DRAFT

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS AT EIELSON AIR FORCE BASE, ALASKA

Prepared by:

Department of the Air Force

March 2024

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DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA) FOR CONSOLIDATED PROJECTS AT EIELSON AIR FORCE BASE, ALASKA

INTRODUCTION

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code Sections 4331 *et seq.*, implemented by Council on Environmental Quality regulations at Title 40 Code of Federal Regulations (CFR) 1500-1508; U.S. Air Force (USAF) regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*; Air Force Instruction 32-1015, *Integrated Installation Planning*; and Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*, the USAF assessed the potential environmental consequences associated with implementing five individual installation development projects at Eielson Air Force Base (EAFB), Alaska. The Environmental Assessment (EA), incorporated by reference into this finding, presents the analysis of potential environmental consequences of activities associated with the Proposed Action, and provides environmental protection measures to avoid or reduce adverse environmental impacts.

PURPOSE

The purpose of the Proposed Action is to provide infrastructure and functionality improvements necessary to support the mission of the 354th Fighter Wing (354 FW) and tenant units by addressing deficiencies of function, capability, and infrastructure. The strategic vision for installation development at EAFB is to capitalize on its strategic Arctic location and unmatched airspace to provide premier joint and coalition training and support contingency operations. This vision is guided in part by the mission of the 354 FW to prepare aviation forces for combat, deploy airmen in support of global operations, and enable the staging of forces.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

EAFB has identified five installation development projects. All reasonable alternatives were considered during the development of construction, demolition, and renovation associated with these projects, to include status quo, addition/alteration, and new construction.

01. Construct Hursey Gate Final Denial Barrier and Road
02. Construct Addition to Coal Thaw Shed
03. Construct New Joint Pacific Alaska Range Complex Range Operations Center (JROC)
04. Demolish/Rebuild Cryogenics Facility
05. Demolish/Rebuild Building 3425

Construction would disturb up to an estimated 1,084,338 square feet (24.89 acres) and increase the total impermeable surface on the installation by up to 309,889 square feet (7.11 acres). Project implementation would begin in 2025.

This EA evaluates the potential environmental consequences of implementing the Proposed Action and the No Action Alternative. Under the No Action Alternative, no construction would occur. EAFB would continue to have insufficient protection from a variety of security threats; the existing Coal Thaw Shed would continue to be inadequate for railcar thawing needs; optimal success of training would continue to fall short because growth and needed enhancements would not be incorporated; cryogenic operations at EAFB would continue to degrade and the number of aircraft sorties per day would be reduced because of tank downtime and the unavailability of cryogenic fluid to provide breathable air during flight; and the unusable Building 3425 would be left in place and would continue to degrade.

The No Action Alternative does not support the strategic vision and would not meet the purpose of and need for the Proposed Action.

PREFERRED ALTERNATIVE

Each project alternative was evaluated based on universal and project-specific selection standards (Section 2.2). Alternatives that did not meet one or more of the selection standards were considered unreasonable and were not retained for further consideration in the EA. The preferred alternatives were considered reasonable and have been retained for further consideration. For Projects 01-04, the preferred alternative is Alternative 1. There is no preferred alternative for Project 05; two alternatives aside from the No Action Alternative (Alternative 2 and Alternative 3) have been retained for consideration in the EA. Following completion of the impacts analysis, the USAF will decide which of the three Project 05 alternatives is the Preferred Alternative to be incorporated into the final decision document.

01. (Alternative 1) Move the active vehicle barrier to the east to allow time for threat containment within the response zone.
02. (Alternative 1) Construct additions to the north and south sides of the existing shed and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.
03. (Alternative 1) Construct an additional facility to support the RED FLAG-Alaska mission consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.
04. (Alternative 1) Demolish the existing Cryogenics Facility and construct a new liquid oxygen (LOX)/liquid nitrogen (LIN) storage building and an associated administrative building composed of an administrative area and a War Readiness Material (WRM) warehouse.
05. (Alternative 2) Demolish the damaged building and construct a single facility within the original building footprint as well as a communications building immediately adjacent to and west of the existing building; or (Alternative 3) Demolish the damaged building and construct multiple facilities and/or additions to existing facilities for each user group (either simultaneously or in phases, based on user group necessity).

SUMMARY OF FINDINGS

The USAF has concluded that under the implementation of the Proposed Action there would be no significant adverse impacts to the following resources: Air Installations Compatible Use Zones (AICUZ), land use, noise, air quality, safety and occupational health, hazardous materials and hazardous waste, natural resources, earth resources, socioeconomic resources and environmental justice, and infrastructure and utilities. No significant cumulative impacts would result from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions at EAFB. The USAF would adhere to all established environmental protection measures, best management practices, regulations, plans, and programs in the execution of the Proposed Action.

In addition, the USAF evaluated potential impacts to water resources, biological resources, and cultural resources, and after detailed analysis and coordination with the appropriate agencies and Tribes, the USAF determined that there would be no significant adverse impacts to these resources as a result of the Proposed Action. Pursuant to Executive Order (EO) 11988, *Floodplain Management*, the USAF published early notice that the Proposed Action would occur in a floodplain in the newspaper of record (*Fairbanks Daily News-Miner*) on 19 November 2023. The notice identified state and federal regulatory agencies with special expertise that had been contacted and solicited public comment on the Proposed Action and practicable alternatives. The comment period for public and agency input ended on 19 November 2023.

No public comments were received. The USAF consulted with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act; Federally Recognized Native American Tribes in accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulation, 36 CFR Part 800; and the appropriate State Historic Preservation Office pursuant to Section 106 of the NHPA. Consultation correspondence is presented in Appendix A of the EA.

CONCLUSION

FINDING OF NO PRACTICABLE ALTERNATIVE

EO 11988, Floodplain Management, requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. If it is found that there is no practicable alternative, the agency must minimize potential harm to the floodplain and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. In accordance with EO 11988, a FONPA must accompany the FONSI stating why there are no practicable alternatives to development within or affecting floodplains.

Generally, the extent of the affected environment/region of influence (ROI) is a 2,811-acre area bounded to the north by a service road that connects to Transmitter Road; to the east by French Creek Drive; to the South by an imaginary line running along the southern arm of Inner Loop; and to the west by the Richardson Highway (Figure 2.1-1). Approximately 2,039 acres (73%) of the ROI overlaps the Federal Emergency Management Agency (FEMA) 100-year floodplain and approximately 334 acres (12%) overlaps the FEMA 500-year floodplain. New construction associated with the Proposed Action would have the potential to disturb approximately 22-24 acres of the Tanana River floodplain and would increase the impermeable surfaces by up to 275,000 square feet (6.3 acres), an increase of approximately 0.22%. The project locations require siting that allows for tie-in to existing infrastructure and must be within designated planning districts (Housing, Schools, Medical, Industrial, etc.) in accordance with the EAFB Installation Development Plan. The majority of the developed portion of EAFB, which includes the ROI, is in a floodplain. As such, there are no practicable alternatives to siting the projects within a floodplain. Proposed activities would not alter or interfere with the long-term function of the 100-year floodplain or increase the potential for flooding in the ROI. Pursuant to EO 11988 and information presented in the EA, there is no practicable alternative to the Preferred Alternative, and the Proposed Action includes all practicable measures to minimize harm to the environment. This finding fulfills the requirements of the referenced EO and 32 CFR Part 989 for a FONPA.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analysis in the attached EA, I conclude that the Proposed Action will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the NEPA, 40 CFR Part 1500-1508, and 32 CFR Part 989 *et seq*. have been fulfilled, and an Environmental Impact Statement is not necessary and will not be prepared. The signing of this FONSI completes the environmental impact analysis process.

Signature to be provided with final version

SIGNATORY NAME RANK TITLE	DATE

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α	alpha value; the threshold for statistical significance
°F	degrees Fahrenheit
>	greater than
≥	greater than or equal to
≤	less than or equal to
µg/L	micrograms per liter
%	percent
168 WG	168th Wing
354 CES	354th Civil Engineer Squadron
354 FW	354th Fighter Wing
354 MDG	354 Medical Group
ACAM	Air Conformity Applicability Model
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACP	access control point
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADOLWD	Alaska Department of Labor and Workforce Development
AF	Air Force
AFB	Air Force Base
AFFF	aqueous film-forming foam
AFI	Air Force Instruction
AFMAN	Air Force Manual
AGE	aerospace ground equipment
AHRS	Alaska Heritage Resource Survey
AICUZ	Air Installations Compatible Use Zones
APDES	Alaska Pollutant Discharge Elimination System
APE	area of potential effect
APZ	Accident Potential Zone
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
B.S.	Bachelor of Science
BTEX	benzene, toluene, ethylbenzene, and xylenes
C&D	construction and demolition
$CaCl_2$	calcium chloride
Census	U.S. Census Bureau
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineer Squadron

ACRONYMS AND ABBREVIATIONS (CONTINUED)

CFR	Code of Federal Regulations
CH&PP	Central Heat and Power Plant
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COMMS	Communications Squadron
COPC	contaminant of potential concern
CSU	Colorado State University
CWA	Clean Water Act
CZ	Clear Zone
D	distance from noise contour
D_o	reference measurement distance from noise contour
dB	decibels
dBA	A-weighted decibels
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloro-ethylene
DDT	dichlorodiphenyltrichloroethane
de minimis	[In reference to emissions levels] the minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
DRO	diesel range organics
EA	Environmental Assessment
EAFB	Eielson Air Force Base
ECF	Entry Control Facility
EDB	ethylene dibromide
EIAP	Environmental Impact Analysis Process
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FDB	final denial barrier
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

ACRONYMS AND ABBREVIATIONS (CONTINUED)

FNSB	Fairbanks North Star Borough
FMO	Furnishings Management Office
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
ft^3	cubic foot
FTA	Fire Training Area
FWA	U.S. Army Fort Wainwright
FWCA	Fish and Wildlife Coordination Act
FWI	Fighter Wing Instruction
GAC	granular activated carbon
gal	gallon
GHG	greenhouse gas
GIS	Geographic Information Systems
GPD	gallons per day
GRO	gasoline range organics
GVEA	Golden Valley Electric Association
GVWR	gross vehicle weight rating
GWP	global warming potential
hp	horsepower
HWF	Hazardous Waste Facility
HWMP	Hazardous Waste Management Plan
IC	institutional control
ICRMP	Integrated Cultural Resources Management Plan
ID	identification
IDP	Installation Development Plan
IMP	Integrated Management Practice
INRMP	Integrated Natural Resources Management Plan
JROC	Joint Pacific Alaska Range Complex Range Operations Center
lb/hr	pounds per hour
LBP	lead-based paint
L_{max}	Highest dBA occurring during a noise event during the time that noise is being measured
$L_{max@50}$	Highest dBA occurring during a noise event during the time that noise is being measured at a reference measurement distance of 50 feet
LID	low impact development
LIN	liquid nitrogen
LOX	liquid oxygen
LQG	large quantity hazardous waste generator

ACRONYMS AND ABBREVIATIONS (CONTINUED)

LRS	Logistics Readiness Squadron
LUC	land use control
LUCIP	Land Use Control Implementation Plan
M.A.	Master of Arts
MBTA	Migratory Bird Treaty Act
MDG	Medical Group
MMPA	Marine Mammal Protection Act
MOGAS	motor gasoline
M.S.	Master of Science
MSGP	Multi-Sector General Permit
MW	megawatts
MWe	electric capacity in megawatts
MWt	thermal megawatts
MUNS	Munitions Support Squadron
MXS	Maintenance Squadron
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
National System	National Wild and Scenic Rivers System
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NH_3	ammonia
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
O_3	ozone
ODPCP	Oil and Hazardous Substance Discharge Prevention and Contingency Plan
OHA	Alaska Office of History and Archaeology
OMRS	Operational Medical Readiness Squadron
Ops	Operations
OSHA	Occupational Safety and Health Administration
PAA	Primary Aircraft Assigned

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PACAF	Pacific Air Forces
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethylene
pCi/L	picocuries per liter
PCP	pentachlorophenol
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PJD	Preliminary Jurisdictional Determination
PL	Public Law
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RPA	Registered Professional Archaeologist
RRO	residual range organics
SAC	Strategic Air Command
SDDCTEA	Surface Deployment and Distribution Command Transportation Engineering Agency
SDWA	Safe Drinking Water Act
SFHA	special flood hazard area
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office/Officer
SO_2	sulfur dioxide
SO_x	sulfur oxide
SOA	State of Alaska
Stantec	Stantec Consulting Services Inc.
SWAP	State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
TCE	trichloroethylene
TCP	Traditional Cultural Property
TMB	trimethylbenzene
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force

ACRONYMS AND ABBREVIATIONS (CONTINUED)

USC	U.S. Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VMS	variable message signs
VOC	volatile organic compound
WLM/yr	Working Level Month per year
WOTUS	Waters of the U.S.
WRM	War Readiness Material
WSA	Wild and Scenic Rivers Act
WSDOT	Washington State Department of Transportation
WWTP	wastewater treatment plant

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

Eielson Air Force Base (EAFB) is 23 miles southeast of Fairbanks, Alaska (Figure 1.1-1), and has been an active military base since 1944. It is home to the 354th Fighter Wing (354 FW), whose mission is to provide combat-ready airpower, advanced integration training, and a strategic Arctic basing operation to the U.S. Indo-Pacific Command. The 354 FW operates F-16C/D Fighting Falcon aircraft and F-35A Lightning IIs. The 354th Mission Support Group (354 MSG) supports the 354 FW by providing combat-ready forces, equipment, and essential services, and sustaining base infrastructure. Within the 354 FW, the 354th Civil Engineer Squadron (354 CES) directs facility construction, maintenance, and operation.

EAFB supports six regular military tenant units. Two have aircraft based at Eielson—the Alaska Air National Guard 168th Wing (168 WG) with KC-135R Stratotanker aircraft and the 210th Rescue Squadron Detachment 1 with HH-60 Pave Hawk helicopters. Tenant units without based aircraft include the Air Force Technical Applications Center Detachment 460; 66th Training Squadron Detachment 1, Arctic Survival School; 6th Field Investigations Region Detachment 632, Air Force Office of Special Investigations; 372nd Training Squadron Detachment 25; 732nd Air Mobility Squadron Operating Location A passenger terminal; Air Force Civil Engineer Center Field Operating Agency, Operating Location CE49; Air Force Legal Operating Agency Operating Location 0D4N, Area Defense Council; and the Air Combat Command Detachment 2, Operating Location 00PC. Transient and special mission aircraft also operate at EAFB, particularly during major flying exercises.

With this Environmental Assessment (EA), the 354 CES intends to streamline compliance with the National Environmental Policy Act (NEPA) and facilitate the installation development process by evaluating the potential environmental impacts associated with five proposed construction, demolition, and renovation projects at EAFB. These projects are presented in Section 2.1.

This EA has been prepared by the U.S. Air Force (USAF) in compliance with NEPA (42 U.S. Code [USC] 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (Title 40 of the Code of Federal Regulations [CFR] 1500-1508), effective 14 September 2020, the Air Force Environmental Impact Assessment Process Regulations at 32 CFR Part 989, Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*, and Air Force Instruction (AFI) 32-1015, *Integrated Installation Planning*.

The information presented in this document will serve as the basis for deciding whether the Proposed Action would result in a significant impact to the human environment, requiring preparation of an Environmental Impact Statement (EIS), or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate. If the execution of any of the Proposed Action would involve "construction" in a wetland as defined in Executive Order (EO) 11990, *Protection of Wetlands*, or "action" in a floodplain under EO 11988, *Floodplain Management*, a Finding of No Practicable Alternative (FONPA) would be prepared in conjunction with the FONSI.

1.2 BACKGROUND

Installation development at EAFB includes continuous construction of new facilities and infrastructure, demolition of redundant or obsolete facilities, and renovation of existing facilities, with the goal of maximizing long-term capabilities in a manner that best meets the ongoing mission needs and future development planning.

The strategic vision for installation development is to capitalize on its strategic Arctic location and unmatched airspace to provide premier joint and coalition training and support contingency operations. By efficiently focusing resources and energy capabilities with modernized base infrastructure, EAFB will support airmen and their families through strong community relationships and increased quality of life initiatives (EAFB 2016). This vision was guided in part by the mission of the 354 FW to prepare aviation forces for combat, deploy airmen in support of global operations, and enable the staging of forces; and the four goals set forth to accomplish the mission (EAFB 2016):

1. Increase family services facilities by 100 percent (%) in the next 5 years
2. Modernize infrastructure to maximize energy efficiency and resource usage
3. Increase participation with existing and future community partners
4. Enhance integrated defense with state-of-the-art security systems to enable optimal protection of the mission and personnel

Implementing the five individual installation development projects (Table 2.1-1) would provide infrastructure and functionality improvements necessary to support the mission of the 354 FW and tenant units by addressing deficiencies of function, capability, and infrastructure. Table 1.2-1 demonstrates how the proposed projects support the goals, mission, and strategic vision of EAFB.

Table 1.2-1 Alignment of Proposed Projects and Installation Development Planning

PROJECT ID	PROJECT NAME	GOAL/MISSION/VISION	CONNECTION
01	Construct Hursey Gate Final Denial Barrier and Road	354 FW Goal 4: Enhance integrated defense with state-of-the-art security systems to enable optimal protection of the mission and personnel.	The proposed project would enhance security at the Hursey Gate entry control facility.
02	Construct Addition to Coal Thaw Shed (Building 6203)	354 FW Goal 2: Modernize infrastructure to maximize energy efficiency and resource usage.	The proposed project would increase the efficiency of coal utilization for installation power needs.
03	Construct New JROC	EAFB Strategic Vision: Capitalize on its strategic Arctic location and unmatched airspace to provide premier joint and coalition training and support contingency operations.	The proposed project would increase the value of combat training exercises such as RED FLAG-Alaska.
04	Demolish/Rebuild Cryogenics Facility (Building 3245)	354 FW Mission: Prepare aviation forces for combat.	The proposed project would increase the efficiency of aircraft operations by maintaining a steady supply of LOX and LIN for pilots.
05	Demolish/Rebuild Building 3425	354 FW Goal 2: Modernize infrastructure to maximize energy efficiency and resource usage.	The proposed project would improve storage, organization, and efficiency for five user groups supporting multiple aspects of the 354 FW mission.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: 354 CES 2023; EAFB 2016, 2019d, 2021f, 2023a, 2023k; 354 Contracting Squadron 2022

1.3 PURPOSE AND NEED

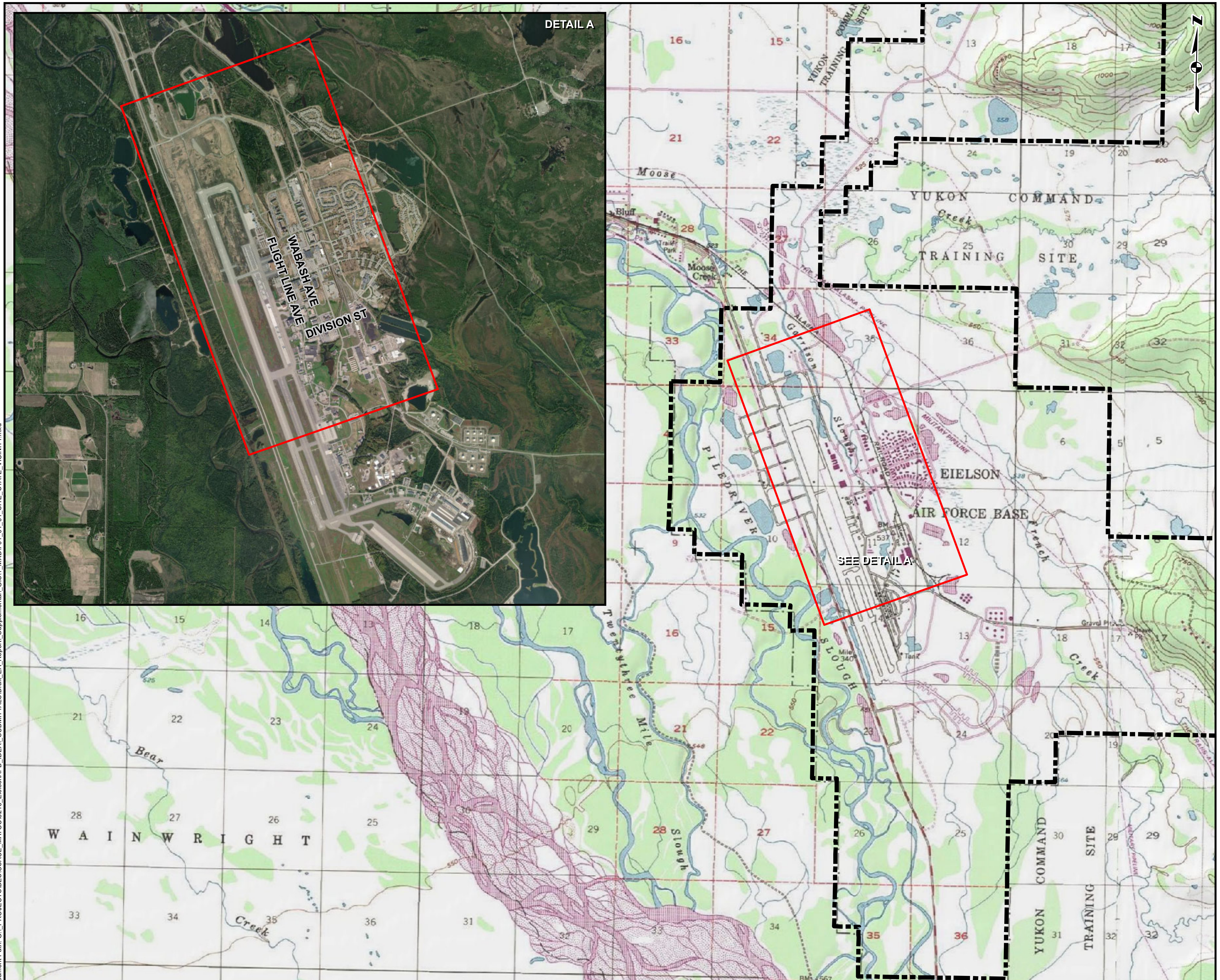
This document treats each project as a discrete proposed action and evaluates each project and its alternatives separately. Each of the five projects (collectively referred to as the "Proposed Action") included in the EA has a specific purpose and need, as shown in Table 1.3-1.

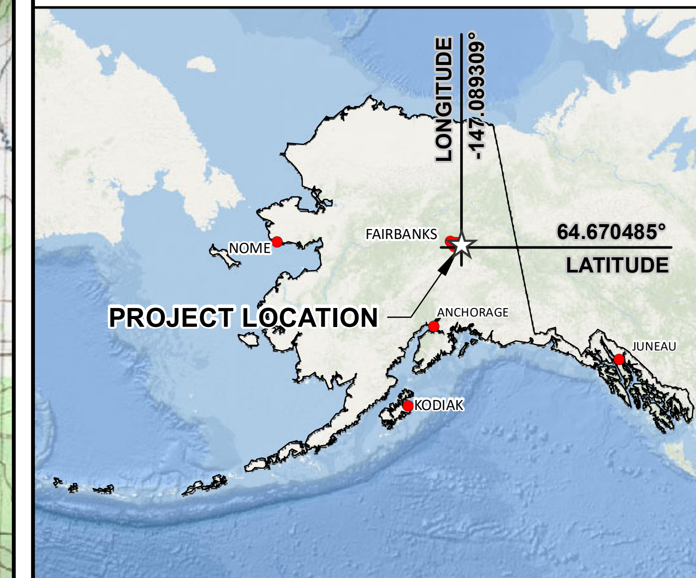
1 INCH

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS

EIELSON AIR FORCE BASE, ALASKA

SITE LOCATION AND VICINITY





Legend

Region of Influence

Installation Boundary

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

ALASKA STATE PLANE ZONE 3. U.S. SURVEY FEET
HORIZONAL DATUM: NAD83(2011) | VERTICAL DATUM: NAVD88

1 0.5 0 1 2
Miles

PROJECT No.: 321604	DATE: 6/6/2023	FIGURE: 1.1-1
P.M.: S.B.	DRAWN: T.A.	

Document Path: G:_PROJECTS\BES\USACE_MATOC\3216_EielsonAFB_IDEA_SUBMITTALS\Draft_EA_Report_Supplemental_GIS\1_MXD\F01_01_01_SITE_STATE_VICINITY.mxd

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Table 1.3-1 Purpose of and Need for Each Project Under the Proposed Action

PROJECT ID	PROJECT NAME	PURPOSE	NEED
01	Construct Hursey Gate Final Denial Barrier and Road	Provide an active vehicle barrier system FDB in accordance with UFC 42-22-01, *Entry Control Facilities Access Control Points* and Military SDDCTEA standard criteria. Provide adequate staging space for commercial vehicles in queue to enter EAFB and prevent bottlenecks at the entry gate that hinder non-commercial vehicle traffic flow.	UFC 42-22-01 mandates that ECF and ACP FDBs must be able to be closed in time to prevent a threat vehicle from breaching the perimeter security. The current FDB is insufficient to protect the base from a determined adversary; the location of the FDB requires a faster closure time to help security guards prevent malicious entry. Both complying with the UFC and reducing bottlenecks would protect EAFB from security threats.
02	Construct Addition to Coal Thaw Shed (Building 6203)	Expand the Coal Thaw Shed to increase coal processing capacity.	Mission changes at EAFB have resulted in additional facilities and infrastructure and a subsequent increased demand for steam and electricity from the CH&PP. The existing thaw shed has capacity for 12 coal rail cars (six per track). Frozen coal-laden rail cars require 48 hours of thaw time before offloading, to prevent chunks of frozen coal from plugging the feed to the boilers and putting the power plant and EAFB at risk for severe damage. Currently, the CH&PP can process coal from eight rail cars per day, usually for 24 to 36 hours. The need is to store 10 railcars per rail, with a total thaw time as close to 48 hours as possible before unloading, thereby mitigating the risks of processing frozen coal and increasing overall safety and efficiency.
03	Construct New JROC	Provide a facility to adequately house range operations supporting RED FLAG-Alaska in the Joint Pacific Alaska Range Complex, including classified spaces in accordance with Intelligence Community Directive 705, *Sensitive Compartmented Information Facilities*; Intelligence Community Standard 705-1, *Physical and Technical Security Standards for Sensitive Compartmented Information Facilities*; technical specifications for Intelligence Community Directive/Intelligence Community Standard 705, and the requirements of UFC 4-010-05, *Sensitive Compartmented Information Facilities Planning, Design, and Construction*.	The existing operations center facility lacks the capacity and capability to plan, execute, and capture required mission data for fifth generation combat training. Insufficient space exists for required offices, a video teleconference/main briefing auditorium, and secured rooms. Current exercise participants must share space, which requires workspaces and briefing/debriefing rooms to be relinquished whenever RED FLAG-Alaska operations take place. The training value of RED FLAG-Alaska is diminished because of inadequate workspace, which not only presents a security concern but also results in a loss of effectiveness for planning, executing, and debriefing. A new facility meeting DoD requirements and technical specifications would provide sufficient space to conduct range operations.

PROJECT ID	PROJECT NAME	PURPOSE	NEED
04	Demolish/Rebuild Cryogenics Facility (Building 3245)	Provide a new base Cryogenics Facility with enough space to operate, maintain, and store 11,000 gallons of LOX and 10,000 gallons of LIN, as prescribed in AFMAN 32-1084, *Facility Requirements*.	The existing facility houses 11,000 gallons of LOX across two tanks and 7,000 gallons of LIN between another two tanks. The facility is beyond the end of its useful life, based on its construction type and age, and it lacks space for several critical functions, including PPE storage/ cleaning, tool storage, vacuum unit and purge unit storage, laboratory testing, employee administrative space, and supporting spaces. Additionally, the number of PAA at EAFB recently has increased, accelerating the rate of LOX/LIN cart filling and delivery necessary to support flight operations. Construction of a new facility with increased LIN storage capacity and space for tertiary supplies/operations would improve operations and bring EAFB into compliance with AFMAN 32-1084.
05	Demolish/Rebuild Building 3425	Provide usable facilities for the CES (FMO Warehouse storage); LRS (administrative space and warehouse storage); MUNS (heated vehicle and equipment storage); MXS (AGE storage); and COMMS (communications distribution).	Building 3425, which provides space for five different user groups, was subjected to weather-related damage in 2022, which caused the roof to fail. The building is no longer safe to occupy, as the structure has been compromised. The entities that used the building before it was damaged require new space. Construction of a new facility or facilities would address this need.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: 354 CES 2023; EAFB 2019d, 2021f, 2023a, 2023k; 354 Contracting Squadron 2022

1.4 INTERAGENCY/INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

1.4.1 Interagency Coordination and Consultations

Scoping is an early, open process for developing the breadth of issues to be addressed in the EA and identifying significant concerns related to a proposed action. Per the requirements of the Intergovernmental Cooperation Act of 1968 (42 USC 4231[a]) and EO 12372, Intergovernmental Review of Federal Programs, federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action were notified during EA development.

Appendix A contains the list of agencies consulted during this analysis and copies of the relevant correspondence.

1.4.2 Government-to-Government Consultations

Consultation with Federally Recognized Tribes is consistent with the National Historic Preservation Act (NHPA) of 1966 implementing regulations (36 CFR Part 800); U.S. Department of Defense (DoD) Instruction 4710.02, *Interactions with Federally Recognized Tribes*; AFI 90-2002, *Air Force Interaction with Federally Recognized Tribes*; and AFMAN 32-7003, *Environmental Conservation*. Tribes that are historically affiliated with the EAFB geographic region are invited to consult on proposed undertakings that have a potential to affect properties of their cultural, historic, or religious significance.

Tribal consultation is distinct from the NEPA scoping process (40 CFR Part 1501.9) or the USAF Interagency/Intergovernmental Coordination for Environmental Planning process and requires separate notification to relevant Tribes. The timelines for Tribal consultation also are distinct from those of intergovernmental consultations. The EAFB contact for Native American Tribes is the Installation Commander. The EAFB contact for consultation with the Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation (ACHP) is the Cultural Resources Manager.

A list of Native American Tribal governments that were coordinated with and copies of government-to-government consultation letters are provided in Appendix A.

1.4.3 Other Agency Consultations

The EA process, in compliance with NEPA guidance, includes public and agency review of information pertinent to the Proposed Action and alternatives. Furthermore, compliance with Section 7 of the Endangered Species Act (ESA) and Section 106 of the NHPA require consultation with the U.S. Fish and Wildlife Service (USFWS) and State Historic Preservation Office (SHPO), respectively. Federal, state, and local agencies with jurisdiction that could be affected by the alternative actions were notified and consulted during EA development.

Appendix A provides the list of agencies consulted during this analysis and copies of correspondence.

1.5 PUBLIC AND AGENCY REVIEW OF ENVIRONMENTAL ASSESSMENT

Because the Proposed Action area coincides with the Federal Emergency Management Agency (FEMA) 100-year floodplain, it is subject to the requirements and objectives of EO 11988. The USAF published early notice that the Proposed Action would occur in a floodplain in the newspaper of record (*Fairbanks Daily News-Miner*) on 19 November 2023. The notice identified state and federal regulatory agencies with special expertise that had been contacted and solicited public comment on the Proposed Action and practicable alternatives. The comment period for public and agency input ended on 19 November 2023. No public comments were received.

A Notice of Availability of the Draft EA was published in the *Fairbanks Daily News-Miner*, the Fairbanks, Alaska Facebook page, and the EAFB Facebook page and website, announcing the availability of the Draft EA for public review and comment on 10 March 2024. The public and agency review period ends on 10 April 2024.

Copies of the Draft EA are available for review at the following locations:

- North Pole Branch Library
  656 NPHS Boulevard
  North Pole, AK 99705
- EAFB website: https://www.eielson.af.mil/General-Information/Environmental/

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

EAFB has identified five individual installation development projects, as shown in Table 2.1-1. Construction would increase the total impermeable surface on the installation by approximately 237,000 square feet or 309,889 square feet, depending on which project alternatives are selected (refer to Section 2.3).

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Table 2.1-1 Projects Identified for Installation Development

PROJECT ID	PROJECT NAME	PREFERRED ALTERNATIVE	APPROXIMATE IMPLEMENTATION YEAR	TOTAL AREA OF DISTURBANCE (square feet)	CHANGE IN IMPERMEABLE SURFACES (square feet)
01	Construct Hursey Gate Final Denial Barrier and Road	Alternative 1: Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two FDBs, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.	2028	812,363	+154,153
02	Construct Addition to Coal Thaw Shed (Building 6203)	Alternative 1: Construct a 5,950-square-foot addition to the north side of the existing shed capable of thawing eight railcars (four per rail) and a 2,275-square-foot addition to the south side of the existing shed capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.	2027	8,225	+8,225
03	Construct New JROC	Alternative 1: Construct an additional facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.	2026	36,735	+36,735
04	Demolish/Rebuild Cryogenics Facility (Building 3245)	Alternative 1: Demolish the existing Cryogenics Facility and construct a new LOX/LIN storage building and an associated administrative building composed of an administrative area and a WRM warehouse.	2027	43,326	+35,206
05	Demolish/Rebuild Building 3425	There is no preferred alternative for Project 05. Two alternatives aside from the No Action Alternative have been retained for consideration in the EA. Following completion of the impacts analysis, the USAF will decide which of the three alternatives is the Preferred Alternative to be incorporated into the final decision document. Alternative 2: Demolish the damaged building (108,119 square feet) and construct a single 110,000-square-foot facility within the original building footprint as well as an 800-square-foot communications building immediately adjacent to and west of the existing building. Alternative 3: Demolish the damaged building and construct multiple facilities and/or additions to existing facilities for each user group (either simultaneously or in phases, based on user group necessity) totaling 75,570 square feet.	2025	110,800 OR 183,689	+2,681 OR +75,570
-	-	-	-	**Total** **1,011,449 (23 acres)** **OR** **1,084,338 (25 acres)**	**Total** **+237,000 (5 acres)** **OR** **+309,889 (7 acres)**

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: 354 CES 2023; EAFB 2019d, 2021f, 2023a, 2023k, 2023l; 354 Contracting Squadron 2022

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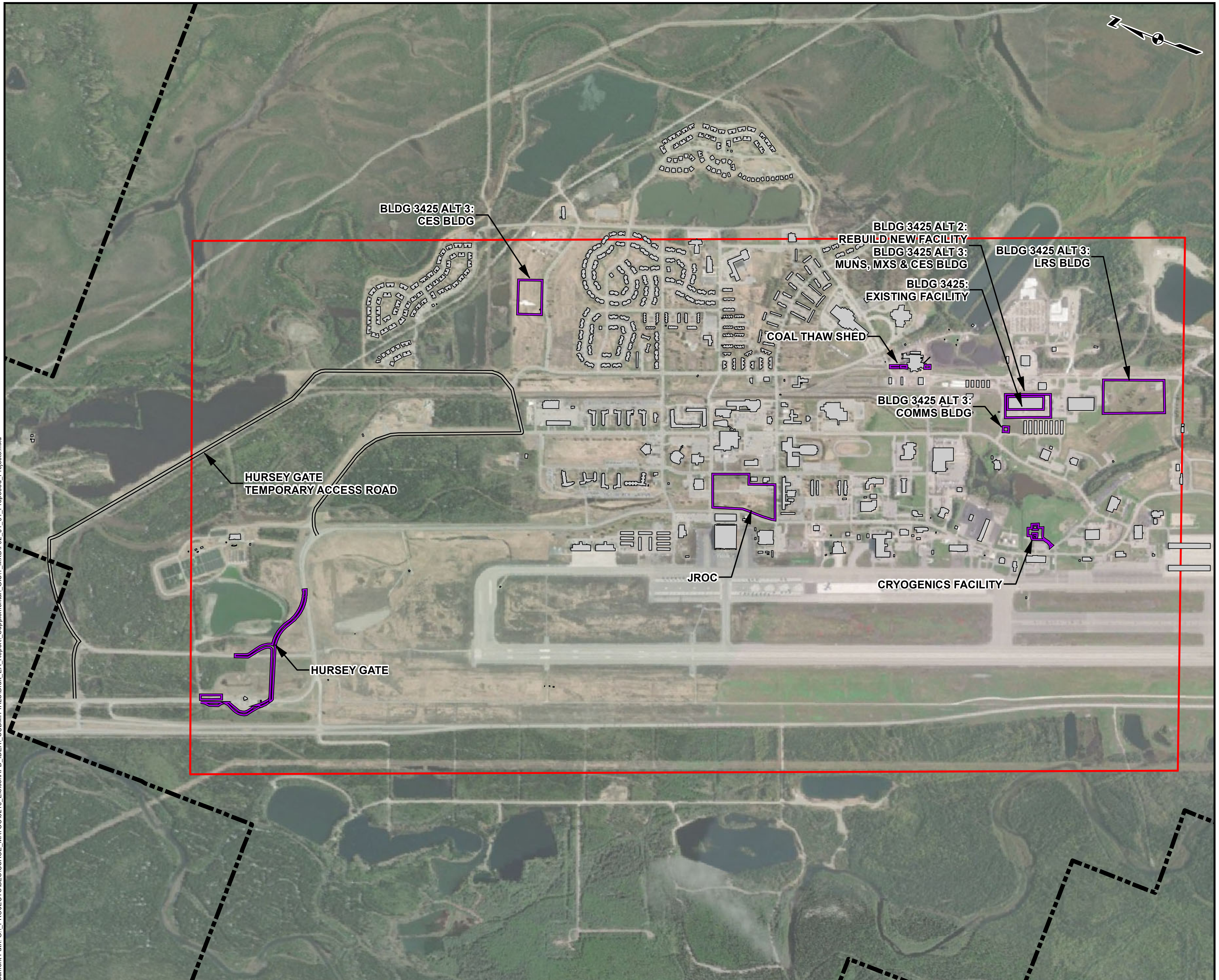

1 INCH

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS

EIELSON AIR FORCE BASE, ALASKA

PROPOSED PROJECTS AT EIELSON AIR FORCE BASE

Legend

- Hursey Gate Temporary Access Road
- Building
- Project Areas
- Region of Influence
- Installation Boundary

Abbreviations

Alt	Alternative
Bldg	Building
CES	Civil Engineer Squadron
COMMS	Communications Squadron
JROC	Joint Pacific Alaska Range Complex Range Operations Center
LRS	Logistics Readiness Squadron
MXS	Maintenance Squadron
MUNS	Munitions Squadron

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

ALASKA STATE PLANE ZONE 3. U.S. SURVEY FEET
HORIZONAL DATUM: NAD83(2011) | VERTICAL DATUM: NAVD88

1,500 750 0 1,500 3,000
Feet

PROJECT No.: 321604	DATE: 1/18/2024	FIGURE: 2.1-1
P.M.: S.B.	DRAWN: T.A.	

