1/2 mile
Richardson Highway

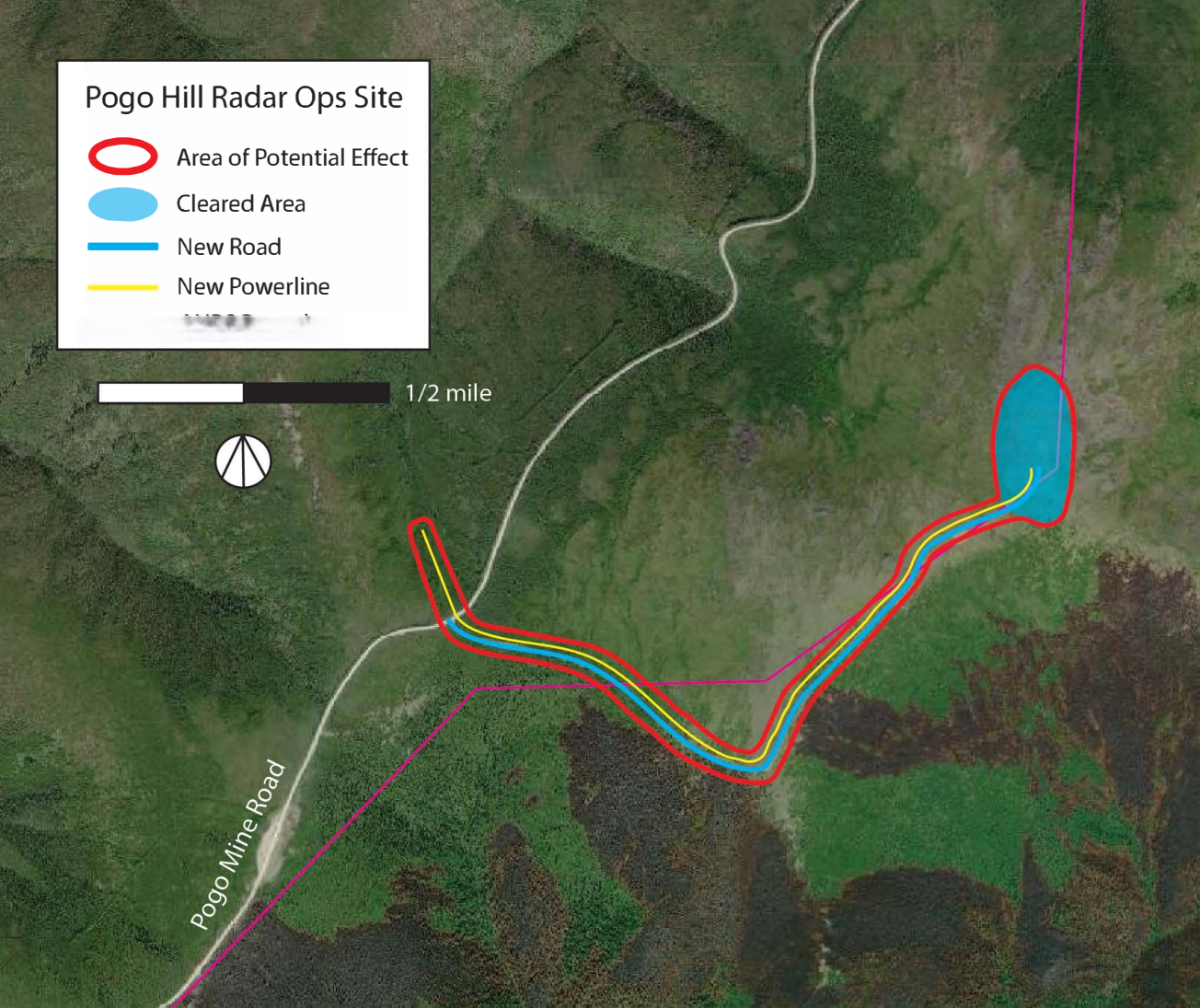

Gerstle River Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
New Underground Powerline
1/2 mile
Tower Road
Gerstle River

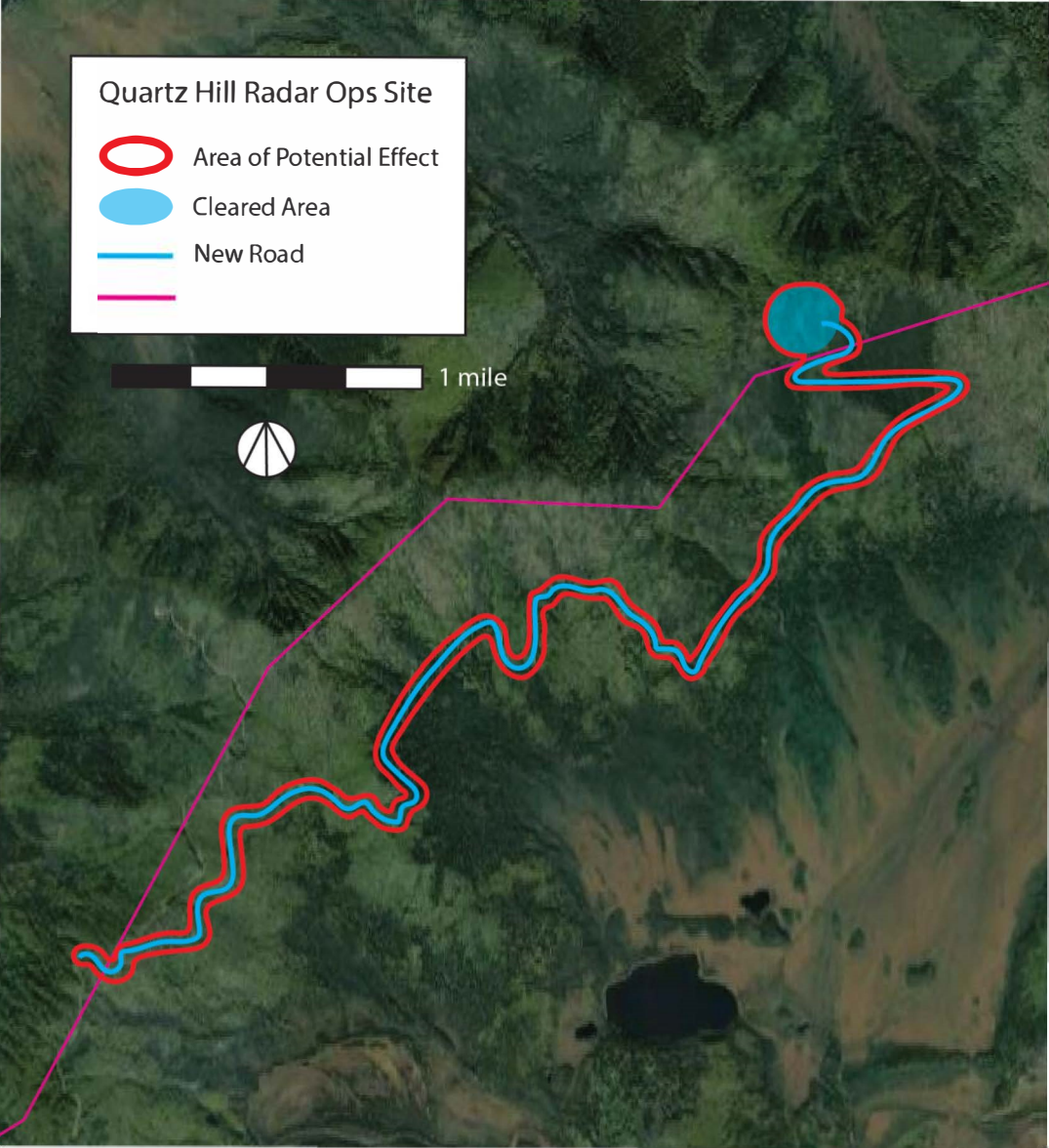

South Pole Hill Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
1/2 mile
Quarry Road
Johnson Road

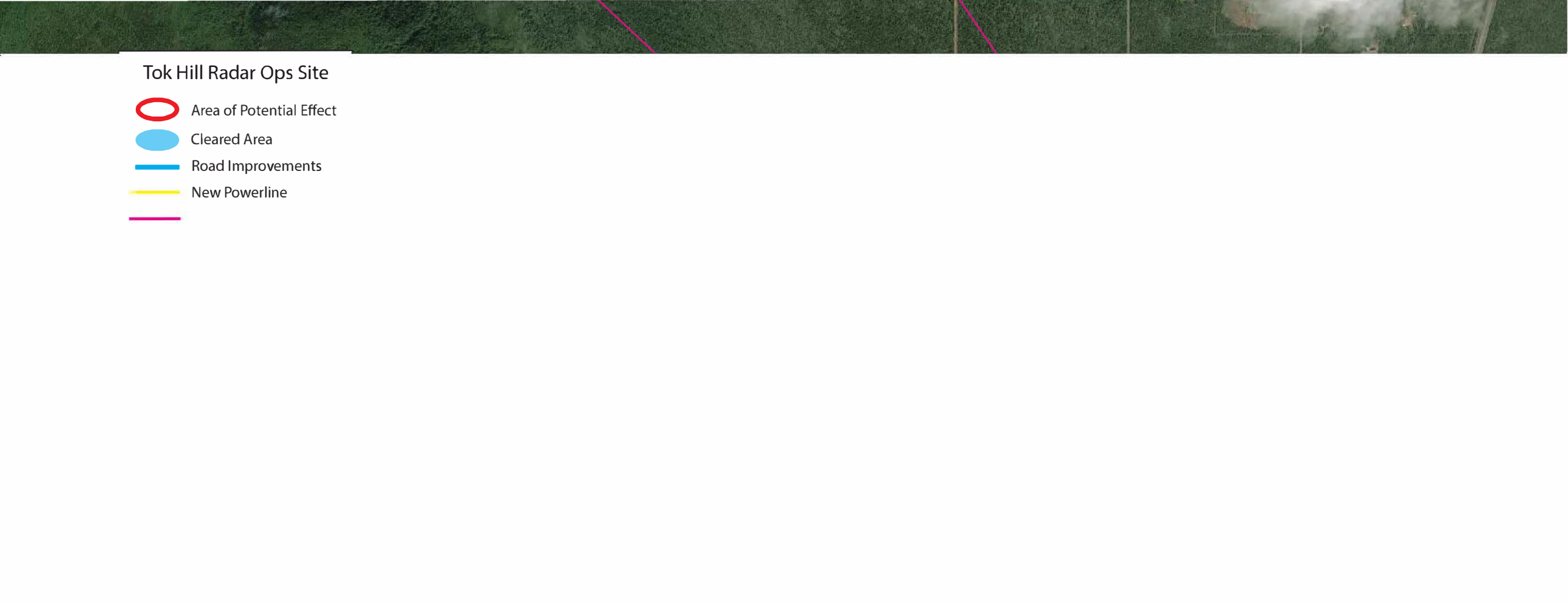

Engineer Hill Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
1/2 mile


Birch Hill Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
1/2 mile
Richardson Highway
Tanana River


Alaska Highway
Dry Creek Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
1/2 mile


Pogo Hill Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
New Powerline
1/2 mile
Pogo Mine Road


Quartz Hill Radar Ops Site
Area of Potential Effect
Cleared Area
New Road
1 mile


Tok Hill Radar Ops Site
Area of Potential Effect
Cleared Area
Road Improvements
New Powerline

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources
DIVISION OF PARKS AND OUTDOOR RECREATION
Office of History & Archaeology

550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3561
907-269-8700
http://dnr.alaska.gov/parks/oha

January 30, 2024

File No.: 3130-1R AF / 2023-01326

Brooks Lawler
Cultural Resources Manager
354th CES/CEIE
2310 Central Avenue, Suite 100
Eielson AFB, AK 99702
brooks.lawler@us.af.mil

Subject: 354th Range Squadron Radar Operations Sites

Dear Ms. Lawler:

The Alaska State Historic Preservation Officer (AK SHPO) received your request for concurrence (dated November 28, 2023) regarding the subject undertaking on December 8, 2023. Our office requested copies of the reports that supported the US Air Force (USAF) 's finding of effect on December 20, 2023. We received the reports titled *Archaeological Investigations of Proposed Air Force Radar Sites on USAG Alaska-Managed Lands* and *Cultural Resources Survey for the 354th Range Squadron Radar Operations Sites, AKV402* on December 20, 2023 and January 18, 2024, respectively. We reviewed the provided documentation pursuant Section 106 of the National Historic Preservation Act, and we offer the following comments for your consideration.

USAF requested concurrence from the AK SHPO that the seven-mile long Tok Cutoff Highway Segment (TNX-00293) is not eligible for listing in the National Register of Historic Places (NRHP). The historic context demonstrated that the property is directly associated with WWII and was a mission-critical resource for the US military, but the three miles of the segment within the APE lacked integrity. There are other factors that we believe should be considered to fully assess whether the property is eligible for listing in the NRHP. The scope of the investigation did not encompass the integrity of the bypassed road segment that was outside the APE nor did the investigation compare this segment to other segments of the Tok Cutoff or Alaska Highway.

Diminished integrity in some situations may not preclude eligibility for the NRHP. In this case, we recommend that a determination of NRHP eligibility assess the integrity of the whole segment and discuss how this segment compares to other segments of the Tok Cutoff. Our recommendation is based on the property's national significance, and the possibility that this segment may represent the best-preserved section of the Tok Cutoff in existence today. In consideration of the Tok Cutoff Highway Segment's national significance we recommend the USAF treat the property as eligible for the purposes of this undertaking. This will allow for a more detailed assessment of the property's integrity and NRHP eligibility in the future.

We believe a finding of no adverse effect is appropriate for the subject undertaking with the *assumed* eligibility for the NRHP of the Tok Cutoff Highway Segment (TNX-00293) as USAF does not plan on making any improvements or modifications to the property. This assumption of eligibility is only for the purposes of this project. No formal determinations on eligibility were made as a result of this review.

Please note that our office may need to re-evaluate our concurrence if changes are made to the project's scope or design, or comments are received from other consulting parties. 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. Our response 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 NRHP eligibility criteria (36 CFR 60.4), in consultation with our office.

Thank you for the opportunity to review and comment. Please contact Sarah Meitl at 907-269-8720 or sarah.meitl@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner
State Historic Preservation Officer

JEB:sjm

DEPARTMENT OF THE AIR FORCE
354TH FIGHTER WING (PACAF)
EIELSON AIR FORCE BASE, AK

26 February 2024

Ms. Brooks A Lawler
Cultural Resources Manager
354th CES/CEIE
2310 Central Avenue, Suite 100
Eielson AFB, AK 99702

Herbert Demit
President
Native Village of Tanacross
P.O. Box 76009
Tanacross, AK 99776

Dear President Demit:

I am writing to follow up regarding a letter sent to the Native Village of Tanacross about an Air Force Project planned off the Eielson Installation for which the Air Force is proposing to construct radar simulators on several high points distributed around the Richardson and Alaska Highways. This letter is intended to provide an update on the National Historic Preservation Act Section 106 cultural resource survey findings and allow for an opportunity for discussion. To recap the project, each of the radar simulator sites constitute nine discontinuous Areas of Potential Effect (APEs). The APEs are comprised of new single lane 12-foot (ft) wide access routes, new powerline routes cleared 30-ft, and the area to be cleared of vegetation around where pads to support the 8-ft x 33-ft trailer mounted radar will be installed. Buffers 100-ft wide were included on either side of the access and powerline route centerlines. The APEs do not include existing commercial quarries from which material will be obtained to improve the new access routes, or existing well-maintained road infrastructure that will not be altered by the undertaking.

The USAF is preparing an Environmental Assessment under the National Environmental Policy Act (NEPA) to evaluate potential environmental impacts associated with the proposed radar simulator site construction. Additionally, efforts to identify potential historic properties with the proposed site locations in accordance with Section 106 of the National Historic Preservation Act (NHPA) took place in the summer of 2023. Prior to this effort, archaeological investigations had only been conducted at one of the nine proposed radar ops sites. No known archaeological investigations had ever been conducted at seven of the proposed locations. In 1996 Eielson AFB conducted an installation-wide archaeological investigation which covered proposed radar ops site APE on Engineer Hill geared towards non-military cultural resource identification and evaluation. In order to identify potential historic properties in the APEs in accordance with 36 CFR § 800.4(b), cultural resources surveys were conducted at eight of the proposed radar ops sites between June and September of 2023. Two locations (Bridge to Terabithia, Gerstle River) were surveyed by Julie Esdale (PhD), Robert Nethken (BS), and Whitney McLaren (BA) of the Center for Environmental Management of Military Lands at Colorado State University (CEMML 2023). Six locations (Engineer Hill, Birch Hill, Dry Creek, Pogo Hill, Quartz Hill, Tok Hill) were surveyed by Aubrey Morrison (MA) and Haley McCaig (BA) of Cultural Resource Consultants, LLC (CRC). Both CEMML and CRC documented their cultural resources surveys with mapping-grade GPS units.

Results of the Section 106 survey have been presented in a report that will accompany the Environmental Assessment. Cultural resource surveys did not identify archaeological or historic sites

through pedestrian transects or subsurface testing at eight of the nine radar ops APEs. CRC archaeologists identified recent use cultural items and historic site within the APEs for Engineer Hill and Tok Hill radar ops sites, respectively. Thirty-six defensive fighting positions ("foxholes"), isolated can dump, and modern cabin complex were identified at Engineer Hill radar ops site. The cabin complex, appearing on aerial imagery post 1974, and 17 of the 36 defensive fighting positions were documented in the 1996 Archaeological Survey of Eielson AFB, and described as recent use sites, likely of military origin. Tok Hill radar ops site access will utilize one historic feature, a 3-mile segment of the original alignment of the Tok Cutoff Highway, and bisect a previously identified historic Moose/Caribou Fence and the historic Eagle Trail. CRC archaeologists also documented several cultural isolates including 1960s-era pull tab soda cans and six recent bark-stripped birch trees. While the historic Moose/Caribou Fence was unable to be relocated, the Eagle Trail appears to be used regularly by vehicle and ATV traffic. The findings have been reviewed USAF Cultural Resource Manager and Alaska State Historic Preservation Officer (SHPO). SHPO concurred with the findings of the Cultural Resource Survey that the project is not expected to have adverse effects on historic properties. SHPO recommended that the original Tok Cutoff Highway be *assumed* as eligible for the National Register of Historic Places for the purpose of this project. SHPO finds the determination of no adverse effect is appropriate for the project with the *assumed* eligibility of the Tok Cutoff Highway Segment as USAF does not plan on making any improvements or modifications to the property.

As the Eielson AFB Cultural Resource Manager, I am offering to discuss the proposed construction of radar simulator infrastructure at these nine locations in detail with you and would like to hear from you regarding any comments, concerns, and suggestions you may have.

If you have any questions, please contact Brooks Lawler, Cultural Resource Program Manager by phone 907-377-4253 or email brooks.lawler@us.af.mil. Or, Captain Sarah Larson, JPARC Program Manager, by phone at 907-377-3023 or email at sarah.larson.7@us.af.mil. Thank you in advance for your assistance in this effort.

Sincerely

Brooks Ann Lawler

BROOKS LAWLER, Cultural Resource Manager, 354 USAF

Below are figures that show the proposed radar site locations and their Areas of Potential Effect.

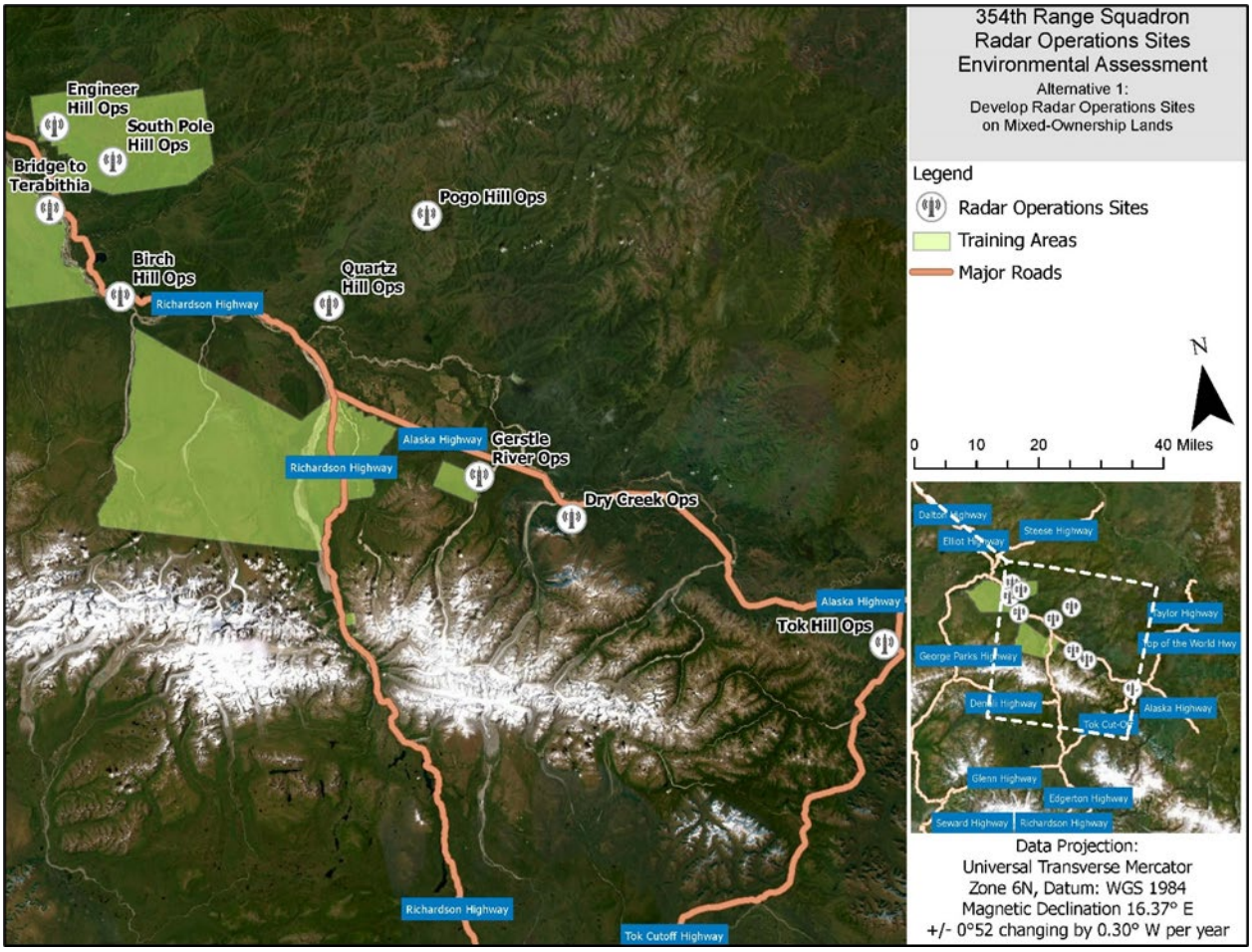


Figure 1. Overview of proposed radar locations.