Document Path: G:_PROJECTS\BES\USACE_MATOC\3216_EielsonAFB_IDEA_SUBMITTALS\Draft_EA_Report_Supplemental_GIS\1_MXD\F02_01_01_Proposed_Projects.mxd

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2.2 SELECTION STANDARDS FOR ALTERNATIVES

The NEPA and CEQ implementing regulations (effective 14 September 2020) mandate consideration of reasonable alternatives for the Proposed Action. "Reasonable alternatives," as defined under 40 CFR Part 1508, means a reasonable range of alternatives that are technically and economically feasible, meet the purpose of and need for the Proposed Action, and, where applicable, meet the goals of the applicant. Per the requirements of 32 CFR Part 989, the USAF Environmental Impact Analysis Process (EIAP) regulations, selection standards are used to identify alternatives for meeting the purpose of and need for a USAF Proposed Action. Each project alternative was evaluated based on three universal selection standards, described next. The tables in Section 2.3 provide details about how these universal selection standards apply to each project.

Standard 1: Planning Constraints

Planning constraints are human-made or natural elements that can create significant limitations to the operation or construction of facilities, including operational, environmental, and cultural considerations; existing infrastructure; and compatibility with land use planning documents.

Standard 2: Installation Capacity Opportunities

This refers to the capability of the installation's existing facilities/infrastructure to meet existing and future mission needs. This standard generally drives the scope of the facility/infrastructure development and/or improvement and requires that proposed facility/infrastructure development and improvements support mission operations, mission support, built infrastructure, and quality of life.

Standard 3: Environmental Sustainability

This refers to the ability to sustain the mission while minimizing impacts to the natural and human-made systems that support it.

2.3 SCREENING OF ALTERNATIVES

The NEPA process is intended to support flexible, informed decision-making; the analysis provided by this EA and feedback from the public and other agencies will inform decisions made about whether, when, and how to execute the Proposed Action. The No Action Alternative will substantively analyze the consequences of not undertaking the Proposed Action, not simply conclude no impact, and will establish a comparative baseline for analysis.

Action alternatives that met the selection standards described in Section 2.2 were considered reasonable and have been retained for further consideration. Alternatives that did not meet one or more of the selection standards were considered unreasonable and were not retained for further consideration in the EA. This section presents the alternatives that were considered for each of the proposed projects as well as which of the alternatives were eliminated from further consideration and the reason(s) for their elimination. Approximately 2,039 acres (73%) of the region of influence (ROI) lies within the 100-year floodplain of the Tanana River (Section 3.4) and contains a number of known contaminated sites, while approximately 334 acres (12%) of the ROI lies within the 500-year floodplain (Figure 3.6-1). USAF uses the EIAP (32 CFR Part 989) to evaluate impacts to or resulting from these resources. For these reasons, the presence of floodplains or contaminated sites with land use controls (LUCs) in the vicinity of a proposed alternative does not preclude consideration of the alternative in the EA. The presence of these resources is noted for each preferred alternative under Standard 3.

2.3.1 Project 01: Construct Hursey Gate Final Denial Barrier and Road

Table 2.3-1 Alternatives Considered/Eliminated/Carried Forward: Project 01

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 2	Maintain the existing Flight Line Avenue alignment while pushing the active vehicle barrier further along Flight Line Avenue to allow time for threat containment within the response zone.	Eliminated from consideration because of the requirement to relocate the runway threshold to decrease the clear zone extents (Standard 1). In addition, airfield lighting and navigational aids would have to be reviewed by airfield personnel and relocated in a separate project (Standard 1). This alternative would be more disruptive to the existing entry control facility, base, and airfield operations than the Preferred Alternative.
Alternative 3	Maintain the existing Flight Line Avenue alignment and provide a switchback just after the ID checkpoint to allow time for threat containment within the response zone.	Eliminated from consideration because roadway alignment would be difficult for a motorist to maneuver and could result in slower speeds, winter safety concerns, and possible congestion from the sharp curves (Standard 1). This alternative would be more disruptive to the existing entry control facility, base, and airfield operations than the Preferred Alternative.
Alternative 4 (No Action)	No construction would occur. EAFB would continue to have insufficient protection from a variety of security threats.	N/A – carried forward for analysis.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: 354 CES 2023

Alternative 1 (preferred) meets the selection standards as follows:

Table 2.3-2 Project 01 Alternative 1 (Preferred) Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would temporarily disrupt traffic while Flight Line Avenue is reconfigured; however, this constraint would be managed easily by re-routing traffic through a temporary construction gate north of Hursey Gate. The project would not disrupt infrastructure on the installation; impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes, safety standards, or internal policies. The project would not occur in an area with established LUCs at EAFB. The project would contribute to the overall quality of life on-base by relieving congestion at Hursey Gate. The project would improve the built environment by bringing the installation into compliance with UFC 42-22-01 and improve land use compatibility on the installation by routing traffic outside the airfield clear zone, which is not zoned for traffic.
Standard 2	The project would not fail to utilize existing facilities/infrastructure, as none exist on the installation that would satisfy the need for the project (Table 1.3-1). The project would support mission operations by enhancing security.
Standard 3	The project would not put significant pressure on available natural resources such as energy, water, or wastewater, and would not significantly contribute to diminished air quality; utilize more space than necessary; or impede environmental sustainability on the installation. The project would occur in a flood zone.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

In addition, this alternative is less disruptive to the existing entry control facility, base, and airfield operations than Alternatives 2 or 3.

2.3.2 Project 02: Construct Addition to Coal Thaw Shed (Building 6203)

Project-Specific Selection Standard 1: The Coal Thaw Shed must have space for at least 20 rail cars per day.

Table 2.3-3 Alternatives Considered/Eliminated/Carried Forward: Project 02

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 2	Construct a standalone 7,700-square-foot pre-thaw shed capable of thawing eight railcars (four per rail) on the north side of the existing shed.	Eliminated from consideration because construction of the pre-thaw shed would require site remodeling and negatively impact vehicle movement and future growth potential. (Standards 1 and 2).
Alternative 3	Construct a standalone 13,200-square-foot pre-thaw shed on one of the siding rails west of the plant capable of thawing 10 railcars on a single track.	Eliminated from consideration because it would result in unacceptable railcar maneuvering requirements for CH&PP personnel and create a large new facility with additional utilidor, steam, and electricity costs (Standard 1).
Alternative 4	Construct a standalone 13,200-square-foot pre-thaw shed on one of the siding rails north of the plant on "the hill" (an area known to have noticeable grade on the tracks) capable of thawing 10 railcars on a single track.	Eliminated from consideration because it would result in unacceptable railcar maneuvering requirements for CH&PP personnel and create a large new facility with additional utilidor, steam, and electricity costs (Standard 1). Modifications to the rail line to lower the grade could extend more than 1,000 feet to the north, impacting existing buildings and infrastructure (Standard 1). Additional safety procedures, including chalking or other yet-to-be determined options, may be necessary to prevent runaway railcars (Standard 1).
Alternative 5	Construct a 350-square-foot addition to the north side of the existing shed capable of thawing two additional railcars.	Eliminated from consideration because it would not satisfy Project-Specific Selection Standard 1.
Alternative 6	Thaw frozen coal via high-temperature radiant heat using gas or electric heaters (depending on the location—within the existing shed or within a separate pre-thaw shed) to heat each railcar from 15 to 30 minutes.	Eliminated from consideration as a standalone option because it would not satisfy Project-Specific Selection Standard 1. In addition, it would be economically unfeasible to use beyond this limited purpose (Standard 1); it would add significant infrastructure to the existing thaw shed, impeding personnel movement and available space (Standards 1 and 2); and it potentially would be unsafe to personnel because of the risks of damage to railcars or fire (Standard 1).
Alternative 7	Thaw frozen coal via de-stratification, in which the temperature of the thaw shed would be lowered and stabilized to improve existing thaw shed effectiveness and more thoroughly thaw rail cars during the available time.	Eliminated from consideration as a standalone option because it would not satisfy Project-Specific Selection Standard 1. In addition, space within the thaw shed would be limited, and implementing de-stratification would require detailed design and construction (Standards 1 and 2). Depending on the method used, high annual operations and maintenance costs could be incurred for air handling units that would run continuously throughout the winter (Standard 1).
Alternative 8	Thaw frozen coal via chemical de-icing, in which a high-pressure stream of 35% $CaCl_2$ would be sprayed on residual coal after dumping the railcar to reduce the bond strength between frozen coal and the railcar sides.	Eliminated from consideration as a standalone option because it would not satisfy Project-Specific Selection Standard 1. In addition, $CaCl_2$ could pose a corrosion risk to the rail cars and boilers (Standard 1) and would not be cost-effective (the estimated cost is $150,000/year, not including shipping) (Standard 1). Furthermore, storage and disposal of the residual $CaCl_2$ solution would be subject to environmental regulations, adding time and potential cost to the project (Standards 1 and 3).

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 9 (No Action)	No construction would occur. The existing Coal Thaw Shed would continue to be inadequate for railcar thawing needs.	N/A – carried forward for analysis.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2021f

Alternative 1 (preferred) meets the selection standards as follows:

Table 2.3-4 Project 02 Alternative 1 (Preferred) Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would not disrupt operations or infrastructure on the installation (the existing Coal Thaw Shed would remain operational throughout project implementation); impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes, safety standards, or internal policies. The project would occur in an area with established LUCs. USAF would adhere to the procedures for implementing, maintaining, reporting on, and enforcing LUCs at EAFB, per the EAFB LUCIP. The project would improve installation operations and installation safety by providing more space to safely thaw coal without the need for dangerous coal plug removal practices.
Standard 2	The project would utilize existing infrastructure (the existing Coal Thaw Shed) to meet the need for increased thawing capacity (Table 1.3-1). The project would support mission operations by enhancing coal thawing efficiency.
Standard 3	The project would not require additional coal burning and would not put significant pressure on available natural resources such as energy, water, or wastewater. It would not significantly contribute to diminished air quality; utilize more space than necessary; or impede environmental sustainability on the installation. The project would occur in a flood zone. The existing Coal Thaw Shed contains known ACM, LBP, and PCBs. Materials generated during demolition and renovation would be handled in accordance with EAFB's Asbestos Management Plan, HWMP, and LBP Management Plan. The project would support installation sustainability while minimizing impacts to the natural environment by removing regulated materials (ACM, LBP, and PCBs) from the building, thus preventing potential future exposure to toxic substances.
Project-Specific Selection Standard 1	The project would provide space for an additional 8 railcars, bringing the total capacity to 20 railcars.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

2.3.3 Project 03: Construct New Joint Pacific Alaska Range Complex Range Operations Center

Table 2.3-5 Alternatives Considered/Eliminated/Carried Forward: Project 03

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 2	Construct an addition to Building 1151 (RED FLAG Ops) consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities. This would include a circulation path, replacement of fire alarm and mass notification systems, and retrofitting the existing secure workspace to accommodate secure unit workrooms and a briefing space. The existing parking lot would be reconfigured to accommodate spaces required for the addition. Airfield fencing and landscaping would be removed to accommodate the addition.	Eliminated from consideration because it would be cost-prohibitive compared to constructing a new facility (Standard 1) and would not meet new aesthetic installation guidelines and input from the campus planner (Standard 2).

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 3 (No Action)	No construction or renovation would occur. Optimal success of training would continue to fall short because growth and needed enhancements would not be incorporated. The training value of RED FLAG – Alaska would diminish because of inadequate workspace, and loss of effectiveness for planning, executing, and debriefing for RED FLAG – Alaska would occur. The inadequate amount of classified workspace would be a security concern.	N/A – carried forward for analysis.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2019d

Alternative 1 (preferred) meets the selection standards as follows:

Table 2.3-6 Project 03 Alternative 1 (Preferred) Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would not disrupt operations or infrastructure on the installation; impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes, safety standards, or internal policies. The project would occur in an area with established LUCs. USAF would adhere to the procedures for implementing, maintaining, reporting on, and enforcing LUCs at EAFB, per the EAFB LUCIP. The project would improve the built environment by providing an operations facility that meets Intelligence Community Directive 705, ICS 705-1, and UFC 4-010-05 specifications.
Standard 2	An addition to the existing operations center facility was considered as a potential project alternative; however, it was eliminated from consideration because even after the addition, the facility would not meet new aesthetic installation guidelines and input from the campus planner; additionally, the proposed new facility would provide a second floor with administration space, including a commander's office, and a double-story theater to allow stadium seating. The project would support mission operations by providing enough space to adequately house range operations.
Standard 3	The project would not put significant pressure on available natural resources such as energy, water, or wastewater, and would not significantly contribute to diminished air quality; utilize more space than necessary; or impede environmental sustainability on the installation. The project would occur in a flood zone. The project would cause the total water demand on the installation to increase during training exercises; however, the increase would be temporary and would not exceed available resources. The project would cause the electrical demand on the installation to increase to maintain and keep the data server systems cool. The new facility would be designed to meet UFC 1-200-02 requirements to achieve optimal system performance and maximum energy savings and would contain a building energy control system to provide lower operating costs and ease of operation. The existing power supply is adequate to meet the increased demand.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

2.3.4 Project 04: Demolish/Rebuild Cryogenics Facility (Building 3245)

Project-Specific Selection Standard 1: The facility must be capable of storing 11,000 gallons of liquid oxygen (LOX) and 10,000 gallons of liquid nitrogen (LIN), as prescribed in AFMAN 32-1084.

Project-Specific Selection Standard 2: The facility must include administrative office space for six to eight assigned personnel.

Project-Specific Selection Standard 3: The facility must include a War Readiness Material (WRM) storage area.

Table 2.3-7 Alternatives Considered/Eliminated/Carried Forward: Project 04

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 2	Minor repairs of the existing facility, limited to repair of concrete slabs within the building; removal/replacement of the roof, siding (including the perimeter base angle attaching the siding to the building, which is corroded), and plastic weather curtains; removal of the office to maintain code compliance for storage of LOX; relocating LOX/LIN tanks to maintain clearances; and repair of cracking foundation using epoxy injection.	Eliminated from consideration because the existing facility is beyond its service life and cannot be cost-effectively modified (Standard 1). Butler-style buildings constructed in the 1960s were designed for a single, limited purpose and were not built with flexibility for future adaptive uses. In addition, this alternative would not provide administrative space (Project-Specific Selection Standard 2).
Alternative 3	Major repairs of the existing facility (including the addition of a LIN storage bay) and construction of a new administrative building.	Eliminated from consideration because the existing facility is beyond its service life and cannot be cost-effectively modified (Standard 1).
Alternative 4	Demolish existing Cryogenics Facility and construct a new LOX/LIN storage building and associated administrative building (this alternative would not include space for a WRM warehouse).	Eliminated from consideration because although this alternative is similar to the Preferred Alternative, it would not include a WRM storage area (Project-Specific Selection Standard 3).
Alternative 5 (No Action)	No demolition or construction would occur. Cryogenic operations at EAFB would continue to degrade and reduce the number of aircraft sorties/day because of tank downtime and the unavailability of cryogenic fluid to provide breathable air during flight. The new war readiness mission would be unable to meet storage and response requirements because of the inability to store and maintain the new tanks.	N/A – carried forward for analysis.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: 354 Contracting Squadron 2022

Alternative 1 (preferred) meets the selection standards as follows:

Table 2.3-8 Project 04 Alternative 1 (Preferred) Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would not disrupt operations or infrastructure on the installation (the existing Cryogenics Facility would remain operational throughout project implementation); impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes, safety standards, or internal policies. The project would occur in an area with established LUCs. USAF would adhere to the procedures for implementing, maintaining, reporting on, and enforcing LUCs at EAFB, per the EAFB LUCIP. The project would improve installation operations by increasing the LOX/LIN storage capacity to meet the increased demand for in-flight breathable air. The project would improve installation safety by providing a new facility that complies with building and safety codes and standards.
Standard 2	The existing Cryogenics Facility lacks space for several critical functions and personnel and cannot operate effectively. New construction within the original facility footprint would reduce the net increase in space utilization while providing a larger area to support mission operations.

SELECTION STANDARD	DESCRIPTION
Standard 3	The project would not put significant pressure on available natural resources such as energy, water, or wastewater. It would not significantly contribute to diminished air quality; utilize more space than necessary; or impede environmental sustainability on the installation. New construction within the original facility footprint would minimize impacts to the natural and human-made environment to the extent practicable. The existing Cryogenics Facility contains known radon, LBP, and PCBs. Materials generated during demolition would be handled in accordance with EAFB's HWMP and LBP Management Plan. The project would support installation sustainability while minimizing impacts to the natural environment by removing regulated materials (radon, LBP, and PCBs) from the building, thus preventing potential future exposure to toxic substances.
Project-Specific Selection Standard 1	The project would provide enough space to operate, maintain, and store 11,000 gallons of LOX and 10,000 gallons of LIN, as prescribed in AFMAN 32 1084.
Project-Specific Selection Standard 2	The facility would include administrative office space for six to eight workstations.
Project-Specific Selection Standard 3	The Administrative Building would include a WRM storage area with warm storage for empty 500-gallon tanks.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

2.3.5 Project 05: Demolish/Rebuild Building 3425

Table 2.3-9 Alternatives Considered/Eliminated/Carried Forward: Project 05

ALTERNATIVE	DESCRIPTION	REASON FOR ELIMINATION (IF APPLICABLE)
Alternative 1	Repair the damaged building and resume previous operations.	Eliminated from consideration because the existing facility exceeds the space authorization limit, per AFMAN 32-1084. Repair would require at least 16 code waivers to be signed (Standard 1).
Alternative 4	Lease offsite facilities for each user group that previously occupied Building 3425.	Eliminated from consideration because it would be cost-prohibitive and not operationally feasible (Standards 1 and 2).
Alternative 5 (No Action)	No construction or renovation would occur. The unusable building would be left in place and would continue to degrade.	N/A – carried forward for analysis.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2023a, 2023b

There is no preferred alternative for Project 05. In addition to the No Action Alternative, Alternatives 2 and 3 have been retained for consideration in the EA. Following completion of the impacts analysis, USAF will decide which of these alternatives is the Preferred Alternative to be incorporated into the final decision document.

Alternative 2: Demolish the damaged building and construct a single 110,000-square-foot facility within the original building footprint, as well as an 800-square-foot communications building immediately adjacent to and west of the existing building. This alternative meets the selection standards as follows:

Table 2.3-10 Project 05 Alternative 2 Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would not disrupt infrastructure on the installation; impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes, safety standards, or internal policies. The project would occur in an area with established LUCs. USAF would adhere to the procedures for implementing, maintaining, reporting on, and enforcing LUCs at EAFB, per the EAFB LUCIP. The project would support installation operations by providing adequate storage space for multiple user groups.
Standard 2	The existing building is unusable due to roof failure. New construction within the original facility footprint would reduce the net increase in space utilization while providing the necessary storage space to meet the needs of each affected user group. Existing utility lines would be utilized at the new building.
Standard 3	The project would not put significant pressure on available natural resources such as energy, water, or wastewater. It would not significantly contribute to diminished air quality, utilize more space than necessary, or impede environmental sustainability on the installation. The project would occur in a flood zone. New construction within the original facility footprint would minimize impacts to the natural and human-made environment to the extent practicable. The existing building contains known radon, ACM, LBP, and PCBs. Materials generated during demolition would be handled in accordance with EAFB's HWMP and LBP Management Plan. The project would support installation sustainability while minimizing impacts to the natural environment by removing regulated materials (radon, ACM, LBP, and PCBs) from the building, thus preventing potential future exposure to toxic substances.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Alternative 3: Demolish the damaged building and construct multiple facilities and/or additions to existing facilities for each user group (either simultaneously or in phases, based on user group necessity) totaling 75,570 square feet. This alternative meets the selection standards as follows:

Table 2.3-11 Project 05 Alternative 3 Conformity to Selection Standards

SELECTION STANDARD	DESCRIPTION
Standard 1	The project would not disrupt operations on the installation (the existing building is condemned and would remain non-operational throughout project implementation); impact environmental or cultural attributes that substantially contribute to the overall quality of life on-base; or violate applicable building codes or safety standards. The project would occur in an area with established LUCs. USAF would adhere to the procedures for implementing, maintaining, reporting on, and enforcing LUCs at EAFB, per the EAFB LUCIP. The EAFB IDP (EAFB 2016) defines district-specific land uses that account for land use compatibility, facility consolidation, mission sustainability, quality of life, and safety and security. Building 3425 is in District 4, which is classified as "Industrial." The proposed FMO Warehouse site lies within District 1, which is classified as "Housing." Table 9.3 of the IDP indicates that "light industrial" land use (warehouse, maintenance, and storage) is restricted in District 1. Industrial facilities in designated residential districts may increase safety risks to personnel and their dependents who live on-base. However, adherence to DoD and USAF safety policies and plans would ensure the safety of personnel and the public. The proposed FMO Warehouse site is identified for housing development under every alternative scenario in the IDP's Strategic Vision Plan. However, the IDP notes that land uses may be permitted (with specific restrictions) within specific planning districts or future planning areas to ensure that development within those areas is not disruptive to the installation's missions. A list of recommended development guidelines by district is provided in the IDP.

SELECTION STANDARD	DESCRIPTION
Standard 2	The existing building is unusable due to roof failure. New construction in several locations rather than within the confines of the original footprint would allow USAF to correct deficiencies in space utilization and provide usable areas designed to meet each user group's needs, improving their ability to support the growing USAF mission. Existing utility lines would be utilized at the new facilities or tied into the new facilities via existing utilidors.
Standard 3	The project would not put significant pressure on available natural resources such as energy, water, or wastewater. It would not significantly contribute to diminished air quality, utilize more space than necessary, or impede environmental sustainability on the installation. The project would occur in a flood zone. The existing building contains known radon, ACM, LBP, and PCBs. Materials generated during demolition would be handled in accordance with EAFB's HWMP and LBP Management Plan. The project would support installation sustainability while minimizing impacts to the natural environment by removing regulated materials (radon, ACM, LBP, and PCBs) from the building, thus preventing potential future exposure to toxic substances.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 SCOPE OF THE ANALYSIS

Potential alternatives for each of the five projects under the Proposed Action were evaluated in Section 2.3 based on the selection standards presented in Section 2.2. For four of the projects, only two alternatives (the Preferred Alternative and No Action Alternative) were retained for consideration in the EA. For Project 05 (Demolish/Rebuild Building 3425), three alternatives were retained for consideration (Section 2.3.5) and will be evaluated in this EA. Following completion of the impacts analysis, the USAF will decide which of the three alternatives is the Preferred Alternative to be incorporated into the final decision document.

In compliance with NEPA, CEQ, and EIAP (32 CFR 989) guidelines, this chapter describes the current conditions of the environmental resources, human-made or natural, that would be affected by the Proposed Action or the No Action Alternative. All potentially relevant resource areas were considered for analysis. Depending on the resource area, the extent of the affected environment/ROI may differ. Unless otherwise noted, the extent of the affected environment/ROI is a 2,811-acre area bounded to the north by a service road that connects to Transmitter Road; to the east by French Creek Drive; to the South by an imaginary line running along the southern arm of Inner Loop; and to the west by the Richardson Highway (Figure 2.1-1). Unless otherwise defined, Table 3.1-1 presents definitions for descriptors used to indicate the degree of effects on resource areas analyzed in this EA.

Table 3.1-1 Environmental Consequences Descriptors

CATEGORY	DESCRIPTOR	DEFINITION
Type	Direct	Direct impacts are caused by an action and occur at the same time and place as the action.
	Indirect	Indirect impacts are caused by the action and occur later in time or are farther removed from the place of impact but are reasonably foreseeable.
	Cumulative	Incremental impacts of the action with past, present, and reasonably foreseeable future actions. Refer to Section 3.1.1.
Context	The resource area(s) being impacted and the corresponding ROI.	
Duration	Short-term	Impacts with temporary effects.
	Long-term	Impacts with permanent effects.
Intensity	Negligible	The impact is localized and not measurable, or at the lowest level of detection.
	Minor	The impact is localized and slight, but detectable.
	Moderate	The impact is readily apparent and appreciable.
	Substantial	The impact is large and highly noticeable.
	Significant	Significance indicators are defined in the Environmental Consequences subsection for each individual resource area.
Nature	Adverse	A negatively perceived or undesirable effect on the human or natural environment; the effect may violate an existing environmental regulation or cause a deterioration of the baseline environmental quality.
	Beneficial	A desirable or positive effect on the human or natural environment; the effect may bring a condition closer to achieving compliance with existing environmental regulations or create efficiencies in resource area use.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

3.1.1 Cumulative Impacts Analysis

As defined in 40 CFR 1508.7, cumulative impacts to the environment are those that result from the incremental impact of the action and other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. Several USAF-led projects/actions were identified as relevant for cumulative impacts analysis (Table 3.1-2). No relevant projects led by other agencies or persons were identified in the ROI.

Table 3.1-2 Past, Present, and Reasonably Foreseeable Projects for Cumulative Impacts Analysis

PROJECT	DESCRIPTION	TIMELINE
Multiple actions/projects	Storage, usage, and spills of PFAS-containing materials, including AFFF, on EAFB have resulted in areas of soil and groundwater impacts, which are under investigation. Stockpiles of impacted soil from recent construction projects will be treated or disposed of. Consequently, the base is underlain by a PFAS plume.	Past activities
F-35A Beddown	Beddown of two squadrons of F-35A aircraft at EAFB, up to 54 aircraft. This project will increase the base population by 2,765, increase F-35A operations, and include associated construction, demolition, and renovation of facilities.	Past activities
Repair CH&PP Turbine Generators (Building 6203)	Repair aging infrastructure and provide additional power generating capacity.	Past activities
Repair Garrison Slough Trestle Bridge	Maintain a reliable conveyance method for the CH&PP's coal supply.	2023/2024
KC-135R Beddown	Beddown of up to four KC-135R Stratotanker aircraft and associated supporting Active-Duty personnel, approximately 254. This project will increase the base population by 508, increase KC-135R operations, and include associated construction, demolition, and renovation of facilities.	2023/2024
Hursey Gate Area Liquid GAC Curtain Pilot Study	Construction of a liquid GAC curtain near Hursey Gate is planned to mitigate migration of PFAS-impacted groundwater off the installation. Liquid GAC will be injected into the wall to filter impacted groundwater as it moves off-base.	2024/2025
South Loop Fire Station	Construction of a new satellite fire station for Fire Emergency Services to reach the far end of the airfield in the required fire-minute response time.	2026
Micro-Reactor Pilot Project	EAFB anticipates receiving a nuclear micro-reactor. The micro-reactor technology for the pilot is expected to have the capacity to produce up to 5 MWt per day that could be used directly as heat or converted to electricity to supplement current installation energy sources.	2027
Consolidate Munitions on Quarry Hill	Consolidate munitions storage on Quarry Hill and demolish existing and outdated facilities at Engineer Hill. There is a possibility that the facilities to be demolished may be repurposed. In that case, new facilities will be constructed to meet AFMAN 91-201 *Explosive Safety Standards*, reduce transport time, and save facility funds and labor.	2027
Joint Mobility Complex Addition	Improve the complex's capacity to process deploying personnel to meet the increased demand generated by mission growth.	2027

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2021c; USAF 2016; SAF/IE 2021b

3.2 AIR INSTALLATIONS COMPATIBLE USE ZONES/LAND USE/NOISE

3.2.1 Definition of Resource

3.2.1.1 Air Installations Compatible Use Zones

The Air Installations Compatible Use Zones (AICUZ) Program was established by the DoD as a direct response to the Noise Control Act of 1972 to promote compatible land use patterns around air installations and decrease the effects of noise on public health and welfare. The AICUZ Program also protects DoD airfields from encroachment and incompatible land use while balancing the need for aircraft operations with community concerns (U.S. Army Fort Wainwright [FWA], USAF EAFB, Fairbanks North Star Borough [FNSB] 2006).

3.2.1.2 Land Use

Land use generally refers to the management and use of lands by people, including land ownership, status, and consistency with the land management plans and ordinances in effect. For EAFB and its adjacent communities, land management plans and zoning regulations determine what land uses are allowable in specific areas to limit conflicting land uses and ensure protection of specially designated or environmentally sensitive areas. Land use categories could also include special use areas, parks and recreational areas, and communities.

3.2.1.3 Noise

Sound can be defined as a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable, intrusive, or intense enough to cause hearing damage. Proper noise analysis requires assessing a combination of physical measurements of sound and physical, physiological, psycho-acoustic, and socio-acoustic effects. Noise analysis typically evaluates potential changes to existing noise environments that would result from implementing the Proposed Action and alternative(s). In accordance with Air Force Handbook 32-7084, *AICUZ Program Manager's Guide* (USAF 2017a), 65 A-weighted decibels (dBA) Day-Night Average Sound Level (DNL) is the noise level below which generally all land uses are compatible with the noise from aircraft operations. Areas below 65 dBA DNL may also experience levels of appreciable noise, depending on training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo because of unit deployments, funding levels, and other factors.

Proper analysis is required because the response of different individuals to similar noise events is diverse and can be influenced by the type of noise, the perceived importance, the time of day, the type of activity, and the sensitivity of the individual. Noise may also affect wildlife through disruption of nesting, foraging, migration, and other life-cycle activities.

3.2.2 Affected Environment

3.2.2.1 Air Installations Compatible Use Zones

The affected environment for AICUZ analysis area includes EAFB and the surrounding areas of Moose Creek, North Pole, Fairbanks, and Salcha. EAFB is inside the FNSB, approximately 22 miles southeast of Fairbanks and 10 miles southeast of North Pole. Moose Creek and Salcha are adjacent to the northern and southern base boundaries, respectively. The FNSB is spread over an area of

7,000 square miles. The State of Alaska (SOA) owns 68% of the land, the federal government (DoD and Bureau of Land Management) owns 19%, and the remaining 13% is under private ownership (FNSB 2018).

EAFB conducted AICUZ studies in 1978 with updates in 1992 and 1996 to examine the effect of noise associated with flight operations at the airfield and recommend land use for areas exposed to noise and accident risk. Noise is further discussed in Section 3.2.2.3. The AICUZ study also provided Accident Potential Zones (APZs) around EAFB as a planning tool for local land use agencies and the DoD for future land use projects. As presented in Table 3.2-1, the APZs are categorized into three main zones and are based on the landing and takeoff patterns of the aircraft.

DoD standards recommend no structures in the Clear Zone (CZ), no residential structures in APZ I, and low-density residential use in APZ II. APZs at EAFB are presented on Figure 3.2-1.

Table 3.2-1 Accident Potential Zone Categories

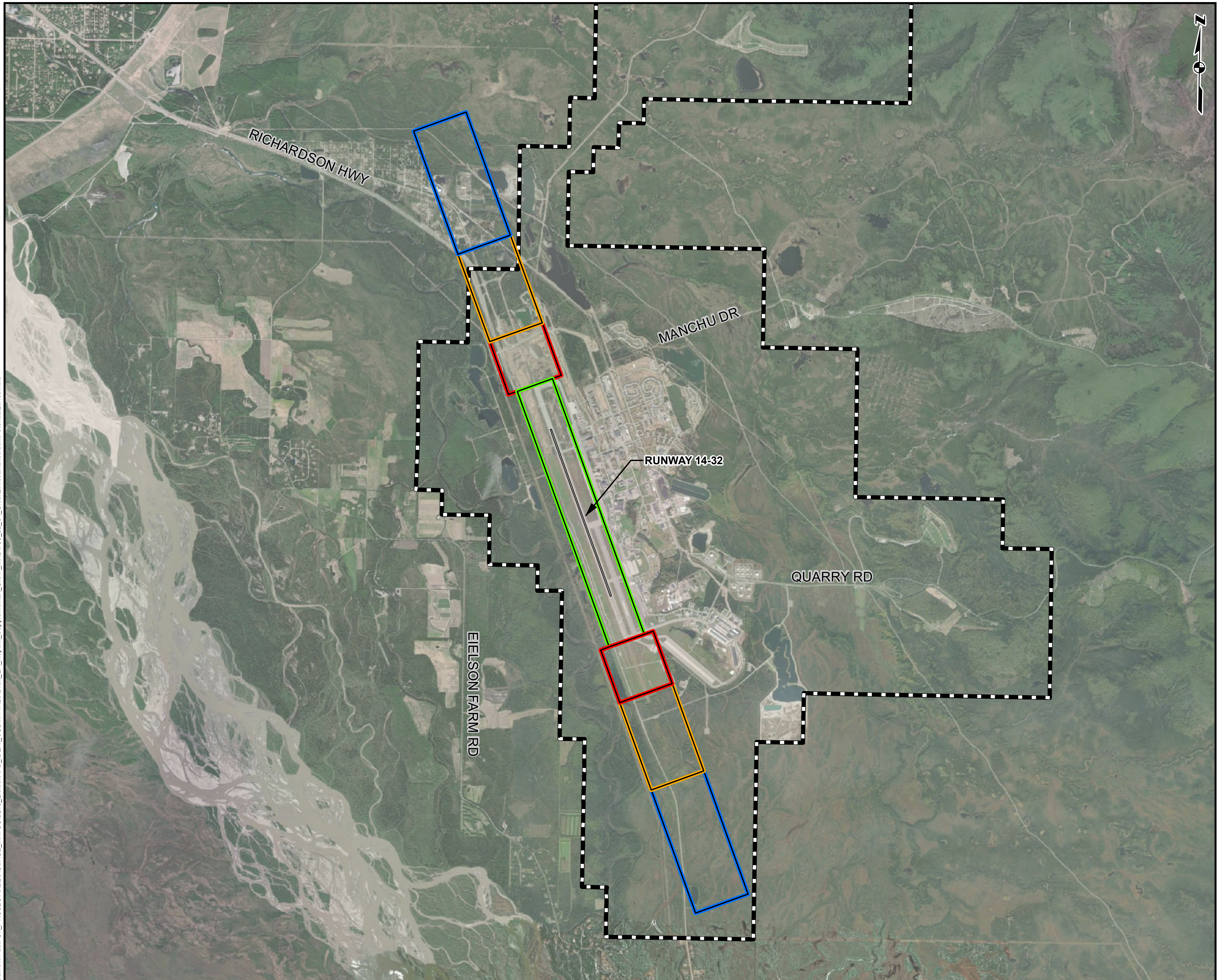
ZONE CLASSIFICATION	ZONE DESCRIPTION
Clear Zone (CZ)	The area with highest aircraft accident potential, usually located at the immediate ends of the runway; at EAFB, measures 3,000 feet wide by 3,000 feet long.
Accident Potential Zone I (APZ I)	The area less critical than a CZ but still with significant potential for accidents; at EAFB, measures 3,000 feet wide by 5,000 feet long.
Accident Potential Zone II (APZ II)	The area least critical and with moderate potential for accidents; at EAFB, measures 3,000 feet wide by 7,000 feet long.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: U.S. Army, FWA; USAF, EAFB; FNSB Planning Department 2006

1 INCH

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS
EIELSON AIR FORCE BASE, ALASKA

EIELSON AIR FORCE BASE CLEAR ZONES AND ACCIDENT POTENTIAL ZONES



Legend
- Runway 14-32
- Accident Potential Zone 1
- Accident Potential Zone 2
- Clear Zone
- Lateral Clear Zone
- Installation Boundary

Notes
1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References
1. Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 3, U.S. SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

1 ½ 0 1 2
Miles

PROJECT No.: 321604	DATE: 6/5/2023	FIGURE:
P.M.: S.B.	DRAWN: D.H.	3.2-1

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3.2.2.2 Land Use

The Installation Development Plan (IDP) guides land management for approximately 19,790 acres on the installation. The base manages an additional 37,824 acres at four other locations: the Blair Lakes Air Range, located approximately 17 air miles southwest of EAFB in the FWA Tanana Flats Training Area; the Chena River Research Site, located approximately 10 miles northeast of EAFB within the FWA Yukon Training Area; the Birch Lake Recreation Area, located on the western shore of Birch Lake approximately 35 miles southeast of EAFB along Highway 2; and C Battery, located on a ridge line within the FWA Yukon Training Area approximately 12 air miles east-southeast of EAFB (EAFB 2016).