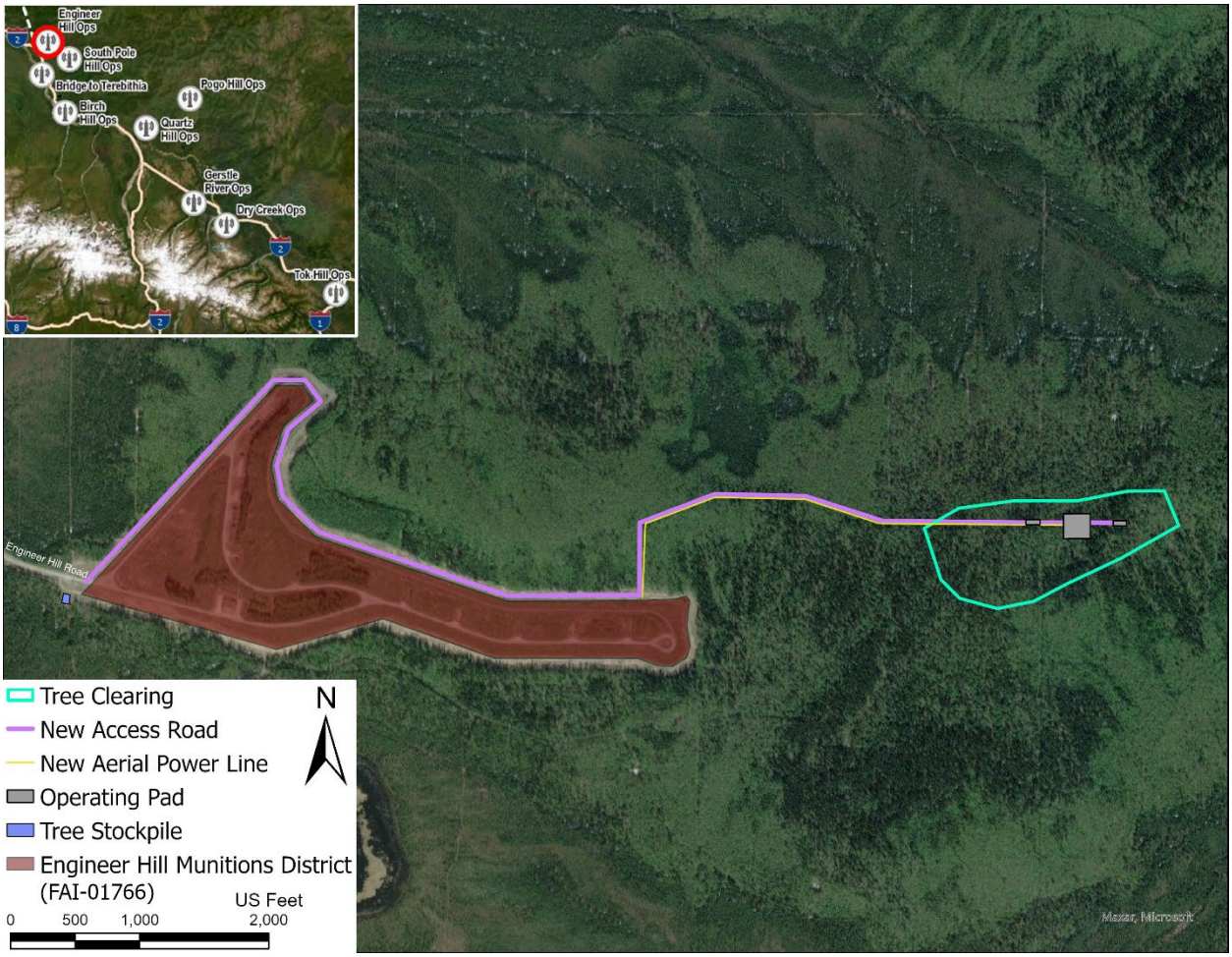


Figure 2. Proposed APE for Engineer Hill Radar Ops Site

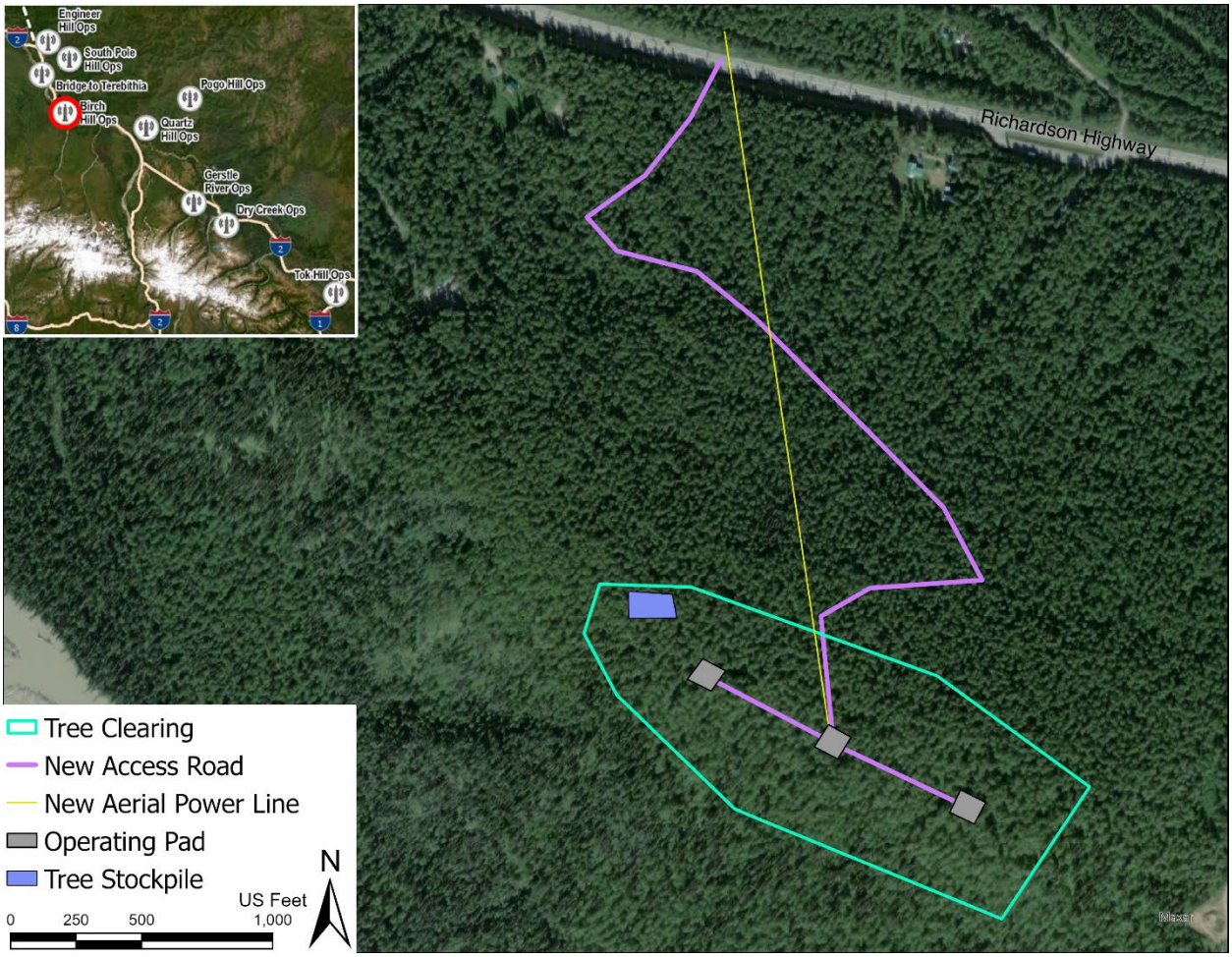


Figure 3. Proposed APE for Birch Hill Radar Ops Site

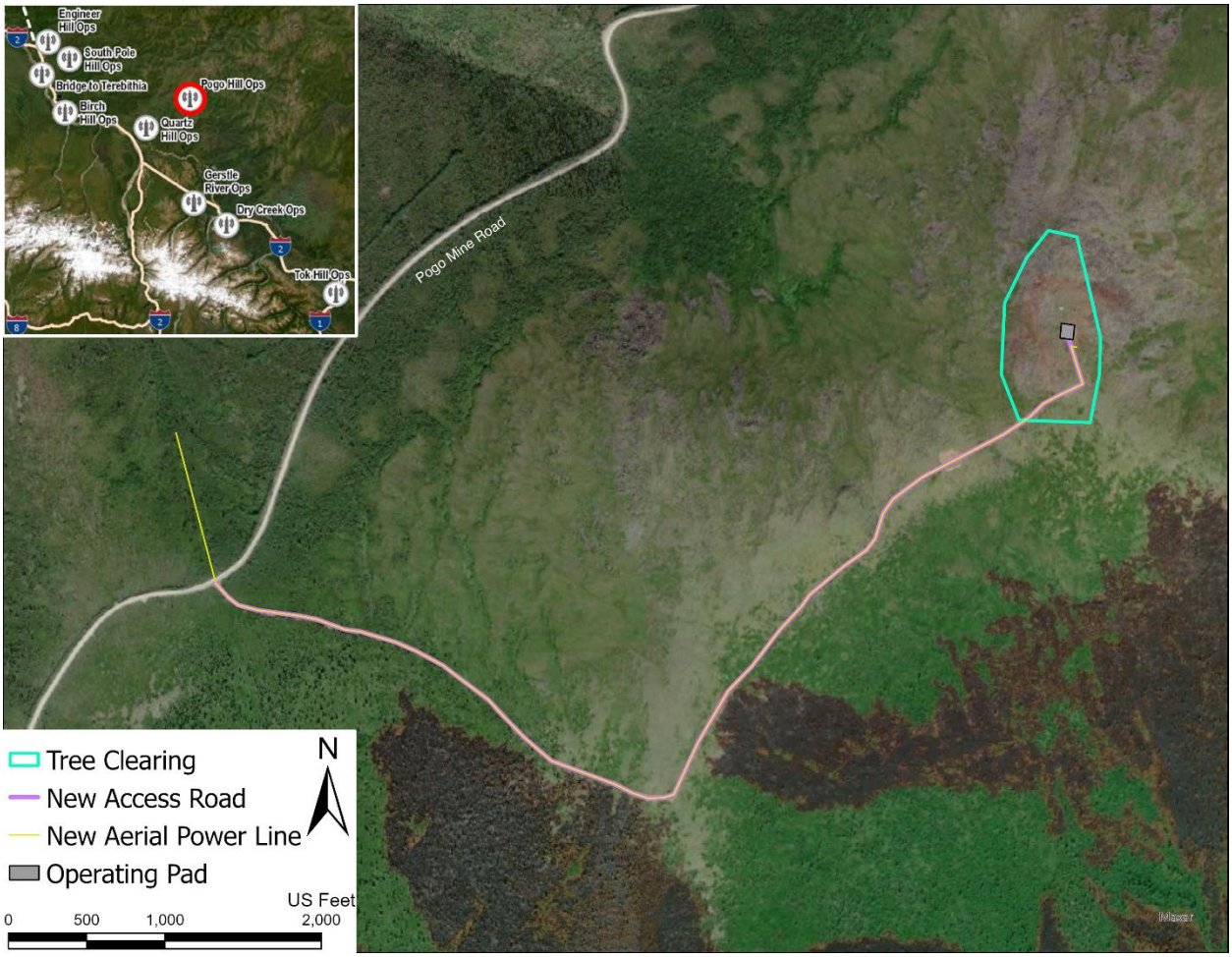


Figure 4. Proposed APE for Pogo Hill Radar Ops Site

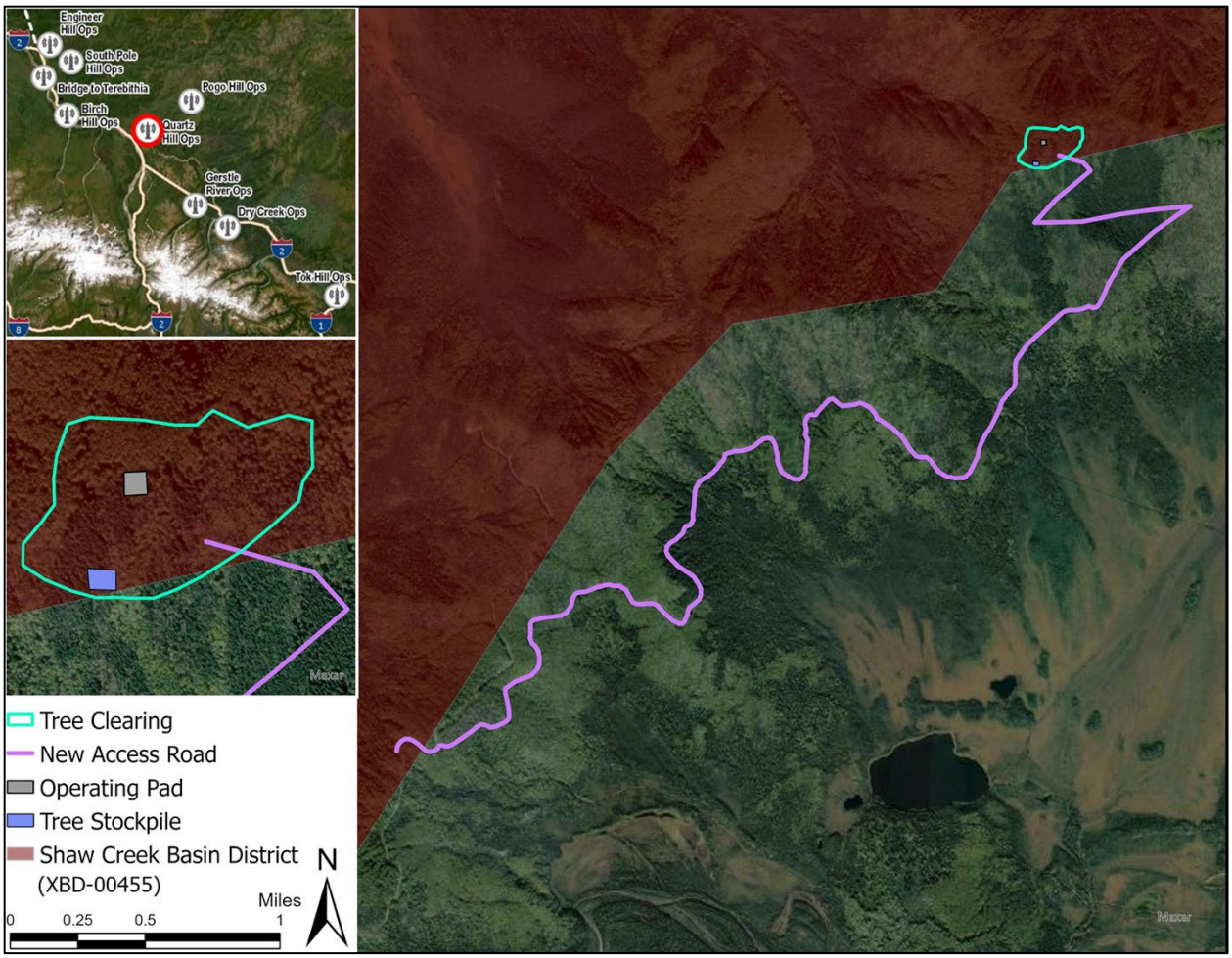


Figure 5. Proposed APE for Quartz Hill Radar Ops Site

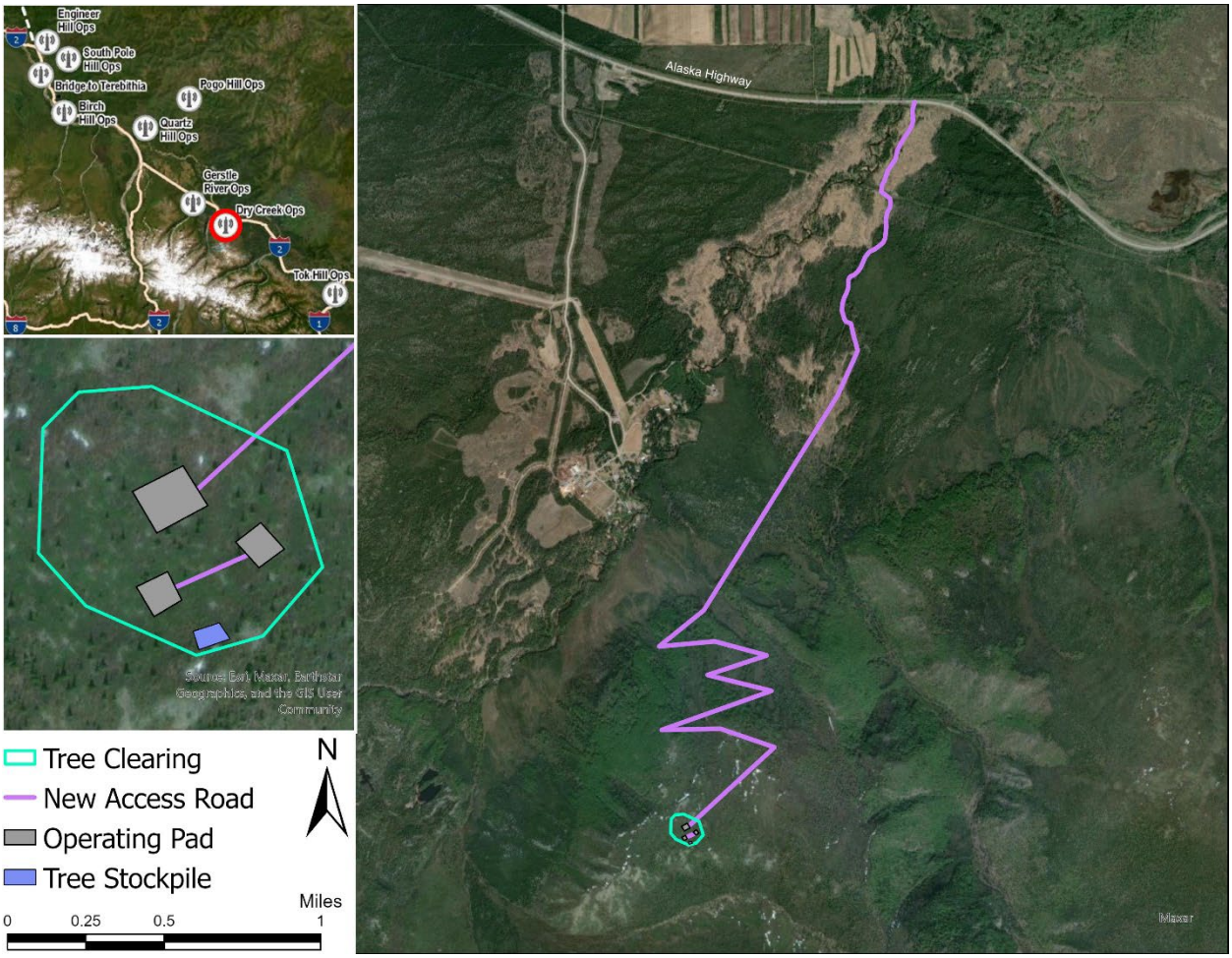


Figure 6. Proposed APE for Dry Creek Radar Ops Site

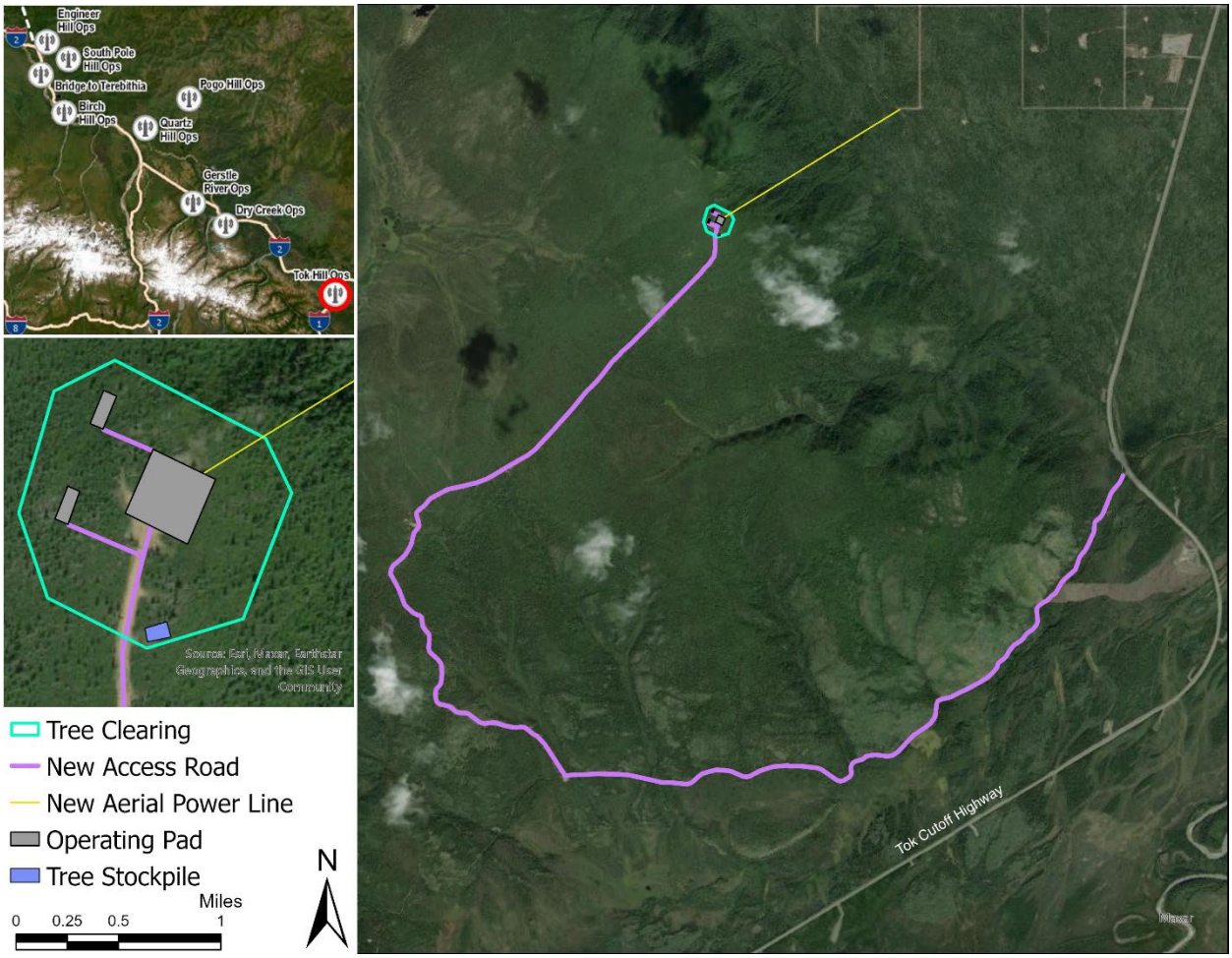


Figure 7. Proposed APE for Tok Hill Radar Ops Site

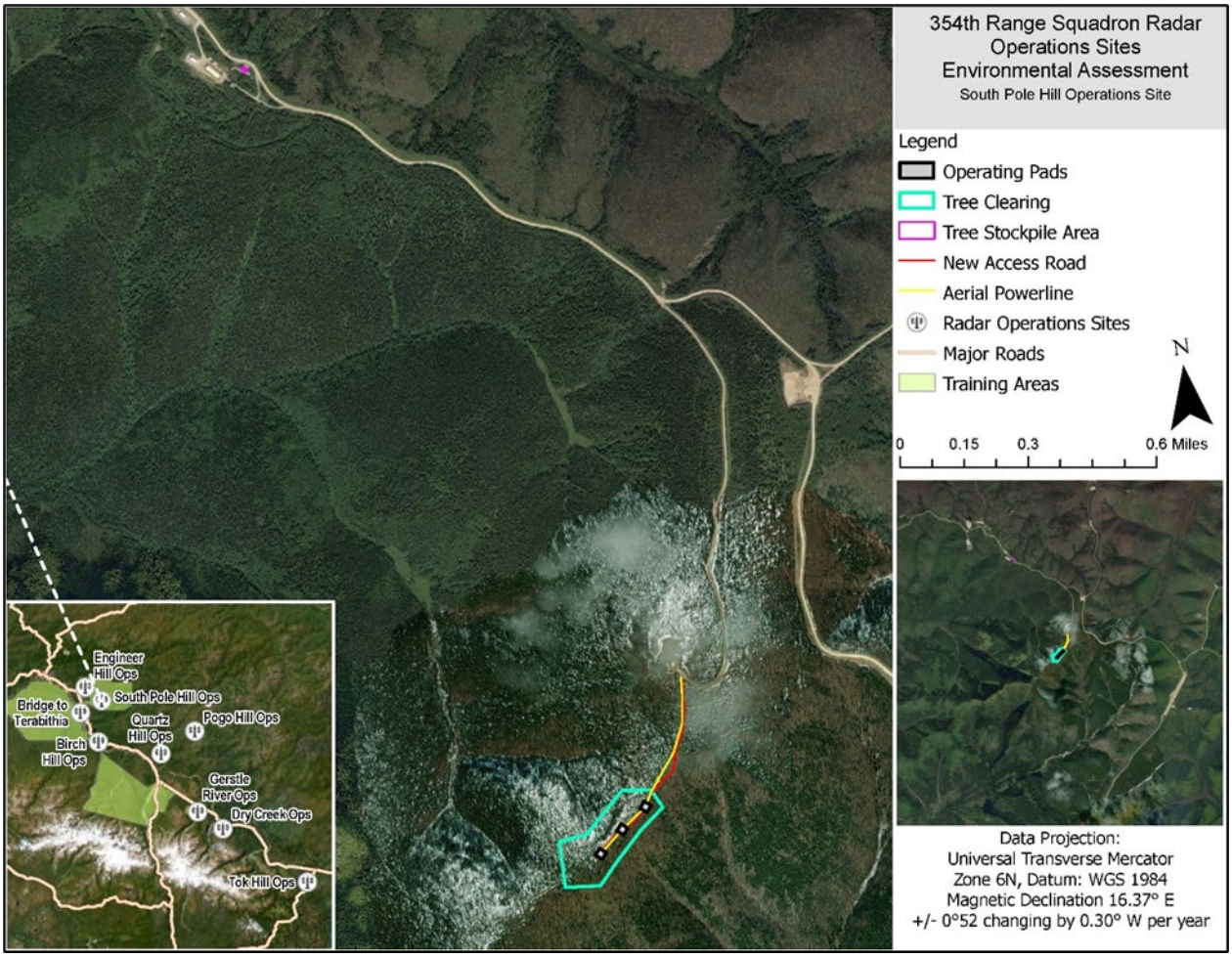


Figure 8. Proposed APE for South Pole Hill Radar Ops Site

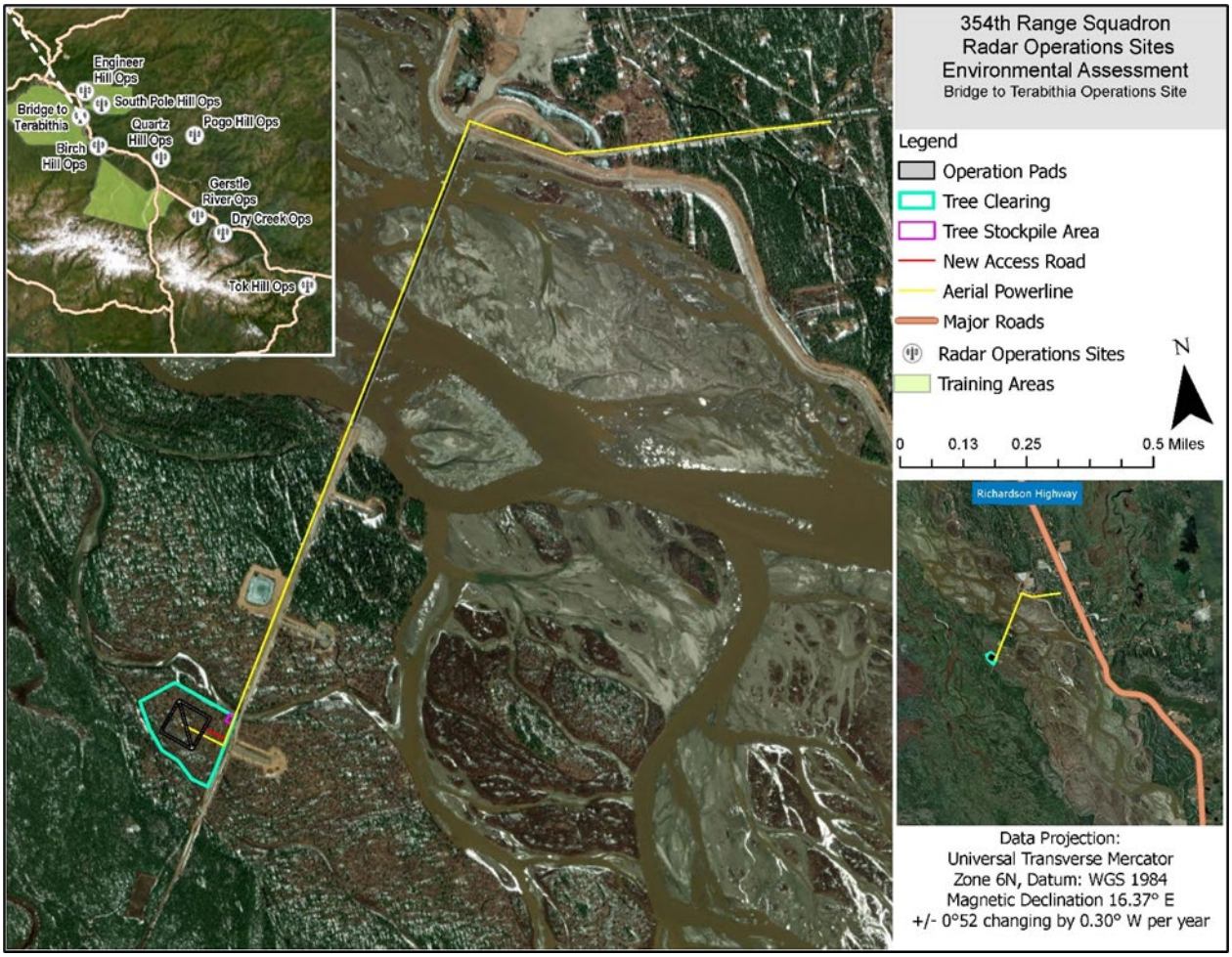


Figure 9. Proposed APE for Bridge to Terabithia Radar Ops Site

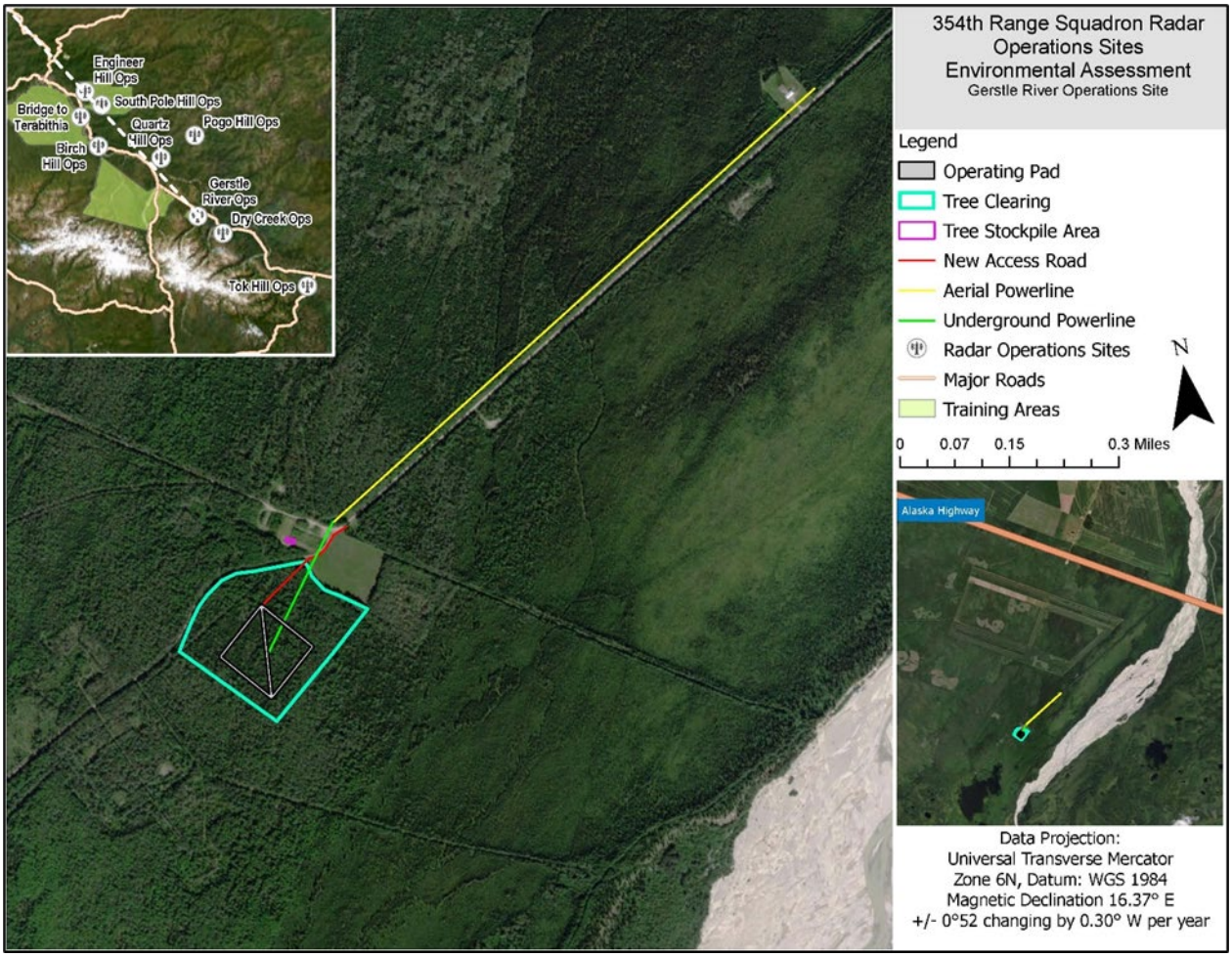


Figure 10. Proposed APE for Gerstle River Radar Ops Site

United States Fish and Wildlife Service

Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Northern Alaska Fish & Wildlife Field Office
101 12th Avenue
Room 110
Fairbanks, AK 99701-6237
Phone: (907) 456-0203 Fax: (907) 456-0208

In Reply Refer To:
Project Code: 2023-0121880
Project Name: AKV402 Radar Operation Sites

August 25, 2023

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

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

This species list is provided by:

Northern Alaska Fish & Wildlife Field Office
101 12th Avenue
Room 110
Fairbanks, AK 99701-6237
(907) 456-0203

PROJECT SUMMARY

Project Code: 2023-0121880
Project Name: AKV402 Radar Operation Sites
Project Type: Military Development
Project Description: The Proposed Action would construct radar simulator operating site infrastructure at nine locations on a mixture of Federal, State, and Fairbanks North Star Borough land. Each new radar simulator could operate independently, and the concurrent operation of each additional simulator increases the variety and effectiveness of training. The infrastructure would include gravel pads, access roads, power lines, generators, and fuel storage tanks. The land use designation for some of the lands selected for radar operating sites would be changed because of the Proposed Action.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@63.658444,-144.59565750000002,14z

Counties: Fairbanks North Star and Southeast Fairbanks counties, Alaska

ENDANGERED SPECIES ACT SPECIES

There is a total of 0 threatened, endangered, or candidate species on this species list.

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

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

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

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

CRITICAL HABITATS

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

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

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

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

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

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

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.

There are migratory birds in your project area. Please refer to Alaska's Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

THERE ARE MIGRATORY BIRDS IN YOUR PROJECT AREA. PLEASE REFER TO ALASKA'S BIRD NESTING SEASON FOR RECOMMENDATIONS TO MINIMIZE IMPACTS TO MIGRATORY BIRDS, INCLUDING EAGLES.

MIGRATORY BIRDS FAQ

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 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 list of migratory birds that potentially occur 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 Rapid Avian Information Locator (RAIL) 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 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 or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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.

WETLANDS

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.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPAC USER CONTACT INFORMATION

Agency: Army Corps of Engineers
Name: Matthew Ferguson
Address: 2204 Third Street
City: JBER
State: AK
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APPENDIX B

Air Conformity Applicability Model

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *Environmental Impact Analysis Process* (EIAP, 32 CFR 989); the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

a. Action Location:

Base: EIELSON AFB
State: Alaska
County(s): Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Installation of Radar for New Aircraft Training Sites

c. Project Number/s (if applicable):

d. Projected Action Start Date: 9 / 2027

e. Action Description:

The proposed action will construct radar systems that create new threat operating sites for aircraft. Currently, all threats are located at Eielson AFB and represent only one lane of a fight. This does not meet the training requirements.

f. Point of Contact:

Name: Amanda Coleman
Title: GS-07, Air Program Manager
Organization: 354 CES/CEIE
Email: amanda.coleman.10@us.af.mil
Phone Number: 907-377-1815

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

____ applicable
_X_ not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (hsba.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts to local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact to air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (hsba.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2027

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	250	No
NOx	0.216	250	No
CO	0.144	250	No
SOx	0.044	250	No
PM 10	0.047	250	No
PM 2.5	0.047	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2028 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.161	250	No
NOx	0.649	250	No
CO	0.433	250	No
SOx	0.132	250	No
PM 10	0.141	250	No
PM 2.5	0.141	250	No
Pb	0.000	25	No
NH3	0.000	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

Amanda Coleman, GS-07, Air Program Manager — Oct 26 2023

Name, Title — **Date**

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EIELSON AFB
State: Alaska
County(s): Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Installation of Radar for New Aircraft Training Sites

- Project Number/s (if applicable):

- Projected Action Start Date: 9 / 2027

- Action Purpose and Need:
The new radars are critical to training 5th generation aircraft against peer adversary nations. The new locations are critcal to provide a two lane fight for four sqaudrons of 5th generation aircraft on a daily basis.

- Action Description:
The proposed action will construct radar systems that create new threat operating sites for aircraft. Currently, all threats are located at Eielson AFB and represent only one lane of a fight. This does not meet the training requirements.

- Point of Contact
Name: Amanda Coleman
Title: GS-07, Air Program Manager
Organization: 354 CES/CEIE
Email: amanda.coleman.10@us.af.mil
Phone Number: 907-377-1815

- Activity List:

Activity Type		Activity Title
2.	Emergency Generator	Radar Construction and Operation for Aircraft Training Sites - Non-Emergency Generator
3.	Emergency Generator	Warm-up Generator Use

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Emergency Generator

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Radar Construction and Operation for Aircraft Training Sites - Non-Emergency Generator

- Activity Description:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

New radar systems will be constructed at multiple sites. Since ACAM did not have a non-emergency generator listed as an activity, the emergency generator activity was chosen with operations of 246 hrs. per year. The yearly hours account for two assumptions:
1. Routine runtime for a year is 3 hours per week for 42 weeks, therefore, 126 hours.
2. Runtimes for exercises for a year is 12 hours for 10 weeks, therefore, 120 hours.

The proponent has determined two locations will have prime power generation from a generator and one location will have a temporary generator for 3 months, for backup power. Since all sites are incongruous from EAFB and from each other, each site will be evaluated separately during project planning for air permit applicability. Exact start date has not been determined.

- Activity Start Date
Start Month: 9
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.156486
SO_x	0.131807
NO_x	0.645012
CO	0.430756

Pollutant	Emissions Per Year (TONs)
PM 10	0.140781
PM 2.5	0.140781
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.002597
N_2O	0.000519

Pollutant	Emissions Per Year (TONs)
CO_2	64.501200
CO_2e	74.597040

2.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 456
Average Operating Hours Per Year (hours): 246

2.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.15	1.33

2.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

3. Emergency Generator

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Warm-up Generator Use

- Activity Description:

During the months of November-April a smaller generator is used to warm-up the main permanent non-emergency generator. This takes about 1-hour and happens before each use. The main generator will run twice a week for a duration of 1.5 hours, resulting in the the warm up generator needing to be ran for 2 hours per week in this the time period of Nov-April. Therefore, to estimate the emissions from the warm-up generator the total run time over the 24 week period will be 48 hours.

- Activity Start Date

Start Month: 11
Start Year: 2027

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.004245
SO_x	0.000190
NO_x	0.003538
CO	0.002238

Pollutant	Emissions Per Year (TONs)
PM 10	0.000232
PM 2.5	0.000232
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.000015
N_2O	0.000003

Pollutant	Emissions Per Year (TONs)
CO_2	0.347328
CO_2e	0.347328

3.2 Emergency Generator Assumptions

- Emergency Generator

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Type of Fuel used in Emergency Generator: Gasoline
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 13.4
Average Operating Hours Per Year (hours): 48

3.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.0132	0.000591	0.011	0.00696	0.000721	0.000721		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.08	1.08

3.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *Environmental Impact Analysis Process* (EIAP, 32 CFR 989); the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

a. Action Location:

Base: EIELSON AFB
State: Alaska
County(s): Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Installation of Radar for New Aircraft Training Sites

c. Project Number/s (if applicable):

d. Projected Action Start Date: 9 / 2029

e. Action Description:

The proposed action will construct radar systems that create new threat operating sites for aircraft. Currently, all threats are located at Eielson AFB and represent only one lane of a fight. This does not meet the training requirements.

f. Point of Contact:

Name: Amanda Coleman
Title: GS-07, Air Program Manager
Organization: 354 CES/CEIE
Email: amanda.coleman.10@us.af.mil
Phone Number: 907-377-1815

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

____ applicable
_X_ not applicable

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (hsba.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts to local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact to air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (hsba.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2029

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.008	250	No
NOx	0.031	250	No
CO	0.021	250	No
SOx	0.006	250	No
PM 10	0.007	250	No
PM 2.5	0.007	250	No
Pb	0.000	25	No
NH3	0.000	250	No

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	25	No
NH3	0.000	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

Amanda Coleman, GS-07, Air Program Manager — Oct 02 2023

Name, Title — **Date**

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EIELSON AFB
State: Alaska
County(s): Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Installation of Radar for New Aircraft Training Sites

- Project Number/s (if applicable):

- Projected Action Start Date: 9 / 2029

- Action Purpose and Need:
The new radars are critical to training 5th generation aircraft against peer adversary nations. The new locations are critcal to provide a two lane fight for four sqaudrons of 5th generation aircraft on a daily basis.