The airfield is the largest portion of EAFB, with a notably long 14,530-foot runway and associated ramps and taxiways occupying the west and south sides of the base. The runway is parallel to the Richardson Highway, which runs through the base. Most aircraft operational and industrial areas are adjacent to the airfield on the east side. Land to the west of the airfield and highway is predominantly undeveloped open space with wetlands, lakes, and forests. The base also includes facilities such as heating, power, water, 910 family housing units, and approximately 615 rooms for unattached military personnel (EAFB 2021c).

Outside of EAFB, land use is guided by the FNSB Regional Comprehensive Plan (FNSB 2005). The purpose of the plan is to protect private property rights and enhance development opportunities while minimizing land conflicts. Table 3.2-2 presents local community information.

Table 3.2-2 Land Use Near Eielson Air Force Base

AREA	LOCATION IN RELATION TO EAFB	ESTIMATED POPULATION
Moose Creek	North	531
Salcha	South	973
City of North Pole	10 miles Northwest	2,254
City of Fairbanks	22 miles Northwest	31,843

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: ADOLWD 2023a

3.2.2.3 Noise

The noise environment at EAFB comprises sounds produced by military aircraft, including F-16C/D, KC-135R, F-35A, and HH-60, as well as other types of transient aircraft. Figure 3.2-2 shows the noise contour map for EAFB as of October 2020. As identified on the noise map, contours of greater than or equal to (≥) 70 dBA lie within the installation boundaries, while contours of 65 dBA extend 1 mile past the northern base boundary. Table 3.2-3 summarizes the noise impacts within the 65-dBA noise contour.

Departures of F-16 and F-35A based at EAFB contribute the highest DNL north of the base due to their operational maneuvers, the period of the day in which maneuvers occur, and their single event sound level. Transient heavy cargo aircraft and F-35A arrivals contribute the highest DNL to the south of the base (USAF 2016).

Table 3.2-3 Noise Impacts On and Off Eielson Air Force Base

NOISE BAND (dBA)	ACREAGE	ESTIMATED POPULATION	HOUSEHOLDS
On EAFB			
65-70	2,831	2,242[1]	512
70-75	1,761	0	0
75-80	772	0	0
80-85	370	0	0
85+	440	0	0
Total	**6,174**	**2,242**	**512**
Off EAFB			
65-70	884	181[2]	74
70-75	10	0	0
75-80	0	0	0
80-85	0	0	0
85+	0	0	0
Total	**894**	**181**	**74**

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
[1] Population residing within the on-base residences
[2] Population residing in households outside the north installation boundary
Source: USAF 2016; Census 2023a, 2023b; ADOLWD 2023a

Currently, seven noise-sensitive receptors located within and near EAFB experience DNL ≥ 65 dBA: Areas of EAFB housing; base dormitories; Ben Eielson Junior/Senior High School; Crawford Elementary School; and the base chapel, library, and medical clinic (Figure 3.2-3). A total of 74 households located near the installation are also within the 65- to 70-dBA noise contours.

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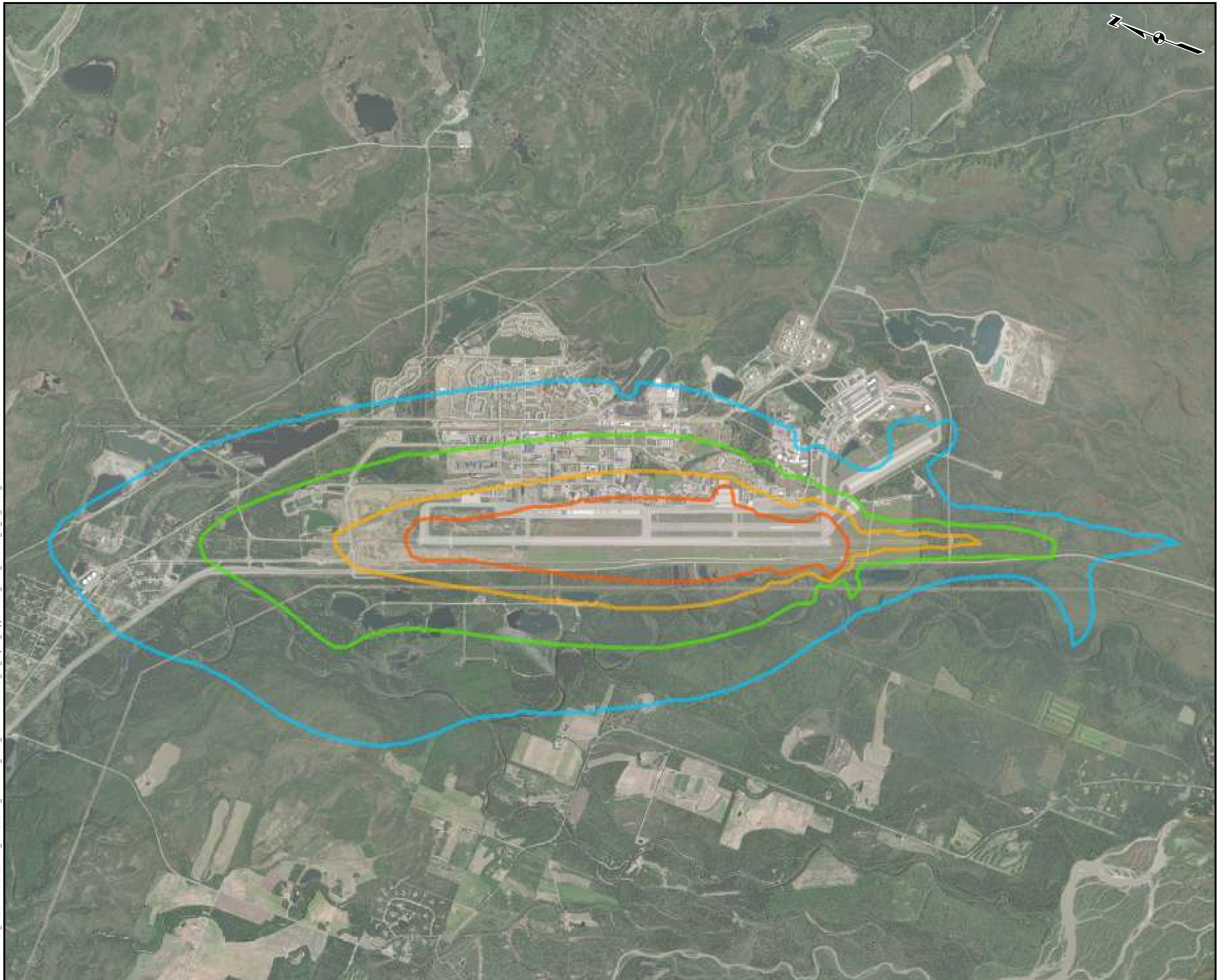

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS

EIELSON AIR FORCE BASE, ALASKA

AIR INSTALLATIONS COMPATIBLE USE ZONES

Legend

dBA Day-Night Level

- 65-70
- 70-75
- 75-80
- 80-85

Abbreviations

dBA A-weighted decibels

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References

1. Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 3, U.S. SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

3,500 1,750 0 3,500 7,000

SCALE IN FEET

PROJECT No.: 321604	DATE: 6/19/2023	FIGURE: 3.2-2
P.M.: S.B.	DRAWN: T.A.	

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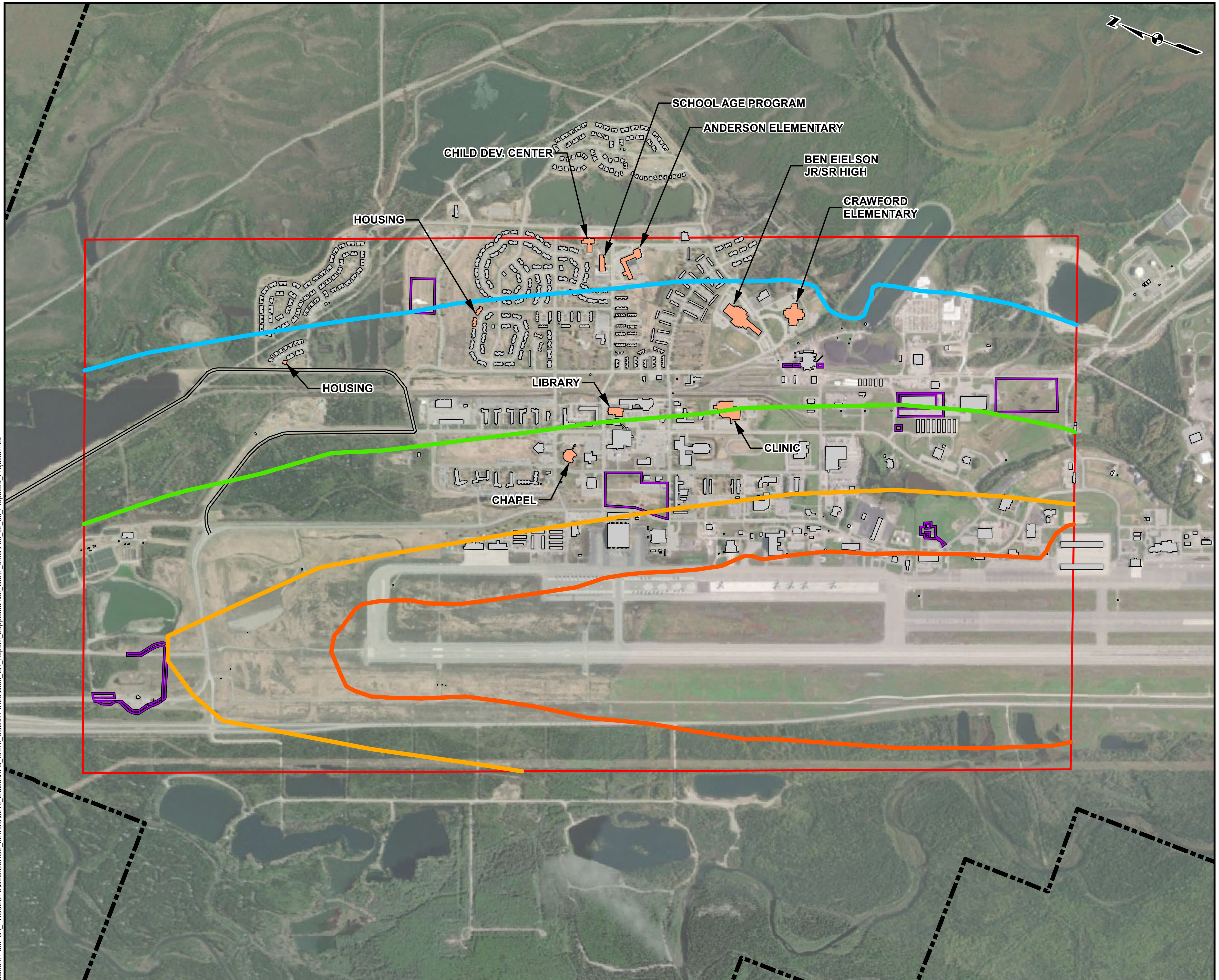

1 INCH

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS
EIELSON AIR FORCE BASE, ALASKA

PROPOSED PROJECTS, BASELINE NOISE CONTOURS, AND SENSITIVE NOISE RECEPTORS

Legend

dBA Day-Night Level

- 65-70 dBA Day-Night Level
- 70-75 dBA Day-Night Level
- 75-80 dBA Day-Night Level
- 80-85 dBA Day-Night Level
- Hursey Gate Temporary Access Road
- Sensitive Noise Receptor
- Building
- Project Areas
- Region of Influence
- Installation Boundary

Abbreviations

dBA A-weighted decibels

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

ALASKA STATE PLANE ZONE 3. U.S. SURVEY FEET
HORIZONAL DATUM: NAD83(2011) | VERTICAL DATUM: NAVD88

1,500 750 0 1,500 3,000
Feet

PROJECT No.: 321605	DATE: 11/22/2023
P.M.: S.B.	DRAWN: T.A.

FIGURE: 3.2-3

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3.2.3 Environmental Consequences

3.2.3.1 Proposed Action

Air Installations Compatible Use Zones

Potential significance indicators (in terms of AICUZ impacts) for land use near air installations include uses that:

- Concentrate people in a compact area
- Encroach vertically on airspace
- May draw birds/animals near airfields and create a strike hazard for aircraft
- May interfere with radio frequency
- Result in excessive lighting and impair pilot vision
- Result in smoke, dust, and steam and impair pilot vision

Because new facility construction under the Proposed Action would occur on available land and would not change existing APZs, no significant adverse impacts to AICUZ would occur. Construction would be guided by DoD Instruction (DoDI) 4165.57 and the IDP to ensure compatible land use on- and off-base (DoD 2011). EAFB would continue to update its AICUZ plan and work with FNSB to minimize the impacts of the Proposed Action to the land uses surrounding the air installation. Project 01 would move vehicle channeling curbs outside of the airfield and preserve the nearby runway CZ (EAFB 2023h), resulting in long-term, negligible, direct beneficial impacts.

Land Use

Significance is assigned to land use impacts from a Proposed Action based on land use sensitivity levels and their compatibility with the existing conditions of the area. Generally, significance indicators for land use impacts are whether the proposed land use is inconsistent or non-compliant with the existing plans or policies, affects the viability of existing land use, affects the area's continued use or potential occupation, or affects the public health or safety of occupants of the adjacent land use. No significant adverse impacts to land use would occur from the addition of new infrastructure or improvements to existing facilities at EAFB because all of the proposed construction locations are on previously disturbed land. New facilities would be an efficient use of land and would not conflict with existing uses (R. Gunderson, personal communication, 3 May 2023), which could result in long-term, minor to moderate, direct beneficial impacts.

Project 05 Alternative 3 includes a potential rebuild location for the CES Housing Supplies and Storage Facility (also known as the Furnishings Management Office [FMO] Warehouse) within a district zoned for residential use. The FMO Warehouse is classified as an industrial facility and construction in a residential district could reduce the number of parcels available for potential housing in the future; however, no additional residential housing is required for, or associated with the Proposed Action. Industrial facilities in designated residential districts may increase safety risks to personnel and their dependents who live on-base. For an analysis of safety and risk, refer to Section 3.5.

Construction, demolition, and renovation projects (Table 2.1-1) would be consistent with constraint areas and land use guidelines dictated by the IDP, and all new facilities would be consistent with the base's existing land uses. At the time of the 2006 FNSB Joint Land Use Study (U.S. Army, FWA; USAF, EAFB; FNSB, Planning Department 2006), land use conflicts near EAFB were generally limited. USAF would continue to work with the FNSB and FWA to plan for land use that would reduce its operational impacts to adjacent private land.

Noise

Impacts resulting from noise change may be considered significant if they violate any federal, state, or local noise ordinances. Substantially increasing areas of incompatible land use outside the EAFB borders would also be a significance indicator. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels).

An analysis of potential short-term noise impacts in three "worst-case" construction/receptor scenarios was conducted following the guidelines in Section 6.4, Construction Noise Prediction Methodology, of the U.S. Federal Highway Administration (FHWA) *Highway Construction Noise Handbook* (FHWA 2006a) and the FHWA *Roadway Construction Noise Model (RCNM) User's Guide* (FHWA 2006b). These scenarios were identified by using the construction or demolition projects with the closest sensitive noise receptor(s). Representative construction equipment was selected from the default RCNM equipment list, and default noise emission reference levels and usage factors were used for the model. Maximum noise level exposures were compared to the default noise impact criteria identified in the RCNM.

The noise analysis also evaluated potential short-term and long-term traffic noise impacts. For short-term impacts, the analysis examined the re-routing of incoming and outgoing base traffic, including medium and heavy trucks, along Arctic Avenue past a base housing subdivision. This "worst-case" scenario for temporary traffic noise impacts was evaluated using the FHWA Traffic Noise Screening Tool in accordance with FHWA *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) and the *FHWA Traffic Noise Screening Tool User's Guide* (FHWA 2021). Site-specific inputs were used to the maximum extent possible, including the most recent available traffic volume data from the nearest applicable traffic count station to Hursey Gate. One-hour average noise exposures were compared against both the FHWA Noise Abatement Criteria and the 65-dBA baseline noise level for the receptor. Potential long-term impacts due to traffic noise were also evaluated with the FHWA Traffic Noise Screening Tool using a worst-case scenario of increased traffic operations at the FMO Warehouse in proximity to the nearest base housing receptor. A technical report detailing the noise analysis and findings is provided in Appendix D.

Neither construction and demolition (C&D) operations nor the temporary increase in traffic on Arctic Avenue from the Proposed Action would result in more than short-term, negligible, direct adverse impacts to sensitive noise receptors. Long-term noise from increased traffic accessing or operating at new facilities would likewise result in no more than negligible direct adverse impacts. Under all scenarios, noise would attenuate to ambient levels before being perceived at nearby sensitive noise receptors; therefore, no significant adverse impacts to sensitive noise receptors would occur from the Proposed Action.

3.2.3.2 No Action Alternative

AICUZ, land use, and noise levels would remain unchanged under the No Action Alternative. Base operations would likely continue the general trend of expansion and augmentation but without new construction or the proposed infrastructure improvements. Future projects would be evaluated against the current AICUZ plan to avoid incompatible land uses. EAFB would continue to work with the FNSB to provide recommendations and incorporate changes to ensure no adverse impacts to public health and safety. Projects would not occur if they would change the APZs or the CZs. Current and future projects would continue to cause long-term, minor, direct adverse impacts to AICUZ.

3.2.4 Cumulative Impacts

3.2.4.1 Air Installations Compatible Use Zones

New facility construction would be guided by DoDI 4165.57 and the IDP to ensure compatible land use on- and off-base. EAFB would continue to work with FNSB to minimize potential cumulative impacts to surrounding land uses by adhering to recommendations in DoD guidance, AICUZ studies, and the FNSB Comprehensive Regional Plan. Construction, demolition, and renovation supporting the F-35A and KC-135R beddowns would be compatible with AICUZ land and would have no impact on airspace.

Project 01 would preserve the nearby runway CZ. Because none of the other projects associated with the Proposed Action would occur within the existing APZs or CZs, no cumulative impacts to AICUZ would occur.

3.2.4.2 Land Use

Short-term, minor to moderate, beneficial cumulative impacts to land use would result from the Proposed Action and future base developments. The planned Micro-Reactor Pilot Project, Hursey Gate Area Liquid Granular Activated Carbon (GAC) Curtain Pilot Study, and South Loop Fire Station would provide a number of benefits, including a new source of heat and electrical power generation, prevention of off-base migration of per- and polyfluoroalkyl substances (PFAS) in groundwater, and improved response time for fire emergency services to reach the far end of the airfield. The Joint Mobility Complex Addition would improve the installation’s capacity to process deploying personnel to meet the increased demand of mission growth. Construction to replace the existing munitions storage facility at Quarry Hill would improve safety in accordance with AFMAN 91-201 Explosive Safety Standards and be an efficient form of land use.

3.2.4.3 Noise

Short-term, moderate, adverse cumulative noise impacts would result from ongoing aircraft operations and training maneuvers in conjunction with the Proposed Action. Future projects such as the planned Micro-Reactor Pilot Project or other construction projects may overlap and generate additional noise from the operation of heavy equipment and tools used for construction, demolition, and renovation activities. These impacts would be resolved by ensuring proper noise analysis, protection, and mitigation to avoid human exposure to noise levels beyond 65 dBA for long durations. Sound damping systems, scheduling/administrative controls, and proper noise modeling could help to minimize these impacts. These methods would also apply to noise-sensitive receptors within 3,000 feet of the project. By implementing these measures, no significant cumulative impacts to the noise environment would occur.

3.3 AIR QUALITY

3.3.1 Definition of Resource

3.3.1.1 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants of concern as determined by the U.S. Environmental Protection Agency (EPA) with respect to the health and welfare of the public. Six major pollutants of concern, called "criteria pollutants," are:

Table 3.3-1 Criteria Pollutants of Concern

POLLUTANT	ABBREVIATION
Carbon monoxide	CO
Sulfur dioxide	SO_2
Nitrogen dioxide	NO_2
Ozone	O_3
Total suspended particulate matter ≤ 2.5 and 10 micrometers in aerodynamic diameter	$PM_{2.5}$, PM_{10}
Lead	Pb

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Air pollution is the presence of these criteria pollutants in excess of EPA standards. If air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area. Areas that do not meet the national standard are called nonattainment areas (EPA 2023d). If an area was previously in nonattainment but now meets the standard, it is called a maintenance area. Maintenance areas must have an approved maintenance plan to meet and maintain air quality standards.

3.3.1.2 Greenhouse Gas Emissions and Climate Change

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. GHG emissions are generated by both natural processes and human activities. Recent scientific evidence indicates a correlation between increasing global temperatures over the past century and the worldwide proliferation of GHG emissions by humankind. Climate change associated with global warming is predicted to produce negative environmental, economic, and social consequences across the globe (U.S. Global Change Research Program [USGCRP] 2018).

GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its lifetime and ability to trap heat in the atmosphere (EPA 2023e). The GWP rating system is standardized to CO_2, which has a value of 1. To simplify GHG analyses, total GHG emissions from a source are often expressed as a carbon dioxide equivalent (CO_2e). CO_2e is calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in such greater quantities that it is the overwhelming contributor to global CO_2e emissions from both natural processes and human activities.

3.3.2 Affected Environment

3.3.2.1 Air Quality

The affected environment for air quality includes the area surrounding EAFB and the adjacent FNSB air district, which includes the urbanized areas of Fairbanks, Chena, Ester, Fox, and North Pole. The boundary ends northwest of Moose Creek. The FNSB air district is in nonattainment for particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) (Figure 3.3-1) and maintenance for carbon monoxide (CO) (Figure 3.3-2).The baseline emissions for the FNSB air district are shown in Table 3.3-2.

Table 3.3-2 Baseline Emissions for the Fairbanks North Star Borough

CRITERIA POLLUTANTS (TONS)					
CO	**NO_x**	**VOCs**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
1,296,771	12,877	322,330	6,905	131,138	110,355

GREENHOUSE GASES (METRIC TONS)			
CO_2	**CH_4**	**N_2O**	**CO_2e**
9,216,842	52,327	9	10,527,728

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EPA 2020

EAFB operates under a Title V air quality operating permit (Permit number AQ0264TVP02 Revision 5; Alaska Department of Environmental Conservation [ADEC] 2013a, 2013b), valid indefinitely under a permit shield pending ADEC issuance of an updated permit. The base is located outside of the FNSB nonattainment and maintenance areas (Figure 3.3-1).

Vehicle emissions on EAFB include privately owned vehicles; light-duty gasoline trucks (0 to 8,500 pounds gross vehicle weight rating [GVWR]); light-duty diesel trucks (0 to 8,500 pounds GVWR); and heavy-duty diesel vehicles (8,501 to greater than [>] 60,000 pounds GVWR).

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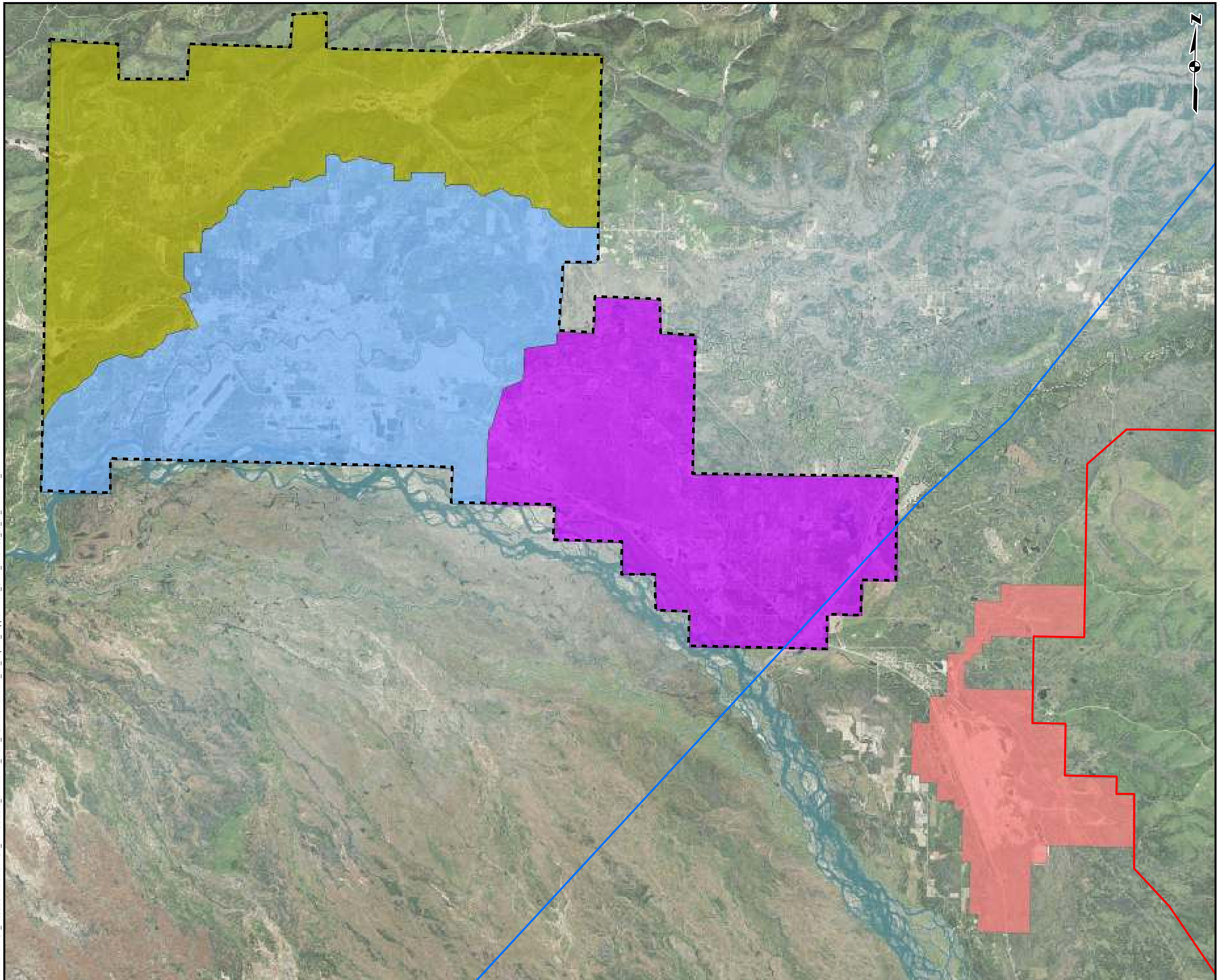

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS
EIELSON AIR FORCE BASE, ALASKA

FAIRBANKS NORTH STAR BOROUGH PM2.5 NONATTAINMENT AREA

Legend

- Special Use Air Space
- Restricted Air Space
- Fairbanks North Star Borough PM2.5 Nonattainment Area
- Fairbanks Portion of AQCZ
- Goldstream Portion of AQCZ
- North Pole Portion of AQCZ
- Eielson Air Force Base

Abbreviations

PM2.5	Particulate Matter 2.5
AQCZ	Air Quality Control Zone

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References

1. Fairbanks North Star Borough Air Quality Office. 2017. https://www.fnsb.gov/338/Program-Boundaries. 20 October.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 3, U.S. SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

15,000 7,500 0 15,000 30,000

SCALE IN FEET

PROJECT No.: 321604	DATE: 6/19/2023	FIGURE:
P.M.: S.B.	DRAWN: D.H.	3.3-1

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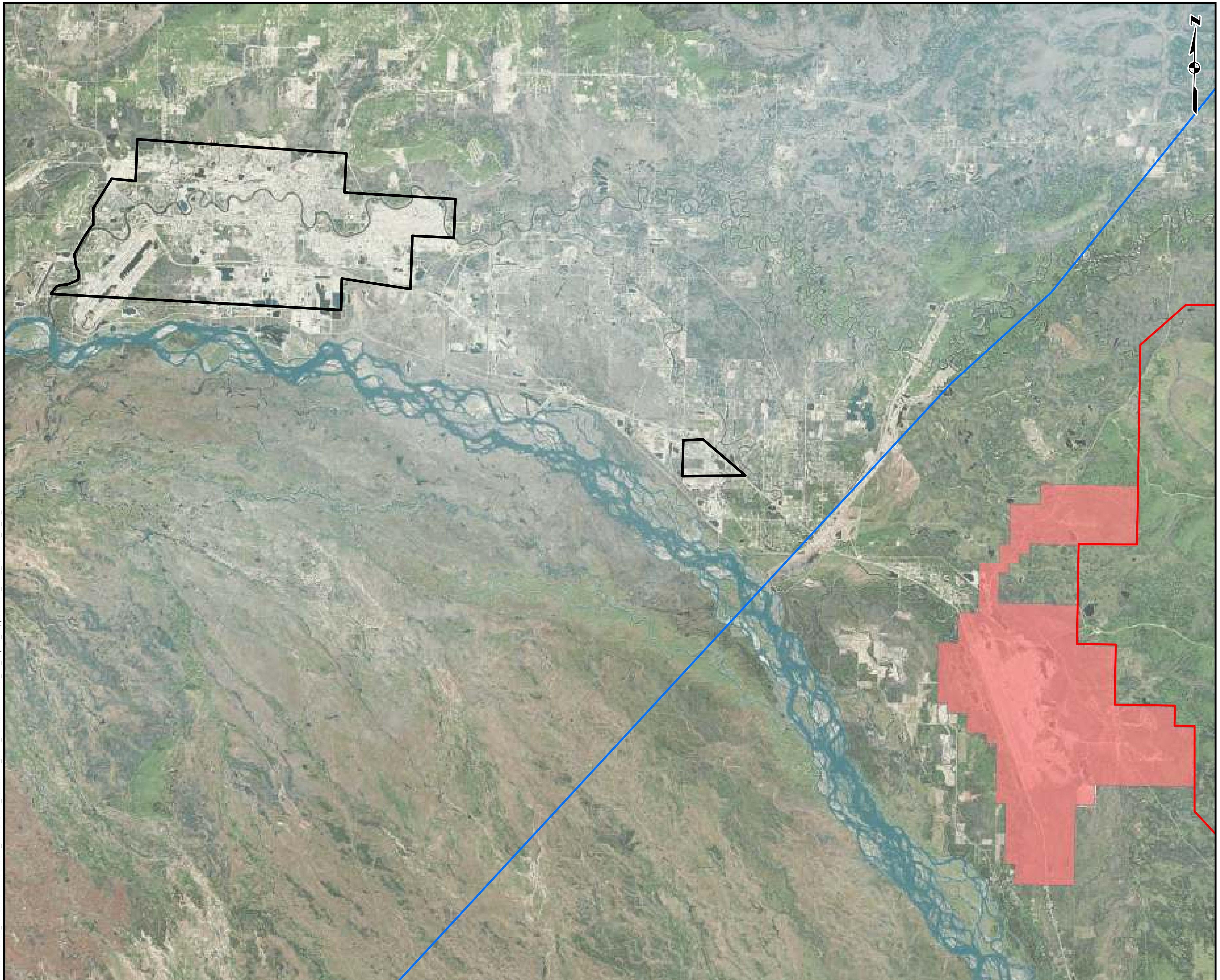

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS
EIELSON AIR FORCE BASE, ALASKA

FAIRBANKS NORTH STAR BOROUGH CARBON MONOXIDE MAINTENANCE AREA

Legend

- Special Use Air
- Restricted Air
- Carbon Monoxide Maintenance
- Eielson Air Force Base

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References

1. Fairbanks North Star Borough Air Quality Office. 2017. https://www.fnsb.gov/338/Program-Boundaries. 20 October.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 3, U.S. SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

13,000 6,500 0 13,000 26,000

SCALE IN FEET

PROJECT No.: 321604	DATE: 6/19/2023	FIGURE:
P.M.: S.B.	DRAWN: D.H.	3.3-2

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3.3.2.2 Greenhouse Gas Emissions and Climate

The affected environment for climate change includes the area surrounding the EAFB and the global climate. The sub-arctic continental climate of the area is characterized by short, warm summers and long, cold winters. The average annual temperature is about 10 to 16 degrees Fahrenheit (°F) in the north and 20 to 25°F in the south. The temperature usually remains above freezing from June through mid-September. The average annual precipitation ranges from less than 10 inches in valley bottoms and lowlands in the northeast to 20 to 40 inches at higher elevations. Maximum rainfall occurs in late summer, mostly from thunderstorms. The average annual snowfall ranges from approximately 45 to 100 inches (U.S. Department of Agriculture [USDA] 2004).

According to the University of Alaska Fairbanks International Arctic Research Center (UAF IARC), temperatures in and around Alaska have been rising since the 1970s and are rising twice as fast as in other parts of the U.S., with typical annual average statewide temperatures now 3 to 4°F warmer than during the early and mid-20th century. Increased temperatures are most noticeable over northern and western Alaska, where snow and especially sea ice losses are impacting the regional climate (Thorman and Walsh 2019). Late summer Arctic sea ice extent and thickness have decreased substantially in the last several decades and the ice volume is approximately one-half of that observed prior to satellite monitoring in 1979. Climate models project that before 2050, Arctic waters will be virtually ice-free by late summer. With the late summer ice edge located farther north than it used to be, storms produce larger waves and cause more coastal erosion. Many seasonal events have undergone profound changes in recent years. The increased frequency of warm dry summers and associated thunderstorms, along with the drying out of wetlands, has led to more large fires in Alaska in the last 10 years than in any decade since record-keeping began in the 1940s (National Oceanic and Atmospheric Administration [NOAA] 2022).

ADEC quantified GHG emissions from human-caused sources within Alaska from 1990 through 2020 using data obtained from EPA and the SOA (ADEC 2023a). Emissions were segregated by economic sector for the six GHGs listed in Section 3.3.1.2. Total state emissions for the year 2019 (the most recent year on record) are 33.70 million metric tons. Alaska's GHG emissions account for approximately 0.66% of nationwide GHG emissions and 0.000093% CO_2e of global GHG emissions. The Industrial Sector, which includes the oil and gas industries, produces 59.2% of Alaska's emissions, the highest annual GHG emissions by sector in Alaska (ADEC 2023a).

3.3.3 Environmental Consequences

USAF has defined significance indicators for air quality impacts as whether an action would interfere with the state's ability to maintain the National Ambient Air Quality Standards (NAAQS) or result in a violation of any federal, state, or local air regulation.

3.3.3.1 Proposed Action

USAF has developed an automated screening tool known as the Air Conformity Applicability Model (ACAM) to perform a simplified General Conformity Rule Applicability Analysis for non-transportation proposed actions and projects. Net change analyses for the Proposed Action, including both build alternatives for Project 05, were performed using ACAM. Appendix B presents the summary and detailed reports for these analyses, which are summarized below.

Proposed Action with Project 05 Alternative 2

The following net emissions were estimated for Projects 01 through 04 and Project 05 Alternative 2 (replace Building 3452 with a single 110,000-square-foot facility, as well as an 800-square-foot communications building).

Table 3.3-3 Year 2025 Proposed Action Emissions with Project 5 Alternative 2

POLLUTANT	ACTION EMISSIONS (tons/year)	INSIGNIFICANCE INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	1.417	250	No
NO_x	1.015	250	No
CO	1.226	250	No
SO_x	0.004	250	No
PM_{10}	2.118	100	No
$PM_{2.5}$	0.032	100	No
Pb	0.000	25	No
NH_3	0.005	100	No
CO_2e	373.3	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-4 Year 2026 Proposed Action Emissions with Project 5 Alternative 2

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.562	250	No
NO_x	0.820	250	No
CO	1.100	250	No
SO_x	0.010	250	No
PM_{10}	0.967	100	No
$PM_{2.5}$	0.034	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	282.5	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-5 Year 2027 Proposed Action Emissions with Project 5 Alternative 2

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.354	250	No
NO_x	0.970	250	No
CO	1.421	250	No
SO_x	0.017	250	No
PM_{10}	0.676	100	No
$PM_{2.5}$	0.046	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	347.5	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-6 Year 2028 Proposed Action Emissions with Project 5 Alternative 2

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.352	250	No
NO_x	1.894	250	No
CO	2.363	250	No
SO_x	0.020	250	No
PM_{10}	24.423	100	No
$PM_{2.5}$	0.084	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	646.3	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-7 Year 2029 (Steady State) Proposed Action Emissions with Project 5 Alternative 2

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.017	250	No
NO_x	0.070	250	No
CO	0.047	250	No
SO_x	0.014	250	No
PM_{10}	0.015	100	No
$PM_{2.5}$	0.015	100	No
Pb	0.000	25	No
NH_3	0.000	100	No
CO_2e	8.1	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Proposed Action with Project 05 Alternative 3

The following net emissions were estimated for Projects 01 through 04 and Project 05 Alternative 3 (replace Building 3452 with five separate facilities totaling 75,570 square feet).