- Action Description:
The proposed action will construct radar systems that create new threat operating sites for aircraft. Currently, all threats are located at Eielson AFB and represent only one lane of a fight. This does not meet the training requirements.

- Point of Contact
Name: Amanda Coleman
Title: GS-07, Air Program Manager
Organization: 354 CES/CEIE
Email: amanda.coleman.10@us.af.mil
Phone Number: 907-377-1815

- Activity List:

Activity Type		Activity Title
2.	Emergency Generator	Radar Construction and Operation for Aircraft Training Sites - Temporary Non-Emergency Generator

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Emergency Generator

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Radar Construction and Operation for Aircraft Training Sites - Temporary Non-Emergency Generator

- Activity Description:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

New radar systems will be constructed at multiple sites. Since ACAM did not have a non-emergency generator listed as an activity, the emergency generator activity was chosen with operations of 36 hrs accumulated over three months as a temporary generator. The total hours are calculated based on the assumption that the generator runtime is 3 hours per week for 12 weeks.

The proponent has determined two locations will have prime power generation from a generator and one location will have a temporary generator for 3 months, for prime power. Since all sites are incongruous from EAFB and from each other, each site will be evaluated separately during project planning for air permit applicability. Exact start date has not been determined.

- Activity Start Date
Start Month: 9
Start Year: 2029

- Activity End Date
Indefinite: No
End Month: 12
End Year: 2029

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.007633
SO_x	0.006430
NO_x	0.031464
CO	0.021012

Pollutant	Total Emissions (TONs)
PM 10	0.006867
PM 2.5	0.006867
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.000127
N_2O	0.000025

Pollutant	Total Emissions (TONs)
CO_2	3.146400
CO_2e	3.638880

2.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 456
Average Operating Hours Per Year (hours): 36

2.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.15	1.33

2.4 Emergency Generator Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

APPENDIX C

Environmental Justice Analysis

TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

CEJST	Climate and Economic Justice Screening Tool
CEQ	Council on Environmental Quality
EJ	Environmental Justice
EJScreen	Environmental Justice Screening and Mapping Tool
EO	Executive Order
EPA	Environmental Protection Agency
FNSB	Fairbanks North Star Borough
Ops Site	Operations Site

354TH Range Squadron Radar Operations Sites
Environmental Justice Analysis

1.0 Introduction

This Environmental Justice (EJ) Analysis is to supplement the evaluation of EJ and protection of the children impacts from the proposed implementation of the Preferred Alternative for the Air Force's Proposed Action, *354TH Range Squadron Radar Operations Sites*. This should not be used as a standalone document.

2.0 Overview

Executive Order (EO) 12898, February 11, 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of their actions on low-income, minority, and Tribal populations, to the greatest extent practicable and permitted by law. An EJ Analysis typically includes:

- Identification of any minority and/or low-income status communities in the areas of the operations sites (ops sites);
- Identification of any adverse environmental or human health impacts anticipated from the action; and,
- Determination of whether those impacts would disproportionately affect minority and/or low-income communities (i.e., disadvantaged communities).

An EO associated with EJ is EO 13045, April 23, 1997, "Protection of Children from Environmental Health Risks and Safety Risks," which directs Federal agencies to identify and address environmental health and safety risks that may disproportionately affect children, to the greatest extent practicable and permitted by law. This analysis typically includes a determination of whether the identified adverse environmental or human health impacts anticipated from the Preferred Alternative would disproportionately affect children.

Another executive order associated with EJ is EO 14096, April 21, 2023, "Revitalizing our Nation's Environmental Justice for All," which directs Federal agencies to advance EJ by implementing and enforcing the Nation's environmental and civil rights laws as well as investing in communities. EO 14096 builds upon EO 12898 and reaffirms the Federal government's commitment to EJ. Federal guidance on implementation of this EO is anticipated later in 2023.

This EJ Analysis employs the Council on Environmental Quality's (CEQ's) Climate and Economic Justice Screening Tool (CEJST) and the Environmental Protection Agency's (EPA's) EJ Screening and Mapping Tool (EJScreen) to provide a consistent government identification of communities with EJ concerns. The CEJST identifies if a community is disadvantaged if it's census tract is (see CEQ 2023):

1. Within the boundaries of a Federally Recognized Tribe's land; and/or,
2. At or above the indicator threshold of 90th percentile or a specific qualifier for one or more environmental, climate, or other burdens (i.e., category of burden) and at or above the CEQ 2023 provided percentile threshold for an associated socioeconomic burden; or,
3. Completely surrounded by disadvantaged communities and is at or above the 50th percentile for low income.

The EJScreen identifies areas of potential for EJ concern(s) if any one or more of the EJ Indices are at or above the 80th percentile indicator threshold. This tool uses a formula to combine a

single environmental factor with the demographic index (average of low income and people of color populations). Explanations of what each index means can be found at the EPA's website, "Overview of Environmental Indicators in EJScreen" (EPA 2023). In addition to the CEJST and EJScreen, this analysis will be supplemented with local and State data wherein deemed relevant and practicable to further inform potential EJ impacts.

With regard to percentiles used throughout this analysis, they will indicate how local residents compare to another population (i.e., Nation or State). For example, an "80 percentile" for "Low Income" when compared to the Nation would mean that people living in the assessed area have an income level equal to or higher than 80 percent of people living in the United States.

3.0 Engineer Hill and South Pole Hill Ops Sites

CEJST uses the Fairbanks North Star Borough (FNSB) Tract Number 02090001800 as their unit of analysis, while EJScreen uses Tract Number 0209098010 for the Engineer Hill and South Pole Hill Ops Sites. EJScreen lists a total population of this block group as 3,497, while CEJST lists the total population as 3,425.

CEJST Methodology Assessment

In the northern most portion of the FNSB Tract Number 02090001800, there is land of a Federally Recognized Tribe (BLM 2024). Thus, the tract is considered to be a partially disadvantaged community under the CEJST methodology.

The existing environmental conditions and human health risks for the FNSB Tract Number 02090001800 included three risks above the 90th percentile or that qualified (Table 1). These were the "Flood Risk" under the "Climate Change" category and "Proximity to Superfund Sites" and "Formerly Used Defense Site" under the "Legacy Pollution" category. In addition to these, "Wildfire Risk" under the "Climate Change" category is presumed exceeded due to the high risk and occurrence of wildfires throughout Interior Alaska. To be identified as a disadvantaged community based on the exceeded indicator thresholds for these environmental conditions and human health risk categories, the low income socioeconomic indicator must be at or above the 65th percentile (Table 2). As the low income percentile is less than the 65th percentile, the tract area is not considered a disadvantaged community due to a category of burden via the CEJST methodology.

Table 1. Existing Environmental Conditions and Human Health Risks for the FNSB (Engineer Hill & South Pole Hill Ops Sites)

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	38 percentile
	Building Loss Rate	15 percentile
	Population Loss Rate	36 percentile
	Flood Risk	**96 percentile**
	Wildfire Risk	**No data available**
Energy	Energy Cost	6 percentile
	Particulate Matter 2.5	No data available
Health	Asthma	46 percentile
	Diabetes	0 percentile
	Heart Disease	0 percentile
	Low Life Expectancy	No data
Housing	Housing Cost	75 percentile
	Lack of Green Space	No data available
	Lack of Indoor Plumbing	86 percentile
	Lead Paint	6 percentile

Category	Existing Risk	Compared to Nation
Legacy Pollution	Abandoned Mine Land	No
	Formally Used Defense Site	**Yes**
	Proximity to Hazardous Waste Facilities	44 percentile
	Proximity to Risk Management Plan Facilities	9 percentile
	Proximity to Superfund Sites	**95 percentile**
Transportation	Diesel Particulate Matter Exposure	1 percentile
	Transportation Barriers	18 percentile
	Traffic Proximity and Volume	2 percentile
Water & Wastewater	Underground Storage Tanks and Releases	2 percentile
	Wastewater Discharge	No data available

Source: (CEQ 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology and uses the 90th percentile as an indicator threshold or certain qualifiers in accordance with CEQ 2023.

Table 2. Socioeconomical Indicators for the FNSB (Engineer Hill & South Pole Hill Ops Sites)

Indicator	Compared to Nation	Compared to State
Demographic Index	51 percentile	51 percentile
People of Color	53 percentile	46 percentile
Low Income	48 percentile	58 percentile
Unemployment Rate	87 percentile	83 percentile
Limited English Speaking	63 percentile	71 percentile
Less than High School Education	45 percentile	60 percentile
Under Age 5	91 percentile	89 percentile
Over Age 64	0 percentile	1 percentile

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology in conjugation with Table 1. The indicator thresholds applied to this table are as stipulated on CEQ 2023 based on the indicator thresholds exceeded in Table 1.

EJScreen Methodology Assessment

The "Superfund Proximity" and "Hazardous Waste Proximity" EJ Indices exceed the 80th percentile indicator threshold for the FNSB Tract Number 02090001800 when compared to the State population (Table 3). These exceedances indicate the tract as an area of potential for EJ concerns for these indices via the EJScreen methodology.

Table 3. EJ Index for the FNSB (Engineer Hill & South Pole Hill Ops Sites)

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	Not applicable	Not applicable
Ozone	Not applicable	Not applicable
Diesel Particulate Matter	2 percentile	36 percentile
Air Toxics Cancer Risk	34 percentile	57 percentile
Air Toxics Respiratory Hazard Index	53 percentile	62 percentile
Toxic Releases to Air	17 percentile	53 percentile
Traffic Proximity	11 percentile	16 percentile
Lead Paint	27 percentile	40 percentile
Superfund Proximity	76 percentile	**86 percentile**
Risk Management Plan Facility Proximity	29 percentile	55 percentile
Hazardous Waste Proximity	57 percentile	**82 percentile**
Underground Storage Tanks	0 percentile	0 percentile
Wastewater Discharge	Not applicable	Not applicable

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is within an area of potential environment justice concern under the EJScreen methodology and uses the 80th percentile as an indicator threshold.

Local and State Supplement Data

Local and State data was used to supplement CEJST Methodology Assessment with the presumption that the existing risk of "Wildfire Risk" would likely be disproportionate for the tract when compared to the Nation based on the high occurrence of wildfires in Interior Alaska.

Additional relevant local information is that the majority of the tract census area population is from Eielson Air Force Base (2,610 people as of the 2020 Decennial Census). This would impact the results of the CEJST methodology assessment as the high rotation rate of military personal, families, and contractors at the military base would cause fluctuations to socioeconomic factors in Table 2 that are associated with the tract. In relation to the population centers of these tracts, the Engineer Hill Ops Site is closer than the South Pole Ops Sites to the population centers and generally wherein the general population predominately resides and/or works. However, the ops sites are disconnected from the population centers within the tracts both laterally and vertically. This also applies to the proximity of the ops site to the land of a Federally Recognized Tribe in the tract. There is approximately 6.5 miles of separation between the Engineer Hill Ops Site (the closest ops site) to the land of a Federally Recognized Tribe.

4.0 Bridge to Terabithia Ops Site

Both EJScreen and CEJST use the FNSB Tract Number 02090001100 as their unit of analysis for the Bridge to Terabithia Ops Site. EJScreen lists a total population of this tract as 10,846, while CEJST lists the total population as 10,016 (CEQ 2023).

CEJST Methodology Assessment

This tract is not within the boundaries of a Federally Recognized Tribe's land (BLM 2024).

The existing environmental conditions and human health risks for the FNSB Tract Number 02090001100 included four risks above the 90th percentile or that qualified (Table 4). These were the "Flood Risk" under the "Climate Change" category, "Housing Cost" under the "Housing" category, and "Abandoned Mine Land" and "Proximity to Superfund Sites" under the "Legacy Pollution" category. In addition to these, "Wildfire Risk" under the "Climate Change" category and "Particulate Matter 2.5" under the "Energy" category are presumed exceeded due to the high risk and occurrence of wildfires throughout Interior Alaska and a portion of the tract occurring within the boundaries of the FNSB Particulate Matter 2.5 Nonattainment Area, respectively. To be identified as a disadvantaged community based on the exceeded indicator thresholds for these environmental conditions and human health risk categories, the low income socioeconomic indicator must be at or above the 65th percentile (Table 5). As the low income percentile is more than the 65th percentile, the tract area is considered a disadvantaged community compared to the Nation population and potentially the State population due to a category of burden via the CEJST methodology.

Table 4. Existing Environmental Conditions and Human Health Risks for the FNSB (Bridge to Terabithia Ops Site)

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	15 percentile
	Building Loss Rate	3 percentile
	Population Loss Rate	4 percentile
	Flood Risk	**97 percentile**
	Wildfire Risk	**No data available**
Energy	Energy Cost	8 percentile
	Particulate Matter 2.5	**No data available**

Category	Existing Risk	Compared to Nation
Health	Asthma	54 percentile
	Diabetes	0 percentile
	Heart Disease	0 percentile
	Low Life Expectancy	No data available
Housing	**Housing Cost**	**91 percentile**
	Lack of Green Space	No data available
	Lack of Indoor Plumbing	65 percentile
	Lead Paint	11 percentile
Legacy Pollution	**Abandoned Mine Land**	**Yes**
	Formally Used Defense Site	No
	Proximity to Hazardous Waste Facilities	52 percentile
	Proximity to Risk Management Plan Facilities	37 percentile
	Proximity to Superfund Sites	**93 percentile**
Transportation	Diesel Particulate Matter Exposure	28 percentile
	Transportation Barriers	48 percentile
	Traffic Proximity and Volume	21 percentile
Water & Wastewater	Underground Storage Tanks and Releases	5 percentile
	Wastewater Discharge	No data available

Source: (CEQ 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology and uses the 90th percentile as an indicator threshold or certain qualifiers in accordance with CEQ 2023.

Table 5. Socioeconomical Indicators for the FNSB (Bridge to Terabithia Ops Site)

Indicator	Compared to Nation	Compared to State
Demographic Index	64 percentile	72 percentile
People of Color	58 percentile	54 percentile
Low Income	**69 percentile**	**83 percentile**
Unemployment Rate	39 percentile	26 percentile
Limited English Speaking	59 percentile	66 percentile
Less than High School Education	17 percentile	21 percentile
Under Age 5	97 percentile	98 percentile
Over Age 64	0 percentile	0 percentile

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology in conjugation with Table 4. The indicator thresholds applied to this table are as stipulated on CEQ 2023 based on the indicator thresholds exceeded in Table 4.

EJScreen Methodology Assessment

The "Air Toxics Respiratory Hazard Index," "Toxic Releases to Air," "Superfund Proximity," and "Hazardous Waste Proximity" EJ Indices exceed the 80th percentile indicator threshold for the tract when compared with the State population; and the "Air Toxics Respiratory Hazard Index" and "Superfund Proximity" EJ Indices exceed the 80th percentile indicator threshold for the tract when compared with the Nation population (Table 6). These exceedances indicate the tract as an area of potential for EJ concerns for these indices via the EJScreen methodology.

Table 6. EJ Index for the FNSB (Bridge to Terabithia Ops Site)

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	Not applicable	Not applicable
Ozone	Not applicable	Not applicable
Diesel Particulate Matter	51 percentile	70 percentile
Air Toxics Cancer Risk	76 percentile	78 percentile
Air Toxics Respiratory Hazard Index	**87 percentile**	**84 percentile**
Toxic Releases to Air	37 percentile	**85 percent**

Index	Compared to Nation	Compared to State
Traffic Proximity	44 percentile	59 percentile
Lead Paint	32 percentile	47 percentile
Superfund Proximity	**84 percentile**	**92 percentile**
Risk Management Plan Facility Proximity	26 percentile	60 percentile
Hazardous Waste Proximity	70 percentile	**91 percentile**
Underground Storage Tanks	44 percentile	49 percentile
Wastewater Discharge	Not applicable	Not applicable

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is within an area of potential environment justice concern under the EJScreen methodology and uses the 80th percentile as an indicator threshold.

Local and State Supplement Data

Local and State data was used to supplement CEJST Methodology Assessment with the presumptions that (1) the existing risk of "Wildfire Risk" would likely be disproportionate for the tract when compared to the Nation based on the high occurrence of wildfires in Interior Alaska and (2) the existing risk of "Particulate Matter 2.5" would likely be disproportion for the tract when compared to State and Nation based on a portion of the tract occurring within the boundaries of the FNSB Particulate Matter 2.5 Nonattainment Area.

Additional relevant local information is that the majority of the tract census area population is from Fort Wainwright (9,798 people as of the 2020 Decennial Census). This would impact the results of the CEJST methodology assessment as the high rotation rate of military personal, families, and contractors at the military base would cause fluctuations to socioeconomic factors in Table 5 that are associated with the tract. In relation to the population centers of these tracts, the Bridge to Terabithia Ops Site is within the United States Army Garrison Alaska's Tanana Flats Training Area. Thus, the ops site is disconnected and relatively far removed the population centers and wherein the general population predominately resides and/or works within the tract.

5.0 Birch Hill Ops Site

Both EJScreen and CEJST use the FNSB Tract Number 02090001700 as their unit of analysis for the Birch Hill Ops Site. EJScreen lists a total population of this tract as 965, while CEJST lists the total population as 1,143 (CEQ 2023).

CEJST Methodology Assessment

In Salcha, Alaska, within FNSB Tract Number 02090001700, there is land of a Federally Recognized Tribe (BLM 2024). Thus, the tract is considered to be a partially disadvantaged community under the CEJST methodology.

The existing environmental conditions and human health risks for the FNSB Tract Number 02090001700 included four risks above the 90th percentile or that qualified (Table 7). These were the "Flood Risk" under the "Climate Change" category, "Energy Cost" under the "Energy" category, "Lack of Plumbing" under the "Housing" category, and "Formerly Used Defense Site" under the "Legacy Pollution" category. In addition to these, "Wildfire Risk" under the "Climate Change" category is presumed exceeded due to the high risk and occurrence of wildfires throughout Interior Alaska. To be identified as a disadvantaged community based on the exceeded indicator thresholds for these environmental conditions and human health risk categories, the low income socioeconomic indicator must be at or above the 65th percentile (Table 8). As the low income percentile is less than the 65th percentile, the tract area is not considered a disadvantaged community due to a category of burden via the CEJST methodology.

Table 7. Existing Environmental Conditions and Human Health Risks for the FNSB (Birch Hill Ops Site)

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	42 percentile
	Building Loss Rate	3 percentile
	Population Loss Rate	8 percentile
	Flood Risk	**92 percentile**
	Wildfire Risk	**No data available**
Energy	**Energy Cost**	**94 percentile**
	Particulate Matter 2.5	No data available
Health	Asthma	49 percentile
	Diabetes	25 percentile
	Heart Disease	37 percentile
	Low Life Expectancy	No data available
Housing	Housing Cost	24 percentile
	Lack of Green Space	No data available
	Lack of Indoor Plumbing	**95 percentile**
	Lead Paint	25 percentile
Legacy Pollution	Abandoned Mine Land	No
	Formally Used Defense Site	**Yes**
	Proximity to Hazardous Waste Facilities	12 percentile
	Proximity to Risk Management Plan Facilities	4 percentile
	Proximity to Superfund Sites	54 percentile
Transportation	Diesel Particulate Matter Exposure	0 percentile
	Transportation Barriers	72 percentile
	Traffic Proximity and Volume	6 percentile
Water & Wastewater	Underground Storage Tanks and Releases	7 percentile
	Wastewater Discharge	No data available

Source: (CEQ 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology and uses the 90th percentile as an indicator threshold or certain qualifiers in accordance with CEQ 2023.

Table 8. Socioeconomical Indicators for the FNSB (Birch Hill Ops Site)

Indicator	Compared to Nation	Compared to State
Demographic Index	25 percentile	15 percentile
People of Color	31 percentile	12 percentile
Low Income	34 percentile	38 percentile
Unemployment Rate	0 percentile	0 percentile
Limited English Speaking	0 percentile	0 percentile
Less than High School Education	12 percentile	14 percentile
Under Age 5	19 percentile	10 percentile
Over Age 64	42 percentile	56 percentile

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology in conjugation with Table 7. The indicator thresholds applied to this table are as stipulated on CEQ 2023 based on the indicator thresholds exceeded in Table 7.

EJScreen Methodology Assessment

None of the EJ Indices exceed the 80th percentile indicator threshold for the tract when compared with the Nation and State populations (Table 9). This indicates the tract as an unlikely area of potential for EJ concerns via the EJScreen methodology.

Table 9. EJ Index for the FNSB (Birch Hill Ops Site)

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	Not applicable	Not applicable
Ozone	Not applicable	Not applicable
Diesel Particulate Matter	0 percentile	11 percentile
Air Toxics Cancer Risk	3 percentile	18 percentile
Air Toxics Respiratory Hazard Index	14 percentile	28 percentile
Toxic Releases to Air	11 percentile	38 percentile
Traffic Proximity	5 percentile	6 percentile
Lead Paint	28 percentile	45 percentile
Superfund Proximity	43 percentile	46 percentile
Risk Management Plan Facility Proximity	8 percentile	25 percentile
Hazardous Waste Proximity	16 percentile	40 percentile
Underground Storage Tanks	0 percentile	27 percentile
Wastewater Discharge	Not applicable	Not applicable

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is within an area of potential environment justice concern under the EJScreen methodology and uses the 80th percentile as an indicator threshold.

Local and State Supplement Data

Local and State data was used to supplement CEJST Methodology Assessment with the presumptions that the existing risk of "Wildfire Risk" would likely be disproportionate for the tract when compared to the Nation based on the high occurrence of wildfires in Interior Alaska.

In relation to the population centers of this tract, the Birch Hill Ops Site is south of predominate population center in the tract, Salcha, Alaska (977 people as of the 2020 Decennial Census). The ops site is disconnected and relatively far removed the population center and wherein the general population predominately resides and/or works within the tract. Although, the ops site is within relative proximity of privately-owned land. The ops site is also disconnected from the land of a Federally Recognized Tribe within the tract. There is approximately 15 miles of separation between the Birch Hill Ops Site and the of a Federally Recognized Tribe.

6.0 Pogo Hill, Quartz Hill, and Gerstle River Ops Sites

Both EJScreen and CEJST use the Southeast Fairbanks Census Tract Number 02240000400 as their unit of analysis for the Pogo Hill, Quartz Hill, and Gerstle River Ops Sites. EJScreen lists a total population of this tract as 4,282 while CEJST lists the total population as 4,436 (EPA 2023).

CEJST Methodology Assessment

Within the eastern portion of the Southeast Fairbanks Census Tract Number 02240000400 north of the Alaska Highway, there are lands of a Federally Recognized Tribe (BLM 2024). Thus, the tract is considered to be a partially disadvantaged community under the CEJST methodology.

The existing environmental conditions and human health risks for the Southeast Fairbanks Census Tract Number 02240000400 included three risks above the 90th percentile or that qualified (Table 10). These were the "Flood Risk" under the "Climate Change" category, "Lack of Plumbing" under the "Housing" category, and "Formerly Used Defense Site" under the "Legacy Pollution" category. In addition to these, "Wildfire Risk" under the "Climate Change" category is presumed exceeded due to the high risk and occurrence of wildfires throughout Interior Alaska. To be identified as a disadvantaged community based on the exceeded indicator thresholds for these environmental conditions and human health risk categories, the low income

socioeconomic indicator must be at or above the 65th percentile (Table 11). As the low income percentile is less than the 65th percentile, the tract area is not considered a disadvantaged community due to a category of burden via the CEJST methodology.

Table 10. Existing Environmental Conditions and Human Health Risks for the Southeast Fairbanks Census Area (Pogo Hill, Quartz Hill, & Gerstle River Ops Sites)

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	No data available
	Building Loss Rate	3 percentile
	Population Loss Rate	89 percentile
	Flood Risk	**91 percentile**
	Wildfire Risk	**No data available**
Energy	Energy Cost	77 percentile
	Particulate Matter 2.5	No data available
Health	Asthma	37 percentile
	Diabetes	13 percentile
	Heart Disease	28 percentile
	Low Life Expectancy	45 percentile
Housing	Housing Cost	9 percentile
	Lack of Green Space	No data available
	Lack of Indoor Plumbing	**95 percentile**
	Lead Paint	27 percentile
Legacy Pollution	Abandoned Mine Land	No
	Formally Used Defense Site	**Yes**
	Proximity to Hazardous Waste Facilities	15 percentile
	Proximity to Risk Management Plan Facilities	0 percentile
	Proximity to Superfund Sites	5 percentile
Transportation	Diesel Particulate Matter Exposure	0 percentile
	Transportation Barriers	7 percentile
	Traffic Proximity and Volume	3 percentile
Water & Wastewater	Underground Storage Tanks and Releases	16 percentile
	Wastewater Discharge	No data available

Source: (CEQ 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology and uses the 90th percentile as an indicator threshold or certain qualifiers in accordance with CEQ 2023.

Table 11. Socioeconomical Indicators for the Southeast Fairbanks Census Area (Pogo Hill, Quartz Hill, & Gerstle River Ops Sites)

Indicator	Compared to Nation	Compared to State
Demographic Index	35 percentile	28 percentile
People of Color	37 percentile	19 percentile
Low Income	45 percentile	54 percentile
Unemployment Rate	82 percentile	75 percentile
Limited English Speaking	68 percentile	78 percentile
Less than High School Education	33 percentile	41 percentile
Under Age 5	71 percentile	64 percentile
Over Age 64	31 percentile	41 percentile

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology in conjugation with Table 10. The indicator thresholds applied to this table are as stipulated on CEQ 2023 based on the indicator thresholds exceeded in Table 10.

EJScreen Methodology Assessment

None of the EJ Indices exceed the 80th percentile indicator threshold for the tract when compared with the Nation and State populations (Table 12). This indicates the tract as an unlikely area of potential for EJ concerns via the EJScreen methodology.

Table 12. EJ Index for the Southeast Fairbanks Census Area (Pogo Hill, Quartz Hill, & Gerstle River Ops Sites)

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	Not applicable	Not applicable
Ozone	Not applicable	Not applicable
Diesel Particulate Matter	0 percentile	5 percentile
Air Toxics Cancer Risk	4 percentile	27 percentile
Air Toxics Respiratory Hazard Index	45 percentile	50 percentile
Toxic Releases to Air	11 percentile	39 percentile
Traffic Proximity	7 percentile	11 percentile
Lead Paint	32 percentile	50 percentile
Superfund Proximity	5 percentile	29 percentile
Risk Management Plan Facility Proximity	0 percentile	6 percentile
Hazardous Waste Proximity	3 percentile	31 percentile
Underground Storage Tanks	0 percentile	31 percentile
Wastewater Discharge	Not applicable	Not applicable

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is within an area of potential environment justice concern under the EJScreen methodology and uses the 80th percentile as an indicator threshold.

Local and State Supplement Data

Local and State data was used to supplement CEJST Methodology Assessment with the presumption that the existing risk of “Wildfire Risk” would likely be disproportionate for the tract when compared to the Nation based on the high occurrence of wildfires in Interior Alaska.

This tract census area population is predominately composed of multiple population centers. relatively centered around to Delta Junction (918 people as of the 2020 Decennial Census). The other predominate communities are Deltana (2,359 people as of the 2020 Decennial Census), Big Delta (444 people as of the 2020 Decennial Census), and Fort Greely (309 people as of the 2020 Decennial Census). Fort Greely would impact the results of the CEJST methodology assessment as the high rotation rate of military personal, families, and contractors at the military base would cause fluctuations to socioeconomic factors in Table 11 that are associated with the tract. In relation to the population centers of this tract, the Pogo Hill, Quartz Lake, and Gerstle River Ops Sites are generally disconnected and removed from where the general population predominately resides. This also applies to the proximity of the ops site to the land of a Federally Recognized Tribe in the tract. There is approximately 10 miles of separation between the Gerstle River Ops Site (the closest ops site) to the land of a Federally Recognized Tribe. However, although they are not within proximity of where the population predominately lives and the Tribal land, there is frequent recreating near the Quartz Hill and Gerstle River Ops Sites, and working personnel near the Pogo Hill Ops Site.

7.0 Dry Creek and Tok Hill Ops Sites

Both EJScreen and CEJST use the Southeast Fairbanks Census Tract Number 02240000100 as their unit of analysis of the Dry Creek and Tok Hill Ops Sites. EJScreen lists a total population of this tract as 2,567 while CEJST lists the total population as 2,442 (CEQ 2023).

CEJST Methodology Assessment

Within the Southeast Fairbanks Census Tract Number 02240000100, there are various parcels of land of a Federally-recognized Tribe (BLM 2024). The closest parcel to the Dry Creek Ops Site is approximately 2.25 miles and the closet parcel to the Tok Hill Ops Site is approximately 4 miles. Thus, the tract is considered to be a partially disadvantaged community under the CEJST methodology.

The existing environmental conditions and human health risks for the Southeast Fairbanks Census Tract Number 02240000100 included five risks above the 90th percentile or that qualified (Table 13). These were the "Flood Risk" and "Population Loss Rate" under the "Climate Change" category, "Energy Cost" under the "Energy" category, "Lack of Plumbing" under the "Housing" category, and "Formerly Used Defense Site" under the "Legacy Pollution" category. In addition to these, "Wildfire Risk" under the "Climate Change" category is presumed exceeded due to the high risk and occurrence of wildfires throughout Interior Alaska. To be identified as a disadvantaged community based on the exceeded indicator thresholds for these environmental conditions and human health risk categories, the low income socioeconomic indicator must be at or above the 65th percentile (Table 11). As the low income percentile is more than the 65th percentile, the tract area is considered a disadvantaged community compared to the Nation population and potentially the State population due to a category of burden via the CEJST methodology.

Table 13. Existing Environmental Conditions and Human Health Risks for the Southeast Fairbanks Census Area (Dry Creek & Tok Hills Ops Sites)

Category	Existing Risk	Compared to Nation
Climate Change	Agriculture Loss Rate	No data available
	Building Loss Rate	0 percentile
	Population Loss Rate	**96 percentile**
	Flood Risk	**94 percentile**
	Wildfire Risk	**No data available**
Energy	**Energy Cost**	**93 percentile**
	Particulate Matter 2.5	No data available
Health	Asthma	79 percentile
	Diabetes	69 percentile
	Heart Disease	83 percentile
	Low Life Expectancy	67 percentile
Housing	Housing Cost	10 percentile
	Lack of Green Space	No data available
	Lack of Indoor Plumbing	**99 percentile**
	Lead Paint	21 percentile
Legacy Pollution	Abandoned Mine Land	No
	Formally Used Defense Site	**Yes**
	Proximity to Hazardous Waste Facilities	0 percentile
	Proximity to Risk Management Plan Facilities	0 percentile
	Proximity to Superfund Sites	1 percentile
Transportation	Diesel Particulate Matter Exposure	0 percentile
	Transportation Barriers	24 percentile
	Traffic Proximity and Volume	3 percentile
Water & Wastewater	Underground Storage Tanks and Releases	10 percentile
	Wastewater Discharge	No data available

Source: (CEQ 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology and uses the 90th percentile as an indicator threshold or certain qualifiers in accordance with CEQ 2023.

Table 14. Socioeconomical Indicators for the Southeast Fairbanks Census Area (Dry Creek & Tok Hill Ops Sites)

Indicator	Compared to Nation	Compared to State
Demographic Index	66 percentile	73 percentile
People of Color	60 percentile	58 percentile
Low Income	**69 percentile**	**83 percentile**
Unemployment Rate	82 percentile	76 percentile
Limited English Speaking	0 percentile	59 percentile
Less than High School Education	64 percentile	81 percentile
Under Age 5	74 percentile	68 percentile
Over Age 64	66 percentile	81 percentile

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is considered disadvantage under the CEJST methodology in conjugation with Table 13. The indicator thresholds applied to this table are as stipulated on CEQ 2023 based on the indicator thresholds exceeded in Table 13.

EJScreen Methodology Assessment

None of the EJ Indices exceed the 80th percentile indicator threshold for the tract when compared with the Nation and State populations (Table 15). This indicates the tract as an unlikely area of potential for EJ concerns via the EJScreen methodology.

Table 15. EJ Index for the Southeast Fairbanks Census Area (Dry Creek & Tok Hill Ops Sites)

Index	Compared to Nation	Compared to State
Particulate Matter 2.5	N/A	N/A
Ozone	N/A	N/A
Diesel Particulate Matter	0 percentile	5 percentile
Air Toxics Cancer Risk	0 percentile	18 percentile
Air Toxics Respiratory Hazard Index	0 percentile	22 percentile
Toxic Releases to Air	3 percentile	19 percentile
Traffic Proximity	7 percentile	10 percentile
Lead Paint	51 percentile	73 percentile
Superfund Proximity	0 percentile	32 percentile
Risk Management Plan Facility Proximity	0 percentile	9 percentile
Hazardous Waste Proximity	0 percentile	27 percentile
Underground Storage Tanks	32 percentile	50 percentile
Wastewater Discharge	N/A	N/A

Source: (EPA 2023)
Note: This table identifies data relevant to determine whether a community is within an area of potential environment justice concern under the EJScreen methodology and uses the 80th percentile as an indicator threshold.

Local and State Supplement Data

Local and State data was used to supplement CEJST Methodology Assessment with the presumption that the existing risk of “Wildfire Risk” would likely be disproportionate for the tract when compared to the Nation based on the high occurrence of wildfires in Interior Alaska.

This tract census area population is predominately composed of multiple population centers. relatively adjacent to highways (i.e., Alaska Highway, Tok-Glenn Highway Cut-off, Taylor Highway). The predominate population center in the tract is Tok, Alaska (1,243 people as of the 2020 Decennial Census). In relation to the population centers of this tract, Tok Hill Ops Site is generally disconnected and removed both laterally and vertically from where the general population predominately resides and works. However, there is recreating and subsistence activities that actively occur within near and at both proposed ops sites. The Dry Creek Ops Site is the closest ops site under the Preferred Alternative to a population center (i.e., Dry Creek consisting of 61 people as of the 2020 Decennial Census) wherein the population resides and

works. Specifically, there is approximately 1 to 1.5 miles horizontal separation between the ops site and the core Dry Creek community. Although laterally there is approximately over 1,300 feet of separation. There is approximately 2.25 miles separating the Dry Creek Ops Site and approximately 4 miles separating the Tok Hill Ops Site from the land of a Federally Recognized Tribe. However, in relation to land of a Federally Recognized Tribe, the ops sites are generally disconnected and removed horizontally and laterally.

8.0 Conclusion and Determinations

In accordance with EO 12898, Federal agencies are required to identify any adverse environmental or human health impacts anticipated from a Proposed Action, and to determine whether those impacts would disproportionately affect minority and/or low-income communities. Additionally, in accordance with EO 13045, Federal agencies are required to identify any impacts that would disproportionately affect children. The Air Force's determinations in regard to the ops sites and their potential impacts related to EJ are summarized in Table 16.

Table 16. Summary of Air Force EJ Determinations

Tract Determinations			Preferred Alternative Determinations		
Name	**CEJST Assessment of Presence Disadvantaged Community**	**EJScreen Assessment of Potential EJ Concern(s)**	**Ops Site**	**Potential Adverse Environmental or Human Health Impacts?**	**Impacts have Potential to Disproportionately Affect a Disadvantaged Community?**
FNSB Tract Numbers 02090001800 and 0209098010	Partially Disadvantaged wherein Federally Recognized Tribe Land Occurs	With Regards to State Only: • Superfund Proximity • Hazardous Waste Proximity	Engineer Hill	Yes	No
			South Pole Hill	Yes	No
FNSB Tract Number 02090001100	Fully Disadvantaged	With Regards to Nation and State: • Air Toxics Respiratory Hazard Index • Superfund Proximity With Regards to State Only: • Toxic Releases to Air • Hazardous Waste Proximity	Bridge to Terabithia	Yes	No
FNSB Tract Number 02090001700	Partially Disadvantaged wherein Federally Recognized Tribal Land Occurs	None	Birch Hill	Yes	No
Southeast Fairbanks Census Tract Number 02240000400	Partially Disadvantaged wherein Federally Recognized Tribal Land Occurs	None	Pogo Hill	Yes	No
			Quartz Hill	Yes	No
			Gerstle River	Yes	No
Southeast Fairbanks Census Tract Number 02240000100	Fully Disadvantaged	None	Dry Creek	Yes	Yes
			Tok Hill	Yes	No

The tracts identified as partially or fully disadvantaged will herein be referred to as, "Preferred Alternative Disadvantaged Communities."

The potential adverse environmental or human health impacts associated with the Preferred Alternative would require consideration of risks associated with the Climate Change, Energy, Health, Transportation, and Water & Wastewater categories considered in this EJ Analysis with regards to the Preferred Alternative Disadvantaged Communities. With regard to the EJ Indices, the following indices are of particular consideration due to the nature of the Preferred Alternative: Particulate Matter 2.5, Ozone, Diesel Particulate Matter, Air Toxics Cancer Risk, Air Toxics Respiratory Hazard Index, Toxic Releases to Air, Traffic Proximity, Hazardous Waste Proximity, and Wastewater Discharge. Although the activities and degree of potential impacts would vary by ops site, the following Preferred Alternative activities would have the most potential to contribute to these adverse environmental or human health impacts and/or the EJ Indices of a tract: construction activities, construction and post-construction traffic to and from the ops sites, and post-construction operation of temporary generator and permanent generators with associated gasoline generators to support Yukon Enhanced Training Initiatives training. Air operations under the Preferred Alternative are not being considered a project-specific impact in this EJ analysis as the number of air operations from Eielson Air Force Bases would not increase, air operations vary year to year, and air operations would take place in existing designated airspace in accordance with applicable laws, regulations, and agreements.

Construction activities with potential to increase adverse environmental or human health impacts and/or the EJ Indices of a tract would be temporary and generally only last for the duration of the construction phase. These activities may include but not be limited to heavy equipment operation, temporary diesel generator operation, community gravel pit operations, potential wastewater discharge, and increased traffic to and from the ops sites for construction purposes.

Upon completion of the construction phase, the Preferred Alternative would operate the Yukon Enhanced Training Initiative systems at the ops sites. The Dry Creek and Quartz Hill Ops Sites would be permanently powered by diesel generators that would produce air pollutant emissions and potentially increase EJ Indices. This would include air pollutant emissions from gasoline generators that would be used to warm the diesel generators when necessitated by low temperatures. Ops sites would also lead to increase traffic to these remote areas by increasing accessibility with the new gravel access roads that would be used by operators to reach the ops sites. These roads would also be available to and used by other site users. Gravel roads are known to be a main source of fugitive dust (i.e., particulate matter 2.5) emissions in rural Alaska.

Although the Preferred Alternative construction and operation of the ops sites have the potential to increase adverse environmental or human health impacts and/or the EJ Indices of a tract, it is not anticipated that the Preferred Alternative would result in an exceedance of a CEJST or EJScreen indicator threshold. Furthermore, it would be unlikely that the Preferred Alternative would disproportionately impact a disadvantaged community for eight of the nine ops sites due to the size of the tracts and the proximity of nearby population centers and/or the land of a Federally Recognized Tribe to the footprints of the ops sites. Furthermore, the ops sites would generally coincide with other land uses in the region and take measures to minimize and/or avoid impacts to adverse environmental or human health impacts potentially resulting from the Preferred Alternative.

The Dry Creek Ops Site occurs within a tract that has been identified as a fully disadvantaged community and would be located within range of the tract’s Dry Creek Community, wherein potential impacts from the Preferred Alternatives Dry Creek Ops Site are more likely to affect the community’s members who live, work, recreate, and conduct subsistence activities within the area at and adjacent to the Dry Creek Ops Site’s footprint.

Determination under EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Due to the remote location of the ops sites and temporary nature of impacts, it was determined that the Preferred Alternative would not have any significant adverse environmental or human health impacts or adverse impacts that would disproportionately affect minority and/or low-income communities for Engineer Hill, South Pole Hill, Bridge to Terabithia, Birch Hill, Pogo Hill, Quartz Hill, Gerstle River, and Tok Hill Ops Sites. For the Dry Creek Ops Sites, further coordination with the community is recommended prior to determining the severity (i.e., whether the impacts would be significantly disproportionate) to the Dry Creek Community.

Determination under EO 13045, Protection of Children from Environmental Health Risks and Safety Risks

Children and/or children facilities (e.g., schools and daycares) are not anticipated to be in the area where the Preferred Alternative would be constructed except when doing recreational activities with an adult. Thus, it was determined that the Preferred Alternative would not have any disproportionate adverse impacts on the health or safety risks to children.

9.0 References

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APPENDIX D

Cultural Resource Survey Reports

Cultural Resources Survey for 354th Range Squadron Radar Operations Sites, AKV402

January 2024

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Contract W911KB22D0003
Task Order W911KB23F0078

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Statement of Confidentiality

To protect fragile, vulnerable, or threatened cultural sites from disturbance, access to site-specific information from the Alaska Heritage Resources Survey is restricted or confidential. Distribution of those portions of this report that identify the location of cultural sites is to be limited to those with a legitimate need to know, such as appropriate personnel from Cultural Resource Consultants LLC, AECOM Technical Services, Inc., the United States Airforce, and the United States Army Corps of Engineers. Restricted or confidential information is withheld from public records disclosure under state law (Alaska Statute [AS] 40.25.110) and under the federal Freedom of Information Act (Public Law [PL] 89-554). Information about site inventory may be restricted pursuant to AS 40.25.120(a)(4), Alaska State Parks Policy and Procedure No. 50200, the National Historic Preservation Act (PL 89-665, 54 U.S.C. 300101), and the Archaeological Resources Protection Act (PL 96-95).

Executive Summary

This report describes a Phase II cultural resources survey of six radar operations sites that the U.S. Air Force 354th Range Squadron is proposing to construct in interior Alaska, between North Pole and Tok. The Project is a federal undertaking as defined by the National Historic Preservation Act of 1966. Through Contract W911KB22D0003, Task Order W911KB23F0078 with the U.S. Army Corps of Engineers, AECOM Technical Services, Inc. retained Cultural Resource Consultants LLC to identify properties in the Project's study area that could be eligible for the National Register of Historic Places (National Register).

The areas of potential effects (APE) for this study are six separate radar operations sites in the following areas:

- Section 13 of Township 2 South, Range 3 East and Section 18 of Township 2 South, 4 East, Fairbanks Meridian
- Sections 4 and 9 of Township 6 South, Range 5 East, Fairbanks Meridian
- Sections 11, 12, and 14 of Township 6 South, 13 East, Fairbanks Meridian
- Sections 12, 13, 14, 22, and 28 of Township 8 South, Range 10 East, Fairbanks Meridian
- Sections 23, 24, 26, and 35 of Township 14 South, Range 16 East, Fairbanks Meridian
- Sections 21, 26, 28, 29, 31, 32, 34, and 35 of Township 17 North, Range 12 East, Copper River Meridian
- Sections 2, 3, and 4 of Township 16 North, Range 12 East, Copper River Meridian

Available literature, including the Alaska Heritage Resources Survey (AHRS), was reviewed prior to fieldwork. Cultural Resource Consultants LLC conducted the cultural resources survey of the proposed sites in September of 2023.

Six previously documented AHRS sites are within or immediately adjacent to the APE: the Shaw Creek Basin Archaeological District, the Richardson Highway, the Haines Fairbanks Pipeline Corridor, a Moose/Caribou Fence, the Chistochina to Eagle Trail, and the Engineer Hill Munitions Historic District.

As a result of this survey, one newly documented site was assigned an AHRS number: a three-mile bypassed section of the original Tok Cutoff Highway. Although the original Tok Cutoff Highway Bypass Segment is significant under Criterion A, it does not retain historic integrity and is not recommended eligible for the National Register of Historic Places (NRHP).

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AHRS	Alaska Heritage Resources Survey
APE	Area of Potential Effects
ARC	Alaska Road Commission
AS	Alaska Statute
BP	Before Present
Cal BP	Calibrated Radiocarbon Years Before Present
cmbs	centimeters below surface
CRC	Cultural Resource Consultants LLC
DFP	Defensive Fighting Position
EAFB	Eielson Air Force Base
GPS	Global Positioning System
National Register	National Register of Historic Places
NHPA	National Historic Preservation Act of 1966
NLUR	Northern Land Use Research
OHA	Office of History and Archaeology
PL	Public Law
Project	354th Range Squadron Radar Operations Sites
shovel test	subsurface shovel test
TNT	Trinitrotoluene
cleared area	tree clearing area for radar line-of-sight
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
WAMCATS	Washington-Alaska Military Cable and Telegraph System
WWII	World War II

1.0 Introduction

Through Contract W911KB22D0003, Task Order W911KB23F0078 with the U.S. Army Corps of Engineers (USACE), AECOM Technical Services, Inc. (AECOM) retained Cultural Resource Consultants LLC (CRC) to conduct a Phase II cultural resources survey of six radar operations sites that the U.S. Air Force 354th Range Squadron is proposing to construct in interior Alaska, between North Pole and Tok (Figure 1).

The Project is a federal undertaking as defined by the National Historic Preservation Act of 1966 (NHPA). Section 106 of the NHPA requires consideration of the effects of proposed undertakings on properties included on, or eligible for listing on, the National Register of Historic Places (National Register).

Cultural resources can be affected by actions that alter the attributes that might qualify them for inclusion on the National Register. This report contains documentation prepared in accordance with the NHPA (54 U.S. Code § 306101) and the Alaska Historic Preservation Act (Alaska Statute [AS] 31.35/11 Alaska Administrative Code 16).

The goals of this cultural resource survey were:

- To identify previously known and unknown cultural resources in the Project's APEs
- To determine the National Register eligibility of cultural resources in the APEs
- To evaluate the Project's potential effects on historic properties

CRC conducted the archaeological surveys in September 2023. Archaeological survey on state lands was carried out under State Cultural Resources Investigation Permit 2023-71.

2.0 Areas of Potential Effects

The Project's APEs are six radar operations sites in interior Alaska between North Pole and Tok. Each of the proposed operations sites will include a tree clearing area for radar line-of-sight (cleared area), a gravel operating pad or pads for the radars, a new or expanded access road, and new above ground powerlines. The survey area boundaries for each APE are defined by the primary cleared area as well as 100-foot buffers on either side of the centerline of the new access roads and powerlines. Existing access and haul roads that will not be modified for this project were not surveyed. Four survey areas are on State of Alaska land (Dry Creek, Pogo Hill, Quartz Hill, and Tok Hill), one is on land owned by the Fairbanks North Star Borough (Birch Hill), and one is on Eielson Air Force Base (EAFB; Engineer Hill) (Table 1).

Table 1. Radar Operations Sites Acreage and Ownership

Operations Site	**Acreage**	**Landowner**
Engineer Hill	88	U.S. Air Force, Eielson AFB
Birch Hill	53	Fairbanks North Star Borough
Dry Creek	78	State of Alaska
Pogo Hill	62	State of Alaska
Quartz Hill	168	State of Alaska
Tok Hill	253	State of Alaska

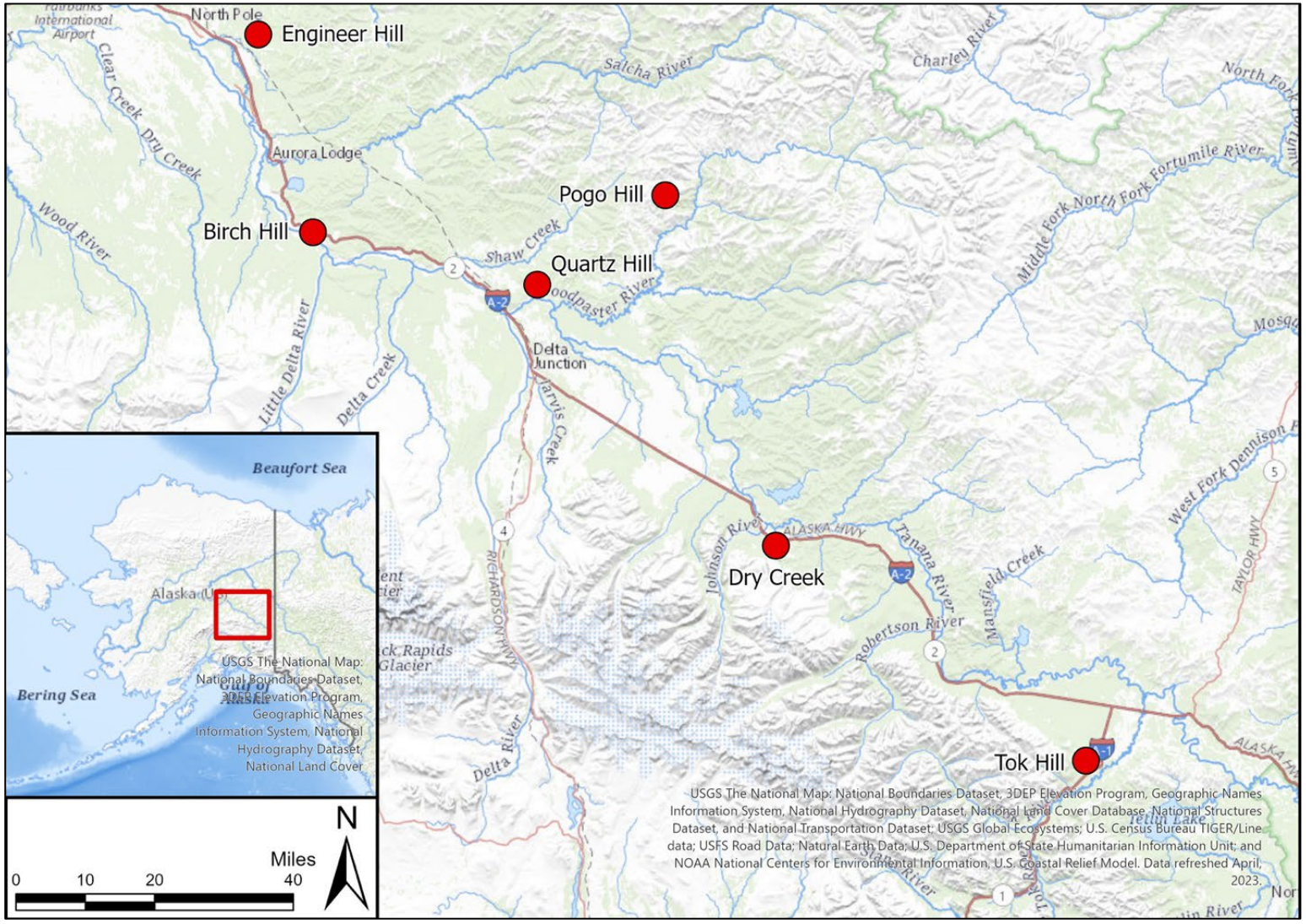

Figure 1. Radar operations site locations

2.1 Engineer Hill

The Engineer Hill radar operations site is on U.S. Air Force land on EAFB. This site is in Section 13 of Township 2 South, Range 3 East and Section 18 of Township 2 South, 4 East, Fairbanks Meridian (Figure 2). The survey area for the Engineer Hill radar operations site was approximately 88 acres and included a section of a new access road, a powerline that parallels the access road, and a 26-acre area to be cleared for the radar system. An existing two track trail extends from the entrance to the Engineer Hill munitions storage area, around the perimeter of the storage area, to the top of Engineer Hill. This route will be widened and improved to provide access to the operations site. Trails in this area are maintained by trappers, as this is an active trapping area managed by Eielson Natural Resources.

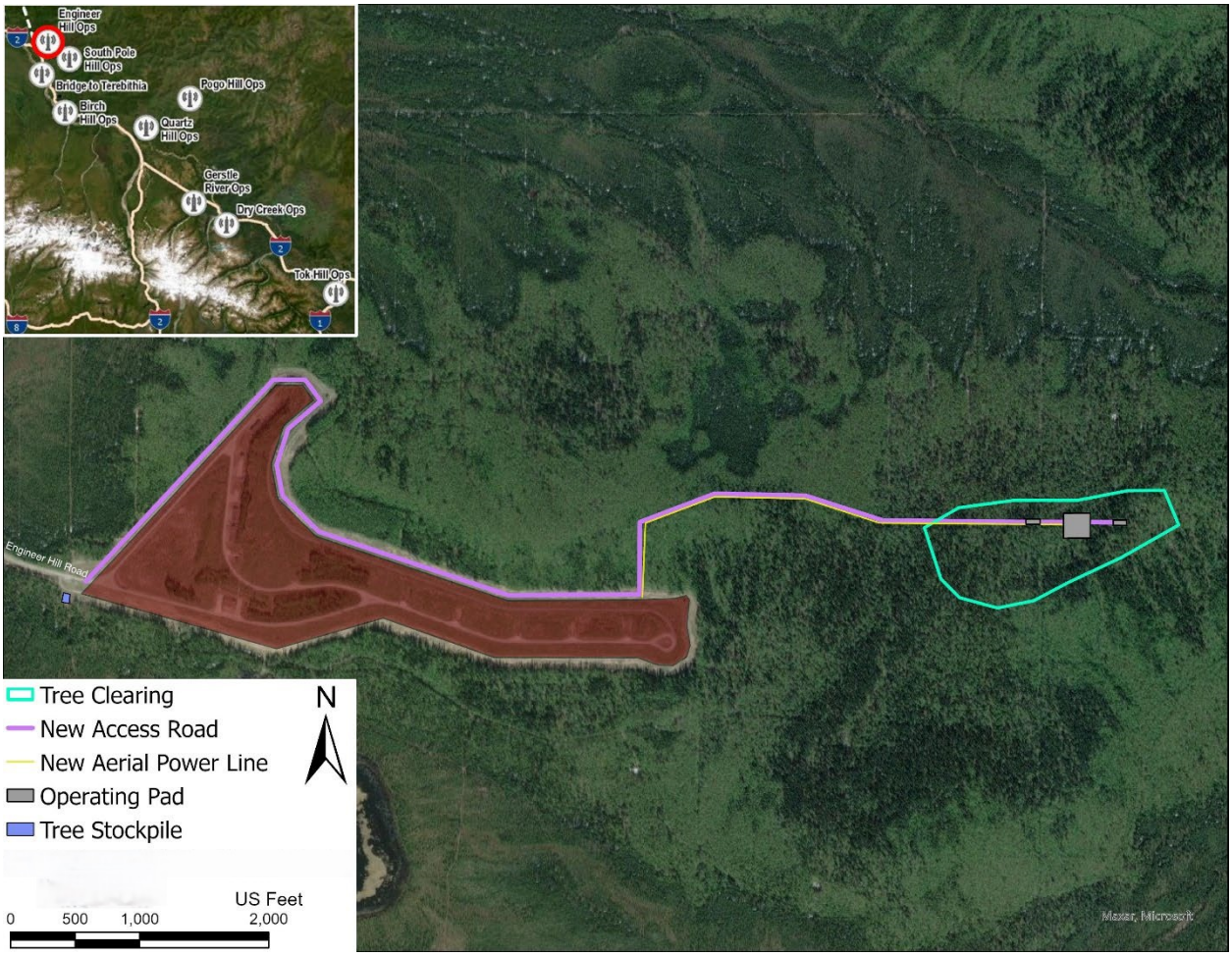

Figure 2. Engineer Hill radar operations site

2.2 Birch Hill

The proposed Birch Hill radar operations site is on the southern side of the Alaska Highway, east of Delta Junction, in Sections 4 and 9 of Township 6 South, Range 5 East, Fairbanks Meridian (Figure 3).

The Birch Hill operations site is on land owned by the Fairbanks North Star Borough. The survey area for the Birch Hill operations site was approximately 53 acres and included 0.5 mile of a proposed gravel road, a proposed powerline, and a 29-acre cleared area for the radar operations site. At present there is no road or trail to the proposed radar operations site.

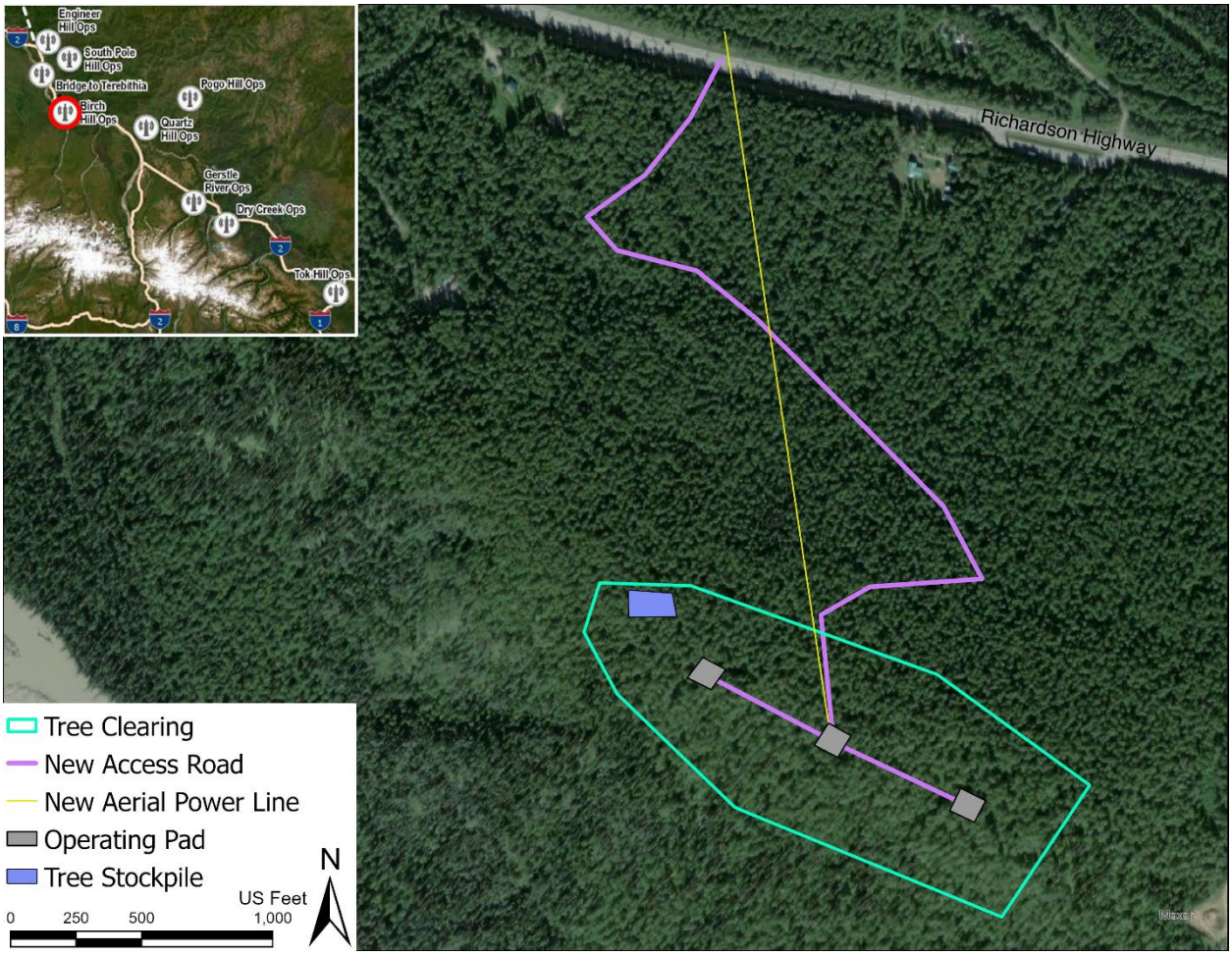

Figure 3. Birch Hill radar operations site

2.3 Pogo Hill

The Pogo Hill radar operations site is on land owned by the State of Alaska in Sections 11, 12, and 14 of Township 6 South, 13 East, Fairbanks Meridian (Figure 4). The site is accessed via the Pogo Mine Road. The Pogo Hill survey area was approximately 62 acres and included a 14-acre cleared area, a 1.5-mile gravel road, and a 0.5-mile aboveground powerline. From the Pogo Mine Road, an existing gravel road provides access to Pogo Hill summit. However, the road is very narrow and will likely need to be widened and improved to provide access to the operations site. The proposed powerline will follow the proposed access road from the operations site to its junction with the Pogo Mine Road. It will cross the road and connect into the existing Pogo transmission line that roughly parallels the Pogo Mine Road.

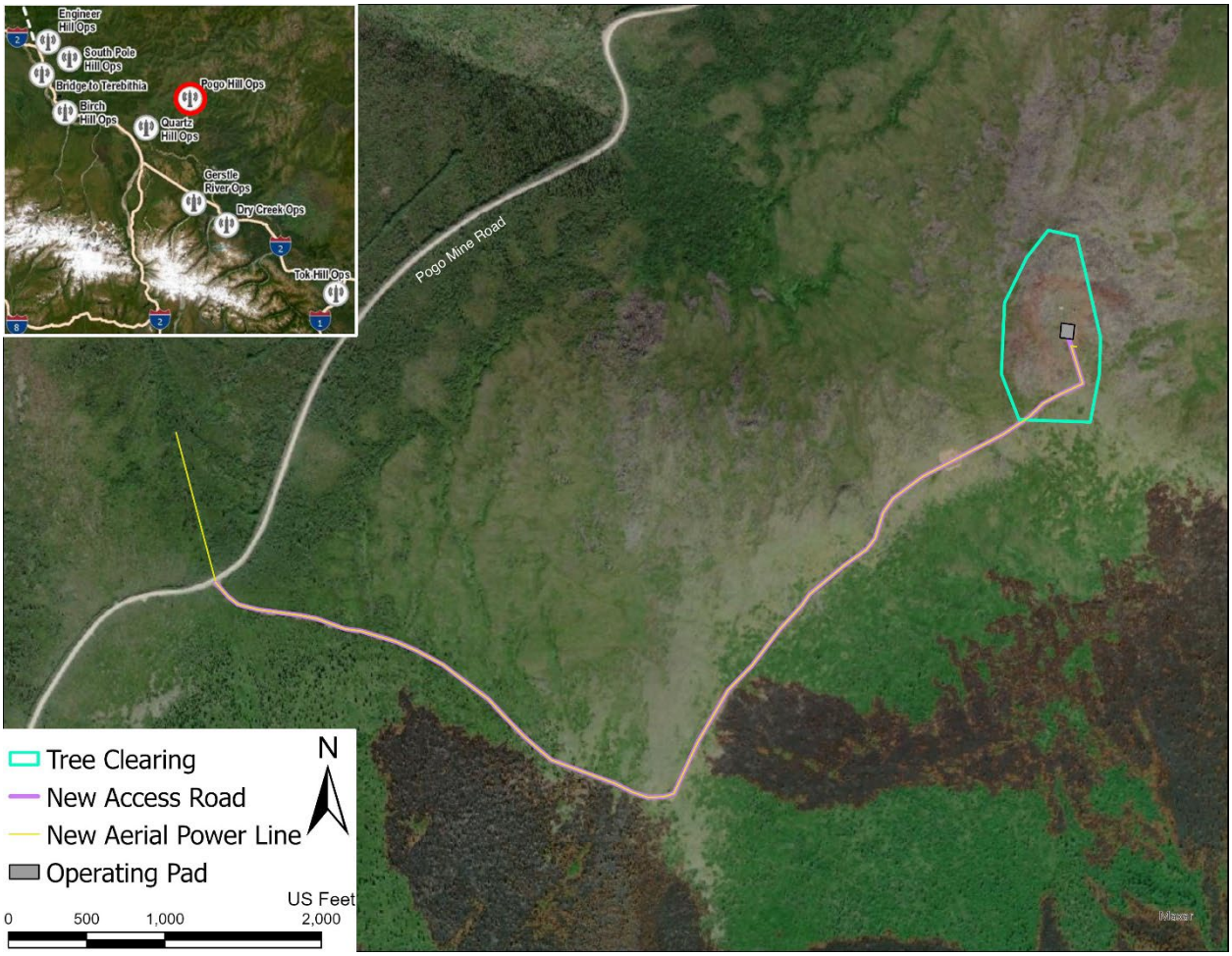

Figure 4. Pogo Hill radar operations site

2.4 Quartz Hill

The footprint for this Quartz Hill operations site is in Sections 12, 13, 14, 22, and 28 of Township 8 South, Range 10 East, Fairbanks Meridian (Figure 5). The Quartz Hill operations site is on land owned by the State of Alaska. The total survey area was approximately 168 acres and included 17 acres to be cleared at the top of Quartz Hill for the radar system and 6.3 miles of a new access road. Approximately five miles of the proposed access road will be within an existing logging road that is currently used by hunters and other recreation groups. The final 1.4 miles of the proposed road to the operations site will be new construction.