Table 3.3-8 Year 2025 Proposed Action Emissions with Project 5 Alternative 3

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	1.286	250	No
NO_x	2.337	250	No
CO	3.367	250	No
SO_x	0.014	250	No
PM_{10}	2.219	100	No
$PM_{2.5}$	0.087	100	No
Pb	0.000	25	No
NH_3	0.005	100	No
CO_2e	836.5	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-9 Year 2026 Proposed Action Emissions with Project 5 Alternative 3

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.585	250	No
NO_x	0.913	250	No
CO	1.162	250	No
SO_x	0.029	250	No
PM_{10}	0.987	100	No
$PM_{2.5}$	0.054	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	293.1	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-10 Year 2027 Proposed Action Emissions with Project 5 Alternative 3

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.377	250	No
NO_x	1.062	250	No
CO	1.483	250	No
SO_x	0.036	250	No
PM_{10}	0.697	100	No
$PM_{2.5}$	0.067	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	358.2	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-11 Year 2028 Proposed Action Emissions with Project 5 Alternative 3

POLLUTANT	ACTION EMISSIONS (tons/year)	INDICATOR (tons/year)	EXCEEDANCE (Yes or No)
VOC	0.374	250	No
NO_x	1.987	250	No
CO	2.426	250	No
SO_x	0.039	250	No
PM_{10}	24.443	100	No
$PM_{2.5}$	0.104	100	No
Pb	0.000	25	No
NH_3	0.002	100	No
CO_2e	657.0	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.3-12 Year 2029 (Steady State) Proposed Action Emissions with Project 5 Alternative 3

POLLUTANT	ACTION EMISSIONS (ton/yr)	INDICATOR (ton/yr)	EXCEEDANCE (Yes or No)
VOC	0.040	250	No
NO_x	0.163	250	No
CO	0.109	250	No
SO_x	0.033	250	No
PM_{10}	0.036	100	No
$PM_{2.5}$	0.036	100	No
Pb	0.000	25	No
NH_3	0.000	100	No
CO_2e	18.9	N/A	N/A

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Analysis Summary

Short- and long-term, minor, direct adverse impacts to air quality would occur as a result of the Proposed Action. Airborne dust and other pollutants generated during construction, demolition, and renovation projects would cause short-term emissions increases. None of the estimated annual net emissions associated with either build scenario exceed the ACAM insignificance indicators, indicating there is no potential to cause or contribute to an exceedance on one or more NAAQS. Potential emissions are below the de minimis thresholds under the General Conformity rule and would occur in areas that are within attainment for all criteria pollutants. Long-term, negligible, direct adverse impacts to climate would occur as a result of the Proposed Action. The amount of CO_2 produced when a fuel is burned is a function of the carbon content of the fuel. Using CO_2 emissions as a benchmark, the relative quantity of GHG emissions that would be produced by the Proposed Action can be calculated by comparing CO_2 emissions due to construction, demolition, and operation of the facilities. The demolition/construction phase of the projects would be completed using diesel-fueled equipment such as excavators, loaders, forklifts, feller bunchers, asphalt mixers, graders, and rollers. Gasoline-powered vehicles may also be used. Operation of the new facilities would consume sub-bituminous coal generated by the Central Heat and Power Plant (CH&PP) for both electricity and heat.

Assuming the demolition/construction phase would be completed in 3 months (one full construction season) with equipment operating 40 hours per week, and that aside from Project 03, none of the projects would result in increased energy consumption (Section 3.7 discusses energy impacts), C&D associated with the Proposed Action would produce a total of approximately 2,145 tons (1,946 metric tons) of CO_2 between 2025 and 2029, for an average increase of approximately 536 tons (486 metric tons) per year. This one-time release represents a less than 0.01% short-term increase above the baseline CO_2 emissions in the FNSB (EPA 2020, 2023f). Operation of the new Joint Pacific Alaska Range Complex Range Operations Center (JROC) facility would produce an estimated 664 tons (603 metric tons) of CO_2 per year, and emergency generators associated with the Building 3452 replacement facilities under Project 05 Alternative 3 would increase baseline CO_2 emissions by an additional 19 tons (17 metric tons) per year. These steady-state additions would likewise represent a less than 0.01% long-term increase above the baseline CO_2 in the FNSB.

3.3.3.2 *No Action Alternative*

The No Action Alternative would not change baseline emissions and consequently would have no impact to air quality. The base would continue to operate under its Title V permit. New development at EAFB would continue regardless of the No Action Alternative. Construction of additional facilities and influx of personnel and residents would increase in power and heat demand, resulting in increased CH&PP emissions. Vehicles and equipment used for new development projects would increase emissions. EAFB would continue to ensure compliance with air quality permits and state and federal air quality laws and would consult with EPA to deploy mitigation measures.

3.3.4 Cumulative Impacts

Short-term, minor, adverse cumulative impacts to air quality could occur as a result of the Proposed Action. In 2023, two steam turbine generators with a capacity of 2.5 megawatts electric (MWe) were removed from Building 6203 and replaced with a single 10-MWe unit. An additional 10-MWe unit is scheduled for installation in 2024, which will further improve energy efficiency on the installation. This and future projects such as the Micro-Reactor Pilot Project in 2027 would result in reduced coal consumption, reducing emissions and partially offsetting the impacts from present and future projects. EAFB would comply with the Clean Air Act (CAA) and evaluate projects to maintain compliance with the ADEC Title V Operating Permit. Any exceedances in the permitted limits of criteria pollutants would require mitigation measures to prevent violations. If all mitigation measures were followed, then no significant cumulative impacts to air quality would occur.

3.4 WATER RESOURCES

3.4.1 Definition of Resource

Water resources are surface waters and groundwater that provide drinking water and support recreation, transportation, commerce, industry, agriculture, and aquatic ecosystems (EPA 2023a). Disruption of any one component of the watershed can affect the entire system.

Waters of the U.S. (WOTUS), as defined in 40 CFR 120.2 and 33 CFR 328.3, include navigable waters, tributaries of such waters, non-navigable interstate waters and their tributaries, non-navigable intrastate waters whose use or misuse could affect interstate commerce, and freshwater wetlands “adjacent” to other jurisdictional waters.

The Fish and Wildlife Coordination Act (FWCA) (16 USC 661-667e) was enacted on 10 March 1934 to protect fish and wildlife when federal actions result in the control or modification of a natural stream or body of water. The FWCA provides the basic authority for the USFWS to evaluate impacts to fish and wildlife from proposed water resource development projects. Water resources relevant to EAFB include wetlands, floodplains, surface waters, and groundwater.

3.4.1.1 *Wetlands*

U.S. Army Corps of Engineers (USACE) and EPA define jurisdictional wetlands as those meeting the three criteria defined in the USACE Wetlands Delineation Manual (USACE 1987) and falling under USACE jurisdiction. These criteria are vegetation, soil, and hydrology. Unless an area has been altered or is a rare natural situation, wetland indicators of all three characteristics must be present during some portion of the growing season for an area to be defined as a wetland.

Wetlands are an important natural system and habitat because of their diverse biologic and hydrologic functions, including water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, and erosion protection. Wetlands are a special category of WOTUS subject to regulatory authority under Section 404 of the Clean Water Act (CWA) and EO 11990. Under the CWA, wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328.3).

AFMAN 32-7003, *Environmental Conservation*, paragraphs 3.20, *The EIAP for Actions that May Affect Waters of the United States*, and 3.60, *Clean Water Act Compliance*, provide additional guidance on protection of wetlands to preserve and enhance their natural and beneficial values while carrying out the USAF mission.

3.4.1.2 Floodplains

EO 11988 defines floodplains as "lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1% chance of flooding in any given year." Areas subject to a 1% chance of annual flooding are called 100-year floodplains, and areas subject to a 0.2% chance of annual flooding are called 500-year floodplains. EO 11988 directs federal agencies to avoid actions in floodplains unless the agency determines no practicable alternative exists. Where the only practicable alternative is to site in a floodplain, the agency should develop measures to reduce impacts and mitigate unavoidable impacts.

Additionally, EO 11988 directs federal agencies to comply with the National Flood Insurance Program (NFIP). The FNSB participates in the NFIP (Community identification [ID] 025009) and has established floodplain management regulations in Title 15, Chapter 4 of the Borough Code, which regulates development within a special flood hazard area (SFHA) by establishing methods, practices, and construction standards for minimizing flood damage. An SFHA is established as lands and properties within the FNSB designated as any "A" Flood Zone, including but not limited to FEMA Flood Zones A, AE, AH and AO. In accordance with AFMAN 32-7003, paragraph 3.23, USAF will make informed decisions concerning the environmental impacts of infrastructure projects and ensure that development occurs in an environmentally sensitive manner. USAF follows the Federal Building Codes requirements within 41 CFR 102-76.10(c), which state that "Federal agencies, upon approval from the General Services Administration…follow nationally recognized model building codes and other applicable nationally recognized codes that govern Federal construction to the maximum extent feasible and consider local code requirements (see 40 USC 3310 and 3312)." As such, federal projects follow local construction codes to the maximum extent practicable.

EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amended EO 11988 and established the Federal Flood Risk Management Standard to improve the nation's resilience to current and future flood risks, which are anticipated to increase over time due to the effects of climate change and other threats. EO 13690 calls for agencies to use a higher vertical flood elevation and corresponding horizontal floodplain than the 100-year floodplain for federally funded projects.

3.4.1.3 Surface Waters

Surface waters include natural, modified, and constructed water confinement and conveyance features above groundwater that may or may not have a defined channel and discernable water flows. Stormwater is surface water generated by precipitation events that may percolate into permeable surficial sediments or flow across the top of impermeable or saturated surficial areas, a condition known as runoff. Stormwater is a key component of surface water systems because of its potential to introduce sediments and other contaminants. Stormwater flows, which can be exacerbated by high proportions of impermeable surfaces, are important to surface water management.

National Pollutant Discharge Elimination System

Through the National Pollutant Discharge Elimination System (NPDES), the CWA establishes federal limits on the discharge of specific pollutants to surface waters. Section 401 of the CWA requires state certification for NPDES permits; in Alaska this is called an Alaska Pollutant Discharge Elimination System (APDES) permit. The APDES stormwater program requires facility operators and owners with stormwater discharges to obtain a Multi-Sector General Permit (MSGP). In addition, construction site operators disturbing 1 acre or more are required to obtain a Construction General Permit for stormwater discharges. The permit mandates use of best management practices (BMPs) to ensure that the facility's operations and soil disturbed during construction do not pollute nearby water bodies. Operators must prepare a Notice of Intent to discharge stormwater and a Stormwater Pollution Prevention Plan (SWPPP) that is implemented during construction and facility operations.

Unified Facilities Criteria 3-210-10, *Low Impact Development*

The Unified Facilities Criteria (UFC) system provides planning, design, construction, sustainment, restoration, and modernization criteria to the Military Departments, the Defense Agencies, and DoD Field Activities in accordance with the Under Secretary of Defense Acquisition, Technology and Logistics (USD[AT&L]) Memorandum DoD UFC, dated 29 May 2002.

Section 438 of the Energy Independence and Security Act (EISA) and the Deputy Under Secretary of Defense DoD policy on implementation of stormwater requirements under EISA Section 438 apply to federal projects with a footprint > 5,000 square feet. UFC 3-210-10 provides technical criteria, technical requirements, and references for the planning and design of applicable DoD projects to comply with EISA Section 438 stormwater requirements. Low impact development (LID) is a stormwater management strategy designed to maintain site hydrology and mitigate adverse impacts of stormwater runoff and non-point source pollution. LID seeks to restore pre-development surface water infiltration rates at project sites through one or more LID Integrated Management Practices (IMPs) and design techniques that, to the maximum extent feasible, infiltrate, store, and evaporate runoff close to its source of origin. Examples of LID-compliant design techniques are bio-retention areas and permeable pavements.

3.4.1.4 Groundwater

Groundwater is subsurface water that occupies the space between and within sand, clay, and rock formations. The Safe Drinking Water Act (SDWA; 40 CFR 141) prohibits federal agencies from funding actions that would contaminate an EPA-designated sole source aquifer or its recharge area. Groundwater can typically be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

3.4.1.5 Wild and Scenic Rivers

In 1968, the Wild and Scenic Rivers Act (WSA; Public Law [PL] 90-542; 16 USC 1271 *et seq.*) established the National Wild and Scenic Rivers System (National System) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The WSA is notable for safeguarding the special character of Wild and Scenic Rivers, while recognizing the potential for their appropriate use and development (National System 2023a). The four federal agencies charged with safeguarding the National System (the "river-administering agencies") are the Bureau of Land Management, the National Park Service (NPS), the USFWS, and the U.S. Forest Service (USFS).

3.4.2 Affected Environment

3.4.2.1 Wetlands

About 52% (10,227 acres) of the main installation is wetlands, comprising 9,435 acres of vegetated wetlands and 602 acres of lakes, ponds, and streams (EAFB 2023f). These wetlands are the result of natural processes creating heavily saturated and wet soil conditions, such as permafrost (ground and/or water that has been frozen for at least 2 years and in poor drainage). Precipitation and snowmelt flooding or filling many standing water bodies and depressions in the topography create favorable conditions for wetlands to occur. Observed vegetated wetlands on-base are dominated by black spruce (*Picea mariana*). Brush and groundcover vegetation in black spruce wetlands often consist of dwarf birch (*Betula nana*), resin birch (*Betula glandulosa*), bog rosemary (*Andromeda polifolia*), low bush cranberry (*Vaccinium vitis-idaea*), and thick layers of moss (EAFB 2023f).

Within the ROI, the area with potential to be either directly or indirectly affected by the Proposed Action is a 360-acre study area that encompasses most structures and grounds east of the runway, the Hursey Gate area north of the runway, and three areas east of Garrison Slough (Figure 3.4-1).

On 4 and 13 June 2023, Stantec Consulting Services Inc. (Stantec) performed a WOTUS determination in the project vicinity. Field data were collected at 19 points based on existing National Wetland Inventory (NWI) data and available aerial imagery indicating areas with the highest probability to be considered wetlands. The findings are summarized in a Preliminary Jurisdictional Determination (PJD) report (Stantec 2023). The PJD identified 0.48 acres of wetlands in the study area. Field-verified results are summarized in Table 3.4-1. Waters in the study area are classified as Freshwater Pond, and all wetlands are classified as Freshwater Emergent (Stantec 2023). Appendix C presents the wetlands PJD Report.

Table 3.4-1 Waters within the Study Area

STATUS	ACRES	PERCENT OF STUDY AREA
Wetlands	0.48	0.1
Waters	11.06	3.1
Uplands	348.46	96.8
Total Study Area	**360.00**	**100.0**

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: Stantec 2023

3.4.2.2 *Floodplains*

Areas of EAFB within the floodplain are presented in Table 3.4-2 and Figure 3.4-1.

Table 3.4-2 Floodplains on EAFB

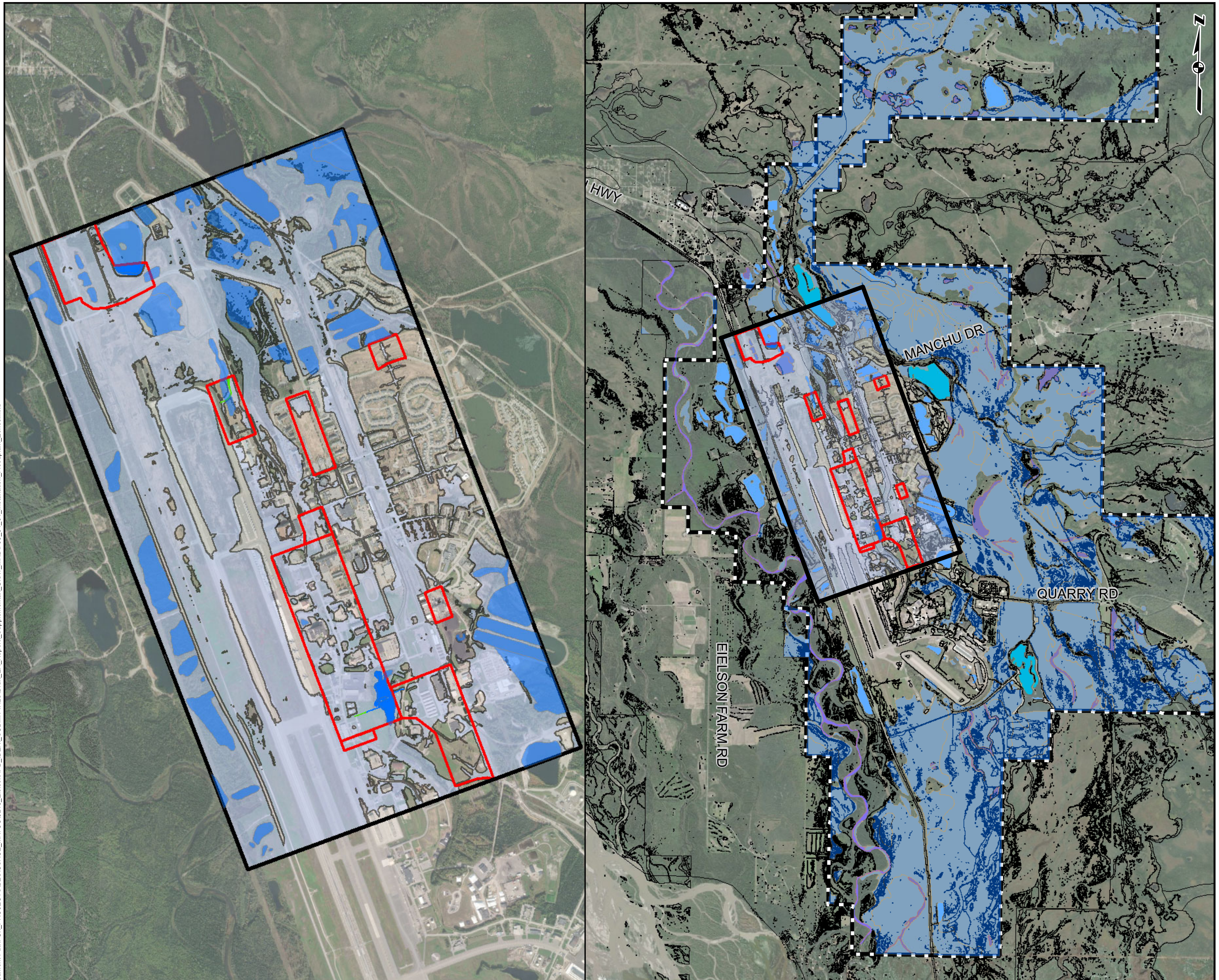
	TOTAL AREA (ACRE)	ACRES WITHIN 100-YEAR FLOODPLAIN	% WITHIN 100-YEAR FLOODPLAIN	ACRES WITHIN 500-YEAR FLOODPLAIN	% WITHIN 500-YEAR FLOODPLAIN
Main Installation	19,789	11,225	57	12,302	62
ROI	2,811	2,039	73	334	12

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2023f; CSU 2023

The maximum flood depth is projected to be 19.1 feet for the 100-year storm and 19.8 feet for the 500-year storm, and the maximum flood velocity is projected to be 32 feet per second for both the 100-year and 500-year storms (Colorado State University [CSU] 2023). FEMA-mapped floodplains of the installation, which differ slightly from the floodplains mapped by CSU, meet the FEMA definition of an SFHA.

Outside of the developed portions of the base, the floodplain is dominated by a mixture of vegetation types, ranging from white spruce (*Picea glauca*)-hardwood forests west of the Richardson Highway to black spruce brushfields and wetlands to the east. In the event of a 100- or 500-year flood, these vegetation types would slow the force of floodwaters by trapping or filtering out woody material and silt.

Since its establishment in 1943, the EAFB flightline has never flooded. Although Fairbanks is downstream of the base, it is the official flood-elevation monitoring site for the Tanana River. The August 1967 Flood of Record for the Tanana River was 27.8 feet. In 2008, flooding of the Salcha and Tanana Rivers caused substantial flooding of Salcha to the south (upstream) of EAFB. During this event, a flood level of 26.53 feet was recorded on the Tanana River, 2.03 feet higher than the flood stage of 24.5 feet recorded at Fairbanks. Neither of these floods, which resulted from unusually heavy summer rains, caused flooding on EAFB (USAF 2016).



1 INCH

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS
EIELSON AIR FORCE BASE, ALASKA

WETLANDS AND FLOODPLAIN ZONES ON EIELSON AIR FORCE BASE

Legend

- WOTUS Study Area
- Wetlands Mapped in Study Area
- Water Bodies Mapped in Study Area
- Approximate Region of Influence
- 100-Year Floodplain Within Region of Influence
- 500-Year Floodplain Within Region of Influence
- Installation Boundary
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

Abbreviations

WOTUS Waters of the U.S.

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References

1. Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
2. Wetland/Floodplain data: 354 CES/CEIE 2023.
3. WOTUS features source: Stantec. 2023. Preliminary Jurisdictional Determination Report, Figure 4. Eielson Air Force Base 2023 Consolidated Infrastructure Projects. 7 August 2023.

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 3, U.S. SURVEY FEET
HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

1 ½ 0 1 2
Miles

PROJECT No.: 321004	DATE: 9/27/2023	FIGURE: 3.4-1
P.M.: M.V.	DRAWN: J.C.	

Document Path: G:_PROJECTS\BES\USACE_MATOC\3216_EielsonAFB_IDEAL_SUBMITTALS\Draft_EA_Report_Supplemental_GIS\1_MXD\F03_04_01_Installation_Floodplain_Zones.mxd

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3.4.2.3 Surface Waters

Surface water bodies comprise approximately 120 acres (4%) of the ROI. Most on-base stormwater flow is overland or sheet flow directed toward French Creek and Garrison Slough. French Creek is located along the eastern boundary of the base. Garrison Slough passes directly through the developed portion of the base and is primarily an engineered channel that drains to Moose Creek. Portions of the slough are enclosed in culverts.

To identify and manage areas where stormwater contamination could occur due to industrial processes, EAFB developed and maintains a base SWPPP, as required under the ADEC MSGP (APDES permit AKR06AD14). The current SWPPP was completed in 2020 and details Standard Operating Procedures, BMPs, and an assessment of potential discharge contaminants through required discharge sampling and monitoring. Potential stormwater leaving regulated industrial sectors is contained onsite by structural BMPs or flows into French Creek and Garrison Slough (EAFB 2020a). EAFB also maintains an APDES wastewater discharge permit for their treatment plant operations (permit number AK0001341). The wastewater treatment plant (WWTP) permitted capacity is 2 million gallons per day (GPD). The normal processing rate is approximately 600,000 GPD, though it can be higher during periods of heavy rain and spring thaw (EAFB 2021d). This permit coverage will expire on 30 June 2028 (EAFB 2020a, 2021d). In addition to the MSGP and wastewater treatment permit, Eielson maintains an APDES permit for the Water Treatment Plant (AKG380017) and the CH&PP (AK0001341). EAFB maintains coverage under these permits and updates the plans and permits as installation operations modifications require per the permit coverage.

3.4.2.4 Groundwater

EAFB is in the FNSB within the Tanana River Valley, which contains an extensive aquifer system. The Tanana Valley Alluvial Aquifer is approximately 50 miles wide and 10 feet below ground surface at its base. It is primarily fed by the Tanana River; the Chena River typically contributes water when its stage is high and the Tanana River is low. The Tanana River gets approximately 85% of its water from snowmelt of the Alaska Range and 15% from the Yukon-Tanana Uplands (Alaska Community Action on Toxics 2003). Due to snowpack and periods of heavy rainfall, the aquifer's water depth fluctuates seasonally.

The public water system for EAFB is supplied by six groundwater production wells fed by the Tanana Valley Alluvial Aquifer. Groundwater is delivered to the 3.2-million-GPD Water Treatment Plant where it is treated, disinfected, and distributed to water faucets via a network of water distribution lines housed within the on-base utilidor system (EAFB 2016). Average demand is 800,000 to 900,000 GPD (EAFB 2023o). The installation monitors drinking water quality annually and reports findings to the public through ADEC.

A few outlying areas not connected to the base distribution system receive delivered water stored in tanks (354 Medical Group [354 MDG] 2023). In Spring 2015, the base detected PFAS in some drinking water supply wells (ADEC 2023b). EAFB is working with state and EPA regulators to address off-base PFAS migration. This includes working with local off-base residents to address drinking water concerns. Refer to Section 3.6.2 for more information.

3.4.2.5 Wild and Scenic Rivers

A search of two interagency Geographic Information Systems (GIS) data sets of Wild and Scenic River centerlines found no designated Wild and Scenic Rivers on EAFB (National System 2023b).

The NPS maintains the Nationwide Rivers Inventory (NRI), a list of more than 3,200 rivers or river segments that appear to meet the minimum WSA eligibility requirements based on free-flowing status and resource values. In accordance with an executive memorandum dated 2 August 1979, each federal agency must avoid or mitigate adverse effects to rivers identified in the NRI (NPS 2021). If a river is listed in the NRI, the federal agency involved with the action must consult with the land management agency, or the NPS if the river is on private lands, to avoid or mitigate adverse effects. This consultation is required pursuant to a directive from the CEQ (USFS 2004). A search of the NRI found no eligible rivers on EAFB (Esri 2023).

There are currently three rivers or river systems under active study to identify their potential for addition to the National System—two under Section 5(a) of the WSA and one under Section 2(a)(ii). None of these rivers are in Alaska (National System 2023c).

3.4.3 Environmental Consequences

3.4.3.1 Proposed Action

Wetlands

The Proposed Action would have no impact to wetlands, as none are present in the vicinity of the projects. Construction would be conducted in accordance with the 2021 APDES CGP, the EAFB APDES permit for stormwater management, and mitigation measures in the base SWPPP (EAFB 2020a). Soil erosion and sediment controls and construction site waste controls that would be employed to minimize impacts to surface waters are discussed in this section under Surface Waters.

Floodplains

During a 100- or 500-year flood event, movement of water in the vicinity of EAFB would be slow due to its distance from the Tanana River's main channel, lack of a high-flow volume outlet to the north, and the density of vegetation between the base and the main channel. As most of the area outside the developed portion of the installation is heavily vegetated with forest, brush, and wetland species, the flow of floodwaters would be slowed or impeded by vegetation trapping or filtering out woody debris and silt.

Of the projects under the Proposed Action, only Project 04 lies outside the floodplain (FEMA 2014a, 2014b). Depending on which Project 05 alternative is selected (refer to Section 2.3.5), the loss of permeable surface area from the Proposed Action would result in approximately 498,000 (Alternative 2) or 945,000 (Alternative 3) cubic feet of flood water displacement and a maximum 0.001- or 0.002-foot increase in base flood elevation. Due to the broad and unconstrained nature of the floodplain, long-term, negligible, direct adverse impacts to the floodplain would occur. The increase in base flood elevation would not significantly impact the floodplain's ability to moderate floodwaters.

Section 3(a) of EO 11988 requires the construction of federal structures and facilities to be consistent with the intent of the standards and criteria promulgated under the NFIP. Although USAF has determined it is not required to obtain a floodplain permit from the FNSB for the Proposed Action, it will consider implementing requirements of Borough Code 15.04.110. USAF would minimize impacts to floodplains through adherence to federal building standards detailed in 41 CFR 102-76.10(c) and policies and procedures outlined in the EAFB Integrated Natural Resources Management Plan (INRMP). These include:

1. Avoid expansion into floodplains whenever possible.
2. When an action is proposed for a floodplain, consult the USACE Floodplain Management Services Section and follow their recommendations (to be done during project design).
3. Maintain up-to-date floodplain maps—The EAFB Natural/Cultural Resources Section will update the GIS floodplains maps for EAFB-managed lands as needed.

Pursuant to EO 11988, if a federal government agency proposes to conduct an activity in a floodplain, then it will consider alternatives to the action and modify its actions, to the extent feasible, to avoid adverse effects or potential harm. The following three requirements set forth in EO 11988 were evaluated and incorporated into the planning process for this action:

1. Avoid direct or indirect development within the floodplain wherever there is a practicable alternative. If no practicable alternatives exist, minimize impacts to floodplains to the extent possible.
2. Minimize the impact of floods on human safety, health, and welfare—road access in and out of the ROI is more than adequate to evacuate personnel in advance of a 100-year or greater flood event.
3. Restore and preserve the natural and beneficial floodplain values—take steps to preserve floodplains values by minimizing vegetation removal and the number of impermeable surfaces being added on the base.

The Proposed Action was developed based on a comprehensive evaluation of operations, logistics, facilities, and support capabilities. The project locations require siting that allows for tie-in to existing infrastructure and must be within designated planning districts (Housing, Schools, Medical, Industrial, etc.) in accordance with the IDP (EAFB 2016). The majority of the developed portion of EAFB, which includes the ROI, is in a floodplain. As such, there are no practicable alternatives to siting the projects within a floodplain.

Based on this review and the information available at the time of analysis, USAF finds there are no practicable alternatives to locating proposed installation developments within the Tanana River 100- and 500-year floodplains.

The public review and comment period was completed as required by EO 11988 (Appendix A). No public comments were received.

Surface Waters

The Proposed Action would not result in control or modification of the water of any stream or other water body; therefore, coordination under the FWCA is not required.

The Proposed Action would not involve the addition of new fuel storage tanks requiring protective measures as outlined in the EAFB Oil and Hazardous Substance Discharge Prevention and Contingency Plan (ODPCP).

While the pond connected to Garrison Slough is not a wetland, it provides some wetland function and value, such as water storage; food, water, and shelter for fish, birds, and mammals; and sediment-trapping. No fishing is allowed in Garrison Slough or the pond due to elevated levels of polychlorinated biphenyls (PCBs). The Proposed Action would not affect the pond or jeopardize its continued functions.

Treated wastewater from the EAFB WWTP is discharged to staged lagoons (“effluent ponds”) for biostabilization (EAFB 2016). One such effluent pond is in the ROI approximately 300 feet east of Transmitter Road. This road would be re-routed east toward the effluent pond for Project 01. The Proposed Action would not affect the effluent pond or jeopardize its continued functions.

Short-term, minor, direct adverse impacts to surface waters could result from construction activities such as clearing, grading, trenching, and excavating, which could displace soil and sediment into nearby waterbodies. However, construction would be conducted in accordance with the APDES CGP and MSGP for stormwater management to minimize these impacts: erosion and sediment controls (e.g., silt fences and sediment traps downslope from construction) and stormwater BMPs (e.g., spill cleanup and appropriate disposal) would be implemented and would be consistent with the base SWPPP. To comply with stormwater requirements under EISA Section 438, USAF would include LID strategies as outlined in UFC 3-210-10 and would employ IMPs such as naturally engineered treatments. By implementing these measures, impacts to surface waters would be negligible.

Groundwater

The Proposed Action would have long-term, negligible, direct adverse impacts to groundwater recharge to the aquifer system from new impermeable surfaces increasing runoff to nearby water bodies, thereby decreasing infiltration to the subsurface and the aquifer. Impermeable surfaces comprise approximately 640 acres (23%) of the 2,811-acre ROI. Depending on which Project 05 alternative is selected (refer to Section 2.3.5), the Proposed Action would add an estimated 202,000 square feet (4.6 acres) (Alternative 2) or 275,000 square feet (6.3 acres) (Alternative 3) of impermeable surfaces to the Tanana River floodplain, an increase of approximately 0.16% or 0.22%, respectively. Because sufficient areas of the floodplain would continue to be available for groundwater recharge and filtration, this impact would not be significant.

No impacts to sole source aquifers would occur, as there are no sole source aquifers on EAFB (EPA 2023c).

Project 03 would have a short-term, moderate, direct adverse impact to groundwater. Average water consumption on-base is 800,000 to 900,000 GPD (EAFB 2023o). Assuming the per capita demand is 100 GPD, during RED FLAG-Alaska exercises demand could increase by up to 140,000 GPD, bringing the total base demand to approximately 1 million GPD. This is safely below the water treatment plant capacity of 2.16 million GPD. Due to the extensive aquifer in the region, the increased demand would not significantly impact groundwater recharge.

Project 05 would have no impact to groundwater. While the on-base wells produce enough water to meet domestic needs, water storage capacity on the installation is estimated to be deficient by upwards of 500,000 gallons (S. Ringle, personal communication, 2 May 2023). The proposed new FMO Warehouse would require an approximately 300,000-gallon water tank for fire suppression. This would not contribute to the base shortage, as the building would be capable of supporting its own fire suppression needs.

Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers, National System-eligible rivers, or study rivers on EAFB. No impacts to Wild and Scenic Rivers would occur from the Proposed Action.

3.4.3.2 No Action Alternative

Short- and long-term, minor, direct adverse impacts to water resources would occur under the No Action Alternative. Installation development construction, demolition, and renovation projects would not be implemented and would not directly place additional demands on the water system or contribute to stormwater discharges at EAFB. Water quality and availability would remain unchanged when compared to existing conditions.

It is presumed that on-base improvements would continue regardless of whether the Proposed Action were implemented. If wetlands could be adversely impacted, USAF would follow applicable regulations under the CWA and consult with USACE to determine the intensity and duration of such impacts and define mitigation measures. Similarly, USAF would employ flood mitigation measures that would minimize inundation effects and notify the public as to why there was no practicable alternative to such development in the floodplain in accordance with EO 11988 and DoD Memorandum for Floodplain Management on DoD Installations (DoD 2014). Any new construction would result in increased impermeable surfaces over time, as well as increased stormwater and wastewater discharges and potentially increased groundwater demand, if the improvements were accompanied by an influx of on-base personnel and/or full-time residents. This would result in long-term, minor, direct adverse impacts to surface waters and groundwater. Ground disturbance from the Garrison Slough Trestle Bridge repairs would cause short-term, minor, direct adverse impacts to surface waters by negatively affecting the function of Garrison Slough as a drainage channel. Such impacts would be minimized to the extent possible. No other base improvements are expected to occur on or near-surface waters. No impact to Wild and Scenic Rivers would occur as a result of base developments, as none are present on EAFB.

3.4.4 Cumulative Impacts

3.4.4.1 Wetlands

Data for past action impacts to EAFB's wetlands are available from 1995, when EAFB contained 10,202 acres of wetlands (USAF 1995). Since then, 766 acres have been impacted and an additional 1.11 acres of impacts are expected with implementation of the KC-135R beddown. The Proposed Action would have no impact to wetlands and would not add to the cumulative percentage of wetlands impacted since 1995. Cumulative impacts to wetlands are summarized in Table 3.4-3.

Table 3.4-3 Cumulative Wetlands Impacts on Eielson Air Force Base

YEAR	TOTAL WETLANDS AT EAFB (acres)	AREA OF WETLANDS IMPACTED SINCE PREVIOUS (CUMULATIVE) (acres)	CUMULATIVE PERCENT WETLANDS IMPACTED (Using 1995 as Baseline)
1995	10,202[1]	N/A	N/A
2016	9,453[2]	749 (749)	7.34%
2022 (post F-35A Beddown)	9,436	17[2] (766)	7.508%
2023-24 (post-KC-135R Beddown)	9,435.59	1.11[3] (767.11)	7.519%
2025	9,435.59	0.0 (767.11)	7.519%

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source:
[1] USAF 1995
[2] USAF 2016

[3] Stantec 2022a, 2022b, 2023; USACE 2022, 2023

At this time, no other projects have been identified that, in conjunction with the Proposed Action, would cause significant cumulative impacts to wetlands. USAF would obtain a Section 404 permit for projects requiring discharge or dredging of fill into wetlands and take past actions into consideration when evaluating potential environmental impacts.

3.4.4.2 Floodplains

The majority of construction associated with the Proposed Action and alternatives as well as past, present, and reasonably foreseeable projects, would occur within the 100- and 500-year floodplain, resulting in long-term, minor, adverse cumulative floodplain impacts. In accordance with EO 11988 and DoD Memorandum for Floodplain Management on DoD Installations (DoD 2014), USAF would identify any new construction designs or renovations of existing installation facilities occurring within the floodplain exceeding $7.5 million. Flood mitigation measures would minimize inundation effects and notify the public as to why there was no practicable alternative to such development in the floodplain.

3.4.4.3 Surface Waters

Short- and long-term, minor, adverse cumulative impacts to surface waters could occur from the Proposed Action as a result of ground disturbance and increased impermeable surfaces. Soil disturbance and related planned actions could result in erosion, sedimentation into local surface water conveyances, and the potential for associated water quality degradation. However, these risks would be minimized by conducting ground-disturbing activities in accordance with the APDES CGP and the EAFB SWPPP. Project design for new impermeable developments would include stormwater conveyance features, as needed, to incorporate new sources of runoff into the installation's stormwater system and to maintain or restore pre-development site hydrology to the maximum extent practicable.

3.4.4.4 Groundwater

The Proposed Action could result in long-term, minor, adverse cumulative impacts to groundwater from increased groundwater withdrawal and from accidental spills or leaks of substances such as fuels, oils, and other materials contaminating groundwater and aquifers in the ROI. Because the aquifer at EAFB is broad and unconsolidated, with an extensive amount of undeveloped land in the watershed, there would be no significant overall regional reduction in groundwater recharge from the Proposed Action and other installation actions. The risk of accidental spills or leaks would be minimized by following equipment maintenance standards and project-specific BMPs and using secondary containment for temporary storage of hazardous materials. Runoff from increased impermeable surface area resulting from the Proposed Action would infiltrate within the installation or at discharge points within the installation boundary.

3.4.4.5 Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers, National System-eligible rivers, or study rivers on EAFB. No cumulative impacts to Wild and Scenic Rivers would occur.

3.5 SAFETY AND OCCUPATIONAL HEALTH

3.5.1 Definition of Resource

Safety and occupational health address the well-being, safety, and health of members of the public, contractors, and USAF personnel during aspects of the Proposed Action and the No Action Alternative. A safe environment is one in which no potential for death, serious bodily injury or illness, or property damage exists, or where that potential has been optimally reduced.

Workplace hazards can often be identified and reduced or eliminated. Situations or environments are prone to accidents when they include the presence of (1) a hazard and (2) an exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair, construction, and activities in extremely noisy environments. This section addresses the safety implications from activities associated with the Proposed Action and alternatives.

3.5.1.1 Construction Safety

Contractors performing construction are responsible for following federal Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910) and are required to conduct construction in a manner that does not increase risk to workers or the public. OSHA regulations set and enforce protective workplace safety and health standards. The regulations are designed to control hazards by eliminating exposure via administrative or engineering controls, substitution, use of personal protective equipment (PPE), and safety data sheets. Contractors working on USAF installations are also responsible for following Air Force Occupational Safety and Health (AFOSH) standards identified within AFI 91-202 (USAF 2022a) and AFMAN 91-203 (USAF 2022b).

Employers are responsible for providing a safe workplace. Employers must follow OSHA safety and health standards, including: review potentially hazardous workplace conditions; monitor exposure to workplace chemicals (e.g., asbestos, lead, contaminated soil), physical hazards (e.g., noise, falls), biological agents (e.g., infectious waste, wildlife, plants), and ergonomic stressors; recommend and evaluate controls to ensure personnel exposure is eliminated or adequately controlled; and provide a medical surveillance program to perform occupational health physicals for workers using respiratory protection or engaged in work involving hazardous waste, asbestos, lead, or other work requiring medical monitoring.

3.5.1.2 Mission Safety

USAF installations are secure sites and are not open to the public. Entry is controlled at base access gates and only authorized persons are permitted to enter the installation. The Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) standard criteria define requirements for adequate response to threats, including measures for access control such as vehicle barriers.

Mission safety on USAF installations is maintained through adherence to DoD and USAF safety policies and plans, thereby ensuring the safety of personnel and the public. AFI 91-202, *USAF Mishap Prevention Program*, implements Air Force Policy Directive 91-2, *Safety Programs*, and provides guidance for executing the safety program on USAF installations.

In accordance with DoDI 4165.57 AICUZ (DoD 2011), APZs are established at military airfields to delineate recommended compatible land uses for protection of people and property. AICUZ, including the CZ, APZ I, and APZ II, are described in Section 3.2.2.1.

The engineering of buildings designed to house large quantities of cryogenic fluids is governed by multiple building and safety codes. This includes various UFCs, American Society of Civil Engineers (ASCE) criteria, International Building Codes, International Fire Codes, and National Fire Protection Association Codes. Adherence to such design standards protects occupants from hazardous aspects of cryogenic fluid storage.

3.5.2 Affected Environment

EAFB is a secure military installation with access limited to military personnel, civilian employees, military families, and approved visitors. EAFB operations and maintenance are performed in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by USAF Occupational Safety and Health requirements. The safety-related ROI corresponds to the footprints of the Proposed Action projects where the installation construction, demolition, renovation, and operational activities would occur.

3.5.2.1 Construction Safety

Contractors performing construction on EAFB are required to adhere to OSHA standards and USAF safety practices (refer to Section 3.5.1).

3.5.2.2 Mission Safety

The 354 Security Forces Squadron provides law enforcement and security services and safeguards both Primary Aircraft Assigned (PAA) and transient aircraft. Two gates are used as Entry Control Facilities (ECFs) at EAFB: Hursey Gate, on the northern side of the installation; and South Gate, on the southern side. Hursey Gate, which is currently the main ECF, is open regularly to installation personnel. South Gate sees limited use, primarily by construction contractors during mobilization and demobilization. At Hursey Gate, there are existing issues with traffic congestion, non-compliance with existing UFCs and the SDDCTEA, as well as safety and response deficiencies due to distance between active vehicle barriers and the ID check point (354 CES 2023).

APZs have been established for EAFB's airfield for the protection of people and property. Flight operations are required to abide by existing airfield course rules and flight procedures protective of APZs. On-base, neither the CZ nor the APZs include housing or other incompatible land uses. To the north, portions of the APZs overlay lands outside of the base. APZ I falls on lands identified as general use (which could be considered a compatible land use), and almost the entirety of APZ II overlays land uses identified as either residential or general use in Moose Creek (USAF 2016). Land uses such as high-density housing, industry (which uses hazardous or flammable chemicals), and public use facilities are not recommended within APZ II-designated areas and conflict with USAF land use recommendations. The current path of Flight Line Avenue from Hursey Gate traverses the northern end of the CZ North, which means the incoming and outgoing base traffic must pass through this space for approximately 0.5 miles.

The 354 CES provides fire response services on EAFB. Aircraft Rescue Fire-Fighting services are available on a 24-hour basis. Crash and rescue services coordinate emergency services in the event of an in-flight or ground emergency. There are two fire stations at EAFB: Fire Station #1, located at the northern end of the flightline within the approximate affected area; and Fire Station #2, located on Glacier Street north of the base housing area. Areas on EAFB have been classified by their use (e.g., industrial, residential) for the purposes of base emergency response planning.

The existing Cryogenics Facility (Building 3245) supports aircraft operations by storing LOX and LIN to provide breathable air during flight. The building stores 11,000 gallons of LOX and 7,000 gallons of LIN across four tanks. The tanks are used to fill LOX/LIN carts, which are delivered to the airfield for use. With the recent increase in the number of PAA at EAFB, the rate at which LOX and LIN are needed to support aircraft operations has increased from the F-35A program and will continue to increase as the KC-135Rs are phased in. The current building configuration does not allow for the required minimum 6 feet of separation between tanks, presenting a hazard to personnel. The building violates numerous safety and facility standards, including UFC 3-600-01, explosion-proof classification, and fire suppression and alarm requirements (354 Contracting Squadron 2022).

The CH&PP, which supplies EAFB with steam heat and electricity, is directly supported by the Coal Thaw Shed. Frozen coal-bearing railcars are stored in the heated shed to thaw before unloading. Railcars require 48 hours of thaw time. During extreme cold, the presence of finely ground particles and moisture in the coal can lead to large frozen chunks. To fit through the initial screen process, frozen coal must be broken apart with hand or power tools, a difficult and dangerous task. The existing Coal Thaw Shed does not have the capacity to thaw the CH&PP's demand of eight railcars per day. There is little to no contingency for emergency use, which puts the base at risk during heavy freezes (EAFB 2021f).

3.5.3 Environmental Consequences

Any increase in safety risks would be considered an adverse impact to safety. Impacts associated with health and safety would be considered significant if the proposed projects were to:

1. Substantially increase risks associated with the safety of construction personnel, contractors, USAF personnel, or the local community
2. Hinder the ability to respond to an emergency
3. Introduce a new health or safety risk for which USAF is not prepared or does not have adequate management and response plans in place

3.5.3.1 Proposed Action

Construction Safety

Contractors and USAF personnel would be required to abide by all safety data sheets and guidance for handling of hazardous materials. Proper PPE would be worn, and applicable permits would be obtained prior to work being performed (e.g., confined space entry). Projects 02, 04, and 05 have the potential to expose workers to asbestos-containing material (ACM), lead-based paint (LBP), and/or PCBs. Section 3.6.2.3 describes procedures for managing these toxic substances during demolition. Construction workers may encounter soil and/or groundwater contamination during the execution of any of the proposed projects. Section 3.6.2.4 describes procedures for planning and managing activities that may affect contaminated soil or groundwater source areas.

Short-term, minor, direct adverse impacts to construction safety could occur as a result of the Proposed Action from worker exposure to general construction safety risks. Impacts would be minimized by adherence to established OSHA and USAF safety policies; therefore, impacts to construction safety would be negligible.

On-base traffic would be temporarily re-routed during Project 01, which would be expected to last one construction season (April through September). During this time, vehicles would enter EAFB through a temporary construction gate north of Hursey Gate leading to Transmitter Road, then to Arctic Avenue, and finally Central Avenue. The traffic pattern would circumvent Hursey Gate and affected portions of Flight Line Avenue, keeping construction separate from daily traffic flow and minimizing construction safety impacts to the base population. This traffic pattern has been used for other improvements affecting entry and exit from the main gate.

Based on the analysis in this section, the execution of any or all of the projects under the Proposed Action would not substantially increase construction safety risks, hinder emergency services' ability to respond to an on-base emergency, or introduce a new health or safety risk.

Mission Safety

Project 01 could result in short-term, minor, direct adverse impacts to mission safety. During the construction phase, base traffic would be routed past housing located off French Creek Drive, and temporary traffic flow could restrict the movement of emergency response vehicles leaving the installation. This would be alleviated by establishing a traffic plan and potential use of existing access roads as emergency routes, as needed. Project 01 would result in long-term, moderate, direct beneficial impacts to mission safety through the addition of a second outbound lane through Hursey Gate, which would improve general traffic flow and emergency vehicle egress. Additionally, Flight Line Avenue would be moved to the north, out of the CZ. The project would bring EAFB into compliance with security standard requirements for controlling points of entry.

Project 02 would result in long-term, moderate, direct beneficial impacts to mission safety by providing infrastructure to safely thaw coal without requiring dangerous coal plug removal practices when railcars are not thawed properly. The added railcar storage capacity would ensure continuity of operations during cold weather.

Project 03 would result in long-term, moderate, direct beneficial impacts to mission safety. Construction of a new JROC would alleviate current facility deficiencies and improve USAF capability to plan, execute, and capture required mission data for 5th Generation combat training. Project 03 would provide adequate and dedicated space that meets security needs and ensure optimal success of training and mission safety.

Project 04 would result in long-term, moderate, direct beneficial impacts to mission safety from construction of a new facility that complies with building and safety standards. The increased LOX/LIN storage would meet the increased demand for in-flight breathable air.

Project 05 would result in long-term, minor to moderate, direct adverse impacts to mission safety. As part of Project 05 Alternative 3, the proposed FMO Warehouse siting on Glacier Boulevard would place an industrial district adjacent to a residential district. This change would be incorporated in base emergency planning to establish procedures for ensuring the safety of base residents in the event of an incident at the FMO Warehouse building.

The execution of any or all proposed projects would not substantially increase mission safety risks for contractors, USAF personnel, or the local community. By implementing planning, administrative controls, or safety engineering/design elements, no significant adverse impacts to mission safety would occur.

3.5.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and there would be no impacts to construction safety because no facility construction, demolition, or renovation would occur other than projects already planned by the installation. Without implementation of Projects 01, 02, or 04, the identified beneficial impacts to mission safety would not occur and mission safety would remain deficient and adversely impacted. It is expected that EAFB will continue the trend of development. Facility repairs, renovations, and new construction projects will be programmed for years to come. As construction projects are executed and new facilities are constructed, USAF personnel and contractors would continue to adhere to the safety policies and procedures identified in Section 3.5.1 to reduce or eliminate construction and operational hazards in the workplace.

3.5.4 Cumulative Impacts

3.5.4.1 Construction Safety

The Proposed Action, in conjunction with various installation projects, could result in short-term, minor, adverse cumulative impacts to construction safety. Construction, demolition, and renovation of facilities are planned and currently in progress for the F-35A and KC-135R beddowns. Additionally, construction of a fire station along South Loop and a liquid GAC curtain near Hursey Gate are planned. The adverse cumulative impacts to construction safety result from the temporal overlap of projects and the increased number of personnel exposed to construction hazards at any one time. Such impacts would be minimized or eliminated by contractor adherence to the OSHA and USAF safety standards. Consequently, no significant adverse cumulative impacts to construction safety would occur.

3.5.4.2 Mission Safety

The Proposed Action, in conjunction with various installation projects, could result in long-term, moderate, beneficial cumulative impacts to mission safety. For example, the construction of the South Loop Fire Station would allow USAF to meet incident response time requirements for the southern end of the airfield. The Garrison Slough Trestle Bridge project combined with Project 02 would result in a beneficial impact to CH&PP mission safety because the goal of both projects is to maintain coal supply and ensure that installation heat and power remain uninterrupted. The Micro-Reactor Pilot Project would also result in a beneficial impact by meeting a portion of the installation’s energy demands, thereby reducing the load on the CH&PP. Based on this analysis, no significant adverse cumulative impacts to mission safety would occur.

3.6 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

3.6.1 Definition of Resource

3.6.1.1 Hazardous Materials and Hazardous Waste

Hazardous materials are defined by 49 CFR 171.8 as hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in 49 CFR 173. Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of releases or extended vapor exposure. Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 USC 6903(5), as amended by the Hazardous and Solid Waste Amendments, as a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infections characteristics may:

- Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed

Evaluation of hazardous materials and wastes focuses on the storage, transportation, handling, and use of hazardous materials, as well as the generation, storage, transportation, handling, and disposal of hazardous wastes. The improper release or storage of hazardous materials, hazardous wastes, and petroleum products can threaten the health and well-being of humans, wildlife, habitats, soil, and water resources.

The purpose of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 is to protect public health, safety, and the environment from chemical hazards by increasing the public's knowledge and access to information regarding the chemicals at facilities. EPCRA requires facilities to report the use and any releases of hazardous and toxic chemicals in the workplace. Facilities must maintain safety data sheets of hazardous chemicals used or stored in the workplace and annually submit a chemical inventory to their designated emergency planning committee.

Storage of bulk petroleum products is regulated federally under 40 CFR 112, *Oil Pollution Prevention*, for any facility with an aggregate storage of more than 1,320 gallons of oil, and facilities that could be reasonably expected to cause substantial harm to the environment by discharging oil into navigable waters. 40 CFR 112 requires facilities to develop a Spill Prevention, Control, and Countermeasures (SPCC) plan that describes spill response measures to be used in the event of a release and other facility information. A Facility Response Plan that describes the facility and emergency response actions must also be developed. The SOA also regulates bulk petroleum storage under Article 4 of 18 Alaska Administrative Code 75, Oil and Other Hazardous Substances Pollution Control. Article 4 requires facilities with > 420,000 gallons of oil storage to develop an ODPCP describing spill response measures, potential spill scenarios, and other facility information.

3.6.1.2 Toxic Substances

Toxic substances are those whose manufacture, processing, distribution, use, or disposal are restricted by the Toxic Substances Control Act (TSCA; 40 CFR 700-766) because they may present unreasonable risk of personal injury or to the health of the environment. Toxics include ACM, LBP, PCBs, and radon.

Radon is a naturally occurring odorless and colorless radioactive gas found in soil and rocks that can lead to the development of lung cancer. Radon tends to accumulate in below-ground and poorly ventilated enclosed spaces (e.g., basements). EPA established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences, and radon levels above this amount are considered a health risk to occupants. USAF policy is to prevent exposure at indoor radon levels above 4 pCi/L.

3.6.1.3 Contaminated Sites

In 1986, Congress created the Defense Environmental Restoration Program (DERP). The DERP addresses the ID and cleanup of hazardous substances and military munitions remaining from past activities at military installations and formerly used defense sites. Through the DERP, contaminated sites are investigated, and remedial actions are implemented in accordance with federal and state regulations. When no further remedial action is necessary and the threat to human health no longer exists, the site is closed.

3.6.2 Affected Environment

The ROI for hazardous materials and hazardous waste impacts analysis includes the footprints of the individual Proposed Action projects where the installation construction, demolition, and renovation would occur, and where day-to-day operations would take place.

3.6.2.1 Hazardous Materials

EAFB uses hazardous materials and petroleum products such as liquid fuels, pesticides, and solvents for daily operations. The existing Cryogenics Facility houses bulk quantities of LIN and LOX tanks. Due to the high number of aircraft operations, fuel is stored in large quantities on-base. The installation's cumulative non-crude oil storage capacity is 32,958,692 gallons. Diesel fuel is used for backup generators and stored in bulk containers for other building support functions. The EAFB ODPCP addresses spill prevention, contingency planning, and emergency response, satisfying federal and state regulatory requirements (EAFB 2021a).

The current RED FLAG Operations (Ops) building has seven flammable lockers for hazardous materials storage. Building 3425 contains various hazardous materials such as: propane; aerosol, foam, and concentrated cleaners; Scotchgard; bleach; and diesel exhaust fluid (EAFB 2023g). There is no storage of hazardous materials within the Coal Thaw Shed or at Hursey Gate (EAFB 2023b).

3.6.2.2 Hazardous Waste

EAFB is regulated as a large quantity hazardous waste generator (LQG) under RCRA. The EAFB Hazardous Waste Management Plan (HWMP) governs the EAFB Hazardous Waste Management Program (EAFB 2021b). Building 4388 houses the Hazardous Waste Facility (HWF) and serves as the 90-day central accumulation site. There are 27 satellite accumulation points near work locations and 3 other accumulation sites. The 354 CES Environmental Element oversees the Hazardous Waste Program and Infrastructure Systems oversees HWF operations and maintenance. Contractors working on the installation are required to complete 354 CES hazardous waste training. Contractors are also responsible for managing their hazardous and universal wastes in accordance with LQG requirements to comply with the base's RCRA status.

No hazardous waste is generated by or stored at the existing Hursey Gate, Coal Thaw Shed, Cryogenics Facility, RED FLAG Ops building, or Building 3425; the facilities do generate universal waste (EAFB 2022a). The CH&PP (connected to the Coal Thaw Shed) generates hazardous waste and houses a satellite accumulation point; the Cryogenics Facility and RED FLAG Ops building contain universal waste containers for waste collection (EAFB 2022a). Table 3.6-1 presents waste streams handled annually from buildings affected by the Proposed Action.

Table 3.6-1 Annual Containers of Waste Generated by Affected Buildings

AFFECTED BUILDING	UNIVERSAL WASTE LAMPS (4-ft^3 bags)	UNIVERSAL WASTE BATTERIES (gal)	UNIVERSAL WASTE AEROSOL CANS (5-gal buckets)	USED OIL (55-gal drums)	USED ANTIFREEZE (55-gal drums)
RED FLAG Ops (Building 1151)	2	<1	<1	0	0
Hursey Gate	Universal waste may be generated at the facility but none are stored at these locations.				
Cryogenics Facility (Building 3245)					
Building 3425	5	2	6	1	2
Coal Thaw Shed (Building 6203)	0	0	1	2	0

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2023n

3.6.2.3 Toxic Substances

EAFB is in a Radon Zone 2 area, meaning the predicted average radon screening level is ≥ 2 and less than or equal to (≤) 4 pCi/L (EPA 1993, 2023b). Radon measurements for buildings affected by the Proposed Action or buildings near the siting for new construction are presented in Table 3.6-2.

Table 3.6-2 Radon Measurements for Buildings and Areas Affected by Proposed Action

PROJECT ID AND NAME	RADON MEASUREMENT (WLM/yr)	RADON MEASURED FROM AFFECTED BUILDING	RADON MEASURED FROM NEARBY BUILDING
01 Construct Hursey Gate Final Denial Barrier and Road	0.0254	No	Waste Treatment Facility Building 2316
02 Construct Addition to Coal Thaw Shed (Building 6203)	0.0155	No	CH&PP Buildings 62033/ 62034
	0.0259	No	Power Plant Building 6203
03 Construct New JROC	0.0306	No	RED FLAG Ops Building 1151
04 Demolish/Rebuild Cryogenics Facility (Building 3245)	0.0306	Yes	No
	0.0358	No	AGE Building 1209
05 Demolish/Rebuild Building 3425	0.0104	Yes	No

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2023i

Radon testing is not required for construction/design specifications at EAFB; however, testing for radon is required 1 year after new construction. The 354 MDG/Operational Medical Readiness Squadron

(OMRS) recommends radon testing following any significant renovations or heating, ventilation, and air conditioning (HVAC) replacement. The 354 MDG/OMRS is notified of planned new construction and renovation projects on-base through the Air Force (AF) 813 work order review process (EAFB 2021e).

The EAFB Asbestos Management Plan details procedures to prevent or minimize installation occupant and worker exposure to ACM, including managing asbestos waste, which is disposed of at an on-base permitted landfill (EAFB 2018). Two buildings affected by the Proposed Action have known ACM: the Coal Thaw Shed and Building 3425 (Table 3.6-3).

Older facilities on EAFB may have been painted with LBP. Alterations of structures suspected of containing LBP are conducted in accordance with applicable regulations and the EAFB LBP Management Plan (EAFB 2015). Samples of potential LBP are screened using a toxicity characteristic leachate procedure to determine if the LBP meets/exceeds RCRA levels and to determine the proper disposal process. Proper disposal of any lead-containing waste is in accordance with federal regulations. Previous sampling has indicated that LBP is present at the Coal Thaw Shed (EAFB 2022a, 2023d) and Cryogenics Facility (EAFB 2020b, 2022a). LBP is also suspected in various components of Building 3425 (EAFB 2023d; SUNEX, Inc. 2003; Table 3.6-3).

From the 1950s through the 1970s, PCBs were widely used in caulking and elastic sealant materials. These materials were primarily used for windows, door frames, stairways, building joints, masonry columns, and other masonry building materials (EPA 2015). PCBs also can be found in transformer oil due to their electrical insulation properties. PCB transformers and large capacitors on EAFB are certified to contain less than 50 parts per million (ppm) PCBs (EAFB 2021b). PCB-containing light ballasts are commonly found in all but the most modern facilities and have a long service life, making it difficult to know where they are until immediate inspection prior to demolition or renovation. PCB-containing light ballasts are potentially present in buildings that would be affected by proposed demolition and renovation. When disposing of light ballasts manufactured before 1978 that are still in service and not labeled “NO PCBs,” the light ballasts are containerized, marked with the date removed from service, and turned in to the HWF for disposal, in accordance with the HWMP (EAFB 2021b). Three existing buildings affected by the Proposed Action have known or suspected PCBs: the Coal Thaw Shed, Cryogenics Facility, and Building 3425 (Table 3.6-3).

Table 3.6-3 Proposed Projects with Known or Suspected Asbestos-Containing Material, Lead-Based Paint, and Polychlorinated Biphenyls

PROJECT ID AND NAME	AFFECTED BUILDING (YEAR CONSTRUCTED)	KNOWN/ SUSPECTED ACM?	KNOWN/SUSPECTED LBP?	KNOWN/ SUSPECTED PCB?
01 Construct Hursey Gate Final Denial Barrier and Road	Building 1099, Guard Shacks (2006, 2018)	No[1]	No[3,7]	No[3,7]
02 Construct Addition to Coal Thaw Shed (Building 6203)	Building 6203 (1953)	Yes[1]	Yes[2,4,7]	Yes[2,4,7]
03 Construct New JROC	N/A	N/A	N/A	N/A
04 Demolish/Rebuild Cryogenics Facility (Building 3245)	Building 3245 (1963)	No[1]	Yes[2,6,7]	Yes[2,7]

PROJECT ID AND NAME	AFFECTED BUILDING (YEAR CONSTRUCTED)	KNOWN/ SUSPECTED ACM?	KNOWN/SUSPECTED LBP?	KNOWN/ SUSPECTED PCB?
05 Demolish/Rebuild Building 3425	Building 3425 (1953)	Yes[1]	Yes ⁻ floor yellow traffic striping, overhead door jambs, angle iron metal corner guards, overhead door, railroad tie traffic guards in loading area, loading dock/ramp metal edge guard[4,5,7]	Yes[4,7]

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source:
[1] EAFB 2023a
[2] EAFB 2022a
[3] EAFB 2023c
[4] EAFB 2023d
[5] SUNEX, Inc. 2003
[6] EAFB 2020b
[7] EAFB 2023n

3.6.2.4 Contaminated Sites

The DoD developed the Environmental Restoration Program (ERP) to facilitate cleanup of sites contaminated by past military activities and regulated under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). EPA and SOA jointly regulate the sites with CERCLA contaminants. Petroleum-contaminated sites are designated as Compliance Restoration Sites and are regulated by the state. Figure 3.6-1 shows ERP and Compliance Restoration Sites within and adjacent to the ROI. Table 3.6-4 presents site descriptions.

The 2013 Institutional Control (IC)/LUC Settlement Agreement between EPA, ADEC, and USAF is the basis for procedures managing activities that may affect contaminated soil or groundwater source areas (EPA, ADEC, USAF 2013). 354 Fighter Wing Instruction (FWI) 32-7006 establishes EAFB's LUC management process, which is executed through the Land Use Control Implementation Plan (LUCIP; EAFB 2021c). The current LUCIP was updated in December 2021 and guides implementing, maintaining, reporting on, and enforcing LUCs at EAFB. Section 4.1 of the LUCIP describes in detail EAFB's LUC and Interim Control administrative approval forms.

The EAFB Restoration Program is notified of new construction projects through the AF 813 work order review process, AF 103 Base Civil Engineer Work Clearance Request, and AF 332 Base Civil Engineer Work Request for future work. Once notified, the Restoration Program ensures that EAFB follows FWI 32-7006 processes for coordinating regulatory approval before construction begins in areas of known contamination.

A CERCLA Five-Year Review was conducted in 2017 for 37 source areas and their remedies. The Five-Year Review concluded that remedies at 28 source areas are currently protective; however, data gaps regarding contaminant delineation affect long-term protectiveness. Protectiveness determinations for nine source areas were deferred pending an evaluation for the vapor intrusion pathway (EAFB 2019a).

PFAS-impacted groundwater in the aquifer beneath EAFB has been identified and extends beyond the base boundary. Widespread and undelineated PFAS impacts also exist in EAFB soil. PFAS compounds, known as "emerging contaminants" or chemicals with limited data on human health effects, are ingredients found in waterproofing products, non-stick compounds, and various fire-fighting foams.

PFAS impacts likely originate from historical fire-fighting foam. Projects encountering water in the vadose zone during construction can expect that water to contain PFAS.

PFAS mitigation to date includes installing GAC filtration for EAFB's water treatment plant. GAC filtration was also installed at many homes in the Moose Creek community (ADEC 2023b). In June 2019, USAF, EPA, and ADEC signed an Interim Record of Decision for Moose Creek to provide an interim remedy to protect human health by addressing the drinking water exposure pathway (USAF 2019). The approved interim remedy is to provide a piped water system from the City of North Pole water treatment plant to Moose Creek community residents. Supply and distribution lines have been installed, and a storage tank and a Moose Creek pump house have been built (AFCEC 2022; ADEC 2023b). Additionally, a pilot study is planned to construct a liquid GAC curtain near Hursey Gate for the purpose of filtering PFAS-impacted groundwater to mitigate off-base contaminant migration. Figure 3.6-1 presents PFAS-impacted sites within the ROI.

Analytical results from soil samples collected in 2023 in the area of Project 01 were non-detect or less than established cleanup levels for: gasoline range organics (GRO), diesel range organics (DRO), and residual range organics (RRO); volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs); pesticides; herbicides; PCBs; PFAS; and metals, with the exception of arsenic. Arsenic was detected greater than ADEC cleanup levels but is considered to be representative of background conditions in the area (Shannon & Wilson 2023).

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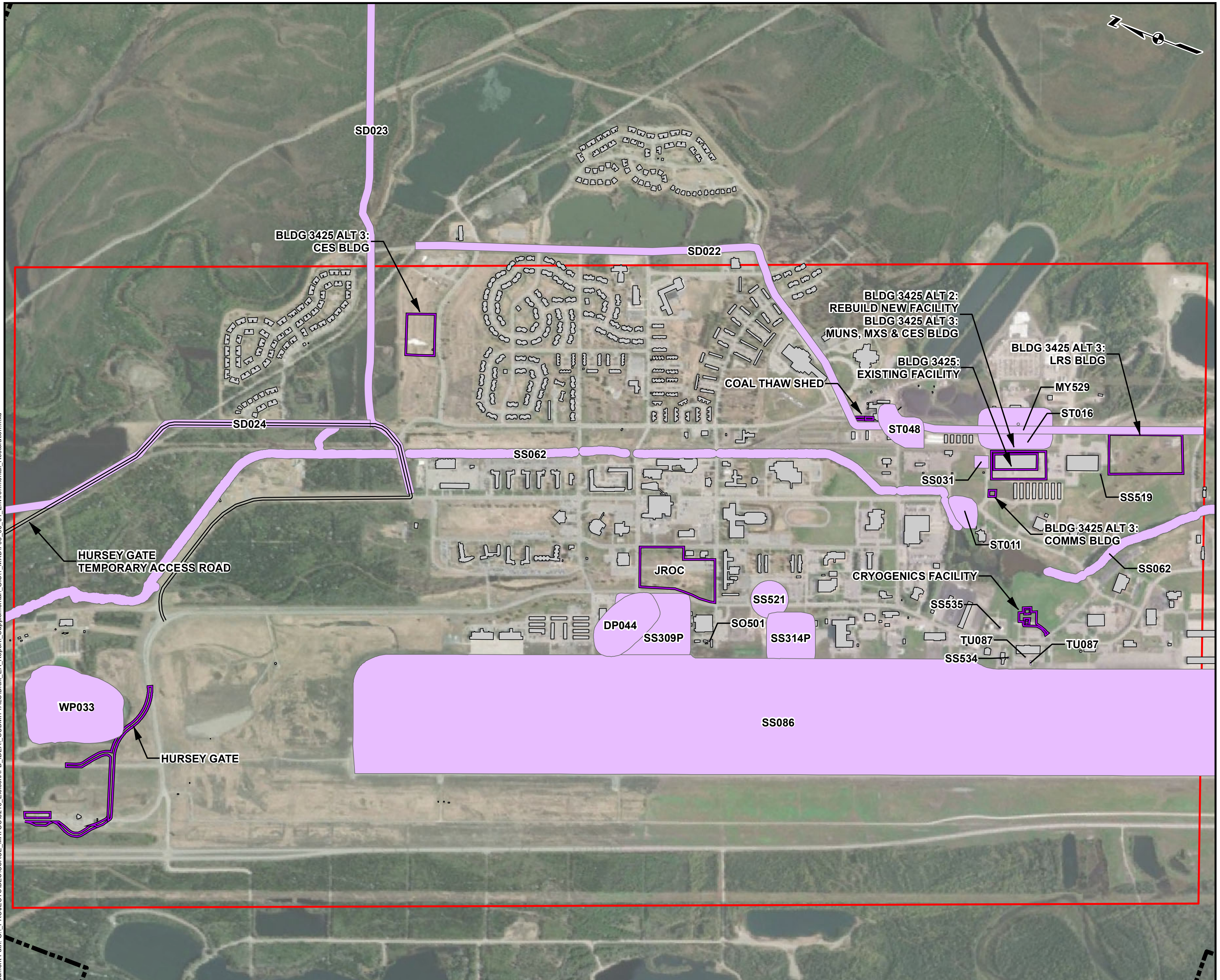

INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS

EIELSON AIR FORCE BASE, ALASKA

ENVIRONMENTAL RESTORATION PROGRAM AND COMPLIANCE RESTORATION SITES

Legend

- Hursey Gate Temporary Access
- ERP and Compliance Restoration Site
- Project
- Building
- Region of Influence
- Installation Boundary

Abbreviations

Alt	Alternative
Bldg	Building
CES	Civil Engineer Squadron
COMMS	Communications Squadron
ERP	Environmental Restoration Program
JROC	Joint Pacific Alaska Range Complex Range Operations Center
LRS	Logistics Readiness Squadron
MXS	Maintenance Squadron
MUNS	Munitions Squadron

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
2. Environmental Restoration Program and Compliance Restoration Site GIS features provided by NEPA Program Manager, Eielson AFB.
3. GIS features for Sites SS309P, SS314P, SS521, and ST016 digitized from: AFCEC. 2022. Environmental Restoration Program Atlas. October.

ALASKA STATE PLANE ZONE 3. U.S. SURVEY FEET
HORIZONAL DATUM: NAD83(2011) | VERTICAL DATUM: NAVD88

1,250 625 0 1,250 2,500
Feet

PROJECT No.: 321604	DATE: 2/23/2024	FIGURE: 3.6-1
P.M.: S.B.	DRAWN: T.A.	

Document Path: G:_PROJECTS\BES\USACE_MATOC\3216_EielsonAFB_IDEA_SUBMITTALS\Draft_EA_Report_Supplemental_GIS\1_MXD\F03_06_01_Environmental_Restoration.mxd

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3.6.3 Environmental Consequences

3.6.3.1 Proposed Action

Hazardous Materials

Short-term, minor, direct adverse impacts associated with the use of hazardous materials and petroleum products would occur during the construction, demolition, and renovation phases of the Proposed Action. Paints, welding gases, solvents, preservatives, sealants, and fuels may be used during construction; however, it is anticipated that the quantities of hazardous materials used would be minimal and temporary. Contractors would be required to submit an inventory of all hazardous materials listed in OSHA Hazard Communications Standard 29 CFR 1910.1200, Class I and II O_3-depleting substances, and all items, including medical supplies, covered under EPCRA for reporting requirements. Usage reports would be submitted monthly to the installation's Hazardous Materials Program Manager, and contractors would be responsible for removing all hazardous materials at project completion. There would continue to be no hazardous materials storage at the Coal Thaw Shed or Hursey Gate. There would continue to be LOX/LIN storage at the Cryogenics Facility; LOX storage capacity would remain the same at 11,000 gallons, and LIN storage capacity would increase by 3,000 gallons. There would be no new risks posed by LOX/LIN storage associated with Project 04 because LOX and LIN are already stored at the existing Cryogenics Facility. Storage at Building 3425 would remain the same or similar to the current facility, and there would be potential for seven additional flammable lockers at the new JROC. Long-term, this would not be a significant change to the types and quantities of hazardous materials used and stored at EAFB.

There would be no additional fuel tanks associated with any of the proposed projects; therefore, no amendments would be needed for the ODPCP (EAFB 2023e). All spills of petroleum, oil, and lubricants (POL) or hazardous materials, or discovery of historical contamination would be reported immediately to 911 and Eielson Environmental, who would notify ADEC and/or EPA, and others, if required.

Hazardous Waste

In the short-term temporary construction phase, all projects would likely generate universal waste, used oil, C&D debris, and/or glycol waste (EAFB 2022a). Waste generated during construction would be recycled, when possible; the Spruce Lake Disposal Area accepts clean concrete, clean gravel, and tree stumps. Non-recyclable C&D debris likely would be disposed of at the FNSB Solid Waste Facility's C&D cell. On average, the facility accepts 25,000 tons of C&D debris annually, and a new C&D cell was constructed in November 2022 (S. Jones, personal communication, 25 May 2023). Short-term adverse impacts would not be significant because the amount of waste generated would not be expected to exceed the handling capacity of any of the disposal locations.

In the long-term operational phase following project completion, the amounts and types of hazardous wastes generated would not be expected to change from the current state, because the affected facilities currently do not generate such wastes. Eielson's RCRA status as an LQG would be unchanged. Long-term, negligible to minor, direct adverse impacts would occur from affected facilities (and like facilities, in the case of Project 03) generating universal waste; however, the change in amount of universal waste generated would not be significant because replacement facilities would be of comparable size.

Toxic Substances

Short-term, minor to moderate, direct adverse impacts associated with construction projects affecting buildings where ACM, LBP, and/or PCBs are known or suspected to be present could occur from generation of hazardous waste demolition debris. Materials would be handled in accordance with Eielson's Asbestos Management Plan, HWMP, and LBP Management Plan. Contractors would be responsible for disposing of these wastes at an approved, permitted disposal facility. Contractor training and waste handling requirements discussed in Section 3.6.2 would provide protection from hazards associated with waste generation.

Removal of existing ACM, LBP, and PCBs would have long-term, moderate, direct beneficial impacts by removing materials from affected buildings, thus preventing potential future exposure to toxic substances.

Contaminated Sites

No significant adverse impacts to contaminated sites would occur from the Proposed Action. Protection of human health and the environment and any site remedies would be maintained by following the procedures established in FWI 32-7006, including early notification to ADEC and EPA during project planning and ADEC and EPA approval prior to work in contaminated sites. An approved Site-Specific Sampling and Analysis Plan would be developed before work begins in areas of known contamination. Due to widespread PFAS contamination in the aquifer beneath Eielson AFB, all projects would be expected to encounter groundwater containing PFAS, which would require a dewatering permit and approval, as well as a groundwater management plan; such approvals and plans would be coordinated through the procedures outlined in FWI 32-7006. For projects where work would require removal of existing monitoring wells, the installation would work with ADEC and EPA to identify acceptable representative locations for replacement wells to be installed as needed. Contaminated soil and groundwater generated by projects would be characterized and disposed of in accordance with state and federal regulations. The Proposed Action would have long-term, negligible, direct beneficial impacts to contaminated sites through removal and disposal of soil and groundwater as contaminant sources.

3.6.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not take place. No impacts to hazardous materials, hazardous waste, or toxic substances would occur, as hazardous materials use and storage and hazardous waste generation would be unchanged from the current state, and EAFB would continue to be a RCRA LQG. Buildings where suspected ACM, LBP and PCBs are present would remain operational. No impacts to contaminated sites would occur in the vicinity of the Proposed Action other than those from planned installation improvements as EAFB continues its trend of development. EAFB would continue to follow established procedures for activities involving hazardous materials, hazardous waste, toxic substances, and contaminated sites. No beneficial impacts from removing toxic substances in affected buildings and removing contaminated soil and groundwater would occur.

3.6.4 Cumulative Impacts

The Proposed Action, in conjunction with the F-35A and KC-135R beddowns; the planned South Loop Fire Station; and the Micro-Reactor Pilot Project, could result in short-term, minor, adverse cumulative impacts to hazardous materials storage and hazardous waste generation from an increase or temporal overlap in handling toxic substances and contaminated sites, if the affected buildings associated with these projects contain suspected ACM, LBP, or PCBs; however, these impacts would be minimized by adherence to the policies and procedures described in Section 3.6.2. The Proposed Action would have long-term, minor, beneficial cumulative impacts by removing or remediating toxic substances.

Past actions and projects have resulted in PFAS-impacted groundwater in the vadose zone, which must be taken into consideration during activities that affect or expose groundwater, such as excavation. These impacts are discussed in Section 3.6.3. The construction of a liquid GAC curtain to mitigate PFAS migration, in combination with removal of any PFAS-impacted soil or water associated with the Proposed Action, would have a long-term, beneficial, cumulative impact to impacted sites.