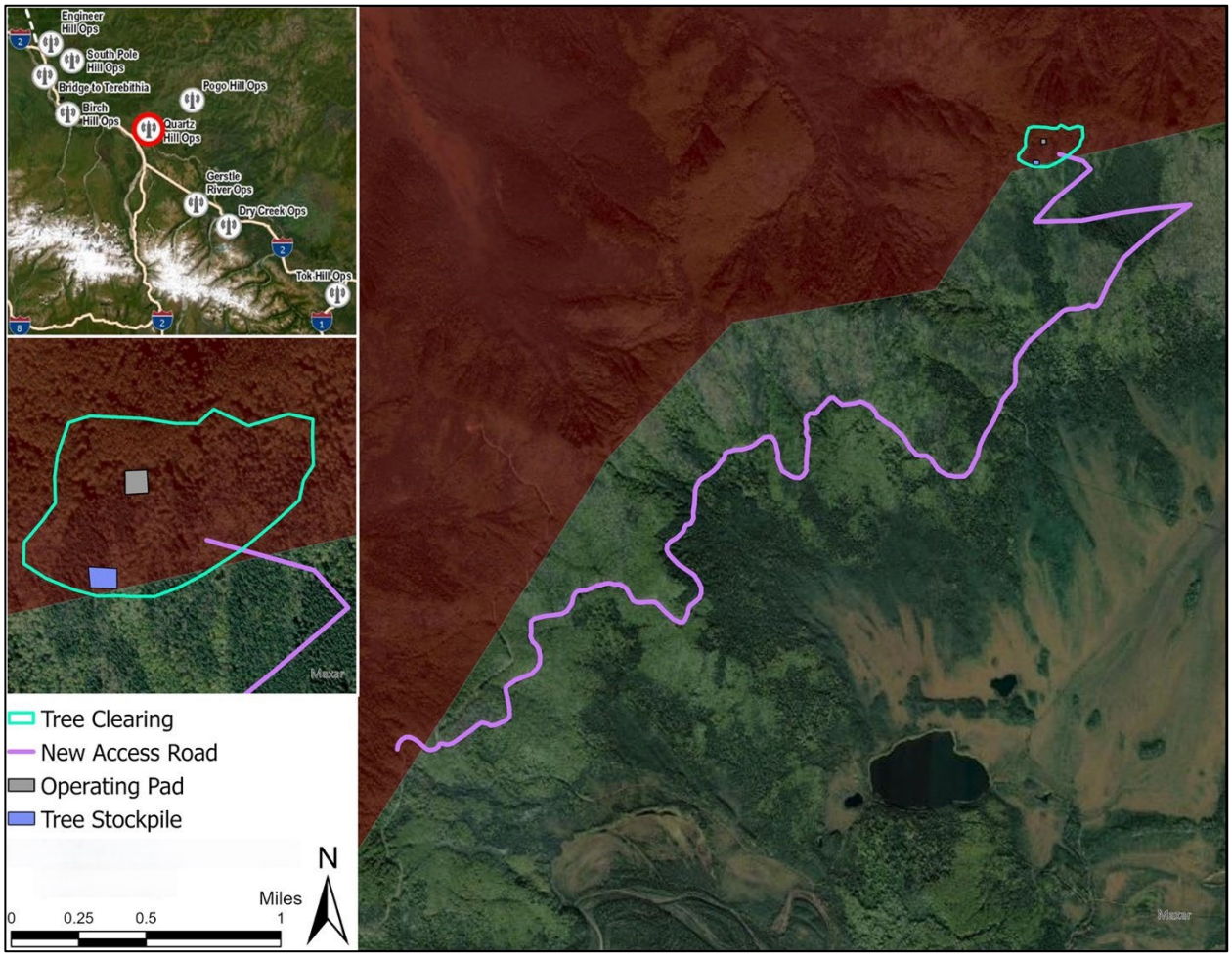

Figure 5. Quartz Hill radar operations site

2.5 Dry Creek

The proposed Dry Creek radar operations site is south of the Alaska Highway at the community of Dry Creek. The site is in Sections 23, 24, 26, and 35 of Township 14 South, Range 16 East, Fairbanks Meridian (Figure 6).

The Dry Creek operations site is on land owned by the State of Alaska. The survey area was approximately 78 acres and included a 5-acre cleared area and a proposed 3-mile gravel access road. From its junction with the Alaska Highway, the first mile of the proposed access road is within an existing gravel road that provides access to a few properties. The remainder of the route to the proposed radar operations site will be new construction.

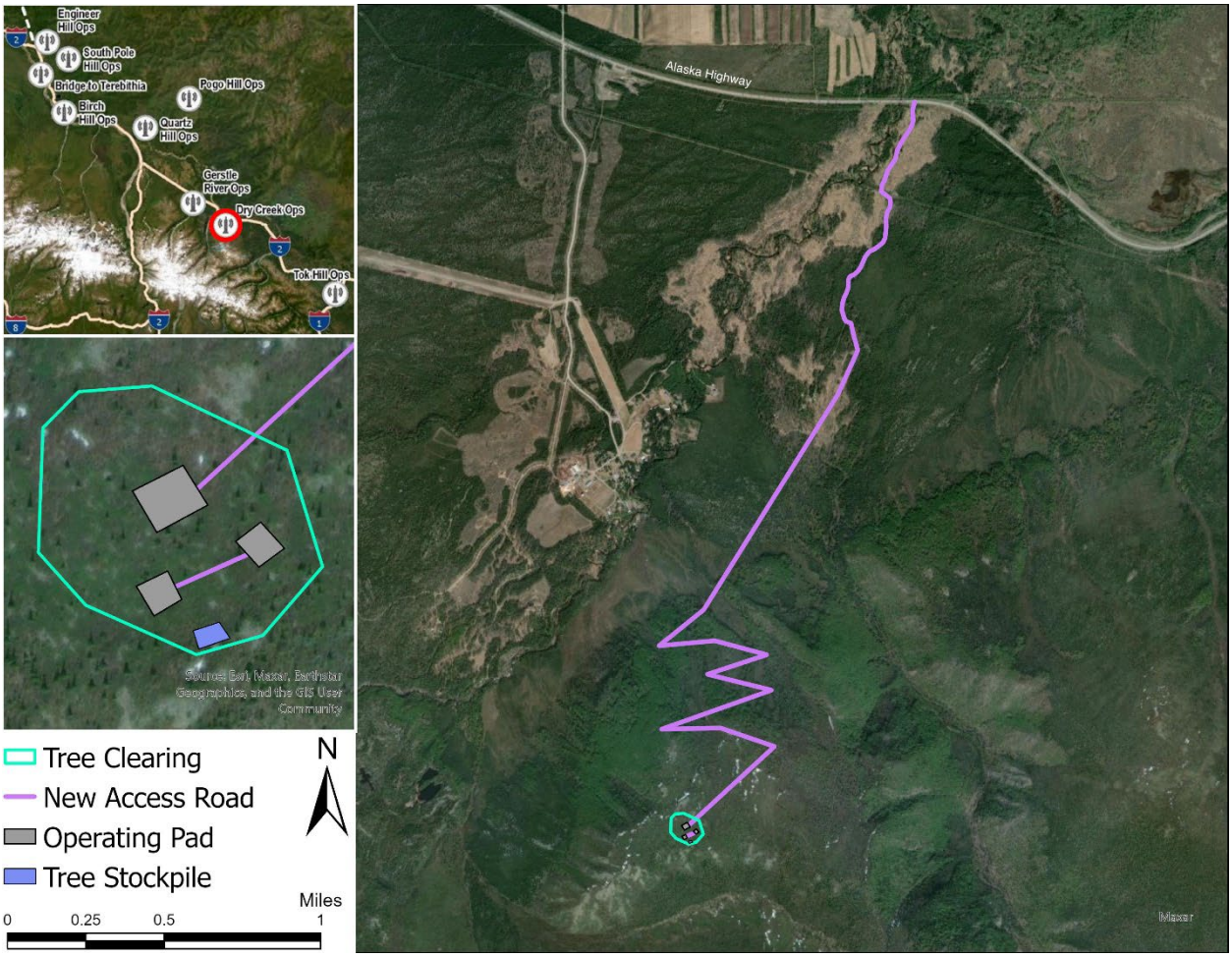

Figure 6. Dry Creek radar operations site

2.6 Tok Hill

The Tok Hill radar operations site is south of the community of Tok on land owned by the State of Alaska. The footprint for this site, including a new access road and a cleared area, is in Sections 21, 26, 28, 29, 31, 32, 34, and 35 of Township 17 North, Range 12 East, Copper River Meridian and Sections 2, 3, and 4 of Township 16 North, Range 12 East, Copper River Meridian (Figure 7). The survey area for the Tok Hill operations site was approximately 253 acres and included a 10.5-acre cleared area for the radar operations site, a new powerline that will connect the operations site to the power grid to the northeast, and an 8-mile gravel access road from the Tok Cutoff Highway to the summit of Tok Hill. The access road is already in existence but will likely need to be widened and improved to provide access to the operations site.

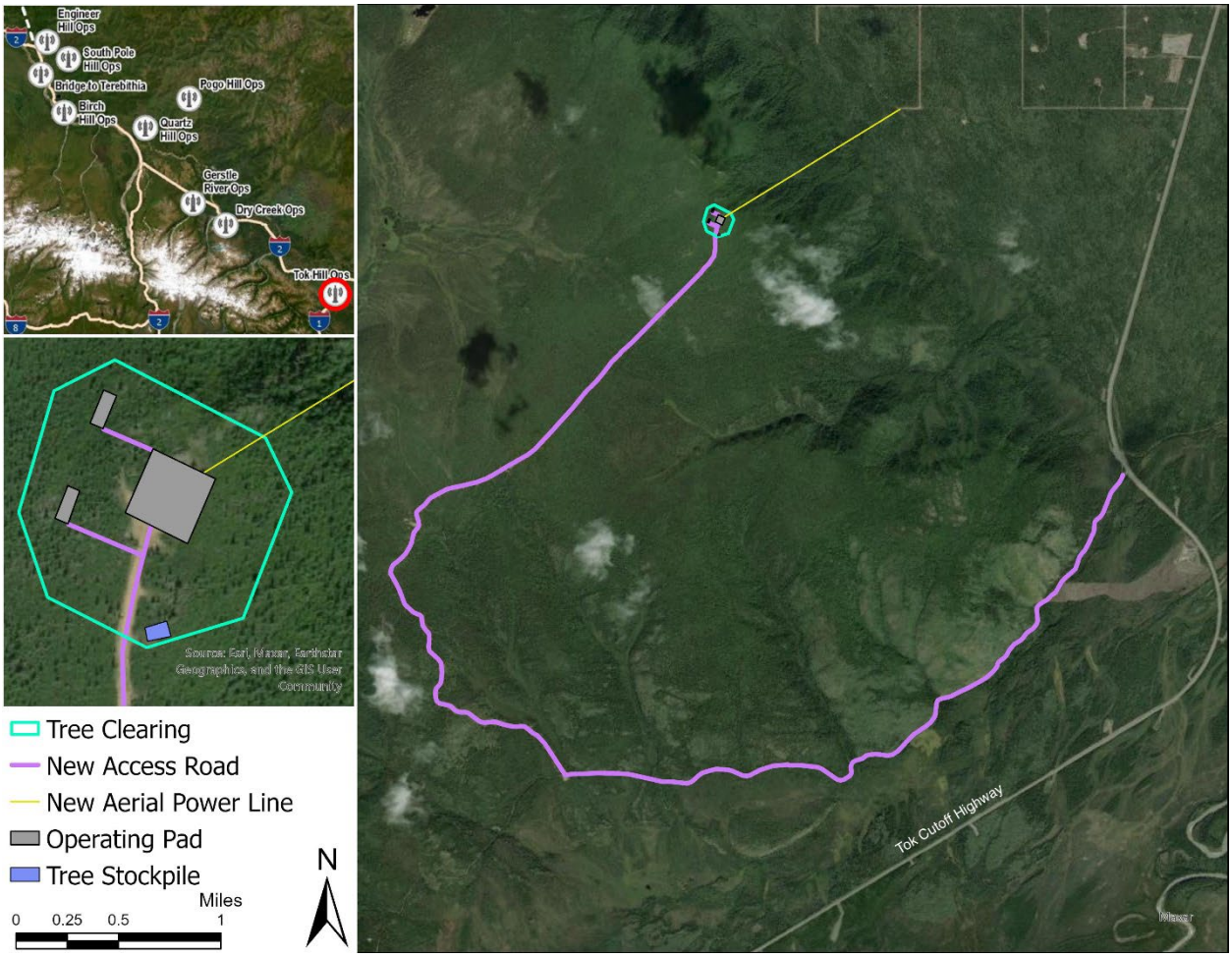

Figure 7. Tok Hill radar operations site

3.0 Environmental Background

The Project's APEs are distributed within the Yukon-Tanana Upland, a large geological area between the Yukon and Tanana floodplains. The area is characterized by plateaus, rolling highlands, gentle slopes, and valleys with dome mountains reaching altitudes of 2,000 to 4,000 feet (U.S. Forest Service n.d.). The geological makeup of the mountains is a complex combination of lithologies, while the Tanana River Valley contains secondary surface deposits from the surrounding area.

As summarized by Yarie et al. (1998), the Tanana River drains the southern Yukon-Tanana Uplands and the Alaska Range from south to north. It frequently floods, especially in mid- to late summer, resulting in erosion and the formation of new alluvial bars. In most of the Project area, the Tanana River is "braided and characterized by unstable, unvegetated gravel bars and multiple channels" (Yarie et al. 1998:691). The Tanana River runs southeast to northwest through interior Alaska. During the late Holocene, the climate was marked by increased rainfall, which caused more frequent flooding and thicker sedimentation. On average, several meters of bank erode into the river each year (Yarie et al. 1998:691). Due to the constant reconstruction of the floodplain, archaeological sites once on the banks of the Tanana River have likely already eroded.

Glacial recession between 19,000 and 12,000 years ago contributed to a loess accumulation of several enters near the Yukon-Tanana Upland (Muhs et al. 2018). By 18,000 years ago, tundra, sparsely vegetated with grasses and herbaceous plants, dominated interior Alaska (Anderson and Brubaker 1994; Bigelow et al. 2003; Edwards et al. 2000). Muhs et al. (2018:801–803) report paleosols within glacial loess dating to as late as 12,000 years ago.

Most Alaskan megafauna became extinct around the end of the Pleistocene. Although fossil evidence dates the extinction of woolly mammoths and horses in interior Alaska around 13,000 years ago, Haile et al. (2009) claim to have identified ancient environmental DNA evidence for both species as late as 10,500 years ago. Bison, moose, caribou, mountain goats, and wapiti continued to be notable grazing animals (Potter 2007; Yesner 2001).

Tall vegetation did not occur in significant quantities until around 12,000 years ago with the advent of dry shrub tundra comprised of dwarf birch (*Betula* spp.) and similar species (Anderson and Brubaker 1994). The dry shrub tundra continued to dominate upland sites, although poplar trees came to cover river valleys and south-facing slopes between 11,000 and 9,000 years ago. Spruce and alder arrived later, between 10,000 and 7,000 years ago. Lakes began to form from melting permafrost in the Yukon Flats to the north by around 9,000 years ago (Edwards et al. 2016). The northern extent of the tundra/taiga boundary was stable by 6,000 years ago (Bigelow et al. 2003; Edwards et al. 2000), with modern vegetation established between 6,000 and 4,000 years ago (Anderson and Brubaker 1994).

Currently, the Yukon-Tanana Upland has a complex vegetation pattern with white spruce, birch, and aspen covering lower slopes and south-facing slopes (U.S. Forest Service n.d.). Black spruce grows at higher elevations, on north-facing slopes, and on lower slopes. At the highest elevations, alpine meadows with sedges and low shrubs grow. Permafrost is discontinuous. Local fauna include moose, caribou, bison, and various rodents and birds. Upland furbearers include marten, mink, and weasels, and the mountains are home to marmots and Dall sheep.

4.0 Cultural Chronology

The history of human occupation in interior Alaska has been described and categorized in a variety of schemas as new data become available and scientific paradigms shift. The cultural – history framework identifies archaeological "traditions" or "complexes" by categorizing generalized material culture typologies within regions. While cultural historical sequences are limited theoretical constructs, the associated terminology remains useful as a standardized way to convey information. The timeline, cultural units, and associated ecologies described are drawn from Smith (2020:140), which is an adaptation of Holmes (2008:Figure 1). Categorization of the earliest human record in interior Alaska uses Reuther's (2013) ecologically driven terminology. The dates are listed in either years before present (BP) or calibrated radiocarbon years before present (cal BP)

4.1 Late Glacial Period (14,300–11,700 Cal BP)

The Late Glacial Period, as presented by Reuther (2013), is based on ecological and environmental parameters, and encompasses more than one of the archaeological complexes defined by earlier researchers. During this period, the middle Tanana Valley was unglaciated steppe-tundra and connected to the larger Beringia Refugium.

The steppe-tundra landscape hosted a variety of large grazing mammals such as mammoth, steppe bison, and wapiti. Low shrubs like willow increased through this period, and the shrub tundra was established by the end of the Late Glacial (Reuther et al. 2023). The earliest evidence of occupation in interior Alaska is represented by materials from Swan Point, Broken Mammoth, and the Mead sites in the middle Tanana Valley, which are associated with the Eastern Beringian tradition as defined by Holmes (2008). Holmes (2008) also includes the Chindadn and Nenana complexes in the Beringian tradition.

The Chindadn complex is noted for the presence of a diagnostic stone tool type, the bifacially flaked, teardrop shaped Chindadn point (Reuther 2013:127). Other artifacts often found in Chindadn assemblages include flaked, triangular projectile points, end scrapers and side scrapers. Some representative Chindadn sites include Dry Creek Component I and the lowest levels at Village Site at Healy Lake (Dixon 1985:53–54). Nenana Complex site assemblages consist of triangular and teardrop-shaped points, like those found in Chindadn complex sites at Healy Lake, but an absence of microblade technology. Sites with a Nenana complex component include Dry Creek, Walker Road site, Broken Mammoth, and others in the Nenana, Tanana, and Teklanika River regions
(Reuther 2013:129–130).

4.2 American Paleo-Arctic (11,700–8,000 Cal BP)

The American Paleo-Arctic tradition, as recorded in Alaska, is associated with the Terminal Pleistocene and early Holocene. Overall warming during these periods initially resulted in upland birch and spruce forests and grasslands, with a variety of large game including grazers like bison and wapiti. The hot and dry climate of the early Holocene culminated with a thermal maximum around 10,000 cal BP that created the sand dune fields in the Tanana Valley (Reuther 2013). Subsequent Holocene cooling supported the expansion of spruce boglands that encroached on the preexisting steppe grasslands. Denali Complex assemblages are noted for distinctive wedge-shaped microblade cores, bifaces, and burins (Reuther 2013:133). Many

Denali complex sites have been identified in interior Alaska, such as Dry Creek Component II, Donnelly Ridge, and some of the levels within the Village Site
(Dixon 1985:54).

4.3 Transitional Northern Archaic (8,000–6,000 Cal BP)

The Transitional Northern Archaic tradition represents the transition from the American Paleo-Arctic (Denali) tradition to classic Northern Archaic assemblages. The Transitional Northern Archaic is a pattern in material culture that corresponds climatically with a sustained cooling event, the decline of grasslands and poplar forests, and the eventual establishment of the boreal forests of interior Alaska (Bigelow 1997). The earliest recorded Northern Archaic sites are in northwestern Alaska and include *(AHRS Reference)*, Last Day 8900, *(AHRS Reference)*, and Nogahabara (Esdale 2008). However, despite the location of the earliest Northern Archaic sites, some researchers maintain that the Northern Archaic spread from farther south in North America with the boreal forest (Reuther 2013:141). Examples of Northern Archaic sites include Ratekin, Dry Creek, and other sites in the Tangle Lakes region (Dixon 1985:54). Assemblages from this period are variable and poorly understood because they do not clearly adhere to the identified patterns (Holmes 2008; Potter 2008).

4.4 Early (Classic) Northern Archaic (6,000–3,500 Cal BP)

Archaeological sites from the Early Northern Archaic period have toolkits well adapted to the boreal forest. The boreal forests of Alaska were established by 6,000 Cal BP (Bigelow 1997). Most Northern Archaic sites date between 6,000 and 4,200 Cal BP (Esdale 2008). There are a few noteworthy examples of Northern Archaic occupations outside of forested regions, including the Tuktu site in Anaktuvuk Pass as reported by Campbell (1961) and in the Ahklun Mountain region of southwestern Alaska (Ackerman 2004). One hallmark of Northern Archaic technology is side-notched projectile points, which represents a hafting innovation used in association with atlatl dart technology. Elongate and semilunar bifaces, notched pebbles, microblade and microblade cores, and burins are also associated with Northern Archaic assemblages (Dixon 1985).

The people using these toolkits relied heavily on caribou (Clark 1994), a migratory herd species susceptible to mass-kill events during seasonal migrations. Cache pit visibility increased in the archaeological record during this period (Smith 2020), illustrating a growing importance of food storage practices in the Northern Archaic tradition. This may suggest caribou driveline features spatially related to Northern Archaic sites, like those found near Agiak Lake, were being cooperatively employed during the middle Holocene (Wilson and Rasic 2008; Wilson and Slobodina 2007). Small, resource/task-specific sites tend to be correlated with high ridges and near rivers and lakes (Betts 1987; Esdale 2008; Smith 2020).

Potter (2008) emphasizes a correlation between bifacial technology and site location. Bifacial technology appears frequently in upland sites, while core and blade technology is dominant in lowland sites. An increase in raw material types illustrates an increase in mobility and trade in the middle Holocene (Smith 2020). Early Northern Archaic residential features include tent rings (Wilson and Rasic 2008) and buried house features reported at Tangle Lakes, Onion Portage, and near the central Yukon River (Anderson 1988; Mobley 1982; Urban et al. 2016).

4.5 Late Northern Archaic (3,500–2000 Cal BP)

Temperatures in the middle Tanana Valley were relatively flat over the Holocene, although there was a slight increase around 4000 BP followed by a slight decrease around 3500 BP (Kielhofer et al. 2023). However, population change and land use in the area is not associated with change in temperature by the mid-Holocene, and the late Northern Archaic is largely a continuation of the previous phase. Late Northern Archaic assemblages contain many of the same traits as the early Holocene Denali complex, including diverse microblade technology, burins, and stemmed, notched, and lanceolate points (Dixon 1985:53; Erlandson et al. 1991). Sites in the Tanana Valley dating to the period include the Healy Lake Village Chugwater (Erlandson et al. 1991), and Campus sites, all of which appear to be reoccupied campsites.

The Late Northern Archaic follows a period where cultural change occurred at the margins of ancestral Dene territory. By 3500 BP, population pressure and Arctic Small Tool tradition users from the west pushed Alaskan groups into the territories they would occupy for the following millennia (Tremayne and Winterhalder 2017). Evidence exists that the interaction between Northern Archaic and Artic Small Tool tradition users was cooperative, with trade (Anderson 2005; Kunz 2005; Odess 2005). However, the Tanana Valley is so far removed from the Arctic Small Tool tradition core areas that, even considering highly mobile Northern Archaic land use patterns, Arctic Small Tool tradition influence in the Tanana Valley was likely second hand. Regardless, there is evidence of Arctic Small Tool tradition influence at the Chugwater site in the form of burins similar to those produced at Choris sites, a derivation of the Arctic Small Tool tradition concentrated in coastal northwest Alaska (Erlandson et al. 1991:42).

4.6 Transitional Athabascan (2,000–1,000 Cal BP)

The Transitional Athabascan phase is associated with intensified occupation of the lowland ecosystem in the Tanana Valley (Doering et al. 2020; Potter 2008). This phase is viewed as part of the broader Northern Archaic tradition that spanned from about 6,000 to 1,000 BP (Smith 2020:151). However, changes in material culture that have been associated with the Dene people, including the widespread use of copper, began during this period. According to Cooper (2007), widespread use of copper by the northern Dene began during this phase, between 1,800 and 1,250 Cal BP. Dixon et al. (2005) report copper use in the Alaska Range potentially by 1,272 Cal BP. A transition from the long-standing use of atlatl darts to arrows also occurred during this period. This transition is well documented in the Yukon Territory in Canada, where organic technology has been well preserved in ice patches (Smith 2020:142).

4.7 Athabascan (1000 Cal BP–Present)

The Athabascan tradition is the most recent precolonial archaeological tradition in the study area. The seasonally sedentary settlement systems represented in the archaeological record were centered around riverine and lacustrine environments. Caribou, moose, sheep, and salmon were important subsistence resources. Winter villages were most often situated at water confluences, such as the junctions of rivers and streams or streams and lakes (Potter 2008).

This tradition exhibited a strong preference for the use of organic tool technologies with a gradual abandonment of lithic use. Notably, bone, antler, copper, wood, and some ceramic replaced stone tool use for many functions over the course of the last 1,000 years BP (Dixon

1985; Holmes 1975). Bow-and-arrow technology was widely adopted during the Athabascan tradition with an abrupt shift away from atlatl dart systems (Hare et al. 2004). Bone and antler were most used to arm projectiles. Bow and arrow use persisted even after the widespread introduction of firearms in the Tanana Valley (McKennan 1959). While organic tool use was emphasized, the lithic Kavik/Klo-Kut Point was innovated and used during this period (Smith 2020). The use of microblade and burin technology disappeared early in the Athabascan tradition (Holmes 2008). Cold hammered and annealed copper was used for tools and personal adornments by the northern Dene (Cooper 2007).

Features associated with this phase include cache pits for food storage associated with habitation sites (Smith 2020), wooden or stone caribou drivelines, and fish weirs (Osgood [1940] 1970; Spencer 1959). Known Athabaskan tradition sites include Dixthada Component I, Nenana River Gorge site, and Dakah De'nin Village (Dixon 1985:53, 59; Thompson and Depew 2005:6).

4.8 Ethnography

Haynes and Simeone (2007) provide an in-depth ethnographic overview of the Upper Tanana Region. Relevant key points of their publication are briefly summarized in the following text.

In the Upper Tanana Region, people living at Healy Lake, Dot Lake, and Tanacross spoke a different Athabascan dialect from people at Tetlin and Northway (Haynes and Simeone 2007:6). However, Haynes and Simeone (2007) generally do not note a distinct difference in the cultural practices of these groups. Rather than hard territory boundaries and strict, established tribes, residents in the Upper Tanana lived in small local bands that might join into larger regional groups to hunt or fish. Each band identified with a hill or mountain near their winter camp that was significant for ceremonies (Haynes and Simeone 2007:18).

By the early 1900s, most bands had a winter village or base camp on a body of water near the center of their territory. Base camps were often near a concentrated and easily-stored-resource, such as caribou or whitefish. Most winter camps emphasized fishing, while auxiliary camps focused on hunting (Haynes and Simeone 2007:11–12). The smaller hunting and fishing camps were usually within 20 to 50 miles of the base camp.

The seasonal round included fishing for whitefish, northern pike, and grayling from late spring to mid-July (Haynes and Simeone 2007:27–33). Fish not immediately eaten were processed for storage by drying or fermenting. Berries, roots, and other plants were gathered from late spring to early fall. Caribou, Dall sheep, and moose were hunted during the summer and fall. Moose were trapped in snares along trails or in a corridor created by a wooden fence. Caribou were driven through fences and harvested in huge numbers during their fall migration.

Although smaller caribou fences were constructed in the uplands, the largest was in the middle Tanana Valley, Mansfield-Ketchumstuk band territory. It was about 20 miles long and used in the late spring and early fall by people from as far away as Dawson, Yukon Territory. At first snowfall, bands separated into semi-permanent camps where they lived off food they had cached earlier in the year. They would also continue to hunt moose and caribou. Smaller game like snowshoe hares, porcupines, muskrats, or lynx were taken when other game was not available. Birds and eggs were harvested throughout the year.

Until log cabins replaced traditional homes in the 1920s, winter houses were semi-subterranean, wood-frame structures covered with birch bark. Wealthy families could live in houses as large as 40 feet long by 25 feet wide. Temporary homes were domed tents supported by wooden poles covered in caribou or moose skin (Haynes and Simeone 2007:79).

Well-worn trails following natural routes like rivers, clear ridges, and mountain passes crossed the landscape (Haynes and Simeone 2007:18–19). Trails within a band's territory were used seasonally, while trails that crossed territories could be used throughout the year. The Eagle Trail is in the historical territory of the Mansfield-Ketchumstuk band (Haynes and Simeone 2007:Figure 2). They resided at semi-permanent villages at Ketchumstuk (Saagescheeg), Dihthaâd, and Mansfield. Before the 1920s, bands used lightweight birch bark canoes and skin boats to travel over water, and bands frequently used dog sleds or traveled by foot until the 1940s when roads were built in the region, and they became more sedentary (Haynes and Simeone 2007:18–19).

4.9 Postcontact History

The Russian fur trade hardly impacted interior Alaska from the start of Russian influence in the early 1800s to the territory's sale to the U.S. in 1867 (Simeone and Hayes 2007:39–46). Russian fur traders did not establish trading posts in Upper Tanana territory, and any trade goods that arrived were probably acquired through trade with Indigenous middlemen. American influence was also limited for several decades until the short-lived Fortymile Gold Rush in 1886 attracted small numbers of prospectors, explorers, U.S. military expeditions, and Christian missionaries.

Described in *Historic Roads of Alaska* by the Office of History and Archaeology and Interpretation and Education (OHA 2017), the Euroamerican history of the study area is tied to the use of trails and eventual development of roads in the region. With the exception of Pogo Hill, all operations sites are directly adjacent to roads originally developed between the early 1900s and 1942. Development of Euroamerican roads through Athabascan territory interrupted traditional lifeways by introducing disease and radically changing Indigenous economies (Simeone and Hayes 2007).

When gold was discovered near Fairbanks in 1902, prospectors and suppliers flooded to Fairbanks from Valdez ports by foot, pack train, or dogsled (OHA 2017). In 1910, the Alaska Road Commission (ARC) transformed the Valdez-Fairbanks Trail into a wagon road. The ARC upgraded the road for easier motor vehicle traffic in the 1920s, although travel for homesteaders and other visitors remained challenging into World War II (WWII). Beginning with the first trails and wagon roads, roadhouses were established to assist travelers, although the businesses largely became obsolete by the 1940s.

4.9.1 Transportation Corridors. The Alaska Highway was constructed in 1942 to support Army operations in Fairbanks and connected to the Richardson Highway at Gakona (OHA 2017). The highway opened to homesteaders in 1946 and the public in 1948. Located at the crossroads of the Alaska Highway and the Tok Cutoff Highway, everyone entering Alaska on the new highway passed through Tok. Tok began as a construction camp and quickly became a central community in the region, with a customs post, a Northern Commercial Company store, post office, and school by the mid- to late 1940s.

4.9.2 Military Buildup. The first U.S. military posts in interior Alaska were at forts Egbert and Gibbon in 1899, near Eagle and Tanana respectively (USAG AK 2020). U.S. Army Signal Corps

telegraph stations constructed at the mouth of the Salcha River in 1902 and at Big Delta in 1904 were associated with the Washington-Alaska Military Cable and Telegraph System (WAMCATS) line, completed in 1906. In 1939, Ladd Field was constructed near Fairbanks as a U.S. Air Force cold weather testing facility, the first major U.S. military post in the middle Tanana Valley. After the outbreak of WWII in late 1939, it became a transfer point for lend-lease operations with the Soviet Union.