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Table 3.6-4 Environmental Restoration Program, Compliance Restoration, and PFAS Sites

SITE NUMBER	SITE NAME	SITE DESCRIPTION	KEY COC/COPC(S)	ASSOCIATED LUCS/REMEDY	POTENTIALLY AFFECTED PROJECTS (ID AND NAME)
DP044	Battery Shop Leach Field	DP044 included a possible wastewater disposal leach field from the battery shop (Building 1141) and the area around the avionics and electronics repair shop (Building 1138). The battery shop and repair shop may have discharged wastes into a leach field system within the area.	BTEX, TCE, PCE, PFAS in soil and groundwater	Soil control Water use/contact control	Project 03 Construct New JROC
MY529	Former Carpenter Shop, Building 2762	Building 2762, a storage facility belonging to the outdoor recreation office (formerly a carpenter shop) is located between three ERP source areas, though contamination is most likely a result of the building's proximity to Source Area ST016, where 5,000 gallons of gasoline were released from a buried fuel line in 1954. Additional sources of contamination include leaking drums from a nearby former drum storage area and hexavalent chromium, which was an anti-corrosion additive to paints.	DRO, benzene in soil Hexavalent chromium in groundwater	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425
SD022	Road Oiling – Industrial Road	Road oiling was used for dust control on unpaved surfaces at EAFB from 1950 until the 1980s. Before 1978, roads were oiled with waste POL products (waste oils, contaminated fuels, and spent solvents). From 1978 until the practice was discontinued, waste engine oils and contaminated diesel fuel were used.	Arsenic, chromium, magnesium, vanadium, zinc, lead, PAHs, and PCBs in soil (COPCs)	Soil control Water use/contact control	Project 02 Construct Addition to Coal Thaw Shed (Building 6203) Project 05 Demolish/Rebuild Building 3425
SD023	Road Oiling – Manchu Road	Road oiling was used for dust control on unpaved roads from 1950 until sometime in the 1980s. Roads were oiled with waste POL products, including waste oils, contaminated fuels, and/or spent solvents. From 1978 until the practice was discontinued, waste engine oils and contaminated diesel fuel were used.	Arsenic, chromium, magnesium, vanadium, zinc, lead, PAHs, and PCBs in soil (COPCs)	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 3 FMO Warehouse Site
SD024	Road Oiling – Gravel Haul Road	Road oiling was used for dust control on unpaved roads from 1950 until sometime in the 1980s. Roads were oiled with waste oils, contaminated fuels, and spent solvents. From 1978 until road oiling was discontinued, waste engine oils and contaminated diesel fuel were used.	Arsenic, chromium, magnesium, vanadium, zinc, lead, PAHs, and PCBs in soil (COPCs)	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 3 FMO Warehouse Site
SO501	Building 1146	Building 1146 is associated with a former 2,500-gallon diesel fuel UST that was removed in May 1993.	GRO, DRO, 1,2,4-TMB, 1,3,5-TMB, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)pyrene, naphthalene, and xylenes in soil DRO, 1-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, and naphthalene in groundwater	Soil control Water use/contact control	Project 03 Construct New JROC
SS031	PCB Storage Facility	The building was used to store out-of-service transformers and capacitors from EAFB and Clear AFB, as well as PCB-contaminated soil and liquid wastes generated during cleanup of a PCB spill at Pedro Dome.	VOCs, GRO, DRO, RRO, EDB, PAHs, lead, and PCBs	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 2, Alternative 3 FMO Warehouse Site
SS062	Garrison Slough	PCBs were detected in fish tissue and sediment samples from within the slough at Site SS062, as well as in the soil in a trench adjacent to Garrison Slough.	PCBs (Aroclor 1260) in soil, sediment, and fish tissue Pesticides (DDD, DDE, DDT, dieldrin, gamma chlordane, heptachlor epoxide), mercury, and arsenic (COPCs)	Fishing restrictions Soil and sediment contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 3 FMO Warehouse Site
SS086	SER001-2011 (Taxiway Golf)	In 2011, petroleum-contaminated soil was discovered during a runway upgrade project. It is suspected that past releases of fuel may have occurred during refueling of aircraft or overflow spillage from aircraft vents. It is likely that this impact was created by multiple minor spills throughout ongoing airfield operations.	GRO, DRO, BTEX, and PAHs	Soil control Water use/contact control	Project 04 Demolish/Rebuild Cryogenics Facility (Building 3245)
SS309P	Former FTA near the Antenna Farm (AFFF Area #8 FT092)	The site consists of locations that were used for fire training exercises during the late 1970s. Two fire training pits near the current Entomology Building area south of the Antenna Farm were used to burn unknown liquid wastes. AFFF may have been used to extinguish flames. Biosolids land spreading may also have occurred in this area and could be an additional source of PFAS.	PFOS in soil PFOA and PFOS in groundwater	Soil control Water use/contact control	Project 03 Construct New JROC
SS314P	AFFF Area #1, ANG Hangar (Building 1171)	Building 1171 is equipped with an AFFF fire suppression system including an 800-gallon tank of AFFF. There was a small amount of fire suppression discharged in the mechanical room (date unknown) with a possible release beyond the mechanical room door on the eastern side of the building.	PFOA/PFOS in groundwater (5.0 µg/L) Soil not sampled	Soil control Water use/contact control	Project 03 Construct New JROC

SITE NUMBER	SITE NAME	SITE DESCRIPTION	KEY COC/COPC(S)	ASSOCIATED LUCS/REMEDY	POTENTIALLY AFFECTED PROJECTS (ID AND NAME)
SS519	Facility 3426/Supply Facility	Contaminated soil was discovered during installation of subsurface utilities; however, the source has not yet been identified.	GRO, DRO, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,4-dichlorobenzene, 1-methylnaphthalene, 2-methylnaphthalene, ethylbenzene, naphthalene, and xylenes in soil (COPCs) DRO, RRO, 1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene in groundwater (COPCs)	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 3
SS521	Building 1161	During the installation of a communication line in 2000, petroleum hydrocarbon-contaminated soil was encountered in five general areas, including SS521.	PCP and metals in soil DRO, PCP, and total metals in groundwater	Soil control Water use/contact control	Project 03 Construct New JROC
SS534	Facility 1211	The site is the location of three aviation fuel/JP-8 fuel spills (2008, 2009, 2011).	DRO and benzo(a)pyrene in soil (COPCs)	Soil control Water use/contact control	Project 04 Demolish/Rebuild Cryogenics Facility (Building 3245)
SS535	Hydrant Fuel System Tank 5	Two JP-8 spills from Tank 5 have been reported in the containment area originating from fuel pipelines that connected Tank 5 to Building 1211.	DRO and benzene in soil DRO and arsenic in groundwater	Soil control Water use/contact control	Project 04 Demolish/Rebuild Cryogenics Facility (Building 3245)
ST011	Fuel-Saturated Area	The source area is associated with subsurface diesel fuel contamination associated with former Building 3224. This building was the Base Bakery from 1956-1977. The bakery used diesel-fired ovens fueled by a 4-inch pipeline, connected to several buried diesel tanks. The source of contamination is suspected subsurface leaks.	GRO, BTEX, tetrachloroethene, TCE, 1,2-dichloroethene, chloromethane, 1,2-dibromoethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, n-propylbenzene, sec-butylbenzene, naphthalene, methylene chloride, and lead in soil (COPCs) GRO, DRO, RRO, BTEX, 1,2-dibromoethane, 1,2,4-trimethylbenzene, n-propylbenzene, arsenic, and naphthalene in groundwater (COPCs) Pesticides, PCBs, total aromatic hydrocarbons, and total aqueous hydrocarbons in surface water (COPCs)	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425 Alternative 3
ST016	MOGAS Fuel Spill Line	In the 1950s, approximately 5,000 gallons of MOGAS were spilled at the carpentry shop.	GRO, DRO, BTEX, and VOCs	Soil control Water use/contact control	Project 05 Demolish/Rebuild Building 3425
ST048	Power Plant Spill Site	A multi-fuel pipeline carrying diesel and gasoline ran from bulk fuel storage tanks to the old military service station at the intersection of Division Street and Wabash Avenue. Contamination is attributed to leaks in the abandoned underground fuel system where it passes beneath Industrial Drive.	BTEX VOCs, GRO, DRO, RRO, EDB, PAHs, and lead in soil (COPCs) GRO, DRO, and benzene in groundwater (COPCs)	Soil control Water use/contact control	Project 02 Construct Addition to Coal Thaw Shed (Building 6203)
TU087	AGE UST Upgrade Building 1209	Contamination is the result of surface releases associated with refueling operations at the USTs and fuel dispensers.	PAHs	Soil control Water use/contact control	Project 04 Demolish/Rebuild Cryogenics Facility (Building 3245)
WP033	Treated Effluent	This is the site of a treated effluent infiltration pond constructed in 1978. The source of contamination is discharge of treated wastewater effluent directly to the vadose zone. Potential wastewater contaminants include a variety of chemicals and POL materials.	Toluene	Soil control Water use/contact control	Project 01 Hursey Gate Final Denial Barrier and Road
N/A	Basewide PFAS Plume	Basewide PFAS contamination of groundwater from AFFF releases.	PFAS in groundwater	Soil control Water use/contact control	All projects

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: EAFB 2021c, 2022b

3.7 BIOLOGICAL/NATURAL RESOURCES

3.7.1 Definition of Resource

3.7.1.1 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats in which they exist. Protected and sensitive biological resources include species designated by the USFWS and the NOAA-National Marine Fisheries Service (NMFS) under the ESA as endangered, threatened, or candidate; migratory birds protected under the Migratory Bird Treaty Act (MBTA); and bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA).

Sensitive habitats include designated ESA-protected critical habitat and sensitive ecological areas designated by state or other federal rulings; wetlands; plant communities that are unusual or limited in distribution; and areas of important seasonal use for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). Below is a detailed description of the regulatory framework used to evaluate the ROI and the potential impacts of the project alternatives.

Endangered Species Act

The ESA (16 USC 1531 *et seq.*) requires federal agencies, in consultation with the USFWS and NMFS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species, and prohibits any action that causes "take" of any listed animal. To take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct."

Under the provisions of Alaska Statute 16.20.190, the Alaska Department of Fish and Game (ADF&G) maintains the State Endangered Species List and oversees the listing and recovery of special-status fish and wildlife species (ADF&G 2023). Alaska's State Wildlife Action Plan (SWAP) is currently used by ADF&G to assess the needs of species with conservation concerns and to prioritize conservation actions and research (ADF&G 2015).

Migratory Bird Treaty Act and EO 13186

The MBTA of 1918 (16 USC 703-712), as amended, and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, require federal agencies to conserve migratory bird populations. Unless otherwise permitted by regulations, the MBTA makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, nest, or egg. Each federal agency that takes actions that could have measurable negative impacts to migratory birds is directed by EO 13186 to develop and implement a Memorandum of Understanding with USFWS to promote the conservation of migratory bird populations.

Bald and Golden Eagle Protection Act

The BGEPA (16 USC 668-668c) prohibits the "take" of bald or golden eagles in the U.S. without a 50 CFR 22.26 permit. BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" is defined as "to agitate or other a bald or golden eagle to a degree that causes or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition covers impacts from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

Sikes Act

The Sikes Act (16 USC 670a) applies to federal land under DoD control and, among other things, requires military services to establish INRMPs to conserve natural resources on military installations. INRMPs include inventories and evaluations of threatened and endangered species, other fish and wildlife resources, wetlands, migratory bird habitat, and forest lands on each installation. INRMPs assess the impact of military activities on natural resources and the means to mitigate these impacts. Coordination with USFWS and ADF&G ensures the INRMP complies with and supports federal and state natural resources-related laws and mandates. The INRMP includes habitat improvements or modifications, wildlife considerations in range rehabilitation, control of off-road vehicle traffic, consumptive and non-consumptive use and protection of fish and wildlife resources, natural resources law enforcement requirements, and designated responsibilities for the control and disposal of feral animals.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265) is the primary law that fosters the long-term biological and economic sustainability of marine fisheries in federal waters (NOAA 2023a). Its objectives include preventing overfishing, rebuilding overfished stocks, increasing long-term economic and social benefits, and ensuring a safe and sustainable supply of seafood.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 USC 1361 *et seq.*, as amended) established a federal responsibility to conserve marine mammals and associated essential habitats in U.S. waters by placing a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction. Management of the MMPA is vested in the NMFS for cetaceans (whales and dolphins) and for pinnipeds (seals and sea lions) other than walrus. The USFWS is responsible for other marine mammals, including sea otter, walrus, polar bear, dugong, and manatee.

3.7.1.2 Natural Resources

Natural resources are materials from the earth that are used to support life and meet people's needs by supplying food, fuel, and raw materials to produce goods. Natural resources at EAFB include water resources (wetlands, floodplains, surface waters, and groundwater, discussed in Section 3.4), gravel, coal, and training/recreational spaces.

CEQ Regulations (40 CFR 1502.16) require that federal agencies consider energy requirements, natural depletable resource requirements, and the conservation potential of alternatives and mitigation measures when evaluating a Proposed Action. Statutes and EOs related to natural resources and energy supply are found in Table 3.7-1.

Table 3.7-1 Natural Resources and Energy Supply Statutes and Executive Orders

STATUTE/EO	DESCRIPTION
EISA	Under this act (PL 110-140), federal agencies are required to take actions to move the U.S. toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy GHG capture and storage options, and to improve the energy performance of the federal government.
Energy Policy Act	The Energy Policy Act (42 USC 13201 *et seq.*) requires federal agencies to take actions to ensure jobs for our future with secure, affordable, and reliable energy. The Energy Policy Act contains provisions that address energy production, including energy efficiency; renewable energy; oil and gas; coal; Tribal energy; nuclear matters and security; vehicles and motor fuels; hydrogen; electricity; energy tax incentives; hydropower and geothermal energy; and climate change technology.
EO 13834	EO 13834, *Efficient Federal Operations*, requires federal agencies to meet energy and environmental performance statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. Agencies are tasked to prioritize actions that reduce waste, cut costs, and enhance the resilience of federal infrastructure and operations.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

3.7.2 Affected Environment

The ROI includes the portion of EAFB where construction, demolition, and renovation projects under the Proposed Action would occur on the installation.

3.7.2.1 Biological Resources

Vegetation

EAFB is in the Yukon-Tanana Uplands ecoregion, which is characterized by rounded mountains and hills of boreal forest or taiga habitats dominated by woodland evergreen species of black spruce (*Picea mariana*) and white spruce (*Picea glauca*). Large stands of deciduous forests that include balsam poplar (*Populus balsamifera*), paper birch (*Betula papyrifera*), and quaking aspen (*Populus tremuloides*) are found in boreal forests on and surrounding EAFB. Developed areas on EAFB have been planted with native and introduced plant species and are landscaped and maintained by the installation, which focuses on maintaining vegetation in early stages of succession to discourage wildlife use (EAFB 2023f).

Wildlife

A variety of bird, mammal, and fish species inhabit the ROI. EAFB is in the Tanana Valley, which provides habitat for year-round resident bird species as well as summer-breeding habitat for migratory bird species. Bird species occurring on EAFB include great horned owl (*Bubo virginianus*), northern goshawk (*Accipiter gentilis*), Canada goose (*Branta canadensis*) ruffed grouse (*Bonasa umbellus*), and willow ptarmigan (*Lagopus lagopus*). More than 30 mammal species have been identified at EAFB including moose (*Alces alces*), black bear (*Ursus americanus*), marten (*Martes americana*), red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), and beaver (*Castor canadensis*). Lakes, ponds, rivers, and streams are abundant in the Tanana Valley and provide aquatic habitat for multiple fish species, including king salmon (*Oncorhynchus tshawytscha*), rainbow trout (*Oncorhynchus mykiss*), Arctic grayling (*Thymallus arcticus*), and northern pike (*Esox Lucius*) (EAFB 2023f).

Protected and Sensitive Species

As of May 2023, there are 40 ESA-listed threatened or endangered species and one proposed threatened species in Alaska (USFWS 2023a; NOAA 2023b). There are no ESA-listed threatened or endangered plant or animal species and no designated critical habitat known or expected to occur in the ROI (USFWS 2023b), though the installation does provide habitat for the little brown bat (*Myotis lucifugus*), the northern bog lemming (*Synaptomus borealis*), and McKay's western bumble bee (*Bombus mckayi*), which are all currently under review for ESA listing (EAFB 2023f).

The State Endangered Species List currently includes two birds (short-tailed albatross [*Phoebastria albatrus*] and Eskimo curlew [*Numenius borealis*]) and three marine mammals (blue whale [*Balaenoptera musculus*], humpback whale [*Megaptera novaeangliae*], and right whale [*Eubalaena*]) (ADF&G 2023). These five state-listed species are also listed as endangered under the federal ESA. The Alaska SWAP contains a list of 138 Species of Greatest Conservation Need (SGCN) in the Central Alaska Bioregion, including fish, freshwater invertebrates, birds, amphibians, and mammals. The full list can be found on the ADF&G Threatened, Endangered, and Diversity Program webpage (ADF&G 2015).

Many migratory bird species have been observed at EAFB, which is along the migratory bird Pacific Flyway. MBTA-protected species that are known to EAFB include lesser yellowlegs (*Tringa flavipes*), solitary sandpiper (*Tringa solitaria*), Swainson's thrush (*Cathorus ustulatus*), American robin (*Turdus migratorius*), olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), bald eagle (*Haliaeetus leucocephalus*), and golden eagle (*Aquila chrysaetos*) (EAFB 2023f; USFWS 2023b). A full list of the most common MBTA-protected species found on the installation is available in Table 2-13 of the EAFB INRMP (EAFB 2023f). In addition to the MBTA, bald and golden eagles also receive protection under the BGEPA. The bald eagle has been observed at EAFB, though no nesting has been recorded (eBird 2023; NestWatch 2023).

3.7.2.2 Natural Resources

Timber

EAFB-managed lands include EAFB, C Battery, Chena River Research Site, Blair Lake Active Firing Range, and Birch Lake Recreation Area. Of the 57,507 acres managed by the installation, 44,627 acres are wetlands, and 46,533 are forested (EAFB 2023f). Most of the land managed by EAFB is relatively undisturbed and consists of a variety of natural resources that are typical of the broad river valleys of Interior Alaska. Surface water, in the form of wetlands, ponds, lakes, and streams, occurs throughout EAFB lands and dominates the landscape in the lowland areas. Much of the developed area at EAFB is within the 100- and 500-year floodplains of the Tanana River and its tributaries (EAFB 2023f; CSU 2023).

Gravel/Topsoil/Unclassified Material

Surface soil is unconsolidated silty sands and gravels, organic silts, and clays. Discontinuous permafrost occurs commonly in the upper soil layers and results in perched water lenses where wetlands are likely to form (refer to Section 3.9 for soil and soil impacts). Due to a generally shallow groundwater table, artificial lakes and ponds were created on EAFB during the excavation of gravel deposits for use as fill material for construction projects on-base. Lake development through gravel and topsoil extraction is still occurring at Mullins Pit and Cathers Lake (EAFB 2023f).

Coal

The coal-fired CH&PP, owned and operated by USAF, is the primary source of electrical power and heat for base facilities. The CH&PP has five burners that burn sub-bituminous coal, capable of 20 MWe per day, though it typically produces about 16 to 17 megawatts (MW) per day during winter months (EAFB 2023p). This coal is transported by rail from the Usibelli Coal Mine, located approximately 75 miles southwest of EAFB as the crow flies (Koenig 2018). A small amount of power is purchased from Golden Valley Electric Association (USAF 2016).

Petroleum

The 168 WG is the premier workhorse tanker unit of the Pacific Rim. The 168 WG aircrews annually transfer more than 17 million pounds of fuel in flight primarily to Active-Duty aircraft on operational missions (EAFB 2023f) and operates nine KC-135Rs as mission critical aircraft (eight PAA and one Backup Aircraft Inventory) (USAF 2016).

EAFB has approximately 113 aboveground fuel storage tanks and 53 underground fuel storage tanks (166 tanks total) with a capacity of 500 gallons or more. The base has bulk storage capacity for 28 million gallons of jet fuel (JP-8) and has a direct pipeline connection to a refinery in North Pole. There is an additional 533,000 gallons in the piping inventory. The liquid fuels infrastructure is a mission critical function at EAFB, and the POL system is robust due to the current missions and support for F-16C/Ds, F-35As, KC-135Rs, aerospace ground equipment (AGE; such as hydraulic test stands, cargo and bomb lifts, jacking units, aircraft de-icers, tractors, tugs, and other service equipment) and non-road equipment (i.e., mobile sources) such as industrial equipment, lawn and garden equipment, agriculture equipment, and recreational vehicles. Non-road equipment on EAFB use diesel fuel, with the exception of riding mowers (three units) and Polaris Ranger snowmachines (three units) (EAFB 2019b).

Training and Recreational Spaces

USAF uses natural areas as a buffer for airfield activities while Detachment 1, 66th Training Squadron uses natural areas to conduct survival training exercises. On EAFB-managed lands, there are outdoor recreation areas, natural environment areas, and areas of historical or ecological significance. With some exceptions, the outdoor recreation resources of EAFB are open to the general public within the constraints of the military mission requirements for security, public health, and safety. Hunting, fishing, and trapping are allowed in accordance with federal and state hunting, fishing, and trapping regulations, seasons, and bag limits.

The outdoor recreation program is coordinated with the mission and other natural resource uses. Recreation is prohibited on land used for mission purposes (airfield, rifle range and impact areas, ammunition storage, etc.) for safety, public health, and security reasons. The mission and outdoor recreation are compatible on other lands; however, in the event of a military exercise, outdoor recreation may be prohibited for a short time. If possible, prime outdoor recreation lands are not used for training exercises or new mission requirements. In areas used primarily for outdoor recreation (campgrounds, picnic sites, ski areas, parkours courses, nature trails, etc.), the use of other natural resources may be modified. Natural resources within the training areas supporting live and inert ordnance and munitions employment are managed by the U.S. Army Garrison FWA under their 2020 INRMP and the Draft EAFB 2023 INRMP (EAFB 2023f).

Timber cutting near recreational areas may be prohibited. Cutting, if allowed, would be restricted to selective or sanitation cuts. Buffer zones would be required around any timber sale near a recreational area. In wildlife viewing areas, trapping and/or hunting might not be allowed. Some forms of recreation may be prohibited in wildlife management areas. Mission-related natural resource use should complement rather than be detrimental to the outdoor recreational program and vice versa.

3.7.3 Environmental Consequences

3.7.3.1 Proposed Action

Biological Resources

Vegetation

Project 01 would require removal of up to an estimated 130,700 square feet (3 acres) of black spruce forest. This represents a fraction of the forested land in this region and a negligible amount of vegetation loss when compared to the entire unimproved areas on the installation (approximately 70%). Project 05 would disturb approximately 535,000 square feet (12 acres) or 611,000 square feet (14 acres) of vegetation, depending on which alternative is selected (refer to Section 2.3.5). In either case, the majority of the disturbed area would consist of landscaped grasses, while the remainder would consist of black spruce, balsam fir, and shrub species.

Long-term, negligible to minor, direct adverse impacts to vegetation would occur in areas where vegetation is removed to make room for new construction. Short-term, minor, direct adverse impacts to vegetation would occur in areas where machinery and equipment are staged or operated. Impacted grass areas would be re-seeded using 50%-50% Kentucky bluegrass (*Poa pratensis*) and creeping red fescue (*Festuca rubra*) as authorized by the INRMP (EAFB 2023f).

Based on this analysis, no significant impacts to vegetation would occur under the Proposed Action.

Wildlife

DNL noise levels and noise contours would not change under the Proposed Action and would therefore have no impacts to wildlife.

Short- and long-term, minor to moderate, direct adverse impacts to wildlife inhabiting nearby areas could occur from increased noise levels and human activity. Wildlife could be startled and temporarily displaced in these circumstances. Tree felling would cause permanent displacement of wildlife. In such instances, it is expected that wildlife would use adjacent habitat. The impacted forest represents a negligible amount of habitat loss when compared to the entire unimproved areas on the installation.

Protected and Sensitive Species

A species list was requested from the USFWS via the Information for Planning and Conservation tool (IPaC) on 23 May 2023 (Appendix A). There are no listed threatened or endangered species or critical habitat present in the ROI; therefore, no significant impacts to ESA-listed species would occur and consultation under Section 7 of the ESA is not required. USAF submitted their determination of no effect to USFWS for review on 23 October 2023.

Objective 4.1 of the EAFB INRMP is to monitor for the presence of listed or proposed threatened and endangered species and critical habitats and other special-status species on EAFB-managed lands. Should any threatened or endangered species become resident to EAFB-managed lands, consultation with the USFWS would be initiated (EAFB 2023f).

It is unlikely that SGCN identified in the SWAP are present in previously developed areas where construction would occur. The exception is Project 01, which would require tree clearing in the black spruce forest west of Hursey Gate. Wildlife species in this area would be subjected to short- and long-term, minor to moderate, direct adverse impacts from increased noise levels, human activity, and tree removal. Because the Proposed Action would not result in a decrease in species population abundance, fitness, or distribution within the region; nor in a disproportionate reduction in habitat quantity or quality; nor permanent loss of irreplaceable high-quality wildlife habitat, no significant impacts to state protected and sensitive species would occur.

Four bird species of conservation concern that may breed and nest in the ROI were identified by USFWS: lesser yellowlegs, olive-sided flycatcher, bald eagle, and golden eagle (USFWS 2023b). The latter two are also protected under the BGEPA. The breeding seasons of each species are presented in Table 3.7-2.

Table 3.7-2 Breeding Seasons of Birds that May Nest on Eielson Air Force Base

SPECIES	BREEDING SEASON
Lesser yellowlegs	May – August
Olive-sided flycatcher	May – August
Bald eagle	February – September
Golden eagle	January – August

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: USFWS 2023b

Birds are known to be sensitive to disturbances during nesting season and could experience short- and long-term, minor, direct adverse impacts from increased noise levels, human activity, and tree removal. Significant adverse impacts to eagles or other bird species are not anticipated because (1) most of the Proposed Action would occur in already developed and/or disturbed areas; (2) the majority of habitat to be removed is not suitable for nesting; and (3) there is abundant habitat in the adjacent Tanana River Valley to support these species.

The MBTA has no provision for allowing take of migratory birds by otherwise lawful activities. To avoid direct adverse impacts to nesting birds, vegetation removal from suitable nesting habitat should occur outside of the nesting season (EAFB 2023f). Additionally, USAF would follow USFWS Nationwide Standard Conservation Measures to minimize impacts to birds and their habitats, including (USFWS 2015):

1. Prior to removal of an inactive nest, ensure that the nest is not protected under the ESA or the BGEPA. Nests protected under these acts cannot be removed without a valid permit.
2. Do not collect birds (live or dead) or their parts (e.g., feathers) or nests without a valid permit.
3. Implement standard soil erosion and dust control measures such as establishing vegetation cover to stabilize soil; using erosion blankets to prevent soil loss; and watering bare soil to prevent wind erosion and dust issues.
4. Schedule all vegetation removal, trimming, and grading of vegetated areas outside of the peak bird breeding season to the maximum extent practicable.
5. When project activities cannot occur outside the bird nesting season, conduct surveys prior to scheduled activity to determine if active nests are present within the area of impact and buffer any nesting locations found during surveys.

a. If active nests or breeding behavior (e.g., courtship, nest building, territorial defense, etc.) are detected during these surveys, no vegetation removal should be conducted until nestlings have fledged, the nest fails, or breeding behaviors are no longer observed.

b. If the activity must occur, coordinate with the USFWS Northern Alaska Field Office to establish a buffer zone around the nest, and no activities will occur within that zone until nestlings have fledged and left the nest area.

6. Prepare a vegetation maintenance plan that outlines vegetation maintenance activities and schedules so that direct bird impacts do not occur.

In summary, the Proposed Action would not result in significant adverse impacts to bald and golden eagles and other migratory birds with ranges extending into the ROI. USAF prepared a letter to inform the USFWS of the Proposed Action and the determination of “may affect, but not likely to adversely affect” for protected bird species (Appendix A).

There is no designated Essential Fish Habitat (EFH) or marine mammals in the ROI (NOAA 2023c, 2023d); therefore, the Proposed Action would have no impact to EFH or marine mammals.

Natural Resources

Timber

The 354 CES manages the personal use firewood program on EAFB. Present demand for commercial timber includes white spruce and paper birch for fuel wood and white spruce and black spruce for Christmas trees (EAFB 2023f). It is estimated that 130,700 square feet (3 acres) of black spruce forest on EAFB would be removed south of Hursey Gate to reconfigure access and traffic flow as part of Project 01 under the Proposed Action. None of this timber is managed for commercial use, and its removal would have no impacts to on-base timber resources.

Project 01 would result in short-term, minor, direct adverse impacts to commercial timber resources. None of the timber required for construction would be sourced from EAFB’s firewood or Christmas tree programs. Construction materials for the remaining structures would originate from non-timber-based sources (e.g., pre-engineered metal buildings). Any increase in demand for commercial timber unrelated to the Proposed Action would be evaluated under a separate NEPA analysis as needed per the EAFB INRMP.

Gravel/Topsoil/Unclassified Material

The Proposed Action would result in short-term, minor, direct adverse impacts to gravel resources due to the increased demand for construction materials. This would also result in short-term, minor, direct beneficial impacts to the local economy. Borrow pit resources expected to be substantially depleted, and long-term borrow pit management, to include extraction, mowing, and wildlife (game/non-game) species management would not change. For these reasons, no significant adverse impacts to gravel resources would occur.

Coal

Projects 02 and 03 would have long-term, minor to moderate, direct adverse impacts to energy consumption due to the electrical and heating requirements of the Coal Thaw Shed addition and the increased electrical demand required to operate the new JROC and keep the facility’s data server systems cool. Other structures under the Proposed Action would not require additional energy consumption and would have long-term, minor to moderate, direct beneficial impacts from similar administrative and engineering controls designed to maximize performance and reduce costs.

Steam heat and electricity are produced by EAFB's CH&PP. Winter coal demand has averaged 800 tons of coal per day supplied by eight 100-ton railcars for approximately the past 20 years (Eielson 2021f). The Proposed Action would not require additional coal burning. Project 02 would extend the existing Coal Thaw Shed and provide space for at least 20 rail cars per day. The extension would allow more coal to thaw inside making reserves are available for burning when needed. Otherwise, the cars would remain outside for up to a week at a time before being maneuvered into the shed where frozen chunks chipped from inside the railcars may not fit through the initial screen process without first breaking apart. The safety implications associated with this task are discussed in Section 3.5.

Per Pacific Air Forces (PACAF) requirements, the JROC facility should meet UFC 1-200-02 requirements to achieve optimal system performance and maximum energy savings (EAFB 2019d) and would contain a building energy control system to provide lower operating costs and ease of operation.

Petroleum

Projects identified for the Proposed Action do not represent any net gain or change to the existing EAFB population; therefore, gasoline consumption for civilian personnel and military personnel and their dependents is expected to remain at current levels and would not be impacted by the Proposed Action. Diesel is the least-used petroleum fuel at EAFB. Diesel demand may increase temporarily due to diesel-powered vehicle use during construction seasons or standard garden/commercial equipment use, which would have short-term, negligible, direct adverse impacts to petroleum resources. Demand would return to pre-construction rates post-implementation.

No generators or fuel tanks are required for any of the proposed new buildings, and the Proposed Action does not require fuel for aircraft exercises or ongoing operations. Petroleum product consumption beyond baseline levels necessary to support standard operations would not be expected to exceed refinery capacity in North Pole or surpass established fuel consumption limits for EAFB. For these reasons, no significant adverse impacts to petroleum resources would occur.

Training and Recreational Spaces

The Proposed Action would result in long-term, substantial, direct beneficial impacts to training spaces. The proposed JROC facility would provide additional space necessary to host and manage combat training exercises (EAFB 2019d), supporting a maximum of 1,400 visiting personnel and participants (EAFB 2023l). The Proposed Action would not contribute to long-term population or personnel growth at EAFB, as temporary increases in the base population during training exercises would not permanently alter, degrade, or impair training and recreational spaces.

If factors unrelated to the Proposed Action caused user demand to exceed a particular recreation resource supply, public access would be limited via a permit or user fee, or a reservation system would be established to control and disperse use over the resource base. If additional resources were necessary to meet the potential demand, such development would be evaluated in a separate NEPA analysis (EAFB 2023f). Because there are no anticipated population gains or increases in demand for training and recreational spaces, the Proposed Action would not have significant adverse impacts.

3.7.3.2 No Action Alternative

Biological Resources

It is presumed that over time, limited construction would occur within previously developed areas on the installation. There would be no change in aircraft numbers or to existing aircraft operations. No high value habitat would be disturbed, and changes to the baseline noise environment would be temporary, resulting in short-term, negligible, direct adverse impacts to wildlife and birds. Impacts to nesting birds are not anticipated; however, if vegetation were removed from suitable nesting habitat, procedures for minimizing bird impacts would be identified and communicated to the appropriate personnel by the Eielson Natural/Cultural Resources Office. There are no listed threatened or endangered species or critical habitat present in the ROI; and it is unlikely that SGCN identified in the SWAP would be present during construction, because such activities would likely occur on previously developed portions of EAFB that do not contain suitable habitat. Direct adverse impacts to sensitive or protected species would be short-term and negligible. Vegetation in developed areas of EAFB consists mostly of grassy areas that have been improved or landscaped and are regularly maintained. Impacted grass areas would be re-seeded with approved seed mixes and impacted forest areas would be allowed to re-seed naturally. Short-term, negligible, direct adverse impacts to vegetation would occur in such cases. For these reasons, no significant adverse impacts to biological resources are anticipated from implementing the No Action Alternative.

Natural Resources

The demand for natural resources such as timber, gravel, coal, and petroleum products would remain at baseline levels, which currently do not exceed and are not anticipated to exceed supply. It is presumed that other on-base improvements would continue regardless of whether the Proposed Action were implemented. Any new construction would result in an increase in demand for natural resources.

Short- to long-term, moderate, direct adverse impacts to timber resources would occur with increased timber demand affecting timber supply. Any adverse impacts to timber resources on EAFB would be mitigated by USAF to the extent practicable through forestry techniques established in the INRMP and would not be significant in the long-term.

Short-term, moderate, direct adverse impacts to construction material resources would occur from borrow pit extraction gradually until supplies are depleted. This would not represent a significant impact to overall supply in the area. USAF would consider alternative methods for obtaining gravel, topsoil, and unclassified materials for construction, such as alternate sources on the installation and local suppliers. If the latter option were pursued, this would result in a significant long-term beneficial impact to the local economy.

Long-term, minor, direct adverse impacts to coal resources would occur from day-to-day installation operations requiring energy consumption. Coal reserves are plentiful in Central Alaska, and it is not anticipated that future on-base improvements would drive the demand for this resource beyond the supply; therefore, impacts to coal resources would not be significant. The inability to thaw additional coal and maintain reserves would create short-term, minor to moderate, indirect adverse impacts during winter and other periods of increased coal consumption.

Long-term, minor, direct adverse impacts to petroleum resources would occur from day-to-day installation operations requiring fuel consumption. Diesel is mainly used for non-road vehicles and equipment on EAFB. While diesel fuel consumption is expected to increase over time, there is no indication that the demand could not be met by suppliers in the area. The same is true for gasoline and JP-8 fuel. For these reasons, significant adverse impacts to petroleum resources are not expected.

Long-term, negligible to minor, indirect adverse impacts to training and recreational spaces would occur from changes in base personnel and mission priorities. It is unlikely that there would be an increase in base personnel to a degree that the demand for training and recreational spaces would adversely impact these resources. If this were to occur, additional facilities would be constructed, or existing spaces would be reorganized; therefore, significant adverse impacts to training and recreational spaces are not expected.

Based on this analysis, there would be no significant adverse impacts to natural resources from the No Action Alternative.

3.7.4 Cumulative Impacts

3.7.4.1 Biological Resources

Short-term, minor, adverse cumulative impacts to wildlife would occur from noise associated with the Proposed Action and other planned actions at EAFB. Disturbance would be greatest for simultaneous construction projects occurring in the same general vicinity. Mortality of small, less-mobile species (e.g., small mammals) could occur from collisions with heavy equipment. When effects from planned projects are considered cumulatively, substantial long-term reductions in species populations would not be expected, given that development would primarily occur in areas that have already been disturbed and where wildlife habitat is marginal. The majority of the affected areas on-base currently contain low-quality habitat for common species. Short- to long-term, negligible, adverse cumulative impacts to vegetation would occur during project staging or construction. Impacted grass areas around the installation are maintained seasonally. Tree clearing would represent a fraction of the forested land in this region and a negligible amount of vegetation loss when compared to the entire unimproved areas on the installation. For these reasons, significant adverse cumulative impacts to biological resources would not be expected.

3.7.4.2 Natural Resources

Timber harvest demand may increase over time with the addition of Active-Duty personnel and their dependents. This represents a long-term, minor to moderate, direct adverse impact to timber resources and potentially to the scenic qualities of recreational areas on the installation; however, this would be mitigated by modifying the 2023 INRMP to maintain productivity while also following Alaska Division of Forestry guidelines for rotation age and maintaining the scenic beauty of recreational areas on EAFB.

Base improvements and developments are expected to increase. Naturally occurring construction materials such as gravel, topsoil, and unclassified material from existing borrow pits would be used when possible. Over time, this demand may exceed the available on-base supply. It may then be feasible to consider creating new borrow pits, revisiting historical borrow pits, or ceasing to gather on-base materials. The decision would take USAF objectives into consideration while weighing them against the potential for adverse effects to the environment. There are numerous commercial sources of these materials within the vicinity of EAFB, and the nature of the unconsolidated materials in the Tanana and Chena River floodplains is such that regional availability is not a concern. No significant adverse impacts to naturally occurring construction material resources would occur under the Proposed Action by exceeding the supply of active borrow pits.

No net increase in population is associated with the Proposed Action; therefore, demand for coal resources is not expected to increase as a result of C&D. However, Project 02 would contribute to improved CH&PP operations and efficiency necessary to meet the installation's growing energy demand attributable to mission-driven changes (EAFB 2021f). Usibelli Coal's active mines represent a combined yield of 270 million tons of coal in addition to its two future reserves: Rosalie Mine and Wishbone Hill Mine. These are not actively being mined but Wishbone Hill is currently permitted and undergoing a feasibility study update (Usibelli 2023). Although the number of rail cars necessary to thaw enough coal to meet demand is expected to increase from eight to ten cars, it is not anticipated that the Proposed Action, in conjunction with other future projects on the installation, would contribute to a cumulative increase in coal demand beyond the capabilities of the Usibelli Coal Mine to supply. No significant adverse impacts to coal resources would occur under the Proposed Action.

EAFB's energy use is approaching its heat load limit (personal communication, 3 May 2023). A turbine replacement project has been discussed as a foreseeable future action which would improve electricity efficiency and alleviate pressure on the current heat load. If additional resources were necessary to meet the potential demand, such development would be evaluated in a separate NEPA analysis (EAFB 2023f).

Short-term, negligible, adverse cumulative impacts to petroleum resources could occur from construction equipment and an influx of vehicles accessing EAFB during project implementation. Usage levels would return to normal following completion of the Proposed Action. Demand for diesel and gasoline would presumably increase in tandem with future base population growth; however, this would not be expected to present a significant drain on available petroleum resources in Central Alaska.

The 2019 National Defense Authorization Act (NDAA) required the Secretary of Energy to report on a pilot program to provide resilience for DoD facilities by contracting with a commercial entity to build and operate at least one licensed nuclear micro-reactor by 31 December 2027 (USAF Office of the Deputy Assistant Secretary for Environment, Safety, and Infrastructure [SAF/IE] 2021a; Conca 2021). EO 13972, Promoting Small Modular Reactors for National Defense and Space Exploration, outlined requirements for micro-reactor development specifically within the DoD. In October 2021, USAF announced EAFB as the installation to pilot its first micro-reactor. EAFB was selected in part due to its resilient power needs for mission assurance, limited access to clean energy, existing energy infrastructure, and compatible climate. Construction of the new micro-reactor is anticipated to begin in 2027 (SAF/IE 2021a, 2021b). The Micro-Reactor Pilot Project is not connected to the Proposed Action; however, because the project is planned to occur in the ROI in the next 5 years, the potential cumulative impacts to natural resources from both the Proposed Action and the micro-reactor project are analyzed in this section.

The micro-reactor would be commercially owned and operated, and licensed by the U.S. Nuclear Regulatory Commission (EAFB 2021g). Components of the micro-reactor would be assembled in a factory and shipped out to siting locations via truck, shipping vessel, airplane, or railcar. Although the exact micro-reactor design had not yet been selected as of April 2022, most micro-reactor designs are powered by uranium-235 (U.S. Department of Energy 2021). There would be no demand for natural resources in the ROI. The micro-reactor technology for the pilot is expected to have the capacity to produce up to 5 thermal megawatts (MWt) per day that could be used directly as heat or converted to electric power capacity (MWe) to supplement current installation energy sources as a redundant resilience measure. This energy resilience would be provided without additional dependence on fossil fuels. The reactor would only serve the installation and would not be connected to the commercial grid; however, should the asset ever be connected to the grid, its relatively small scale would not disrupt coal plant demand (SAF/IE 2021b).

In summary, no significant adverse cumulative impacts to natural resources would occur.

3.8 CULTURAL RESOURCES

3.8.1 Definition of Resource

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 Native American and Alaska Native sacred sites and Traditional Cultural Properties (TCPs).

Potential cultural resource impacts are addressed by Section 106 of the NHPA (54 USC 300101 *et seq.*), which requires federal agencies to consider effects to "historic properties" from an undertaking. Historic properties are defined (54 USC 300308) 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 specific criteria of the NHPA and associated regulations. The Section 106 process is set forth in 36 CFR 800 "Protection of Historic Properties." Per AFMAN 32-7003 and 36 CFR 800.8, EAFB coordinates NEPA compliance with its NHPA responsibilities to ensure that historic properties and cultural resources are given adequate consideration during project planning. This analysis incorporates Section 106 review into the NEPA process.

3.8.2 Affected Environment

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. The APE is determined by the scale and nature of the undertaking and may be different for different kinds of effects caused by project activities. For the purposes of this analysis, the term APE is synonymous with ROI.

USAF has defined the APE for direct effects to historic properties as the specific footprint areas impacted by the five distinct projects, as shown on Figure 2.1-1.

For architectural resources, the APE includes a buffer to account for auditory or visual impacts. The APE for indirect effects is defined as a 1,000-foot buffer around individual project areas. Given the auditory and visual environment of an active Air Force Base (AFB), this buffer should capture locations from which individual project construction or demolition may be visible or audible. As there would be no change to airspace use or flight patterns from the Proposed Action, the APE for this analysis does not include airspace (refer to USAF 2013 and USAF 2016 for a detailed discussion of airspace impacts for aircraft operating out of EAFB).

As discussed in the following sections, within the APE there are three NRHP-eligible historic buildings and no NHRP-eligible archaeological or sacred sites or locations of traditional cultural importance.

3.8.2.1 Archaeological Resources

Gerlach, Bowers, McIntosh, and Mason completed an intensive archaeological survey of EAFB in 1996 (EAFB 2019c). Their efforts included developing a predictive model, intensive systematic pedestrian survey, and subsurface testing including 2,192 soil probes, 465 shovel tests, and several 1- by 2-meter excavation units. Despite these extensive efforts, no archaeological remains or other physical evidence of prehistoric or non-military historic land use by Athabaskans or Euro-Americans was identified. Based on these results, "EAFB has effectively met inventory responsibilities and obligations regarding the ID and assessment of significant archaeological and prehistoric resources" (EAFB 2019c: 55), and the APE contains no known archaeological sites.

3.8.2.2 Architectural Resources

Several building evaluations have been completed at EAFB (e.g., Maggioni and Bowman 2018; McCroskey 2002, 2004a, 2004b; EAFB 2019c; USAF 2016). There is one historic district identified in EAFB's airfield area. Adjacent to Project 03's APE is the EAFB Flightline Historic District (HD), which consists of 19 contributing elements (18 buildings and 1 structure—the airfield runway) and is registered as FAI-01584 with the Alaska Heritage Resource Survey (AHRS), the statewide database of cultural resources maintained by the Alaska Office of History and Archaeology (OHA). The Flightline HD played a central role in bomber deployment and Arctic observation missions during the Cold War period between 1947 and 1960. These missions were central to national strategy regarding worldwide nuclear proliferation, national defense, nuclear strikes, and retaliation. USAF determined the Flightline HD as NRHP-eligible under Criteria A and G, with Alaska SHPO concurrence in 2003 (EAFB 2019c).

Multiple historic properties—buildings that are eligible for the NRHP and contributing elements to the Flightline HD—are located within the direct or indirect APE for Project 03. These are:

1. **Building 3112, Amber Hall/Offices (FAI-00769):** A 143,852-square-foot office building built in 1952. Amber Hall was originally a dormitory and is a contributing element to the Flightline HD, but not individually eligible for the NRHP. Amber Hall is situated approximately 100 feet from the proposed JROC location.
2. **Building 1141, Aircraft Maintenance Shop (FAI-00659):** A 35,107-square-foot rectangular concrete block building built in 1954. The aircraft maintenance shop is a contributing element to the Flightline HD, but not individually eligible for the NRHP. The aircraft maintenance shop is situated approximately 100 feet from the proposed JROC location.
3. **Building 1140, Strategic Air Command (SAC) Hangar/RED FLAG-Alaska (FAI-00658):** A 90,000-square-foot hangar built in 1954 for aircraft supporting SAC bomber operations. It is a contributing element to the Flightline HD and individually eligible for the NRHP because of its direct association with forward bomber operations during the Cold War. The former SAC hangar is situated approximately 350 feet from the proposed JROC location.
4. **Buildings 1133–1136, "Seaweed Storage" (FAI-00651–FAI-00654):** Four of ten 8,040-square-foot Butler Company Model #2 storage warehouses built in 1953. Because the final design and footprint of the JROC building is not yet complete, these buildings may be outside of the 1,000-foot APE but may also experience audio and/or visual impacts. They are contributing elements to the Flightline HD, but not individually eligible for the NRHP. The buildings are situated approximately 750 to 900 feet from the proposed JROC location.

In addition to these historic properties, there are AHRS sites within the indirect APE for Project 01: The Richardson Highway, which runs 365 miles from Valdez to Fairbanks and was completed in 1910, passes within 1,000 feet of the Hursey Gate FDB and road. However, this portion of the highway (miles 329.2 to 362; FAI-02328) is designated as Interstate Highway System and is exempt from Section 106 review (ADNR OHA 2023). The Alaska Military Highway Telephone and Telegraph Line built in 1942/1943 (FAI-01752) also passes within the APE, but it has been designated as not eligible (Bittner 2019). As the Richardson Highway segment here is exempt from Section 106 review and FAI-01752 is not a historic property, the aforementioned sites warrant no further consideration of project impacts.

Two additional historic districts have been identified at EAFB: (1) the Quarry Hill Munitions District (FAI-01766) and (2) the Engineer Hill Munitions District (XBD-00233). These munitions storage facilities were associated with Cold War strategic bomber response and rapid deployment. They are both managed under the Program Comment for World War II and Cold War Era (1939 to 1974) Ammunition Storage Facilities between DoD and the ACHP (2006). Quarry Hill is 3 miles away from the APE; Engineer Hill is 6 miles distant.

No other buildings older than 50 years have been identified as NRHP-eligible. Of the buildings at EAFB dating to the Cold War era that are younger than 50 years, none appear to have the exceptional significance necessary to achieve NRHP eligibility (EAFB 2019c).

3.8.2.3 Traditional/Alaska Native Resources

Six Federally Recognized Tribes may have ancestral ties to EAFB lands: (1) Healy Lake Village; (2) Northway Village; (3) Village of Dot Lake; (4) Native Village of Tanacross; (5) Native Village of Tetlin; and (6) Nenana Native Association. USAF consulted with these Tribes on a government-to-government basis and as part of the Section 106 process per DoDI 4710.02 and AFI 90-2002. Additional Alaska Native organizations coordinated with include Doyon, Limited; the Tanana Chiefs Conference; and the Fairbanks Native Association. Table 5-1 lists these organizations, and Appendix A provides consultation correspondence. No TCPs, sacred sites, or sites of traditional cultural importance have been identified on EAFB.

3.8.3 Environmental Consequences

Impacts to cultural resources can occur by physically altering, damaging, or destroying a resource or by altering characteristics 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, historic properties are subject to the criteria of adverse effect found at 36 CFR 800.5. An adverse effect to historic properties occurs when an undertaking or action alters, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. Adverse effects can include: (1) physical destruction of or damage to all or part of the property; (2) alteration of a property, including restoration, rehabilitation, repair, maintenance, and stabilization; (3) removal of the property from its historic location; (4) change of character in the property's use or of physical features within the property's setting that contribute to its historic significance; and (5) introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features. If an undertaking directly or indirectly affects a property in a manner that does not permanently alter its integrity or NRHP eligibility, then it is not considered an adverse effect. USAF defines an adverse effect as an indicator of a significant impact.

3.8.3.1 Proposed Action

No significant impacts to architectural resources that qualify as historic properties would occur as a result of the Proposed Action. Table 3.8-1 lists the NRHP status of facilities that would experience additions, alterations, or demolition as part of the Proposed Action. None rise to the level of exceptional significance required for NRHP eligibility for properties less than 50 years old (NPS 1997, 1998). None are contributing elements to the Flightline HD (EAFB 2019c). Modifications to or demolitions of these buildings would not constitute direct effects to historic properties.

As shown in Table 3.8-2, for development associated with Project 03 of the Proposed Action, the nearest contributing elements are Building 3112, Amber Hall, and Building 1141, the F-35 Aircraft Maintenance Operation Center, listed with the AHRS as sites FAI-00769 and FAI-00659, respectively. Behind Building 1141 is Building 1140, the former SAC hangar listed as AHRS site FAI-00658. Buildings 1133 through 1136, known as "Seaweed Storage" (AHRS sites FAI-00651 through 00654), are also potentially within the 1,000-foot APE, depending on the final layout of the proposed JROC facility. They are included for the potential for audio and/or visual impacts. The current facility (Building 1151) is not historic but may be impacted.

Table 3.8-1 National Register of Historic Places Status of Facilities Proposed for Additions, Alterations, or Demolition

PROJECT ID	PROJECT NAME	AHRS NUMBER	YEAR BUILT	NRHP ELIGIBILITY
01	Construct Hursey Gate Final Denial Barrier and Road (Buildings 1099 & 2069)	NA	2006	Not Eligible
02	Construct Addition to Coal Thaw Shed (Building 6203)	FAI-01187	1953	Not Eligible
04	Demolish/Rebuild Cryogenics Facility (Building 3245)	FAI-02474	1962	Not Eligible
05	Demolish/Rebuild Building 3425	FAI-00615	1953	Not Eligible

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

Table 3.8-2 Historic Properties within 1,000 Feet of Proposed Action Projects

PROJECT ID	NEAREST HISTORIC DISTRICT CONTRIBUTING ELEMENT/HISTORIC PROPERTY	DISTANCE (feet)
03	Building 3112 (Amber Hall/FAI-00769)	100
	Building 1141 (Aircraft Maintenance Shop/FAI-00659)	100
	Building 1140 (Former SAC Hangar/FAI-00658)	350
	Buildings 1133–1136 (Storage/FAI-00651–00654)	750–900

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

While construction associated with the Proposed Action could be seen and heard from these nearby historic properties, noise and visual impacts would be minor and temporary. They would not permanently affect integrity or characteristics that make the buildings or the Flightline HD eligible for inclusion on the NRHP. Setting and feeling would remain consistent with that of an active military base and would not be adversely impacted. Land use setting would remain consistent with intended use on a military facility. Thus, while during construction there might be short-term, minor adverse auditory and visual impacts to Eielson Flightline HD contributing elements from Project 03 of the Proposed Action, these would not be considered significant.

Based on previous building evaluations (EAFB 2019c), no historic properties are within 1,000 feet of Project 01. The Richardson Highway passes within 1,000 feet of the project area. However, this portion (FAI-02328) is designated as Interstate Highway System and is exempt from Section 106 review (ANDR OHA 2023). The Alaska Military Highway Telephone and Telegraph Line built in 1942/1943 (FAI-01752) also passes within the APE, but it has been designated as not eligible (Bittner 2019).

No historic properties are within the APE of Project 02, Project 04, or Project 05 (including any Project 05 alternative rebuild sites).

No other buildings older than 50 years have been identified as NRHP-eligible. Of the buildings at EAFB dating to the Cold War era that are younger than 50 years, none appear to have the exceptional significance necessary to achieve NRHP eligibility (EAFB 2019c).

No significant impacts to archaeological or traditional resources would occur because no such properties have been identified within the various project APEs. Ground-disturbing activities would occur in previously disturbed areas in the main installation area, and it is highly unlikely that any previously undocumented archaeological resources would be encountered during facility construction, demolition, and/or renovation. In the event of an unanticipated or inadvertent discovery, USAF would comply with Section 106, as specified in standard operating procedures described in the EAFB Integrated Cultural Resources Management Plan (ICRMP).

Based on this analysis, no significant impacts to cultural resources would occur as a result of the Proposed Action. Under Section 106, EAFB consulted with the Alaska SHPO, who concurred with the finding of no adverse effect on historic properties (Appendix A).

3.8.3.2 No Action Alternative

No significant adverse impacts to cultural resources would occur under the No Action Alternative, as the Proposed Action would not be implemented. The general trend of base development would likely continue, and USAF would continue to construct, demolish, and renovate facilities as aging infrastructure is replaced or upgraded to meet evolving needs. The USAF would continue to comply with the Section 106 process, the regulations set forth at 36 CFR 800, procedures in AFI 32-7605, and standard operating procedures in the EAFB ICRMP for these types of projects.

3.8.4 Cumulative Impacts

Damage to the nature, integrity, and spatial context of cultural resources can have a cumulative adverse impact if the initial act is compounded by other similar losses or impacts. The alteration or damage to historic properties may incrementally impact cultural resources in the region.

No significant cumulative adverse impacts to cultural resources would be anticipated from the Proposed Action. Past actions have been conducted in accordance with Section 106 to mitigate adverse effects. Any present and/or future actions would also require implementation and completion of the Section 106 process.

If adverse effects to cultural resources are anticipated from the Proposed Action, or other actions, adherence to the Section 106 process, the regulations set forth at 36 CFR 800, procedures in AFI 32-7605, and standard operating procedures in the EAFB ICRMP would be followed to mitigate these impacts. Similarly, if adverse effects are anticipated to occur to resources outside of EAFB, and the project is considered a federal undertaking, compliance with the Section 106 process would also be required, with the procedures codified in 36 CFR 800 to mitigate adverse impacts. If the Section 106 process were followed during individual projects, any potential adverse impacts would be resolved and, as a result, no significant adverse impacts to cultural resources would be anticipated.

3.9 EARTH RESOURCES

3.9.1 Definition of Resource

Earth resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources are often described as presented in Table 3.9-1.

Table 3.9-1 Earth Resources Descriptors

DESCRIPTOR	DEFINITION
Topography and Physiography	The relative arrangement, positions, and elevations of natural and fabricated features at the earth's surface.
Geology	The distinctive, dominant, and recognizable physical characteristics and features of a volume of rock which provides information on the structure and configuration of the surface and subsurface.
Soils	The unconsolidated earthen materials overlying rock that vary by structure, elasticity, strength, and shrink-swell potential. In some cases, soils are studied for their compatibility with construction.
Geologic Hazards	Adverse geologic conditions capable of causing damage or loss of property and life, including seismic activity, landslides, rock falls, ground subsidence, and avalanches.

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

The Farmland Protection Policy Act (FPPA) requires that federal agencies identify and consider the adverse effects of their programs on the preservation of farmlands (7 CFR 658). The FPPA applies to farmland defined as "prime" or "unique" in Section 1540(c)(1) of the Act, or to farmland or soils of statewide or local importance as defined by the appropriate state or local agency.

3.9.2 Affected Environment

EAFB is in the Tanana River Valley and lies east of the Tanana River. The base is located on the floodplain of the river with elevations ranging from 525 to 550 feet. The area is generally level, sloping downward to the northwest at a gradient of approximately 6 feet per mile.

Geologically, the Yukon-Tanana Terrane comprises most of the Tanana River Valley. This terrane extends from west of Fairbanks, Alaska, eastward to the Yukon Territory of Canada and is the oldest rock known to occur in Interior Alaska. Precambrian metamorphic rocks, including muscovite-quartz schist, micaceous quartzite, and graphitic schist, are found in this area.

Soils in the Tanana River Valley consist of unconsolidated silts, sands, and gravels of alluvial origin (USDA-Natural Resources Conservation Service [NRCS] 2021). Floodplain soils nearest the active river channel are sandy or gravelly, with a thin silt loam layer on the surface. Terraces of the floodplain further from the active river channel may also have caps of silt loam or very fine sandy loam of eolian origin. Permafrost soils contribute to the large percentage of vegetated wetlands occurring Tanana River Valley. Hydric soils in the area contain significant amounts of organic matter and are generally underlain by shallow permafrost. Though discontinuous permafrost occurs in the vicinity of EAFB, the installation's developed area is essentially free of near-surface permafrost. Construction fill used in the development of the base and airfield has been built up to a thickness of 3 to 8 feet, providing a foundation for construction that is generally well-drained and separated from permafrost.

In terms of geologic hazards, Alaska rates as one of the most seismically active areas in North America, with an earthquake detected once every 15 minutes on average (Alaska Earthquake Center 2022). The Denali Fault located at the southern boundary of the Yukon-Tanana Terrane and numerous smaller faults in the Tanana River basin are the source of most earthquakes in the region. In the past 110 years, three magnitude 7 earthquakes have occurred within 50 miles of Fairbanks, Alaska (Haeussler and Plafker 2004).

Soil map units in the ROI outside the floodplain are well-drained and have a flooding frequency of none to rare (USDA-NRCS 2021). In its current state, soils are non-hydric and no wetlands have been mapped in the ROI. The developed portion of EAFB, including the affected area, is composed of both natural soils and fill material deposited atop reclaimed wetlands. The natural soils have a solum of very fine sandy loam or silt loam and are classified as the Jarvis or Salchaket series. The fill material comprises poorly sorted Tanana floodplain gravels, cobbles, and other soil materials classified as either Urban Land or Typic Cryorthents. Based on NRCS soil survey information, soil types within the affected area other than Urban Land are classified as "soils of local importance" (USDA-NRCS 2021).

3.9.3 Environmental Consequences

3.9.3.1 Proposed Action

It is estimated that the Proposed Action would disturb 23 to 25 acres of EAFB property. The Proposed Action would not significantly alter the topography of the ROI or otherwise affect the flooding frequency or intensity in the ROI. It is extremely unlikely that the Proposed Action would create any new geologic hazards or exacerbate or affect existing geologic hazards.

Long-term, minor, direct adverse impacts to soil resources in the ROI would occur. No soils in Alaska have been recognized at the federal or state level as prime farmland, unique farmland, or farmland of statewide importance; however, soil map units 363 (Jarvis-Salchaket complex) and UC (Urban Land-Typic Cryorthents complex) on EAFB are both classified as "farmland of local importance" (USDA-NRCS 2016, 2023a, 2023b). Although the land is currently part of an AFB, which may prevent agricultural use of soil, the Proposed Action would reduce the acreage of soil with agricultural potential in the ROI. However, adverse impacts to soils of local importance resulting from the Proposed Action are minor because the land is reserved for military use for the foreseeable future; the ROI is largely already developed/disturbed land; and the undisturbed land in the ROI is small compared to the total acreage of these soils within the greater Fairbanks-North Pole area.

There is potential to encounter contaminated soil during construction, demolition, and renovation projects due to the proximity of several active contaminated sites within the ROI. Management and disposal of contaminated soils is discussed in Section 3.6.3.1.

3.9.3.2 No Action Alternative

Under the No Action Alternative, construction, demolition, and renovation projects associated with the Proposed Action would not occur, leaving the geology, topography, and soils in the ROI unchanged when compared to existing conditions. Development of areas on-base would continue in the future as base operations change and expand, and as aging facilities are replaced or upgraded. Future developments would likely have long-term, minor, direct adverse impacts to the soil resources in the ROI, as they would reduce the amount of soils with agricultural potential. However, as described previously, these adverse impacts would be considered minor due to the military nature of installation land use, which precludes agricultural use, and the fact that land in the affected areas of the ROI has largely already been developed.

3.9.4 Cumulative Impacts

Past developments at EAFB have adversely impacted earth resources through activities such as filling wetlands to establish the airfield and building roads, parking lots, and structures on soils that could be considered "farmland of local importance." As development continues, guided by the IDP and future mission requirements, it is reasonable to assume that natural soils (e.g., Jarvis and Salchaket soils) would be impacted in areas that have previously been cleared of vegetation but not substantially altered. Furthermore, past practices and handling of hazardous material/waste have contributed to contamination that has adversely impacted soil quality in some localized areas within the ROI. Due to previous development in the area, coupled with the already discontinuous extent of the agricultural soils within EAFB, the potential cumulative impacts to earth resources resulting from the Proposed Action and foreseeable soil disturbances would be long-term, minor, and adverse, resulting in reduced availability of agricultural soils in the ROI; however, with or without the Proposed Action, it is highly unlikely that the affected area would be used for agriculture.

3.10 SOCIOECONOMIC RESOURCES/ENVIRONMENTAL JUSTICE

3.10.1 Definition of Resource

CEQ regulations implementing NEPA state that when economic or social effects and natural or physical environmental effects are interrelated, these effects on the human environment should be analyzed (40 CFR 1508.14). Factors that characterize the socioeconomic environment represent a composite of several interrelated and non-related attributes. Indicators of economic conditions for a geographic area can include demographics, median household income, unemployment rates, employment, and housing. Employment data identify employment by industry or trade and unemployment trends. Data on personal income in a region are used to compare the effects of jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Changes in demographic and economic conditions are typically accompanied by changes in other community components, such as housing availability, education, and the provision of installation and public services, which are also discussed in this section.

Analysis of environmental justice evaluates impacts to minority, low-income, elderly, and child populations (EPA 2014). Two EOs deal directly with concerns of potentially affected communities: EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; and EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. EO 12898 was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, Tribal, and local programs and policies. EO 12898 requires each federal agency to identify and address whether their proposed action results in disproportionately high and adverse environmental and health impacts to low-income or minority populations. EO 13045 requires a similar analysis for children.

Minority populations are "identified where either: (a) the minority population of the affected area exceeds 50% or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (EO 12989). Minorities include Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and multi-race that includes one of the aforementioned races. The U.S. Census Bureau (Census) considers race and Hispanic or Latino origin (ethnicity) as distinct; these data are recorded separately. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty (EO 12989). Children are people 17 years of age and under, while elderly are people 65 years of age and over.

3.10.2 Affected Environment

The ROI for socioeconomics is defined as the geographical area within which the principal direct and secondary socioeconomic effects of actions associated with the Proposed Action would likely occur and where most consequences for local jurisdictions would be expected. The ROI for socioeconomic and environmental justice impacts analysis is the FNSB, which contains the City of Fairbanks, the City of North Pole, and EAFB and surrounding areas, and composed of census tracts 1-19. For comparative purposes and context, additional statewide data are provided.

3.10.2.1 Population

Based on Census data, the population of the ROI in 2022 was 96,747, which represents a 15.4% increase since 2000. Within the ROI, the City of Fairbanks grew at a much smaller rate (5.25%) during the same period, while the City of North Pole grew at a significantly higher rate of 34.5%. During the same period, Alaska's population increased 12.4%, a similar level of growth to the ROI (Alaska Department of Labor and Workforce Development [ADOLWD] 2023a). Table 3.10-1 shows the total populations for 2000, 2010, 2020, and 2022 for the ROI (FNSB), municipalities within the ROI (Fairbanks and North Pole), and Alaska as whole.

Table 3.10-1 Population in Region of Influence, Municipalities, and State of Alaska

GEOGRAPHIC AREA	2000	2010	2020	2022	PERCENT CHANGE 2000-2022
FNSB	82,840	97,581	95,655	96,747	15.4
City of North Pole	1,590	2,117	2,139	2,254	34.5
City of Fairbanks	30,214	31,535	32,515	31,843	5.25
Alaska	626,932	710,231	733,391	736,556	17.4

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: ADOLWD 2023a

The most recent workforce population data was published in 2018, at which time the base's population was 10,756 military and civilian personnel and dependents. Total employment at the base during 2018 consisted of 6,326 personnel, including 1,797 Active-Duty military personnel, 648 Air National Guard members, and 3,881 civilian employees. Of the military members assigned, there were 2,236 associated dependents (My Base Guide 2021). EAFB's population grew 21% between January and March 2022. By March 2022, the base's population had grown to 3,662 Active-Duty personnel, and 4,363 military family members (FNSB 2022).

3.10.2.2 Economic Activity

Table 3.10-2 shows the regional employment by industry in the ROI and Alaska. The total number of employed people in the civilian labor force in the ROI in 2019 was 45,363. The industry employing the highest percentage (26.6%) of the civilian labor force is the educational services and health care and social assistance industry (Census 2023c). This is consistent with Alaska, which has 24.5% employed in this industry, representing the greatest proportion of the state's labor force (Census 2023d). The top private employers in the ROI are Banner Health System (no longer in Alaska), Alyeska Pipeline Services, and Tanana Chiefs Conference. The top public employers are the University of Alaska Fairbanks, FNSB School District, EAFB, and FWA (Citytowninfo.com 2023).

Per capita income in the ROI is $37,885. This is slightly lower than Alaska, which has a per capita income of $39,509 (Census 2023c, 2023d). The (not seasonally adjusted) unemployment rate in the ROI is 3.2% which was slightly lower than Alaska's 3.7%. The unemployment rate in Alaska generally matches the national rate of 3.5% (ADOLWD 2023b).

Table 3.10-2 Employment by Industry in Region of Influence and State of Alaska

CATEGORY	ROI	ALASKA
Population 16 years and over in the labor force	50,640	376,965
Percent of labor force in the Armed Forces	12.4%	4.3%
Population of employed persons in the civilian labor force	41,261	352,556
Percent Employed Persons in Civilian Labor Force by Industry		
Agriculture, forestry, fishing, hunting, and mining	4.9%	4.3%
Construction	5.7%	6.8%
Manufacturing	4.2%	4.9%
Wholesale trade	0.4%	1.2%
Retail trade	12.0%	10.1%
Transportation and warehouse, and utilities	8.8%	9.4%
Information	1.1%	1.8%
Finance and insurance and real estate and rental and leasing	2.2%	3.9%
Professional, scientific, and management, and administrative and waste management services	6.4%	9.4%
Educational services, and health care and social assistance	30.7%	23.0%
Arts, entertainment, and recreation, and accommodation and food services	10.2%	9.1%
Other services, except public administration	4.2%	3.9%
Public administration	9.1%	12.2%

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
The data presented here are estimates from the 2015-2019 American Community Survey.
Source: Census 2023c, 2023d

3.10.2.3 Housing

Both EAFB and the FNSB are experiencing housing shortages. As of September 2021, 94% of on-base housing was occupied, and 99% had been assigned. At that time, Eielson had 910 on-base family homes. Five of these were offline due to fire damage, leaving 905 available homes. Of these, 851 homes were occupied. The only vacant homes (n=54) were those undergoing change-of-occupancy maintenance caused by seasonally heavy turnover. As of August 2021, there were 119 families on the waiting list for on-base family housing. The wait time can exceed 16 weeks (EAFB 2021h).

From December 2018 to December 2022, the apartment/multiplex vacancy rate in the FNSB decreased from 17.9% to 9.4%. As of December 2022, there were 265 total rental housing units available in the FNSB, representing a 58% decrease since December 2018 when 634 units were available (FNSB 2022). During the same period, average monthly rents for a 2-bedroom apartment increased from $1,158 to $1,437 per month, and average monthly rents for 3-bedroom houses increased from $1,598 to $2,000 per month (FNSB 2022). The FNSB housing shortage is also evident in the 21% increase in average price of houses sold from 2020 to 2022; the average home price in 2020 was $265,582, compared to $321,568 in 2022 (FNSB 2022).

Changing mission priorities in the Arctic, particularly from the addition of F-35A and KC-135R aircraft to EAFB's fleet and the accompanying influx of personnel necessary to operate and maintain the aircraft, have contributed to population growth and the housing shortage at EAFB and the FNSB since 2019. These actions resulted in a combined population increase of approximately 3,268 military personnel and dependents (USAF 2016, 2023).

While both EAFB and the FNSB are experiencing housing shortages, the base and community are taking proactive steps to address the issue. The FNSB recently approved a housing incentive for new construction of multi-family units within the city limits of Fairbanks and North Pole: Developments of 1 to 4 units can receive a tax exemption of up to 2 years, while 5+ unit developments can receive up to a 10-year exemption. EAFB is also currently delaying dependent stationing for personnel, postponing travel for military dependents until housing is secured. With these measures, it is possible that the ROI housing shortage will be resolved in the next several years.

3.10.2.4 Education

There are 37 schools in the FNSB School District. Total enrollment during the 2022-2023 school year was 12,647 students, including 6,301 elementary students, 2,009 middle school students, and 4,337 high school students (FNSB School District 2023).

Students living on EAFB attend on-base schools, which are run by the FNSB School District and are the only schools within 5 miles of the installation. Kindergarten through 2nd grade students attend Anderson Elementary School, and 3rd through 5th grade students attend Anderson-Crawford Elementary School. Junior and senior high school students attend Ben Eielson Junior/Senior High School. Approximately 705 elementary and 410 secondary students attend these on-base schools (FNSB School District 2023). Students living off-base attend the public school in their attendance area. Bus transportation is provided for children within the attendance area who live at least 1.5 miles from school. If a military family decides to live off-base in North Pole or Fairbanks, parents may request that their children attend an on-base school. Permission may be granted, provided classroom space is available and parents provide transportation (EAFB 2023j).

3.10.2.5 Installation and Public Services

Fire response and law enforcement services are provided by various city governments in the FNSB. The Fairbanks Fire Department, North Pole Fire Department, Moose Creek Fire Department, and Salcha Fire Department each provide fire response services in the FNSB. At EAFB, the 354 CES fire department provides fire response services. The Fairbanks Police Department, North Pole Fire Department, and

Division of Alaska State Troopers provide crime response services in the FNSB. At EAFB, the 354 Security Forces Squadron provides on-base crime response services.

Major public health facilities in the ROI include Fairbanks Memorial Hospital, which has 152 beds, and the Denali Center, which has 90 beds. The 354 MDG provides an outpatient primary healthcare clinic under the TRICARE program for eligible Active-Duty military members, beneficiaries, and USAF retirees living in the area. Pharmacy, laboratory, X-ray, and immunization services are located within the clinic. A co-located dental clinic provides general dental care for Active-Duty military members.

Bassett Army Community Hospital on FWA serves as EAFB clinics' primary referral source for specialty and inpatient care. The 354 MDG clinic has currently reached a saturation point in terms of both workforce and facilities, with no extra capacity in either (PACAF 2021, 2022). Labor growth will need to occur to meet increased operational needs; however, due to current space saturation, an expansion of the medical campus is needed to make room for additional labor growth (PACAF 2021). In addition, the Managed Care Support Contractor that manages Eielson's TRICARE program has been rated as inadequate (PACAF 2021).

3.10.2.6 Environmental Justice

Demographic information on minority and low-income populations in the ROI and Alaska and U.S. comparative regions is presented in Table 3.10-3. Minority population levels within the ROI are lower than both Alaska and the U.S. Within the ROI, the population reporting to be a race other than white was 31.1% of the total, which is lower than the 40.6% for Alaska and the 38.4% for the U.S. The Black/African American population in both the ROI (4.2%) and Alaska (3%) is substantially lower than the U.S. population (12.4%). The Alaska Native/Native American population in the ROI (7.9%) is greater than the country (1.1%) but less than the state overall (15.2%). The Asian population in the ROI (3.2%) is significantly lower than both Alaska (6%) and the country (5.9%), which are statistically identical. The proportion of Pacific Islanders in the ROI (0.6%) and Alaska (2.5%) is greater than the U.S. (0.2%), but still relatively small. The population reporting as "other race" is identical in the ROI (2.3%) and Alaska (2.5%) but smaller than the nation (8.4%). The proportion of the population reporting "two or more races" is similar in the ROI (12.7%), Alaska (12.2%), and the country (10.2%). The percentage of individuals below the poverty level in the ROI (5.9%) is significantly lower than that of Alaska (10.1%), and the U.S. (12.3%) (Census 2023e, 2023f). The percentage of the population that is elderly in the ROI (11.3%) and Alaska (12.4%) is lower than the U.S. (16.5%), while the child-age population in the ROI (23.8%) and Alaska (24.6%) is slightly higher than the nation as a whole (22.2%).

Table 3.10-3 Minority, Low-Income, and Poverty Status

CATEGORY	FNSB	ALASKA	U.S.
Population	95,655	733,391	331,449,281
Percent Below Poverty Level	5.9%	10.1%	12.3%
Percent Elderly	11.3%	12.4%	16.5%
Percent Children	23.8%	24.6%	22.2%
Race			
White	68.9%	59.4%	61.6%
Black	4.2%	3%	12.4%
Alaska Native or Native American	7.9%	15.2%	1.1%
Asian	3.2%	6%	5.9%

CATEGORY	FNSB	ALASKA	U.S.
Pacific Islander	0.6%	1.7%	0.2%
Other Races	2.3%	2.5%	8.4%
Two or More Races	12.7%	12.2%	10.2%

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.
Source: Census 2023e, 2023f

Under baseline conditions, no off-base minority or low-income populations and no concentrations of children or the elderly experience noise levels exceeding 45 decibels (dB) DNL, a level that is considered consistent with ambient noise conditions (Section 3.2.2). On-base, two schools (Ben Eielson Junior/Senior High School and Anderson-Crawford Elementary School) and a day care center (Eielson Child Development Center) are exposed to noise levels less than 65 dB DNL. These schools currently experience one to three indoor speech interference events per hour with either the windows closed or open. Classroom learning interference events are also one to three events per hour with windows closed or open (Section 3.2.2).

In terms of air quality, EAFB is in an attainment area for criteria pollutants with no existing health issues associated with their emissions to affect environmental justice communities, children, and the elderly. However, in the adjacent FNSB region, $PM_{2.5}$ is in nonattainment and CO is in maintenance (Section 3.3.2). There are no existing health or other safety issues from EAFB related to fire risk and management, APZs, aircraft mishaps, and Bird/Wildlife Aircraft Strike Hazard (BASH) to affect environmental justice communities, children, and the elderly (Section 3.5.2). There are no existing health or other issues related to hazardous/toxic materials and wastes, contaminated sites, or water quality from EAFB that affect environmental justice communities, children, and the elderly.