Big Delta post was constructed in 1942 near the community of Big Delta as an alternative training facility to Ladd Field, corresponding with the completion of the Alaska Highway (CEMML 2021; McCroskey 2002; USAG AK 2020). Mile 26 Satellite Field was constructed in 1943 as a satellite airfield to Ladd Field; it was renamed Eielson Air Force Base in 1948. Big Delta post, renamed Fort Greely in 1955, continued to serve as a cold weather training and research base during the Cold War (1947–1991) (CEMML 2021).

During the Cold War, activities at EAFB included "aerial surveillance monitoring of Soviet lands, regular B-36 bomber rotations, critical radar communications testing, and the transport and testing of nuclear devices" (McCroskey 2002:8). In 1961, EAFB absorbed Ladd Field's air force base responsibilities, and Ladd Field transferred to the U.S. Army and was renamed Fort Wainwright. EAFB also took on the Ladd Field cold weather training school, renamed Arctic Survival School (Shaw 2010).

5.0 Previous Cultural Resource Investigations

A literature review revealed that there have been no previous archaeological studies in or immediately adjacent to the APEs at the Birch Hill, Quartz Hill, Dry Creek, or Tok Hill operations sites. Engineer Hill was surveyed in 1995, and an area immediately adjacent to the Pogo Hill operations site was surveyed in 2015. The Cold War-era Engineer Hill Munitions Historic District adjacent to the Engineer Hill operations site was inventoried and evaluated between 1995 and 2004 (McCrosky 2004, 2005) and in 2017 (Maggioni and Bowman 2018).

5.1 Engineer Hill

In 1995, Northern Land Use Research (NLUR) inventoried and evaluated cultural resources on EAFB to satisfy Section 110 requirements of the NHPA. The purpose and scope of the 1995 survey was to identify non-military archaeological resources, rather than Cold War or WWII-era military historic resources. Their work was based on a predictive model for the presence of precontact cultural resources that identified high and medium probability locations within three areas (A, B, and C) where intensive survey and testing was subsequently completed (Mason et al. 1994). The fieldwork was carried out during the summer of 1995 and included a survey of 5,459 acres (Gerlach et al. 1996).

The Engineer Hill operations site is within NLUR's "Area A" which was one of the areas that was designated as having a high probability for non-military cultural resources. Based on maps and descriptions in Gerlach et al. (1996), NLUR surveyed and shovel tested the entirety of the proposed Engineer Hill operations site in 1995. No historic properties were identified during NLUR's survey (Gerlach et al. 1996:60); however, they did note several recent use sites within the Engineer Hill APE, including a Trapper's Cabin (Recent Use Site 4A) and 17 depressions that were interpreted as foxholes (Recent Use Site 6a). They also identified 5 additional recent

use sites surrounding Engineer Hill. However, the conclusion from the 1996 inventory states that "there are no known, reasonably-discoverable, significant, non-military, cultural properties on Eielson AFB" (Gerlach et al. 1996:62).

From 1995 to 2004, the USACE inventoried Cold War-era structures in three EAFB historic districts, including the Engineer Hill Munitions Historic District (McCrosky 2004, 2005). Work consisted of onsite examinations and photography, archival research, and interviews. The inventory resulted in Alaska Historic Building Survey forms for each building (McCrosky 2004) and a technical report (McCrosky 2005). LG^2 Environmental Solutions, Inc. revisited the Engineer Hill Munitions Historic District in August 2017 (Maggioni and Bowman 2018). The survey included photographs and recommendations of eligibility for five guard towers and a water tank, which had not previously been evaluated. The towers and tank were recommended not eligible for the National Register and were not considered contributing components of the Engineer Hill Munitions Historic District (Maggioni and Bowman (2018:65-66).

5.2 Pogo Hill

In 2014 and 2015, CRC archaeologists Sarah Meitl and Aubrey Morrison surveyed the entirety of the Pogo Transmission Line corridor, which is west of the Pogo Hill operations site. The proposed Pogo operations site powerline would tie into the Pogo Transmission Line. CRC archaeologists did not identify any cultural resources along the section of powerline in the high alpine area near the proposed Pogo Hill operations site (Meitl et al. 2016).

6.0 Previously Reported Cultural Resources

Previous investigations have identified six previously reported AHRS sites in or adjacent to the APEs: the Shaw Creek Basin Archaeological District, the Richardson Highway, the Haines-Fairbanks Pipeline Corridor, a Moose/Caribou Fence, the Chistochina to Eagle Trail, and the Engineer Hill Munitions Historic District.

6.1 The Shaw Creek Basin Archaeological District

The Shaw Creek Basin is bounded by the Tanana River to the west, the Yukon-Tanana Upland to the east, and bedrock ridges to the north and south. It is characterized as a low-lying alluvial plain in the middle Tanana River Valley (Reuther et al. 2023). The Shaw Creek flats were part of a broad, seasonal land use area for the Shaw Creek, Goodpaster, Salcha, and Big Delta Middle Tanana Dene bands (Reuther et al. 2023:697). The Shaw Creek Basin is known for sites with intact stratigraphy that span the entire known history of human land use in Eastern Beringia.

The archaeological district includes a total of 69 currently known sites. Seven of these have been individually determined eligible for the National Register, and 59 are eligible as contributing properties to the district. There are 10 other sites in the district that are considered non-contributing because they are either not from the historic period or have no known cultural association.

Both Pogo Hill and Quartz Hill are in the boundaries of the Shaw Creek Basin Archaeological District, although the district is a broad geographical area and their presence in the

district does not necessarily suggest that these locales have a higher probability for cultural resources.

6.2 The Richardson Highway

The 365-mile Richardson Highway runs from Valdez north to Fairbanks. Once north of the Alaska Range, the highway travels through Isabel Pass to Delta Junction where it connects with the Alaska Highway. The highway then parallels the Tanana River northwest to Fairbanks. The access route for Birch Hill begins at the Richardson Highway.

The ARC completed the highway in 1910. Some sections known as the Old Richardson Highway have been abandoned with subsequent road improvements. The highway is significant under Criterion A for its important association with transportation and military and mining history. Portions of the highway are exempt from Section 106 review as part of the Interstate Highway System. The highway is considered a Treated-as-Eligible Road under the Alaska Historic Roads Programmatic Agreement Interim Guidance, although segments must be evaluated for integrity.

6.3 The Haines-Fairbanks Pipeline Corridor

Construction of the Army's Haines-Fairbanks Pipeline, which provided fuel to interior Alaska military bases, was completed in 1955. The 50-foot-wide pipeline corridor ran a total of 626 miles and was used until 1973. Additional infrastructure features associated with the pipeline include aerial milepost markers, abandoned sections of pipe, and former pump stations. Along the Alaska Highway, the pipeline parallels the road from Nabesna to Fairbanks. The corresponding AHRS site number refers only to the section of pipeline corridor in the Mount Hayes quadrangle. This linear feature has a different AHRS number for each quadrangle it passes through: Tanacross, Mount Hayes, Big Delta, and Fairbanks. Previously identified segments of the Haines-Fairbanks Pipeline Corridor have been found not eligible for listing on the National Register.

6.4 Moose/Caribou Fence

The Moose/Caribou Fence is inventoried in the AHRS without any additional information. However, it is mapped as a linear feature, roughly paralleling the alignment of the Eagle Trail. The proposed Tok Hill powerline would cross the mapped location of the Moose/Caribou Fence.

Examples of animal fences in interior Alaska include brush fences, corrals, and traps that are often made of wood, although locally available materials such as stone were used in unforested areas (Osgood [1940] 1970; Spencer 1959).

6.5 Eagle Trail

The Eagle Trail, also known as the Chistochina to Eagle Trail, was the predecessor to the Tok Cutoff Highway and the WAMCATS line. Although the portion of the Eagle Trail that passes through the APE, also known as the Slana to Tanana Crossing Trail (RST #188), was not previously plotted in the AHRS, a portion of the Eagle Trail to the north, the Chistochina to Eagle Trail, was previously inventoried in the AHRS. The Eagle Trail has not been evaluated for National Register eligibility.

The Eagle Trail was a significant transportation corridor prior to the construction of the Tok Cutoff Highway during WWII. Haynes and Simeone (2007:Appendix A) list the Eagle Trail as

one of the routes used by Upper Tanana Indigenous people prior to sustained contact with Euroamericans at the turn of the twentieth century. As early as 1898, the U.S. Army used a trail from Mentasta to Ketchumstuk that may have been a portion of the Eagle Trail when surveying routes to the Klondike gold fields (Simeone 1982:74, in Haynes and Simeone 2007:170–171).

The Eagle Trail from Valdez was a favored route to interior Alaska because it was entirely within U.S. territory and almost 200 miles shorter than the route over White Pass (BLM n.d.). The trail was heavily trafficked in association with the WAMCATS communication line until 1909, after which the trail's primary users were prospectors and trappers. The trail was not substantially improved until 1930 (Alaska Department of Natural Resources n.d.). Fred Moffit, with the U.S. Geological Survey (USGS) mapped the trail in 1934, commenting on how it was the only established trail in the Eagle Mining District, but that it had hardly been used since the construction of the Richardson Highway and the abandonment of WAMCATS (Moffit 1938:7–8, in Haynes and Simeone 2007:173–174).

6.6 Engineer Hill Munitions Historic District

Built between 1955 and 1957, the Engineer Hill Munitions Historic District is an igloo compound constructed to store munitions in support of bomber deployment during the Cold War (McCrosky 2005:26–28). Concrete and steel igloos were developed just before WWII to safely store munitions. The Engineer Hill Munitions Historic District's igloos conform to standardized designs: measuring 26.6 feet wide, 81 feet long, and over 12.5 feet high. They sometimes contain vaults.

Although the SHPO recognizes the Engineer Hill Munitions Historic District with an AHRS number (Bittner 2018, 2019), the AHRS has not yet been updated to reflect its designation. The concentration of structures includes a gate hou parking building, three administrative buildings, a shop, 10 igloos, two water tanks, and five security guard towers associated with an extant, looped road.

The Engineer Hill Munitions Historic District is eligible for the National Register under Criterion A for its association with the U.S. Air Force's Cold War mission of weapons deployment (McCrosky 2005). Eight igloos and five wooden guard towers have been found eligible for the National Register as contributing properties (Bittner 2019; Maggioni and Bowman 2018). All remaining structures have been found ineligible for listing on the National Register and are non-contributing properties to the Engineer Hill Munitions Historic District (FAI-01766; McCrosky 2004, 2005). The Engineer Hill Munitions Historic District is south of the Engineer Hill operations site and completely fenced off from the Engineer Hill APE. All National Register listed or eligible Department of Defense WWII and Cold War ammunition storage facilities were mitigated as part of a nationwide Program Comment (Advisory Council on Historic Preservation 2006).

7.0 Methods

Prior to the cultural resources survey, an extensive background review was conducted, and CRC ensured that all required land use permissions and permits were acquired. CRC archaeologists coordinated with EAFB archaeologist Brooks Lawler to access the proposed Engineer Hill

operations site on EAFB. The field effort was carried out under the onsite supervision of a CRC Project Archaeologist meeting the *Secretary of Interior's Professional Qualification Standards* (Federal Register Vol. 48, pp. 44738–44739). All field personnel have a demonstrated ability to conduct surveys in Alaska and are familiar with the archaeology of interior Alaska.

The primary objective of this Phase I/II cultural resources survey was to identify any cultural resources in the APE of the six proposed radar operations sites, provide recommendations of National Register eligibility for any discovered archaeological and historic sites, and provide recommendations on potential adverse effects of the Project on eligible properties. Additionally, the field crew documented the presence of modern land use, often associated with ongoing military use or hunting and trapping, as it was encountered.

The survey included the primary areas of the operations sites as described in the Statement of Work, as well as 100-foot buffers on either side of the centerline of the proposed new roads and aboveground powerlines.

A combination of surface inspection and subsurface shovel testing was employed to locate sites. The relative level of effort expended on each technique was dependent on the discretion of the investigator, based on their assessment of expected characteristics of sites in the area.

In most cases, areas selected for additional subsurface testing were marked using a global positioning system (GPS) unit during a complete pedestrian survey of the Project area. The areas with the highest potential for containing subsurface archaeological deposits were revisited and tested after the survey team had visually evaluated the entire Project area. This allowed the team to better understand the landforms they encountered in the context of the surrounding local landscape. Vegetation and groundcover were dense in much of the survey area. This did not impede reasonable survey coverage, but did require shifting survey lines intermittently, especially in areas with dense beetle-kill and deadfall.

Pedestrian surveys were conducted in parallel transects and focused on discovering surface indications of past land use including—but not limited to—cabins and other structures, can and bottle dumps, lithic scatters, and cache pits and semi-subterranean houses. In general, the survey team walked each survey area in transects with 10-meter spacing. Exceptions to this survey method were made on a judgmental basis in the field, including widening the transect spacing to up to 30 meters along existing road corridors. In these cases, clearing and disturbance related to road construction extended ground surface visibility and significantly diminished the likelihood of finding intact cultural features. Slope areas above 10 degrees were excluded from pedestrian survey due to the low probability of cultural resources. These areas of steep terrain were often laden with hazardous deadfall and/or poorly consolidated bedrock outcrops, making them generally unsuitable for most human endeavors.

Subsurface tests were excavated to investigate locations deemed most likely to contain subsurface cultural resources. Criteria for higher probability areas included—but was not limited to—proximity to water, slope of less than 5 percent, and views of the surrounding landscape. Subsurface shovel tests (shovel tests) measured 50 by 50 centimeters. All excavated sediments were screened using a 0.125-inch screen except when field conditions, such as saturated and sticky matrices, made this impractical. In these cases, 0.25-inch screens were used. The reason for termination of each shovel test was recorded by the field crew. Tests were excavated and recorded according to visible stratigraphy (e.g., cultural or natural strata). The stratigraphy of negative shovel tests was also documented. Shovel tests were backfilled once completed.

A mapping-grade GPS unit was used to collect geospatial data throughout the field investigation. Historical artifacts were photographed and described, with a primary focus on identifying and documenting diagnostic characteristics.

8.0 Results

An archaeological survey of the APE covering the six proposed operations sites resulted in the discovery of one new AHRS site and several isolates, both historical and modern. As a result of this project, CRC archaeologists surveyed approximately 570 acres and excavated 95 shovel tests (Table 2). No precontact cultural resources were identified, and isolated historical cultural resources were documented with notes, measurements, photographs, and GPS locations and left in place.

Table 2. Acres surveyed and subsurface shovel tests excavated at operations sites

Operations Site	Acres Surveyed	Shovel Tests Excavated
Engineer Hill	88	19
Birch Hill	53	14
Dry Creek	78	16
Pogo Hill	62	3
Quartz Hill	168	17
Tok Hill	253	26

8.1 Engineer Hill

The proposed Engineer Hill radar operations site is just over a mile east/northeast of Lily Lake at an elevation of just over 1,000 feet. This area is roughly 900 feet higher than the surrounding valley floor. Engineer Hill is heavily forested with a mixed deciduous and spruce overstory (Figure 8). This area had previous military activity that resulted in a variety of ground-surface disturbances, including vegetation clearing and bulldozing for road construction and other purposes, the excavation of defensive fighting position (DFP) features (commonly known as “foxholes”), and the detonation of explosives.

During the survey, a series of DFPs were recorded in addition to historical and modern surface materials related to military and recreational use (Figure 9). Areas determined to have the highest likelihood to contain intact, subsurface cultural materials were shovel tested. Nineteen 50- by 50-centimeter shovel tests excavated in the APE at the Engineer Hill operations site were placed on and near the hill’s summit and spaced along a gently sloping ridgetop that extends generally west from the proposed clearing area along the of the proposed access road (see Figure 9). This area had a very limited viewshed, mostly to the north, which would have better served as an overlook prior to the forestation of the middle Tanana Valley.

Figure 8. Vegetation in the Engineer Hill APE and a DFP (center)

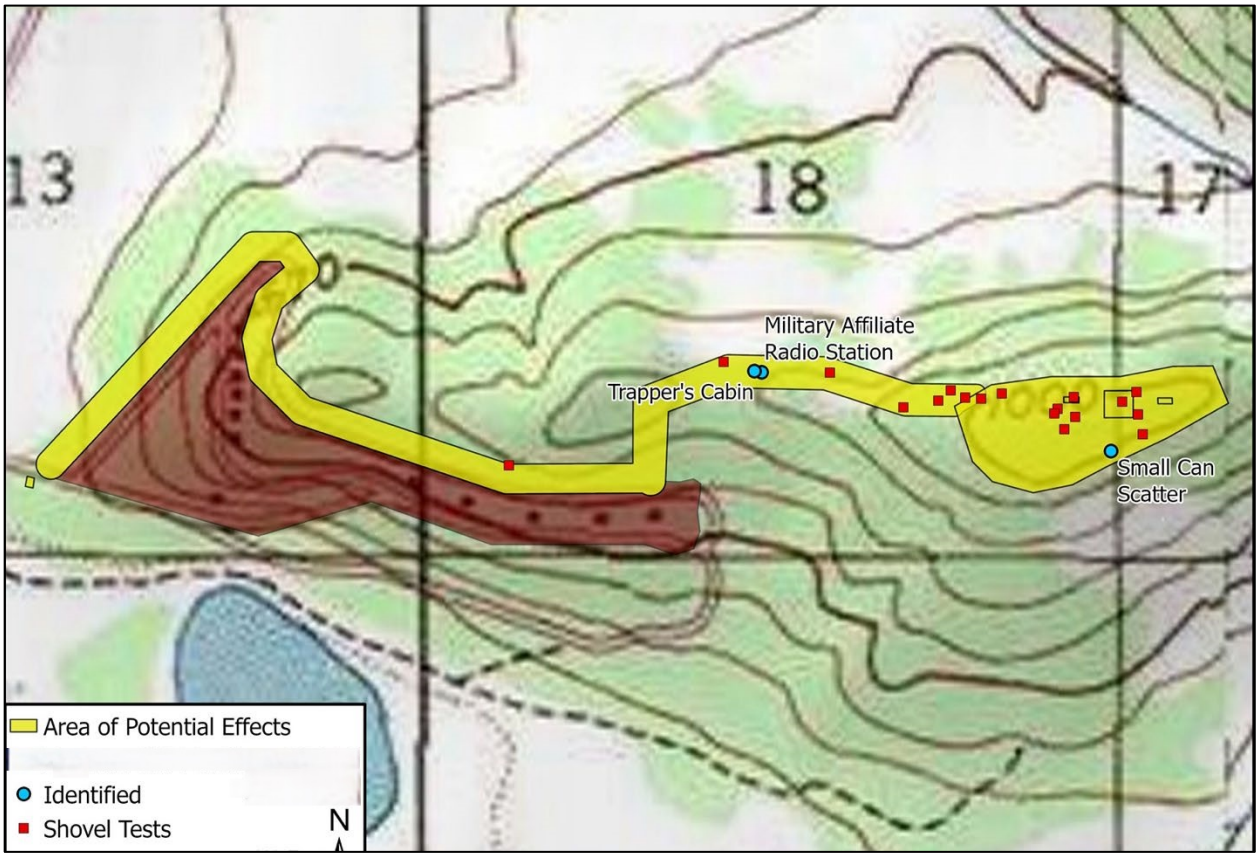

Figure 9. Engineer Hill results

Shovel tests ranged in depth from 43 to 110 centimeters, with the shallower tests near the top of the landform in the proposed cleared area, due to limited deposition and shallow schist bedrock. The stratigraphy of the tests showed a general trend of a well-established moss/root mat in the first 5 to 15 centimeters below the surface, overlaying a silt bed that extended, in some instances, over 1 meter before reaching the schist bedrock below. Discontinuous lenses of reddish-brown silt and charcoal found in the top 20 centimeters were interpreted as an indication of relatively recent, natural forest fires.

Two shovel tests were placed inside DFP features. A thin burned lens, indicated by fragments of charcoal and heat-stained soils, was noted in one of these tests at 74 centimeters below the surface. An extremely friable foil-like substance, likely from a cigarette package, military ration, or other food container, was found in the DFP but not collected. This represented the only subsurface cultural materials discovered during shovel testing in this area.

Several marten traps were noted along both sides of the existing two-track trail to the proposed Engineer Hill operations site. These traps appeared to vary in age, with many containing plastic components, and others being comprised of nothing more than a spruce pole attached to a live spruce tree with wire. This is an active trapping area managed by the Eielson Natural Resources Program.

8.1.1 "Trapper's Cabin" (no AHRS number assigned). Gerlach et al. (1996) documented a cabin complex in NLUR's survey "Area A" that they referred to as "Recent Use Site 4A" (Figure 10). Examination of historical aerial imagery from USGS Earth Explorer revealed that the structures were likely not built before 1974.

This cabin complex is north of an existing access road to the top of Engineer Hill, in a mixed birch and spruce forest with groundcover that includes moss, rose, highbush cranberry, horsetail, and Labrador tea. The site consists of a multi-part cabin, recorded as the "Trapper's Cabin," along with a scatter of items that were once presumably inside the cabin, an outhouse, and a small metal structure (Figure 11). The original portion of the cabin is the oldest and made of unpeeled birch logs, while later structural additions were framed using dimensional lumber and plywood. The interior of the original cabin and the additional structures are degraded. The 1996 report noted that the outhouse was made of plywood and sheet metal. Although CRC archaeologists did not note any sheet metal, the outhouse was partially constructed with reused crates labeled "ROCKET MOTORS CLASS B EXPLOSIVE" (Figure 12).

The associated metal structure is a steel and plywood mobile radio station, originally designed to house operations components of a Radio Set AN/GRC-26 (DOA 1950). This structure is 145 inches long, 81.5 inches wide, and 79.5 inches tall according to manufacturing specifications (Figures 13 and 14).

The structure's western exterior wall is stenciled with "MARS" (Military Affiliate Radio Station), although the interior has been stripped of any radio equipment. Based on historical aerial photographs, this structure was moved to its present location after the mid-1970s, though the structure itself dates to the WWII era.

8.1.2 Small Can Scatter (no AHRS number assigned). To the southeast of the proposed radar pad is a small scatter of potentially historic-age cans, which was treated as an isolate and not assigned an AHRS number. There are three knife-opened coffee cans, part of a wooden crate, and a Welch's grape juice can that is 4.25 inches in diameter. Unfortunately, the coffee cans were too

degraded to determine the brand or manufacture date. Based on the visible information on the Welch's can, it likely dates to the 1960s (Figures 9 and 15).

8.1.3 Defensive Fighting Positions (no AHRS number assigned). A total of 36 depressions were documented at Engineer Hill, predominantly within the proposed cleared area (Figure 15). These were interpreted as DFP features associated with military use of this area. These features are likely part of "Recent Use Site 6A," documented by NLUR in 1995. Gerlach et al. (1996) identified 17 depressions. At the time they were documented, many of the features were lined with small, 5- to 10-centimeter birch poles. The features were described as being "of recent military origin" (Gerlach et al. 1996: I-13). Based on this information, and in consultation with the landowner, CRC archaeologists did not assign an AHRS number to the collection of features. Cold War Training activities at EAFB were focused along the flight line and EAFB's Cold War mission was not connected with DFP training. However, brief physical descriptions, photographs, and GPS coordinates were recorded for each depression.

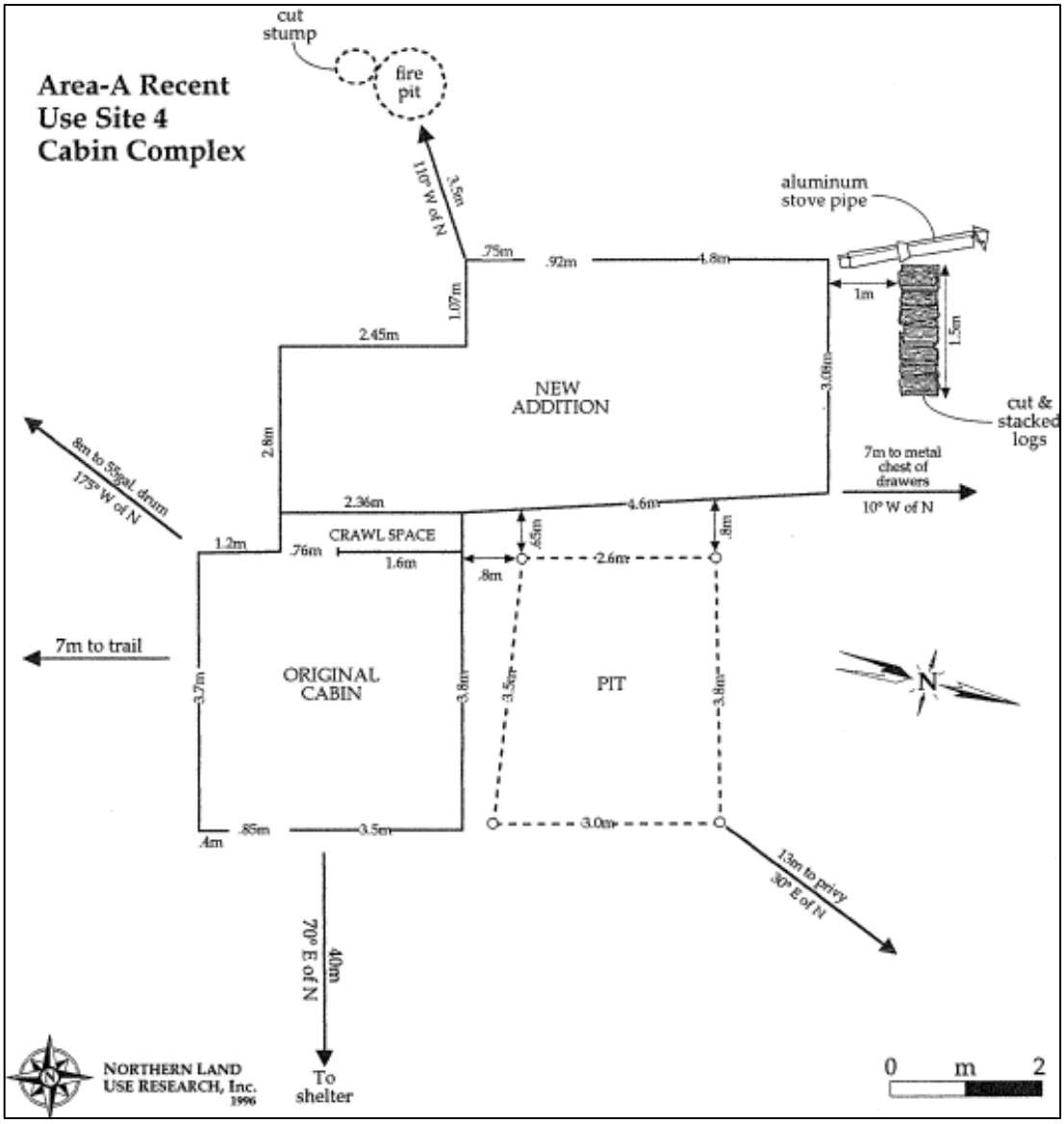

Figure 10. Plan view map of Recent Use Site 4A. (Adapted from Gerlach et al. 1996)

Figure 11. Trapper's Cabin (view to the east)

Figure 12. Outhouse associated with the Trapper's Cabin (view to the west)

Figure 13. Mobile radio station (view to the north/northwest from access road)

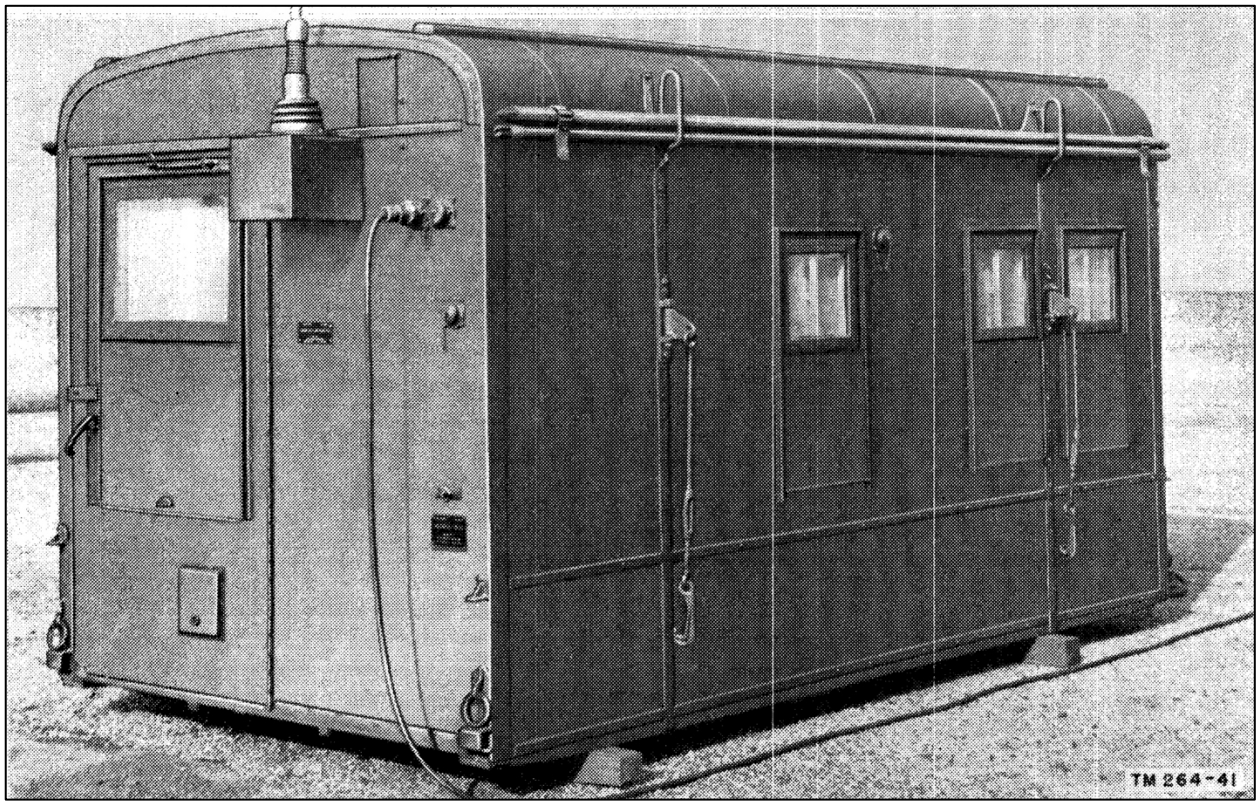

Figure 14. Shelter S 55/GRC (adapted from DOA 1950)

Figure 15. Welch's grape juice can

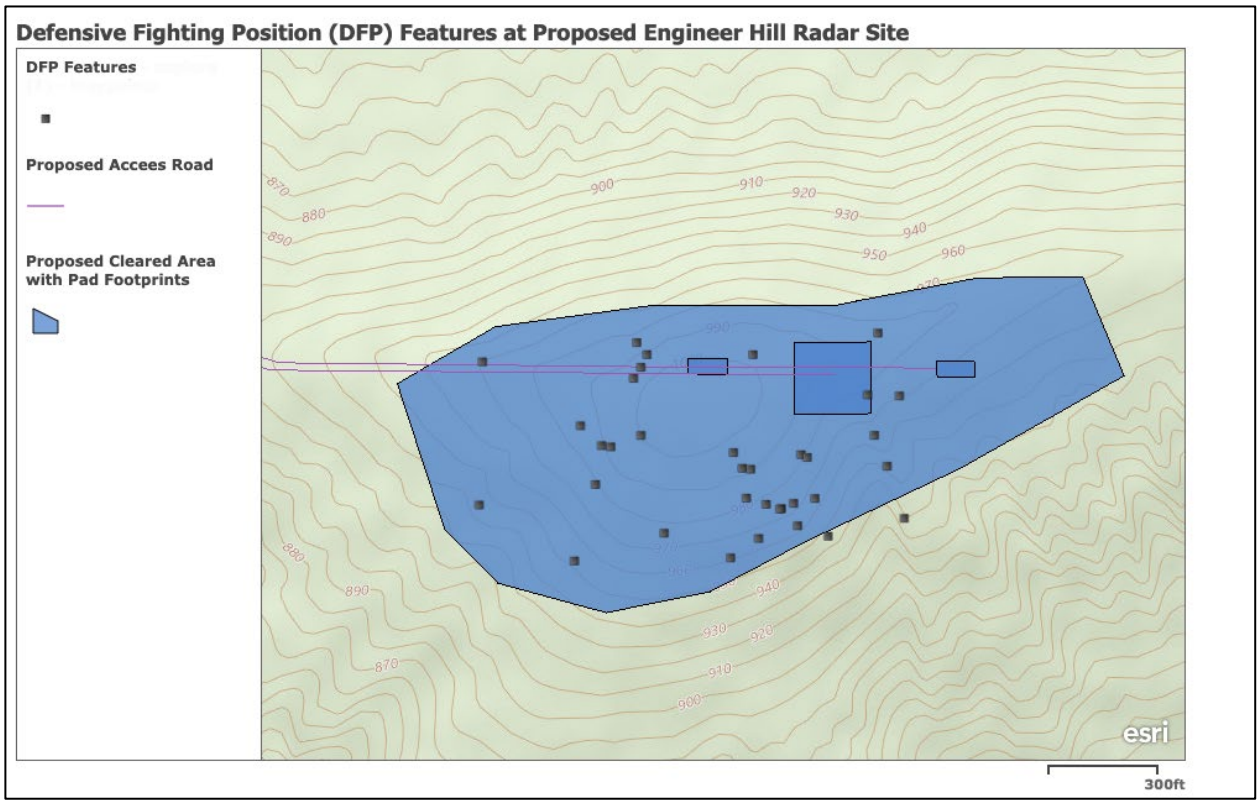

Figure 16. Defensive fighting positions documented in the Engineer Hill cleared area

8.2 Quartz Hill

The 17-acre cleared area at the proposed Quartz Hill radar operations site sits at 2,079 feet elevation, on top of a sloping crest with a relatively flat area at the proposed radar pad location. The proposed operations site is over 2.5 miles north/northeast of Thompson Lake, approximately 3.75 miles northeast of Quartz Lake and 0.75 miles northwest of Indian Creek. There is a limited viewshed to the south that may have been advantageous before the Tanana River Valley was forested, but there are a series of lower elevation promontories between Quartz Hill and the lakes near the main river corridor that would have provided more practical overlooks.

Eight shovel tests were excavated in the proposed cleared area, targeting the most level portions of the landform crest and the potential viewshed to the south (Figures 17 and 18). The stratigraphy in the area consists of layers of loess over fine-grained grey and brown sands bedded on schist. Charcoal was noted in several subsurface tests but was limited to the root mat and was attributed to relatively recent, regional wildfires. Tests ranged from 74 to 117 centimeters in depth. No cultural material was recovered in subsurface tests. Ground disturbance in the proposed cleared area, including sawn tree stumps, a two-track access road, and large patches of alder, suggests it has been logged in the past.

Figure 17. Shovel Test 1 at the top of Quartz Hill in the footprint of the proposed radar pad

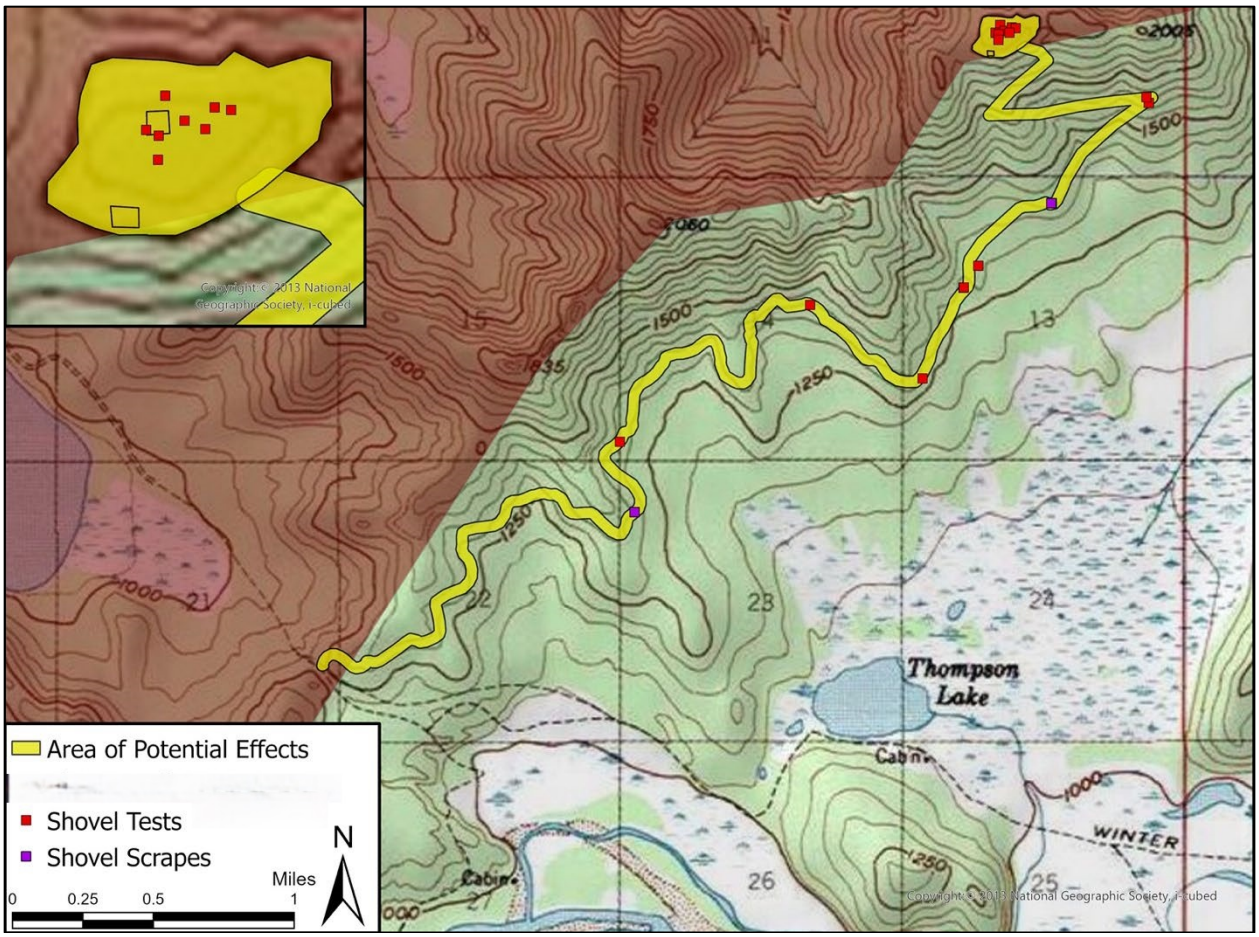

Figure 18. Quartz Hill APE subsurface shovel tests

An existing, 5-mile-long access road from the Quartz Lake Recreation Area is in the Project APE (Figure 19). From where the existing road ends below the proposed radar site, approximately 1.4 miles of new road would be constructed up the steep slope to the radar site (see Figures 5 and 18). This section of the proposed road was deemed to have a very low potential for buried cultural resources, due to the steep slope angle. One relatively flat promontory on the toe of a south/southeast facing finger ridge, approximately 0.5 mile southeast of the proposed radar site was tested for subsurface cultural deposits (see Figure 18). These tests were excavated to between 70 and 90 centimeters below surface (cmbs) to a layer of dense schist cobbles exfoliating from the local bedrock.

The remainder of the proposed access road follows an established logging road that is cut into a steep slope that trends southward toward the Tanana River valley, leaving few suitable areas for shovel testing. In areas where the road cut through finger ridge formations and left an exposed cutbank, the cut face was examined for the presence of cultural materials/strata. Shovel scrapes into the face revealed silt deposits over 1 meter in some locations. A total of five shovel tests and two shovel scrapes were also excavated on lower, relatively flat landforms along the existing road corridor. Some of the tests in areas of deep sedimentation were extended using a 10-centimeter auger to sample deeper deposits for cultural material. A maximum depth of 191 centimeters was achieved through this probing effort. No cultural materials were identified at the Quartz Hill operations site.

Figure 19. Existing road to the Quartz Hill site (view to the east)

8.3 Birch Hill

The proposed Birch Hill radar operations site is approximately 53 acres, including 0.5 mile of proposed access road, a powerline, and a 29-acre cleared area. The Birch Hill APE is densely forested with spruce, alder, and birch, with a thick brushy understory that includes alder, wild rose, and grasses (Figure 20). The Tanana River is less than 1 kilometer to the south. Prior to forestation in the mid-Holocene, this landform would have provided a nearly 180-degree viewshed to the south. The crest of Birch Hill rises approximately 800 feet above the adjacent valley floor.

The proposed cleared area is partially on the crest of the hill, with over half on a dramatic southern slope. The radar pad itself would be on the edge of this southern slope (Figure 21). Subsurface tests spaced across the landform ranged between 52 and 105 centimeters deep. The local stratigraphy was composed of layers of silt over poorly consolidated bedrock. CRC archaeologists excavated 14 shovel tests within the proposed cleared area at Birch Hill and did not identify any subsurface cultural remains (Figures 21 and 22).

Charcoal flecking and staining evident in all the tests is likely from natural regional forest fires. A discrete and discontinuous lens of very dark brown silt noted at depths between approximately

50 and 70 cmbs in shovel tests at the highest point of the landform (Figure 23) may be an older paleosol from a time in the past when vegetation in the area stabilized and it would have been suitable for human occupation. However, this stratigraphic layer may also be the result of an older, natural forest fire event.

No area of the proposed access route warranted subsurface testing because this route switched back and forth across a steep slope with low probability for cultural resources. No cultural materials were identified during the field investigation at Birch Hill.

Figure 20. Overview of the proposed cleared area at Birch Hill (view to the west)

Figure 21. Shovel testing in the proposed Birch Hill operations site (view to the north)

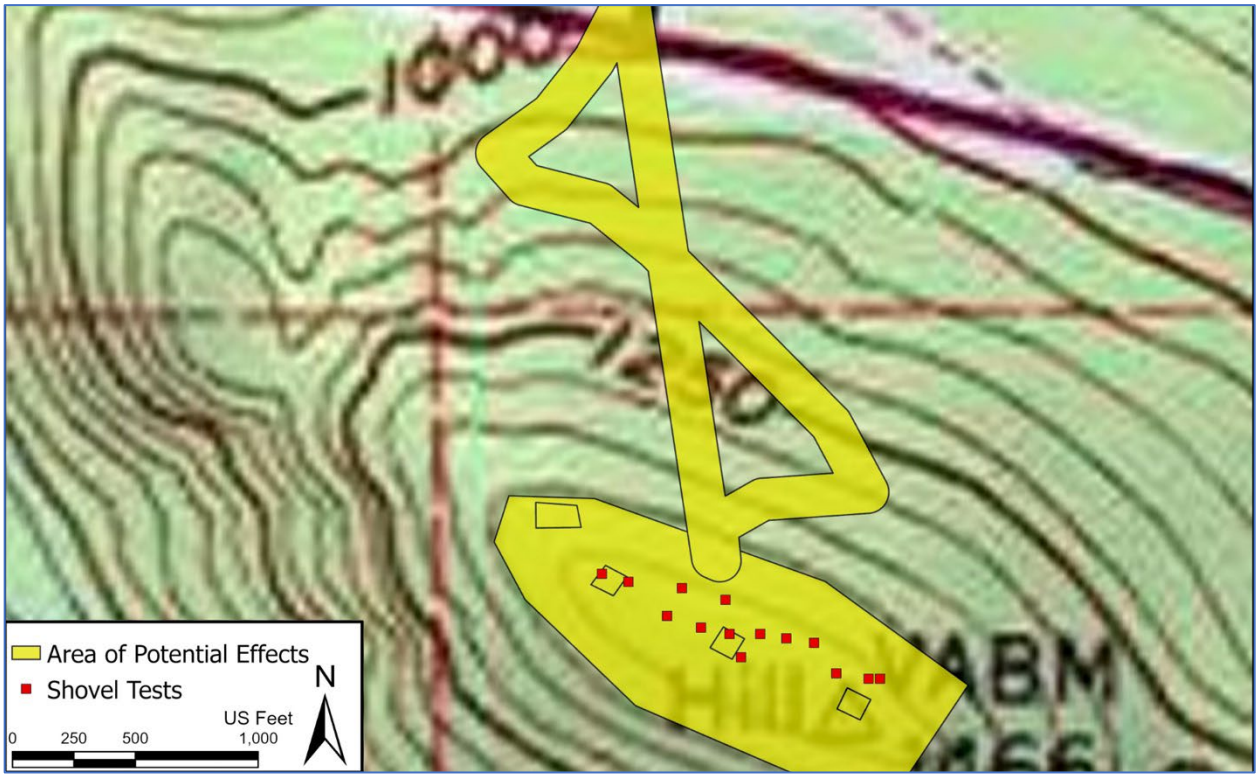

Figure 22. Birch Hill APE subsurface shovel tests

Figure 23. Shovel test at Birch Hill operations site with discrete silt lens at 50 cmbs

8.4 Pogo Hill

The proposed Pogo Hill radar operations site includes a 14-acre cleared area, a gravel road, and a 0.5-mile-long aboveground powerline. The proposed cleared area is near the crest of a large, 4,000-foot-high landform. The rocky and exposed surface with very little sedimentation shows evidence of large, tracked equipment having been driven across the cleared area (Figure 24). There are also several other pieces of communication equipment within the proposed cleared

area for the radar equipment (Figure 25). In addition, this site would not require any vegetation clearing, as there are no trees or shrubs within the proposed operations site.

The survey of the site included a thorough surface examination with limited shovel testing. A total of three shovel tests were excavated within the Pogo Hill cleared area (Figure 26). The maximum depth of any shovel test in the cleared area was only 22 centimeters into fine sandy silt with angular gravels mixed with large cobbles.

No areas for subsurface testing were identified during the pedestrian survey of the access road or powerline corridor. The relatively high elevation road is cut into a steep slope with multiple rock outcroppings and low potential for cultural resources. However, the lack of sedimentation and vegetation cover in this area did allow for a more extensive surface examination (Figure 27). The proposed aboveground powerline would run between the Pogo Hill radar site and an existing overhead powerline that parallels the Pogo Mine Road. It would slope down from the road toward the existing powerline through a saturated muskeg environment forested by low black spruce and shrubby willow and alder. No cultural materials were identified during the field investigation at Pogo Hill.

Figure 24. Previously established access road to the Pogo Hill operations site (view to the north/northwest)

Figure 25. Rocky surface of the proposed cleared area at the Pogo Hill operations site (view to the south)

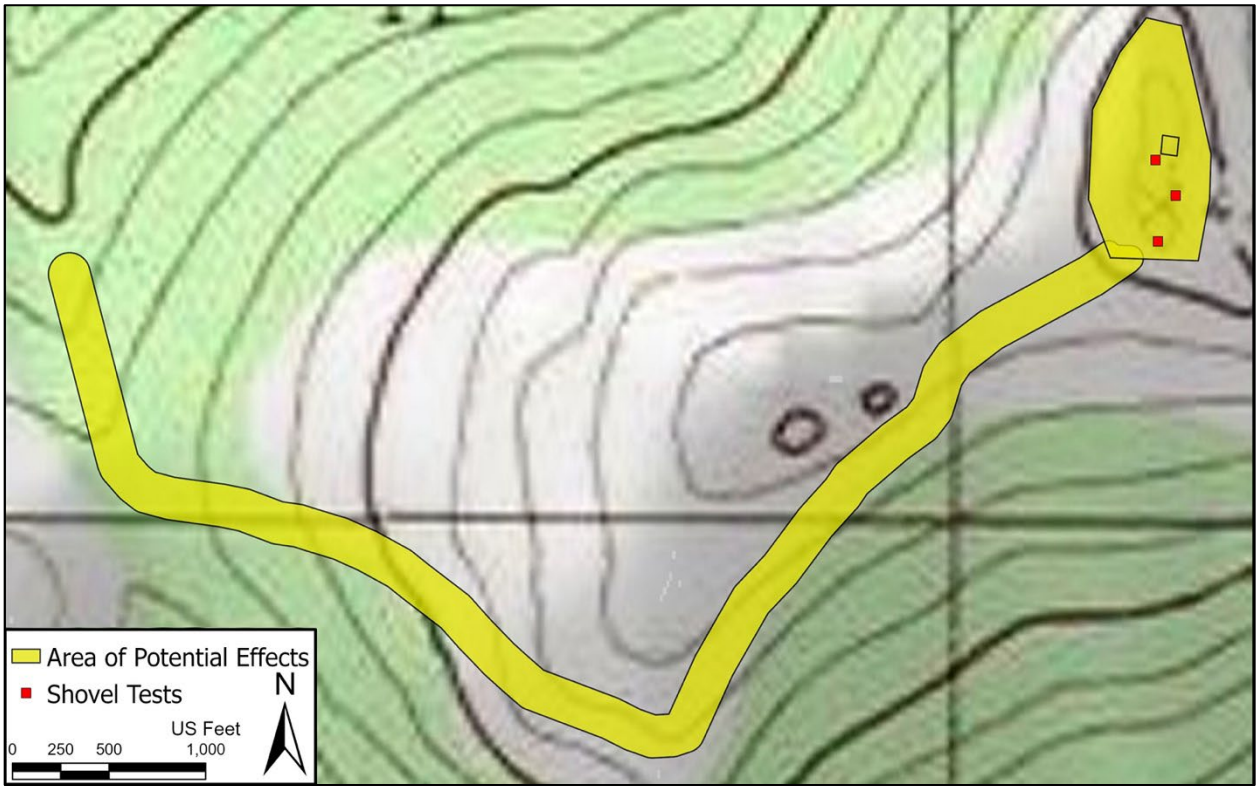

Figure 26. Subsurface shovel tests in the Pogo Hill APE

Figure 27. CRC archaeologist along the access road to the Pogo Hill operations site (view to the southwest)

8.5 Dry Creek

The proposed Dry Creek radar operations site is south of the Alaska Highway at the community of Dry Creek. The APE includes a 5-acre cleared area and a 3-mile gravel access road. A total of approximately 78 acres was surveyed at Dry Creek. The proposed cleared area at the radar site is near the top of a landform, at just over 2,600 feet elevation (see Figure 6). It is covered with low alpine vegetation and has little soil deposition.

The viewshed covers a full 360 degrees, although the dramatic rise of the Alaska Range blocks the view to the south (Figure 28). CRC archaeologists excavated five shovel tests within the proposed cleared area (Figure 29). Stratigraphy at the proposed radar operations site is composed of silts with small, subangular pebble and cobble-sized inclusions. Shovel tests ranged from 9 to 29 centimeters and ended on bedrock.

The proposed access road follows a previously constructed gravel road south from the Alaska Highway before being routed across a cleared field, over Dry Creek, through a dense spruce bog, and finally up a steep talus slope to the top of the hill where the radar would be situated. The initial, low-lying section to the spruce bog appears to have been logged in the past.

Shovel testing along the access route focused on areas near relict and modern channels of Dry Creek, as well as small landforms that rise one to two meters above the otherwise flat valley floor. A total of 11 shovel tests were excavated along the proposed access road corridor (see Figure 29). Large tree root throws were common along the existing channel of Dry Creek where thin sediment deposits covered deep beds of glacial till. Dozens of tree throws in the survey area were checked for cultural remains. No subsurface tests were dug along the portion of the corridor

that passes through the spruce bog. This low-lying bog was saturated, underlain with permafrost, and had a low potential for yielding cultural material.

The final (southernmost) section of access road is composed of a series of switchbacks that climb steeply up to the proposed cleared area. Only two areas along the switchback segment were tested because steep hillsides with poorly consolidated bedrock outcroppings and talus features are common along this section of the access route (Figures 30 and 31). No cultural materials were identified at the Dry Creek operations site.

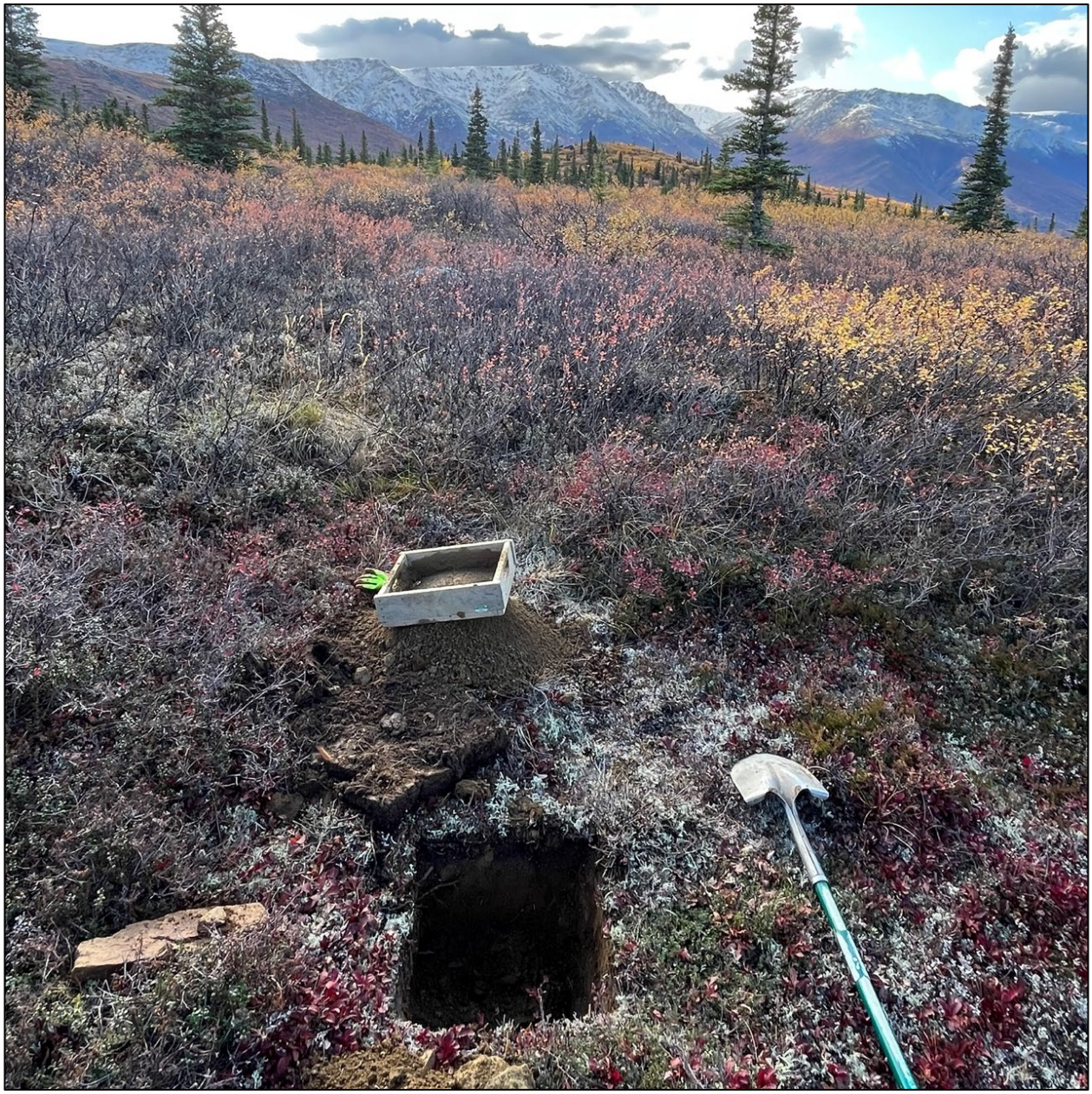

Figure 27. Subsurface shovel test and view to the south from the proposed Dry Creek operations site

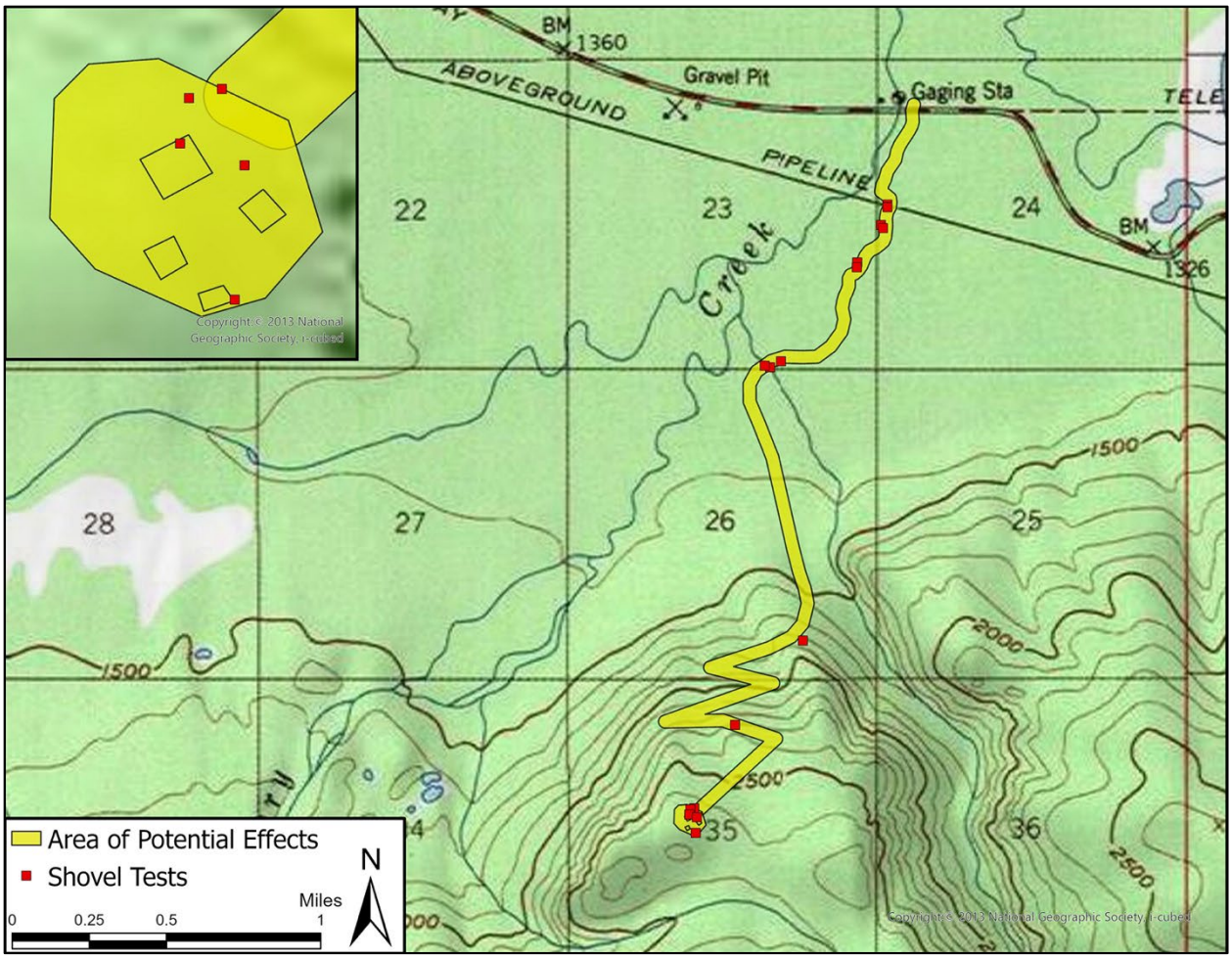

Figure 28. Subsurface shovel tests in the Dry Creek APE

Figure 29. Talus slope on the proposed Dry Creek access road (view to the southwest)

Figure 30. Overview from the proposed Dry Creek access road (view to the north/northwest)

8.6 Tok Hill

The proposed Tok Hill radar operations site includes a 10.5-acre cleared area for the radar, a 2-mile powerline, and 8 miles of existing access road that would likely need to be widened and improved. CRC archaeologists documented several isolates in the APE, including cans, five culturally modified trees, a WWII-era crate of Trinitrotoluene (TNT), and a small scatter of car parts and oil cans. They also documented a portion of the original Tok Cutoff Highway and a portion of the Eagle Trail (Figure 32).

An existing gravel road leads from the Tok Cutoff Highway to the proposed operations site (Figures 7 and 32). The access road runs roughly northeast by southwest for approximately three miles from the Tok Cutoff Highway. This lower section is generally flat and follows the base of a steep slope to the north. The two-track road then ascends a steep hill to the northwest, eventually leveling out on and following the top of a ridge to the east, referred to as the upper section.

The proposed powerline corridor descends a steep slope from the proposed radar site. The steepest portions along the middle section of the proposed powerline corridor were not surveyed due to their very low potential for cultural resources. The proposed cleared area has already been heavily disturbed (Figure 33). The summit of the hill is essentially a gravel parking lot with a variety of debris left by hunters, including a tipped over outhouse. There are also the wooden

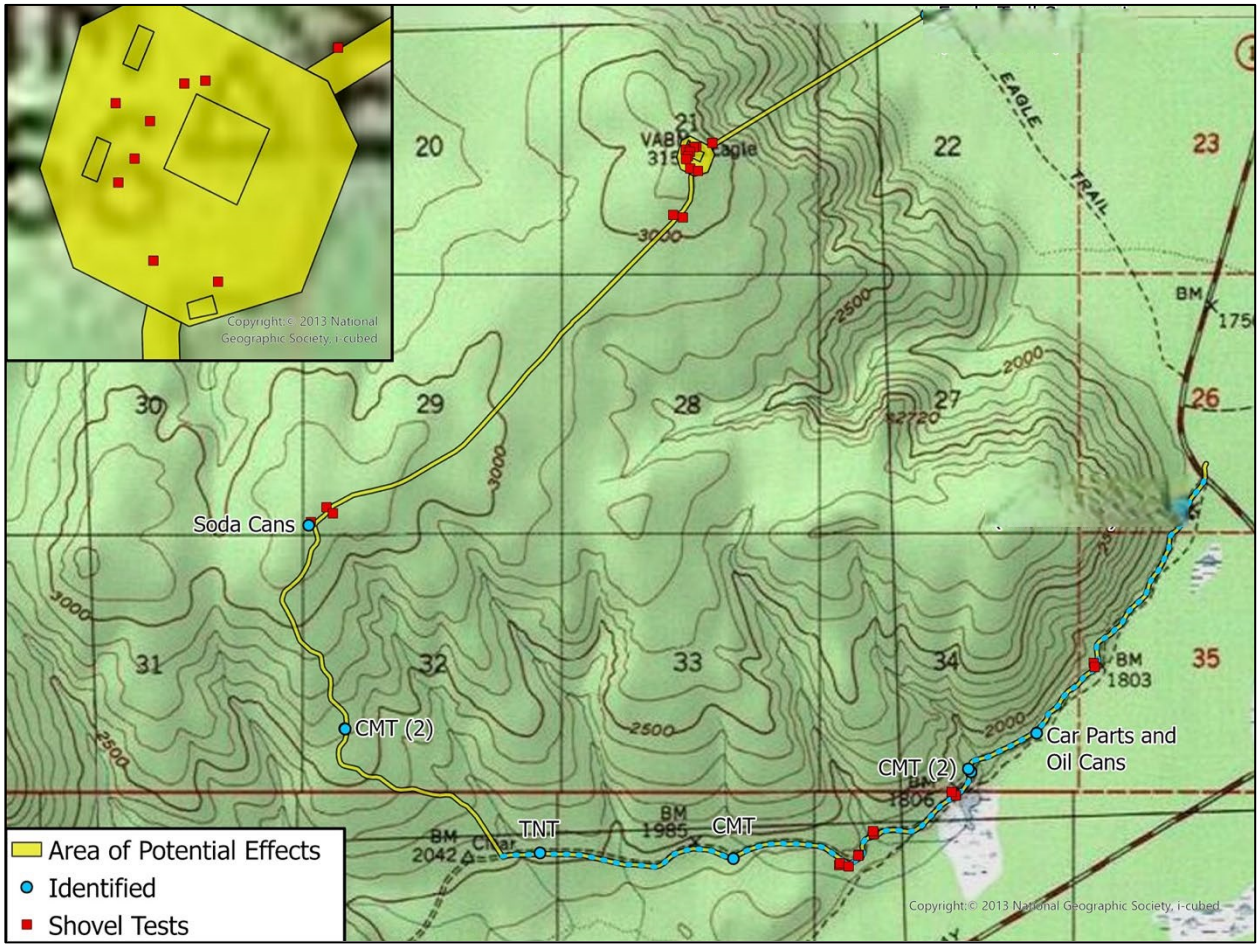

Figure 31. Tok Hill operations site results map

Figure 32. Disturbed area at the top of Tok Hill, also showing remains of fire lookout (view to the southwest)

remains of a recent fire lookout. This disturbed area is the flattest portion of the summit and has an extensive viewshed to the north and east. The Tok River is only about 10 kilometers southeast but cannot be seen from the site.

Shovel testing in the proposed Tok Hill cleared area was primarily on the western/northwestern side of the existing access road disturbance, on relatively level ground with views to the north. The landform edge on the eastern/southeastern side of the road was only tested where there were relatively level undisturbed areas (see Figure 32). The subsurface tests were generally shallow, with 10 centimeters or less of root mat over up to 24 centimeters of sandy silt on top of decaying schist and quartz bedrock. Fragments of schist and quartz were also visible strewn across the modern ground surface. No historical or cultural resources were identified in the proposed cleared area.

The lower section of the proposed Tok Hill operations site access road follows a portion of the original Tok Cutoff Highway that was built during WWII. Approximately three miles southwest of its junction with the modern Tok Cutoff Highway, the existing access road turns north from the historical route and ascends a relatively steep slope. Based on historical aerial imagery, this more modern section of road was constructed after the late 1970s, although the exact date of its

construction and reason for its construction are not currently known. The area appears to have been previously logged.

To the west of the proposed operations site, the existing road is approximately 20 feet wide, with a previously cleared area extending up to 60 feet on either side of the centerline (Figure 34). The vegetation is relatively low and dominated by willow and dwarf birch. Alders predominate in previously disturbed areas. Except for two 1960s pull tab soda cans, no historical or cultural resources were found on the upper portion of the access road (Figures 32 and 35). This area seems to be primarily used by hunters and trappers because several modern marten traps and four-wheeler trails were noted in the APE. Large drainage ditches have been excavated into the shoulders of the existing road.

Overall, the landform would seem to contain a lower potential for buried precontact cultural resources as the access road corridor is not near any current reliable water source and does not have an advantageous view. In the past, the area could have been used seasonally for hunting as it is today; however, modern access roads have made the area significantly more accessible. A total of 14 shovel tests were excavated within the proposed cleared area and along the portion of the proposed access road that follows the high ridge to the proposed operations site (see Figure 32). No subsurface cultural materials were identified in the shovel tests.

Figure 33. View of the existing access road roughly 0.25 mile southwest of the proposed Tok Hill operations site (view to the northwest)

Figure 34. Mountain Dew and Shasta pull tab soda cans

Nearly all the isolated cultural resources documented in the Tok Hill survey area were along the lower section of the proposed access road, which is the WWII-era Tok Cutoff Highway. A total of 12 shovel tests, excavated along finger ridges near creeks and in locations with views toward the Tok River, revealed no cultural resources (see Figure 32). The resources described below were identified through pedestrian transects of the APE.

8.6.1 Tok Cutoff Highway Segment. As previously mentioned, the first three miles of the proposed Tok Hill access road follow a section of the original Tok Cutoff Highway, built by the U.S. Army Corps of Engineers in 1943. A later realignment of the Tok Cutoff Highway bypassed this section of highway, leaving it relatively intact. The total bypassed segment is approximately seven miles long and ends at the Eagle Trail State Recreation Site. However, only the first three miles of this segment are in the APE (see Figure 32).

The roadbed varies from 15 to 20 feet wide. It both follows and is cut into a steep slope above (Figures 36 and 37). Based on historical aerial imagery, this section of road has maintained its original alignment (Figure 38). Two heavy steel culverts were noted in the road and a third culvert was found in the woods nearby, left there after it was replaced.

Figure 35. Typical section of the original Tok Cutoff Highway in the APE (view to the southwest)

Figure 36. Segment of the original Tok Cutoff Highway cut into the slope, view to the northwest

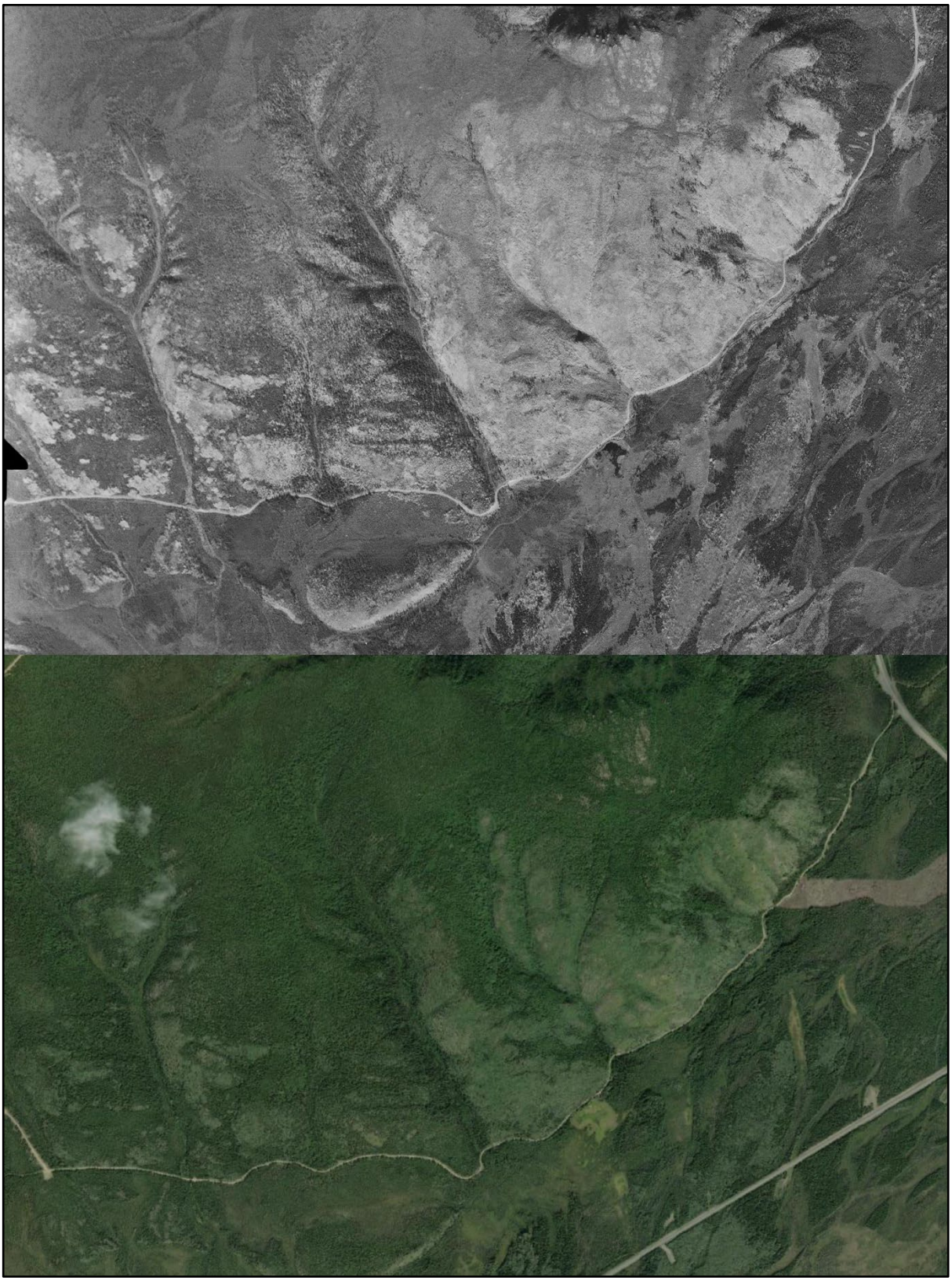

Figure 37. Tok Cutoff Highway in 1948 (top) and modern ArcGIS World imagery (bottom; USGS Earth Explorer)

CRC archaeologists noted several bulldozed clearings, particularly on the southern/southeastern (downhill) side of the road that, as shown by historical aerial photographs, are not original to the road. Their purpose is unclear, although they may be related to later commercial logging.

8.6.2 Crate of TNT (no AHRS number assigned). A wooden crate containing several 0.5-pound blocks of TNT (Figures 39 and 40) was found roughly 15 feet from the northern edge of the proposed access road (see Figure 32). The TNT was packaged in cans labeled:

HIGH EXPLOSIVE
TNT
½ POUND NET
CORPS OF ENGINEERS
DANGEROUS

TNT was the preferred high explosive during WWII due to its stability and relatively low melting point (Goodwin and Associates 1997:158). The crate and TNT were likely left during the construction of the Tok Cutoff Highway in 1943. Due to the nature of the find, no measurements were taken; however, CRC archaeologists recorded the location and took several photographs. The TNT was reported to both the USACE archaeologist as well as the Alaska State Emergency Operations Center. After authorization from the Alaska State Emergency Operations Center, an explosives team from EAFB responded to the report and safely detonated the explosives nearby. According to the EAFB explosives team, a total of 98 one-half-pound blocks were found at the site.

Figure 38. Close-up of TNT brick

Figure 39. Wooden TNT crate

Figure 40. RPM DELO oil can and clear 1 quart bottle

8.6.3 Car Parts and Oil Can Scatter (no AHRS number assigned). A small scatter of oil cans and car parts was found on the southern side of the proposed access road (see Figure 32). The scatter, of an unknown age, contains 12 “RPM DELO” oil cans, four 1-gallon fuel containers, three clear 1-quart bottles, part of a muffler, and part of a broken glass headlight (Figure 41). The oil cans are 5.5 inches tall and 4 inches in diameter. Unfortunately, neither the oil cans nor the clear bottles could be definitively dated.

8.6.4 Culturally Modified Trees (No AHRS number assigned). CRC archaeologists documented five culturally modified birch trees in the proposed access road APE (see Figure 32). All five are bark-stripped birch trees that are spread out along the section of the access road that is part of the old Tok Cutoff Highway.

The trees ranged from 15 to 24 centimeters in diameter at breast height (DBH; Figure 42). Approximate ages of birch trees can be calculated by multiplying their DBH (in inches) with their species-specific growth factor (The Forest Guild n.d.). Birch trees within the size range found are generally under 50 years old and therefore are not of "historic" age. However, they do indicate more recent uses of the Project area for traditional activities.

8.6.5 Moose/Caribou Fence. CRC archaeologists were unable to locate The Moose/Caribou Fence. Based on its records, it should cross the proposed powerline corridor below the radar site.

8.6.6 Eagle Trail. The proposed Tok Hill powerline would intersect the Eagle Trail at the base of the steep slope below the proposed radar site (see Figure 32). This section of the Eagle Trail is frequently used by both automobile and all-terrain vehicle traffic because it connects to both the Tok Cutoff Highway and a residential neighborhood to the north. It now resembles a two-track gravel road (Figure 43). It is approximately 12 to 15 feet wide and runs northwest-southeast through the APE. Only a 200-foot segment of the Eagle Trail is within the Project APE.

Figure 41. One of the five culturally modified trees identified in the APE

Figure 42. The Eagle Trail where it would intersect with the proposed powerline (view to the northwest)

9.0 Significance

In order for a particular property—a district, site, building, structure, or object—to qualify for the National Register, it must meet one or more of the National Register Criteria for Evaluation and retain enough historic integrity necessary to convey its significance (NPS 1998). The National Register criteria are:

> A: Association with events that have made a significant contribution to the broad patterns of history.
>
> B: Association with the lives of significant persons.
>
> C: Embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic values, or representation of a significant and distinguishable entity whose components may lack individual distinction.
>
> D: Having yielded, or having the ability to yield, information important in prehistory or history.

In addition to meeting one or more of the criteria listed above, a property must retain integrity, defined as "the ability of a property to convey its significance" (NPS 1998:44). The seven aspects of integrity are: location, design, setting, materials, workmanship, feeling, and association.

- Location is the place where the property was constructed or the place where the event took place.
- Design is the combination of elements that make up the form, plan, space, structure, and style of a property.
- Setting is the property's physical environment.
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a property.
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling is the property's expressions of the aesthetic or historic sense of a particular period of time.
- Association is the direct link between an important historic event or period and a historic property.

Bulletin 15 states that "To retain historic integrity a property will always possess several, and usually most, of the aspects" (NPS 1998:44). Properties important under Criteria A or B ideally should retain some features of all seven aspects of integrity. However, integrity of design and workmanship might not be as important as other aspects (NPS 1998:46). To be eligible under Criterion C, a property must retain the physical features that characterize its type, period, or method of construction. Retention of design, workmanship, and materials are usually more important than location, setting, feeling, and association. Criterion D is most often applied to archaeological properties, but can apply to structures if they are, or "must have been," the principal source of important information, and retain sufficiently intact and adequate data to answer relevant research questions (NPS 1998:22, 23).

10.0 Recommendation of National Register Eligibility

As described above, several artifacts and cultural features — both historical and modern — were identified during this survey. However, most were either not old enough or not potentially significant enough to be recorded as more than an isolate. The DFPs and cabin complex on EAFB were not assigned AHRS numbers, as they have been previously documented and described as "recent use." Because they are not likely 50 years in age, they were not evaluated for National Register eligibility. However, as the bypassed segment of the old Tok Cutoff Highway is over 50 years old, a discussion of its National Register eligibility is included below.

10.1 Tok Cutoff Highway Bypass (TNX-00293) Application of NHPA Criteria and Consideration of Integrity

Currently considered part of the Glenn Highway and a designated interstate highway, the modern Tok Cutoff Highway begins at Gulkana and ends at Tok. The Tok Cutoff Highway roughly follows the same general route as the Eagle Trail, which was heavily used by prospectors at the turn of the twentieth century. The southern half of the Tok Cutoff Highway includes a branch off the Richardson Highway from Gulkana to Nabesna constructed in the early 1930s to access the Nabesna region for mining (Mead & Hunt and CRC 2014:65). By 1934, half of the 107-mile road was improved for automobile traffic. It was not until WWII, during the construction of the Alaska Highway, that the 97th Regiment, a segregated Black unit, constructed a road from Slana to the Tanana River as a military supply route, completing the Tok Cutoff Highway in 1943 (Mead & Hunt and CRC 2014:186).

The ARC reconstructed and paved the Tok Cutoff Highway in the early 1950s to provide yearlong, paved access to the Alaska Highway for communities and the military bases in Valdez, Fairbanks, and Anchorage (Mead & Hunt and CRC 2014:88). The newly formed Department of Highways (established at statehood in 1959) repaired the road after the 1964 Earthquake (Mead & Hunt and CRC 2014:107). The Tok Cutoff continues to provide critical road access for communities and recreational access.

The recommended methodology for evaluating the National Register significance of a historical Alaskan road is to first consider the significance of the entire road, followed by an evaluation of the integrity of the segment of road that would be impacted by a proposed Project (Mead & Hunt 2014:11). The segment of road within the Project's APE is part of the northern half of the Tok Cutoff Highway, which was not constructed until 1942.

10.1.1 Criterion A: Association with events that have made a significant contribution to the broad patterns of history. To be eligible for the National Register under Criterion A, an Alaskan road must have "direct and important association with single events, a pattern of events, repeated activities, or historic trends" (Mead & Hunt 2014:12). A road significant for its association with transportation must also be associated with agriculture, community planning and development, entertainment/recreation/conservation, industry, military, and/or politics/government. A road is directly associated with military significance if it "Established or improved access to a mission critical military facility" and/or "Facilitated specific activities or strategic access deemed critical for national defense" (Mead & Hunt 2014:20).

The northern segment of the Tok Cutoff is significant under Criterion A for its direct association with WWII military transportation in Alaska. The northern Tok Cutoff segment was constructed

by the military and, in tandem with new and existing roads, established a direct overland route from the contiguous U.S. to mission-critical military installations. Overland access to interior Alaska was considered important at the time for national defense.

10.1.2 Criterion B: Association with the lives of significant persons. To be eligible for the National Register under Criterion B, an Alaskan road must "best exemplify a person's contributions to history; mere association with a road, such as involvement in design or construction, would not render a road significant under Criterion B" (Mead & Hunt 2014:12). The north Tok Cutoff segment is not significant under Criterion B. Although the 97th Regiment constructed the road, the completion of the Tok Cutoff was a side project, and the regiment's greatest contribution to history was the Alaska Highway.

10.1.3 Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction. To be eligible for the National Register under Criterion C, an Alaskan road must "reflect design features or construction practices that were the result of uncommon, early, or specific contributions or advances in the application of engineering principles" (Mead & Hunt 2014:22). The northern Tok Cutoff segment is not significant under Criterion C because the road does not embody distinctive characteristics, represent the work of a master, or possess high artistic value.

10.1.4 Criterion D: Having yielded, or having the potential to yield, information important in prehistory or history. The northern Tok Cutoff segment is not significant under Criterion D, as it is unlikely to provide important information about the past.

10.1.5 Consideration of Integrity. According to Mead & Hunt (2014:27), "assessing integrity is usually focused more narrowly on the segment of road within the APE. In assessing historic integrity, a road or segment of road with significance needs to convey the essential physical features and be of a distance long enough to provide a sense of time and place and travel experience related to the period(s) of significance."

The 3-mile section of the original Tok Cutoff Highway has a very narrow period of significance; the road served a critical purpose during WWII, but by 1954, it was bypassed by the modern highway alignment. In the intervening years, the road has been used recreationally and likely commercially for logging. The total bypassed segment is 7 miles, but the 3-mile section in the APE is the most heavily trafficked and appears to have been more modified over time.

Based on the descriptions of the original Tok Cutoff Highway from WWII, the 3-mile section of the road in the APE has been modified, particularly with the addition of newer culverts, pullouts, and bulldozed embankments. According to Mead & Hunt (2014:32), the most important aspects of integrity for a historical road that is significant under Criterion A are design, location, and association. The overall design of the section of road in the APE has been modified through the introduction of modern pullouts, embankments, and culverts that have diminished its integrity of design; however, the road is within its original alignment and retains integrity of location (Figure 32). Modern alterations have negatively affected its integrity of association and feeling, making it no longer expressive of its military function and WWII-era period of significance. Physical alterations have also diminished the "sense of time and place and travel experience" related to the period of significance described by Mead & Hunt (2014:27). Overall, the Tok Cutoff Highway Bypass does not retain sufficient integrity to demonstrate its significance under Criterion A.

The 4-mile-long section of the bypassed Tok Cutoff Highway outside the APE appears to be the most historically intact based on aerial imagery. This portion of the road is significantly narrower, which may be truer to its original appearance. However, this section was not examined because it was outside the Project's APE. Because the total bypassed segment of the Tok Cutoff Highway is 7 miles, it should be evaluated as a whole. However, such an evaluation is beyond the scope of this Project.

11.0 Recommendation of Effect

According to 36 CFR 800, the regulations for the NHPA, an undertaking has an effect on a historic property when it may alter characteristics of the property that qualify it for inclusion on the National Register (36 CFR 800.16(i)). 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(1)).

The surveyed section of the Tok Cutoff Highway Bypass segment within the APE is recommended not eligible for the National Register. No formal determination of eligibility has been completed for the Eagle Trail, but the Project as proposed will not affect the trail. A determination of eligibility for the 200 feet of the Eagle Trail that is within the APE was beyond the scope of the Project. While the Pogo Hill and Quartz Hill operations sites are within the Shaw Creek Basin Archaeological District, no cultural resources associated with the district were found in the APEs, and the Project will not affect the district. CRC recommends a finding of No Historic Properties Affected for the 354th Range Squadron Radar Operations Sites Project.

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Archaeological Investigations of Proposed Air Force Radar Sites on USAG Alaska-Managed Lands

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Introduction

In 2022 the 354th Range Squadron of the US Air Force proposed to establish radar operations sites at 11 locations across the middle Tanana River valley. Five proposed site locations are located on lands managed by USAG Alaska. Three of these sites (Blair Lakes Ops, South Pole Ops, and East Donnelly LZ Ops) are in areas previously surveyed for archaeological sites and are covered under Fort Wainwright's Operations and Maintenance Programmatic Agreement with Alaska's State Historic Preservation Officer (AK-PA-2202). Two sites, Bridge to Terabithia Ops and Gerstle River Ops had not previously been surveyed. This report summarizes findings of 2023 surveys by Colorado State University's (CSU) Center for Environmental Management of Military Lands (CEMML) Fort Wainwright archaeological team. No archaeological sites or historic structures were found during these surveys.

Site 1. Bridge to Terabithia Ops

Survey Location

The Bridge to Terabithia Ops Area of Potential Effect (APE) is located in the eastern portion of Fort Wainwright's Tanana Flats Training Area (TFTA) (TA208) (Figure 1). The APE is just over 22 acres of flat terrain in the Tanana River floodplain, immediately adjacent an existing all-seasons road. Pedestrian transects of the area were conducted on 3 July 2023.

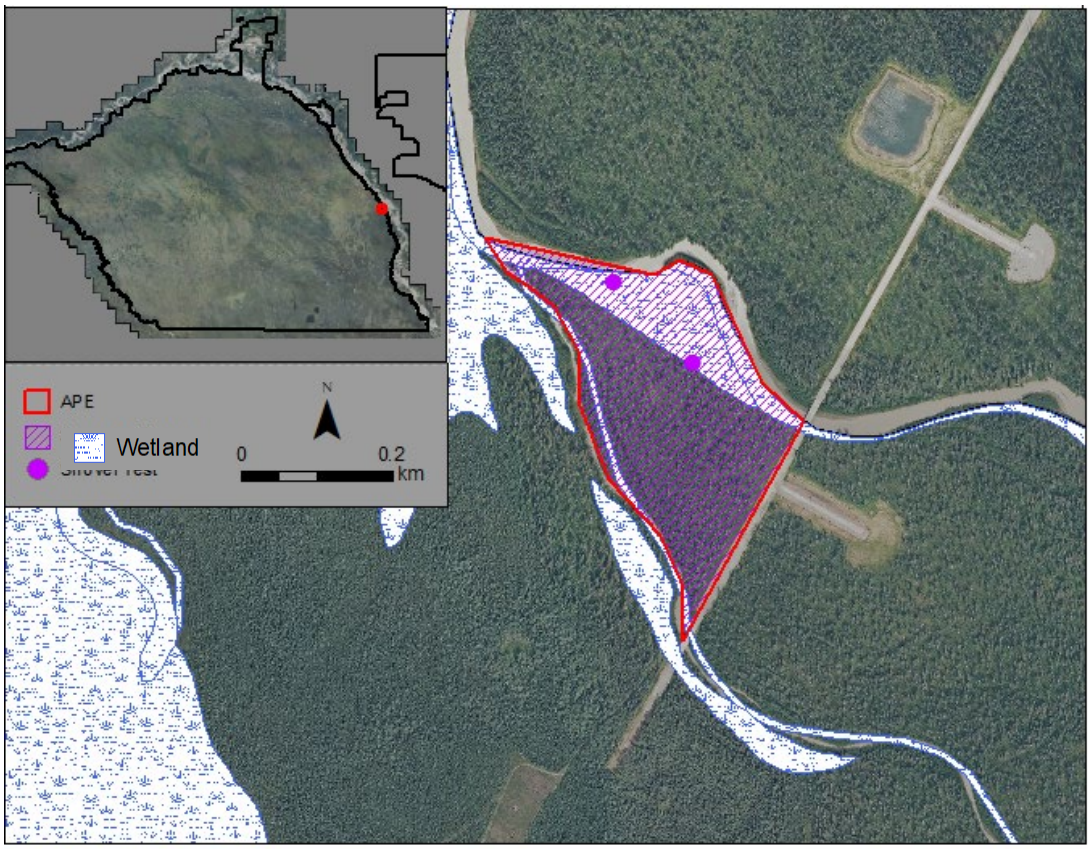

Figure 1. APE within the TFTA.

Setting

The area is thickly vegetated with cottonwood, rose bush, dog wood, various ferns willow young aspen alder moss lichen and other low scrub (Figure 2). The terrain has little relief and there is no visibility of the ground surface due to vegetation.

Figure 2. Overview of vegetation in the TFTA APE.

Findings

Pedestrian survey covered the APE and two shovel tests were excavated in the most high probability areas within the survey area. One shovel test was placed on a slightly higher elevated area overlooking a dry tributary drainage and the second overlooked an active tributary drainage from the Tanana River. Neither shovel test yielded any cultural material.

Shovel Test 1
Location: 06n 495589E 7158029N
Date: 07/03/2023
Crew: Whitney McLaren and Kate Antel

This shovel test was 93 cm deep, terminating at gravel. All sediment was a homogenous sandy silt with slight pedogenic color changes throughout (Figure 3). The stratigraphic profile recorded the following:

0-10 cm below surface (cmbs)- dark brown/black organic mat
10-14 cmbs- light brown silt
14-17 cmbs- grayish brown sandy silt
17-30 cmbs- gray sandy silt

30-37 cmbs- gray coarse sandy silt
37-50 cmbs- mottled strong brown and gray sandy silt
50-56 cmbs orange/strong brown coarse sandy silt
56-73 cmbs- dark brown/dark olive brown coarse sandy silt
75-93 cmbs- mottled strong brown/dark olive brown sandy silt

Figure 3. Shovel test 1.

Shovel Test 2
Location: 06n 495589E 7158029N
Date: 07/03/2023
Crew: Whitney McLaren and Kate Antel

This shovel test was 94 cm deep, terminating at gravel. All sediment was a homogenous sandy silt with slight pedogenic color changes throughout. The stratigraphic profile recorded the following:

0-12 cmbs- dark brown organic mat
12-23 cmbs- mottled yellow/olive/gray brown silt
23-46 cmbs- olive gray/dark brown sandy silt
56-50 cmbs strong brown/orange brown sandy silt
50-61 cmbs mottled strong/orange brown silty sand

61-63 cmbs mottled brown/dark brown silty sand
63-84 cmbs gray coarse sand
84-94 gray coarse sand and cobbles

Site 2. Gerstle River Ops

Survey Location

The Gerstle River Ops APE is located in the northeastern corner of Fort Wainwright's Gerstle Training Area (GRTA) (Figure 4). The APE is 57.6 acres of flat terrain on an old terrace of the Gerstle River. Pedestrian transects of the area were conducted on 14 June 2023.

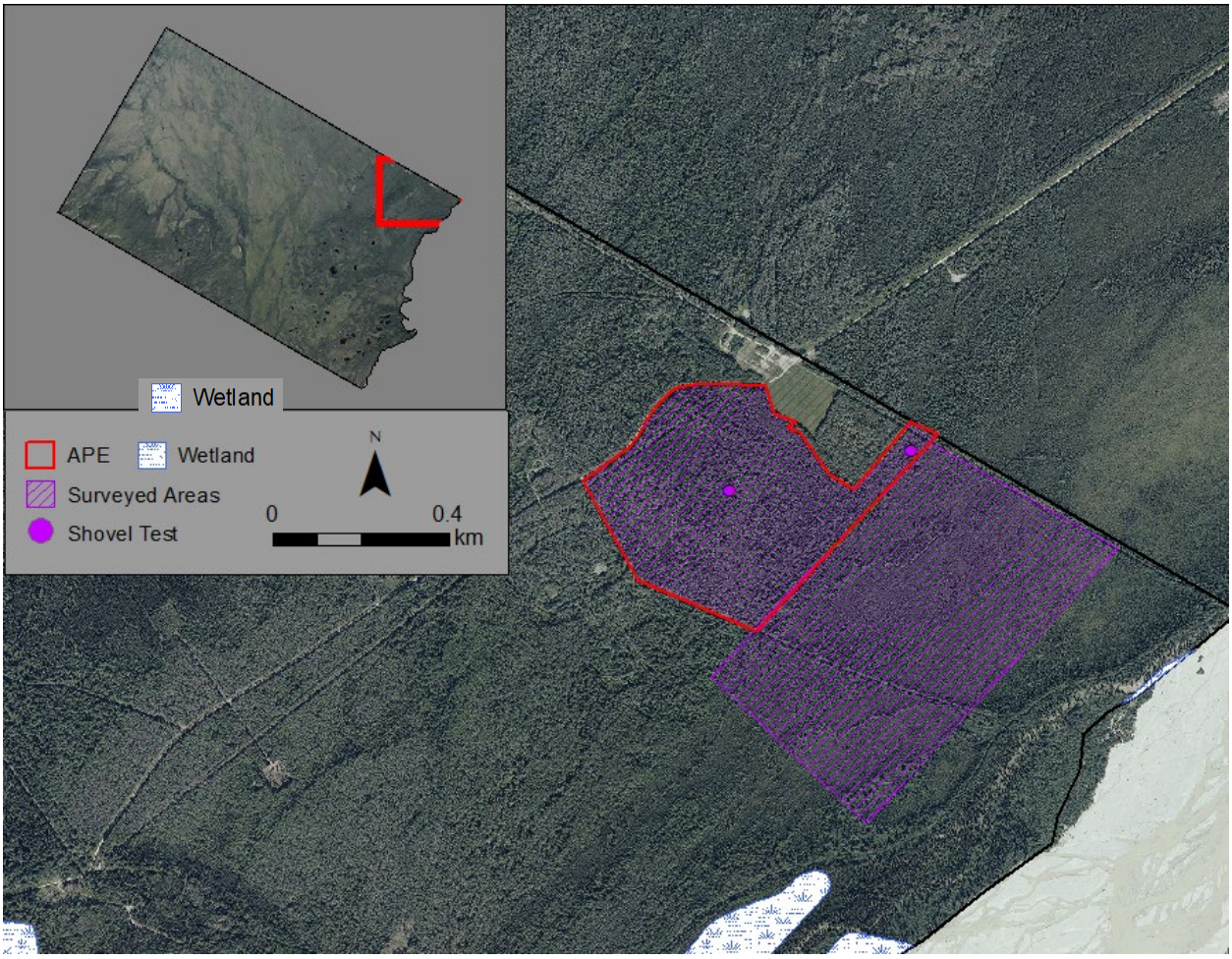

Figure 4. APE within the GRTA.

Setting

The survey area is thickly vegetated with dense black spruce and isolated birch, aspen, willow, and alder tree cover (Figure 5, Figure 6). Labrador Tea, sphagnum moss, soapberry, and juvenile willow compose the groundcover.

Figure 5. Overview of vegetation in the GRTA APE, southeast of the clearing near the entrance to the training area.

Figure 6. Overview of vegetation in the GRTA APE, southeast of the clearing near the entrance to the training area.

Findings

Pedestrian survey outlined the perimeter of the parcel and then the interior was covered by alternating southwest-northeast transects. Two linear push-piles were observed in the parcel, one running northeast-southwest and seemed to run parallel to an anthropogenic clearing at the entrance of the GRTA while the second push-pile paralleled an old dirt trail running northwest-southeast and seemed directly connected to the road cut. No areas of elevation

above the surrounding landscape, which is subject to periodic flooding. Two shovel tests were placed within the APE. Neither shovel test yielded any cultural material.

Shovel Test 1
Location: 06n 597279E 7075169N
Date: 06/14/2023
Crew: Rober Nethken and Cavel Ramos

This shovel test was 93 cm deep, terminating at gravel and rounded cobbles. All sediment was a homogenous silt with slight pedogenic color changes throughout (Figure 7). The stratigraphic profile recorded the following:

0-5 cmbs- dark brown organic mat
5-9 cmbs- brown loamy silt
9-11 cmbs- gray brown silt
11-52 cmbs- red brown fine silt
52-70 cmbs- yellow brown fine silt
70-93 cmbs- mottled gray and yellow brown fine sand and cobbles

Figure 7. Shovel test 1.

Shovel Test 2
Location: 06n 596872E 7075078N
Date: 06/14/2023
Crew: Rober Nethken and Cavel Ramos

This shovel test was 95 cm deep, terminating at cobbles. All sediment was a homogenous silt with slight pedogenic color changes throughout. The stratigraphic profile recorded the following:

0-16 cmbs- dark brown organic mat
16-21 cmbs- gray brown silt
21-45 cmbs- mottled red and yellow brown silt
45-55 cmbs gray silt
55-64 cmbs mottled red and yellow brown
64-71 cmbs gray fine silt
71-90 cmbs mottled red and yellow brown fine silt
90-95 cmbs gray brown fine sand and cobbles

Conclusions

No archaeological sites or historic structures were discovered during the surveys of the two APEs in TFTA and GRTA. The GRTA APE has some evidence of previous disturbance.