3.10.3 Environmental Consequences

Socioeconomic impacts are assessed in terms of direct impacts to the local economy and related impacts to other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed project. USAF has defined the following significance indicators with respect to socioeconomic impacts: (1) substantial change in the local or regional economy, employment, or business volume; and (2) substantial change in the local or regional population and in housing, education, installation services, or public services from the increased or decreased demands of the population change. The potential for disproportionate impacts to minority and low-income populations is determined by comparing the percentage of each population in the ROI to the percentage of each population in the community of comparison.

Impacts to minority or low-income populations within the ROI are measured in terms of disproportionately high adverse human health effects. Significant impacts may occur if (1) health effects are “above generally accepted norms”; (2) the risk or rate of hazard exposure “appreciably exceeds… the risk or rate to the general population”; or (3) the population in question is affected by “cumulative or multiple adverse exposures from environmental hazards” (CEQ 1997).

For child and elderly populations, disproportionate impacts are inherent. The extent to which child and elderly populations would be impacted is disproportionate due to their vulnerabilities from age-related physiological differences in types and levels of exposure; therefore, the evaluation of environmental impacts to these populations differs from the evaluation of impacts to adults and other populations.

3.10.3.1 Proposed Action

Socioeconomics

No significant adverse impacts to education, health care, or housing would occur from the Proposed Action because there would be no change to the local population and no increased demand for these services.

Personnel temporarily traveling to Fairbanks for RED FLAG-Alaska exercises would stay on EAFB in transient personnel housing, and overflow participants would likely overnight at local hotels. There would be no change to the number of personnel employed or stationed at EAFB as a result of the Proposed Action; therefore, no significant adverse impacts to demographics or social services and conditions would occur, including demand for housing, education, law enforcement, fire protection, emergency medical services, and medical services.

In 2021, the FNSB had a civilian labor force of 41,261 people, of which 4,170 (10.1%) were employed in the construction industry (Census 2023c). It is expected that the local labor force would be sufficient to meet the demand for new jobs in construction and other industries without a migration of workers into the area; therefore, no impacts to population would occur because it is expected that construction workers would be from the local or regional area.

Short-term, minor, direct and indirect beneficial impacts to the local economy would occur from the construction, demolition, and renovation projects associated with the Proposed Action. These activities would stimulate the local economy through the employment of construction workers and the purchase of construction-related materials, and in other industries, such as retail, which would generate additional indirect income in the FNSB. Due to the short-term nature of construction, the economic benefits would be temporary.

There would be no change to local business volume due to the Hursey Road temporary traffic re-routing because there are no businesses located at or near Hursey Gate that rely on the existing road for business access.

In summary, no significant adverse impacts to demographics or social services and conditions would occur as a result of the Proposed Action, including demand for housing, education, law enforcement, fire protection, emergency medical services, and medical services.

Environmental Justice

Short-term, negligible to minor, direct adverse impacts to Environmental Justice populations could occur from the Proposed Action due to increased traffic and noise levels and decreased air quality, but these impacts would be localized to the ROI. The ROI has a considerably lower percentage of residents of a racial minority and low-income residents than Alaska and the U.S. Within the ROI, 31.1% of the population is minority, versus 40.6% of Alaska's population and 38.4% for the U.S. The percentage of people living in poverty in the ROI (5.9%) is also lower than Alaska (10.1%) and the country (12.3%). The ROI's population also has a lower percentage of elderly than the state or nation, as well as a statistically similar number of children; however, as stated above, these would occur primarily on the base and would also be experienced by the base's population; therefore, disproportionate impacts to minority or low-income populations would not be expected. No significant adverse impacts to Environmental Justice populations would occur from the Proposed Action.

3.10.3.2 No Action Alternative

No significant adverse impacts to socioeconomic or Environmental Justice populations would occur under the No Action Alternative. The proposed construction, demolition, and renovation projects would not occur; there would be no associated expenditures that would provide short-term construction employment or generate additional indirect and induced income beyond the scope of normal conditions and influences; and there would be no associated socioeconomic impacts beyond those already occurring within the ROI.

3.10.4 Cumulative Impacts

Short-term, minor, beneficial cumulative socioeconomic impacts would occur in the ROI from the Proposed Action and other actions that would occur over the next 5 years (Table 3.1-2) through the increased demand for construction workers and the procurement of goods and services. Because the Proposed Action would not result in an increase in the installation or regional population and would not affect housing availability during times of surge, it would not contribute to cumulative demographic impacts in the region and would not add to the cumulative impacts of low housing stock or diminished health care capacity that have been evaluated under separate NEPA assessments (USAF 2016, 2023).

Long-term, moderate, beneficial cumulative socioeconomic impacts localized to the installation could occur as a result of other reasonably foreseeable future projects such as the South Loop Fire Station and the Micro-Reactor Pilot Project through additional emergency response services and reduced energy consumption and cost.

No significant adverse cumulative impacts to environmental justice populations would occur because the Proposed Action would not result in disproportionately high adverse impacts to environmental justice populations.

3.11 INFRASTRUCTURE AND UTILITIES

3.11.1 Definition of Resource

Infrastructure refers to a human-made array of systems and physical structures that enable a population in a specified area to function. There is a direct correlation between the type and extent of infrastructure available to an area and its characterization as urban or developed. Infrastructure provides the ability and capacity for the economic growth of an area. Components of infrastructure include the transportation system, solid waste management, and utilities. Utilities include electrical supply, potable water system, sanitary sewer system, stormwater drainage system, heating and cooling system, and fuel supply. Solid waste management is discussed in Section 3.6, and fuel supply is discussed in Section 3.7. The remaining components of infrastructure are described in this section.

3.11.2 Affected Environment

3.11.2.1 Road Network

The road network at EAFB consists of 527,994 square feet (12.12 acres) of pavement. The roads are considered to be in fair to good condition, with sustainment, restoration, and modernization efforts having restored a number of roads previously in poor condition. The 10-year pavements plan was updated in 2012 to contain 40 development projects. The general flat and low-lying nature of the base results in poor drainage for pavements and increases the cost of associated maintenance and upkeep (EAFB 2016).

3.11.2.2 Electrical Supply

Electricity at EAFB is supplied by the CH&PP, which currently has a generation capacity of 20 MWe (EAFB 2023p). EAFB also has a tie-in with the local utility company, Golden Valley Electric Association (GVEA), to purchase an additional 10 MW if needed (EAFB 2016). At the time of this analysis, a 10-MWe steam turbine is being installed and will be operational in Summer 2024, which will increase the CH&PP capacity to 30 MWe, for a total maximum capacity of 40 MWe including the purchase agreement with GVEA.

The CH&PP has high reliability in supplying electricity to EAFB and the training ranges, with over 50 miles of cable, sufficient backups, and redundancy in place (EAFB 2016).

3.11.2.3 Potable Water System

Potable water on EAFB is supplied by six on-base wells connected to a 3.2-million-GPD filtration plant. Water treatment, storage, and increased production capacity were added through an upgrade to the plant in 1999. The plant also has a bypass system to route chlorinated water directly to the distribution system, if needed. Small self-contained systems are installed for base facilities outside the central system. The plant has a peak capacity of 7.2 million GPD with an average demand of 0.4 million GPD during normal conditions and 1 million GPD during fire season. Currently, the plant is being upgraded to comply with SDWA regulations, to include installing monitors for turbidity levels, replacing plant service lines, installing power meters on well houses and the main plant, and transitioning to a Supervisory Control and Data Acquisition system (EAFB 2016).

3.11.2.4 Sanitary Sewer System

EAFB is serviced by a sanitary sewer system with a wastewater treatment capacity of 2 million GPD. Average wastewater discharges are significantly below capacity, with a current demand of 0.4 million GPD and a peak demand of 0.7 million GPD. A natural infrastructure assessment conducted in 2012 gave the wastewater system an overall rating of N-0, designating the resource as capable of fully supporting current and future mission requirements with no workarounds. The WWTP is used to treat wastewater collected on-base and from individual septic systems in outlying areas that cannot be connected to the central system in an economical way. The sewer lines connecting the base to the WWTP are inside a utilidor system, with lift stations located across the base to connect with the gravity-fed portion. Wastewater is discharged into the on-base lagoon, which is not degraded, and the water treatment plant filter backwash water is discharged into a designated water body. The WWTP was built in 1953 with upgrades in mid-1990s and retrofits from 2004 through 2013 (EAFB 2016).

3.11.2.5 Stormwater System

The EAFB stormwater system was rated as N-1 by the 2012 natural infrastructure assessment. Due to the base's relatively flat terrain, porous soils, and location in a sub-arctic desert, the stormwater collection systems are minimal, with relatively few catch basin-pipe systems on-base. Currently, stormwater runoff is directed toward grassy fields and retention ponds, where it readily percolates into the ground. Surface drainage is from north-northwest, parallel to the Tanana River. Stormwater is discharged into a receiving body that is degraded, but the degradation does not limit the installation's capacity to discharge below the permit limits (EAFB 2016).

3.11.2.6 Heating and Cooling System

EAFB is supplied with steam heat by the CH&PP. The CH&PP originally had six 120,000 pounds per hour (lb/hr) coal-fired boilers (four installed in 1951 and two in 1954). One boiler has been brought offline due to building improvements and increased energy efficiency. The boilers at the CH&PP burn sub-bituminous coal, which averaged 191,198 tons in 2022 (EAFB 2023m). The coal is supplied to the CH&PP via rail from nearby coal mines. A 90-day supply stockpile is maintained at the CH&PP to meet additional needs caused by surge training event and mission activities. The steam produced by the boilers is also used by five steam turbines to generate electricity, and the extracted steam is supplied to the base for heating through the utilidor system. The boilers are run at reduced capacity due to their age and new state emissions standards. Currently, the operation range of the boilers is 60,000 to 85,000 lb/hr of steam with peak installation demand of 270,000 lb/hr (EAFB 2016).

3.11.3 Environmental Consequences

3.11.3.1 Proposed Action

Road Network

Project 01 would reconfigure approximately 0.5 miles of the road network, creating short-term, moderate, direct adverse impacts during construction. Construction-related impacts would include re-routing certain roads through residential areas for one full construction season or lane closures that could restrict movement of emergency vehicles leaving base. This could be mitigated by using an existing access road as an emergency route. Long-term, substantial, direct beneficial impacts would occur post-construction because the reconfiguration would provide a direct and easily navigable route that preserves the runway CZ and allows for threat containment while improving user access needs (EAFB 2023h).

Each project under the Proposed Action would cause short-term, minor, direct adverse impacts to traffic flows during each construction season. Road reroutes and lane closures are not anticipated for Projects 02-05, but an increase in construction vehicles and equipment as well as personal passenger vehicles traveling to separate project sites each day is likely to occur. While the increased traffic would contribute to existing congestion at Hursey Gate during peak commuting times or on primary roads used to access other project sites, EAFB's road network has experienced similar re-routing scenarios during previous construction seasons and has proven able to accommodate this increase in traffic without long-term, adverse impacts to the road network.

Electrical Supply

Short-term, negligible direct adverse impacts to the electrical supply would occur during implementation of projects involving construction or demolition of buildings. Electrical service interruptions could occur should any electrical lines need to be re-routed. Connecting new or renovated facilities to the installation's electrical distribution system could result in electrical service interruptions. Contractors would be informed of utility locations prior to any ground disturbance to prevent potential interruptions or safety hazards. During the coldest winter months, the CH&PP produces a peak daily electrical output of up to 17 MW (EAFB 2023p). Projects 02 and 03 would increase the daily demand by approximately 9.95 MW (EAFB 2021f, 2023l) for a total of nearly 27 MW during peak demand. Because the CH&PP would have the capacity to accommodate this increase at the time of project implementation as well as the option to purchase additional electricity from local utility providers, if necessary, no significant adverse impacts to electrical supply would occur as a result of the Proposed Action.

Long-term, minor to moderate, indirect beneficial impacts to electrical systems would be expected from demolition of aged facilities with outdated electrical systems and construction of new facilities with updated, energy efficient electrical systems.

Potable Water System

Short-term, negligible, direct adverse impacts to the potable water system would occur during the proposed construction, demolition, and renovation projects as existing water lines are connected to new buildings. Water demand during RED FLAG exercises (Project 03) would increase by approximately 140,000 GPD for a total of 1 million GPD, which is below the water treatment plant capacity of 2.16 million GPD. Additional details can be found in Section 3.4. Because the potable water supply is adequate and the water treatment plant is equipped to handle temporary increases in demand, the Proposed Action would not have significant adverse impacts to the potable water system.

Sanitary Sewer System

No impacts to the sanitary sewer system would occur during the construction phase of the Proposed Action. Temporary portable wastewater facilities would be provided during construction and wastewater would be disposed of off-installation.

No impacts would occur following implementation of the Proposed Action because population increases are not expected and the WWTP is capable of handling the typical wastewater generation demand of 100 GPD per person. However, the sewer lift systems have aged and experience period flow issues, which are slated for future upgrades. Any increased wastewater treatment demand would be evaluated in a separate NEPA analysis, if necessary.

Stormwater System

Short-term, negligible, direct adverse impacts to the stormwater system would occur. Soil disturbance from C&D could temporarily disrupt existing human-made stormwater drainage systems and natural drainage patterns through soil erosion and sediment production. A site-specific SWPPP that includes soil erosion and sediments controls and construction site waste controls would be required, as discussed in Section 3.4.3.1.

Heating and Cooling System

Long-term, negligible, indirect adverse impacts to the heating and cooling system would be expected during training exercises and require a temporary increase of personnel onsite for roughly 40 days each year. Coal demand during these times is expected to increase by approximately 10%. EAFB consumed an estimated 524 tons of coal per day in 2022 (EAFB 2023m). RED FLAG exercises could increase this amount to 576 tons per day, or 23,056 tons across all 40 training days. The increase, in combination with average emissions during the remaining 325 days of the year, would be 193,356, which is below the CH&PP's permitted annual limit of 220,000 tons (EAFB 2023h). The existing utilidor network would supply steam heat to new facilities. The temporary increase would return to normal coal consumption levels following the completion of training exercises.

3.11.3.2 No Action Alternative

Long-term, moderate, direct adverse impacts to infrastructure and utilities would occur under the No Action Alternative. There would be no increase in demand from existing infrastructure and utilities. Coal could not be thawed for fuel reserves without the shed extension, thereby increasing the strain on the base's near-limit heat load but keeping within EAFB's annually permitted emission limit. None of the utilidors would require extension or re-routing to the new facility locations under the Proposed Action. The new facilities would not be built, thereby alleviating the need for additional water for fire suppression in those buildings. Base development would continue, guided by the IDP. Utility upgrades over time would result in beneficial, long-term impacts, potentially mitigating any adverse impacts caused by current ongoing or future projects.

3.11.4 Cumulative Impacts

Long-term, minor to moderate, beneficial cumulative impacts to infrastructure and utilities would occur under the Proposed Action and potentially foreseeable actions such as the Micro-Reactor Pilot Project. CH&PP is considered a mission critical facility, as considerable damage to facilities and infrastructure may occur with a prolonged shut-down. Regular boiler upgrades are required due to the high importance of the CH&PP. The addition of the micro-reactor to EAFB as an alternative source of heat and power would alleviate demand on the aging CH&PP. A turbine replacement project has been discussed as a foreseeable future action, which would also improve electricity efficiency and alleviate pressure on the current heat load. If additional resources were necessary to meet the potential future demand, such development would be evaluated in a separate NEPA analysis (EAFB 2023f).

3.12 OTHER NEPA CONSIDERATIONS

3.12.1 Unavoidable Adverse Effects

In accordance with 40 CFR 1508.27, this EA identifies any unavoidable adverse impacts from the Proposed Action. Energy supplies would be committed to the Proposed Action, which would require the continued use of non-renewable fossil fuels during construction and ongoing operations. Non-renewable resource use under the Proposed Action is an unavoidable occurrence, although not considered significant.

Unavoidable short-term, minor, direct adverse impacts associated with the Proposed Action would include temporary erosion and sedimentation from soil disturbance; a temporary increase in fugitive dust and air emissions during construction; intermittent noise; and alterations to local traffic and airfield operations. These effects are considered minor and would be confined to the immediate project area. Implementing environmental controls required by permits and approvals would minimize potential impacts. Unavoidable long-term, negligible, direct adverse impacts would occur to up to 24 acres of floodplains from Projects 01, 02, 03, and 05. While the adverse impact to the floodplain would be long-term, it would not be expected to have a significant adverse impact to the floodplain's ability to moderate floodwater impacts (Section 3.4.3.1).

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

The relationship between short-term uses and enhancement of long-term productivity from the Proposed Action is evaluated from the standpoint of short-term and long-term effects. Under the Proposed Action, short-term uses of the environment would result in noise and air emissions from construction equipment, demolition activities, and traffic operations. Noise and air emissions would not be expected to result in long-term adverse impacts to noise-sensitive receptors or wildlife due to the interim nature of proposed construction and because local wildlife is likely habituated to construction and traffic and wildlife habitat would not be significantly impacted.

The Proposed Action represents a long-term productivity enhancement for EAFB's operations and support needs. The negative effects of short-term operational changes during construction would be minor compared to the positive benefits from energy efficiency and improved infrastructure. Immediate and long-term benefits would be realized for operations and maintenance.

4.0 LIST OF PREPARERS

This EA has been prepared by Brice Environmental Services Corporation (Brice) under the direction of AFCEC, USAF, and EAFB.

The individuals that contributed to the preparation of this EA are listed in Table 4.1-1.

Table 4.1-1 List of Preparers

NAME/ORGANIZATION	EDUCATION	RESOURCE AREA	YEARS OF EXPERIENCE
Steve Becker, CEP/Brice	M.S. Environmental Quality Science M.A. Cross Cultural Studies B.S. Natural Resource Management (Soils)	Senior NEPA Project Manager, Technical Lead Reviewer	28
Jesse Clous/Brice	M.S. Water Resource Management A.S. Geographic Information Systems B.S. City and Regional Planning	GIS	16
Laura Eckert/Brice	B.S. Psychology	Technical Editor	18
Ned Gaines, RPA/Brice	M.A. Anthropology B.A. Anthropology	Senior Technical Lead Cultural Resources Socioeconomic Resources	21
Mandy Hope/Brice	B.S. Natural Sciences	Water Resources Biological Resources	9
Nikhil Ket/Brice	B.E. Petroleum Engineering M.S. Petroleum and Environmental Engineering	AICUZ/Land Use/Noise Air Quality Infrastructure and Utilities	5
Kelley Tu/Brice	M.S. Marine Biology B.A. Biology	Safety and Occupational Health Hazardous Materials and Hazardous Waste	12
Kristi Duff/Brice	M.P.A. Policy Analysis B.A. Political Science	AICUZ/Land Use/Noise Natural Resources Earth Resources Socioeconomic Resources Infrastructure and Utilities	15
Megan Ockerman/Brice	M.A. History B.A. History	Cultural Resources	9
Steve Reidsma/Stantec	B.S. Biology	Wetlands	29
Victor Ross/Stantec	B.S. Mining Engineering	Wetlands	41

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

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5.0 PERSONS AND AGENCIES CONSULTED/COORDINATED

The Persons and Agencies contacted in the preparation of this EA are listed in Table 5.1-1.

Table 5.1-1 Persons and Agencies Consulted/Coordinated

FEDERAL AGENCIES	
Ellen Lyons Regulatory Project Manager U.S. Army Corps of Engineers – Alaska District PO Box 35066 Fort Wainwright, AK 99703	Rebecca Chu Branch Chief – Policy and Environmental Review U.S. Environmental Protection Agency Region 10 1200 6th Ave. Ste 900 Seattle, WA 98101
Robert J. Henszey, Ph.D. Branch Lead – Conservation Planning Assistance U.S. Fish and Wildlife Service Northern Alaska F&W Field Office 101 12th Ave. Rm 110 Fairbanks, AK 99701	Neesha Stellrecht Branch Lead – Endangered Species U.S. Fish and Wildlife Service Northern Alaska F&W Field Office Ecological Services 101 12th Ave. Fairbanks, AK 99701
Nichole Bjornlie Conservation Planning Assistance Coordinator/ Regional Military Lands Conservation Coordinator U.S. Fish and Wildlife Service Alaska Region 1011 E. Tudor Rd Anchorage, AK 99503	Mike O'Hare Alaskan Region Regional Administrator Federal Aviation Administration 222 W. 7th Ave. #14 Anchorage, AK 99513
STATE AGENCIES	
Judith Bittner State Historic Preservation Officer Alaska Department of Natural Resources Office of History and Archaeology 550 W. 7th Ave. Ste 1310 Anchorage, AK 99501-3565	Melinda Brunner Alaska Department of Environmental Conservation Contaminated Sites Program 610 University Ave. Fairbanks, AK 99709
Lincoln Parrett Regional Supervisor – Fairbanks Alaska Department of Fish and Game 1300 College Rd. Fairbanks, AK 99701-1551	Jennifer Nolanwing ANILCA Project Coordinator Alaska Department of Fish and Game Division of Wildlife Conservation 333 Raspberry Road Anchorage, AK 99518
LOCAL AGENCIES	
Bryce J. Ward Mayor Fairbanks North Star Borough PO Box 71267 Fairbanks, AK 99707	Kellen Spillman Director Fairbanks North Star Borough Community Planning Department 907 Terminal St. 2nd Floor Fairbanks, AK 99707
David Pruhs Mayor City of Fairbanks 800 Cushman St. Fairbanks, AK 99701	Jomo Stewart President/CEO Fairbanks Economic Development Corporation 330 Wendell Ave. Ste E Fairbanks, AK 99701

Michael Welch Mayor City of North Pole 125 Snowman Ln. North Pole, AK 99705	Flood Plain Administrator Fairbanks North Star Borough Community Planning Department 907 Terminal St. 2nd Floor Fairbanks, AK 99707
Nick Czarnecki Air Quality Manager Fairbanks North Star Borough Air Quality Department 3175 Peger Road Fairbanks, AK 99709	David Pruhs Mayor City of Fairbanks 800 Cushman Street Fairbanks, AK 99701
Jomo Stewart President/CEO Fairbanks Economic Development Corporation 330 Wendell Ave. Ste E Fairbanks, AK 99701	Michael Welch Mayor City of North Pole 125 Snowman Lane North Pole, AK 99705
ELECTED OFFICIALS	
Frank Tomaszewski Alaska Representative, HD 34 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	Maxine Dibert Alaska Representative, HD 31 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701
Ashley Carrick Alaska Representative, HD 35 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	Will Stapp Alaska Representative, HD 32 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701
Mike Prax Alaska Representative, HD 33 North Pole 301 Santa Claus Ln. #3B North Pole, AK 99705	Mike Cronk Alaska Representative, HD 36 N Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701
Scott Kawasaki Alaska Senator, SD P Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	Robert Myers Alaska Senator, SD Q North Pole 1292 Sadler Way Ste 308 Fairbanks, AK 99701
Click Bishop Alaska Senator, SD R Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	Mary Sattler Peltola U.S. Representative, Alaska Fairbanks Field Office 100 Cushman St. Ste 307 (Key Bank Building) Fairbanks, AK 99707
Lisa Murkowski U.S. Senator, Alaska Fairbanks Office 250 Cushman St. Ste 2D Fairbanks, AK 99701	Dan Sullivan U.S. Senator, Alaska Fairbanks Office 101 12th Ave. Ste 328 Fairbanks, AK 99701
Mike Dunleavy Governor, Alaska Office of the Governor PO Box 110001 Juneau, AK 99811-0001	Bart LeBon Alaska Representative, HD 31 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701
Grier Hopkins Alaska Representative, HD 34 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	Steve Thompson Alaska Representative, HD 32 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701

Adam Wool Alaska Representative, HD 35 Fairbanks 1292 Sadler Way Ste 308 Fairbanks, AK 99701	
FEDERALLY RECOGNIZED TRIBES	
Caroline Ketzler President Nenana Native Association PO Box 369 Nenana, AK 99760	Patricia MacDonald President Healy Lake Village 600 University Ave. Ste 100 Fairbanks, AK 99709
Tracy Charles-Smith President Village of Dot Lake PO Box 70494 Fairbanks, AK 99701	Herbert Demit President Native Village of Tanacross PO Box 76009 Tanacross, AK 99776-6009
Michael Sam President Native Village of Tetlin PO Box 797 Tok, AK 99780	William Albert President Northway Village PO Box 516 Northway, AK 99764-0516
ALASKA NATIVE ORGANIZATIONS	
Brian Ridley Chief/Chairman, Eagle Tanana Chiefs Conference Chief Peter John Tribal Building 122 1st Ave. Fairbanks, AK 99701	Dr. Jessica Black President Fairbanks Native Association 3830 Cushman St. Ste 100 Fairbanks, AK 99701
Aaron M. Schutt President/CEO Doyon, Limited 1 Doyon Place Ste 300 Fairbanks, AK 99701-2941	Sophie Minich President/CEO Cook Inlet Region, Inc. PO Box 93330 Anchorage, AK 99509-3330

Notes:
For definitions, refer to the Acronyms and Abbreviations section on page v.

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APPENDIX A
INTERAGENCY/INTERGOVERNMENTAL COORDINATION AND PUBLIC PARTICIPATION

[TO BE INCLUDED IN FINAL]

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APPENDIX B
ACAM ANALYSIS REPORT

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The U.S. Air Force's (USAF) Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP; 32 CFR 989) and the General Conformity Rule (GCR; 40 CFR 93 Subpart B). 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 Development Environmental Assessment for Consolidated Projects at Eielson AFB, Alaska

c. Project Number/s (if applicable):

d. Projected Action Start Date: 5 / 2025

e. Action Description:

Project 01. Alternative 1: Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two final denial barriers, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

Project 02. Alternative 1: Construct a 5,950-square-foot addition to the north side of the existing shed, capable of thawing eight railcars (four per rail), and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

Project 03. Alternative 1: Construct an additional facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

Project 04. Alternative 1: Demolish the existing Cryogenics Facility and construct a new liquid oxygen (LOX)/liquid nitrogen (LIN) storage building and associated administrative building, comprised of an administrative area and a War Readiness Material warehouse.

Project 05. Alternative 2: Demolish the damaged building (108,119 square feet) and construct a single 110,000 square-foot facility within the original building footprint as well as an 800-square-foot communications building immediately adjacent to and west of the existing building.

f. Point of Contact:
Name: Mandy Hope
Title: Contractor
Organization: Brice Environmental Services
Email: mandy.hope@bricesolutions.com
Phone Number: 907-342-7943

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

_____ applicable
__X__ not applicable

Total 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" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used 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 potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQS). These insignificance indicators are the 250 tons/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR *de minimis* values (25 tons/yr for lead and 100 tons/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any 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 pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, see Chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2025

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.417	250	
NOx	1.015	250	
CO	1.226	250	
SOx	0.004	250	
PM 10	2.118	100	
PM 2.5	0.032	100	
Pb	0.000	25	No
NH3	0.005	100	
CO2e	373.3		

2026

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.562	250	
NOx	0.820	250	
CO	1.100	250	
SOx	0.010	250	
PM 10	0.967	100	
PM 2.5	0.034	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	282.5		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

2027

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.354	250	
NOx	0.970	250	
CO	1.421	250	
SOx	0.017	250	
PM 10	0.676	100	
PM 2.5	0.046	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	347.5		

2028

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.352	250	
NOx	1.894	250	
CO	2.363	250	
SOx	0.020	250	
PM 10	24.423	100	
PM 2.5	0.084	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	646.3		

2029 - (Steady State)

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.017	250	
NOx	0.070	250	
CO	0.047	250	
SOx	0.014	250	
PM 10	0.015	100	
PM 2.5	0.015	100	
Pb	0.000	25	No
NH3	0.000	100	
CO2e	8.1		

None of the estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality.Therefore, the action will not cause or contribute to an exceedance on one or more NAAQS. No further air assessment is needed.

Mandy Hope

Mandy Hope, Contractor

2/21/24

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 Development Environmental Assessment for Consolidated Projects at Eielson AFB, Alaska

- Project Number/s (if applicable):

- Projected Action Start Date: 5 / 2025

- Action Purpose and Need:

Project 01: Construct Hursey Gate Final Denial Barrier and Road. Purpose: Provide an active vehicle barrier system final denial barrier (FDB) in accordance with Unified Facilities Criteria (UFC) 42-22-01, Entry Control Facilities Access Control Points and Military Surface Deployment and Distribution Command Transportation Engineering Agency standard criteria. Provide adequate staging space for commercial vehicles in queue to enter Eielson AFB and prevent bottlenecks at the entry gate that hinder non-commercial vehicle traffic flow. Need: The current FDB is insufficient to protect the base from a determined adversary. The entry control facility and access control point FDB must be able to be closed in time to prevent a threat vehicle from breaching the perimeter security. The current location of the FDB requires a faster closure time, to help security guards prevent malicious entry.

Project 02: Construct Addition to Coal Thaw Shed (Building 6203). Purpose: Mitigate the risks of processing frozen coal and increase overall safety and efficiency. Need: Mission changes at Eielson AFB have resulted in additional facilities and infrastructure and a subsequent increased demand for steam and electricity from the Central Heat and Power Plant (CH&PP). The existing thaw shed has capacity for 12 coal rail cars (six per track). Frozen coal-laden rail cars require 48 hours of thaw time before offloading, to prevent chunks of frozen coal from plugging the feed to the boilers and putting the power plant and Eielson AFB at risk for severe damage. Currently, the CH&PP can process coal from eight rail cars per day, usually for 24 to 36 hours. The need is to store 10 railcars per rail, with a total thaw time as close to 48 hours as possible before unloading.

Project 03: Construct New Joint Pacific Alaska Range Complex Range Operations Center (JROC). Purpose: Provide a facility to adequately house range operations supporting RED FLAG-Alaska in the Joint Pacific Alaska Range Complex, including classified spaces in accordance with Intelligence Community Directive 705, Sensitive Compartmented Information Facilities; Intelligence Community Standard 705-1, Physical and Technical Security Standards for Sensitive Compartmented Information Facilities; technical specifications for Intelligence Community Directive/Intelligence Community Standard 705; and the requirements of UFC 4-010-05, Sensitive Compartmented Information Facilities Planning, Design, and Construction. Need: The existing operations center facility lacks the capacity and capability to plan, execute, and capture required mission data for fifth generation combat training. Insufficient space exists for required offices, a video teleconference/main briefing auditorium, and secured rooms. Current exercise participants must share space, which requires workspaces and briefing/debriefing rooms to be relinquished whenever RED FLAG-Alaska operations take place. The training value of RED FLAG-Alaska is diminished because of inadequate workspace, which not only presents a security concern but also results in a loss of effectiveness for planning, executing, and debriefing.

Project 04: Demolish/Rebuild Cryogenics Facility (Building 3245). Purpose: Demolish the existing Cryogenics Facility (Building 3245) and construct a new base Cryogenics Facility with enough space to operate, maintain, and store 11,000 gallons of liquid oxygen (LOX) and 10,000 gallons of liquid nitrogen (LIN), as prescribed in Air Force Manual 32-1084, Facility Requirements. Need: The existing facility houses 11,000 gallons of LOX across two tanks and 7,000 gallons of LIN between another two tanks. The facility is beyond the end of its useful life, based on its construction type and age, and it lacks space for several critical functions, including personal protective equipment storage/cleaning, tool storage, vacuum unit and purge unit storage, laboratory testing, employee administrative space, and supporting spaces. Additionally, the number of primary aircraft assigned at Eielson AFB recently has increased, accelerating the rate of LOX/LIN cart filling and delivery necessary to support flight operations.

Project 05: Demolish/Rebuild Building 3425. Provide usable facilities for the Civil Engineer Squadron (Furnishings Management Office Warehouse storage); Logistics Readiness Squadron (heated vehicle storage); Munitions Support Squadron (heated vehicle and equipment storage); Maintenance Squadron (aerospace ground equipment storage); and Communications Squadron (communications distribution). Need: Building 3425, which provides space for five different user groups, was subjected to weather-related damage in 2022, which caused the roof to fail. The building is no longer safe to occupy, as the structure has been compromised. The entities that used the building before it was damaged require new space.

- Action Description:

Project 01. Alternative 1: Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two FDBs, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

Project 02. Alternative 1: Construct a 5,950-square-foot addition to the north side of the existing shed capable of thawing eight railcars (four per rail), and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

Project 03. Alternative 1: Construct an additional facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

Project 04. Alternative 1: Demolish the existing Cryogenics Facility and construct a new LOX/LIN storage building and associated administrative building comprised of an administrative area and a War Readiness Material (WRM) warehouse.

Project 05. Alternative 2: Demolish the damaged building and construct a single 110,000 square-foot facility within the original building footprint.

- Point of Contact

Name: Mandy Hope
Title: Contractor
Organization: Brice Environmental Services
Email: mandy.hope@bricesolutions.com
Phone Number: 907-342-7943

- Activity List:

	Activity Type	Activity Title
1.	Construction / Demolition	Construct Hursey Gate Final Denial Barrier and Road
2.	Construction / Demolition	Construct Addition to Coal Thaw Shed (Building 6203)
3.	Construction / Demolition	Construct New JROC
4.	Construction / Demolition	Demolish and Rebuild Cryogenics Facility (Building 3245)
5.	Construction / Demolition	Alternative 2: Demolish Building 3245 and construct a single 110,000-square-footfacility within the existing building footprint
6.	Emergency Generator	Emergency Generator for Building 3425
7.	Emergency Generator	Emergency Generator for JROC

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Hursey Gate Final Denial Barrier and Road

- Activity Description:
Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two FDBs, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

- Activity Start Date
Start Month: 5
Start Month: 2028

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.334712
SO_x	0.006148
NO_x	1.824221
CO	2.316705
PM 10	24.407667

Pollutant	Total Emissions (TONs)
PM 2.5	0.068385
Pb	0.000000
NH_3	0.001909
CO_2e	638.2

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Area of Building to be demolished (ft^2): 143240
Height of Building to be demolished (ft): 0

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.1.4 Demolition Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 812363
Amount of Material to be Hauled On-Site (yd^3): 14942
Amount of Material to be Hauled Off-Site (yd^3): 14942

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

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- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 3185
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

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Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778

HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Paving Phase

2.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 2
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 154153

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Addition to Coal Thaw Shed (Building 6203)

- Activity Description:
Construct a 5,950-square-foot addition to the north side of the existing shed capable of thawing eight railcars (four per rail) and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

- Activity Start Date
Start Month: 5
Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 9

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End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.156771
SO_x	0.001236
NO_x	0.332199
CO	0.509643
PM 10	0.092780

Pollutant	Total Emissions (TONs)
PM 2.5	0.010912
Pb	0.000000
NH_3	0.000622
CO_2e	130.5

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8225
Amount of Material to be Hauled On-Site (yd^3): 2500
Amount of Material to be Hauled Off-Site (yd^3): 2500

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Building Construction Phase

3.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

3.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 8225
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

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Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Architectural Coatings Phase

3.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

3.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 8225
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct New JROC

- Activity Description:
Construct an additional 36,735-square-foot facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

- Activity Start Date
Start Month: 5
Start Month: 2026

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2026

- Activity Emissions:

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Pollutant	Total Emissions (TONs)
VOC	0.553901
SO_x	0.002377
NO_x	0.784785
CO	1.076534
PM 10	0.959381

Pollutant	Total Emissions (TONs)
PM 2.5	0.026397
Pb	0.000000
NH_3	0.002282
CO_2e	278.4

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 85764
Amount of Material to be Hauled On-Site (yd^3): 14890
Amount of Material to be Hauled Off-Site (yd^3): 14890

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

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4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 2
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 8000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 3
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 36735
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 36735
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 49029

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolish and Rebuild Cryogenics Facility (Building 3245)

- Activity Description:
Demolish the existing Cryogenics Facility and construct a new LOX/LIN storage building and associated administrative building composed of an administrative area and a WRM warehouse.

- Activity Start Date
Start Month: 5
Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.180593
SO_x	0.001941
NO_x	0.567557
CO	0.864205
PM 10	0.568439

Pollutant	Total Emissions (TONs)
PM 2.5	0.020234
Pb	0.000000
NH_3	0.001159
CO_2e	209.0

5.1 Demolition Phase

5.1.1 Demolition Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2420
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Site Grading Phase

5.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 46876
Amount of Material to be Hauled On-Site (yd^3): 7080
Amount of Material to be Hauled Off-Site (yd^3): 7080

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Trenching/Excavating Phase

5.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 7200
Amount of Material to be Hauled On-Site (yd^3): 910
Amount of Material to be Hauled Off-Site (yd^3): 1120

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.3.4 Trenching / Excavating Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

5.4 Building Construction Phase

5.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 3
Number of Days: 0

5.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 6700
Height of Building (ft): 21
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.5 Architectural Coatings Phase

5.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 6700
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.6 Paving Phase

5.6.1 Paving Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40176

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 2: Demolish Building 3245 and construct a single 110,000-square-footfacility within the existing building footprint

- Activity Description:
Building 3425 is a timber-framed warehouse constructed in 1954, with an addition in 1958. The facility housed five different units until it suffered structural damage in March 2022, with a section collapse in April 2022, both due to snow loads above the design values. This alternative would demolish the damaged building and construct a single 110,000 square-foot facility within the original building footprint.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.415106
SO_x	0.002650
NO_x	1.009482
CO	1.222176
PM 10	2.116739

Pollutant	Total Emissions (TONs)
PM 2.5	0.030499
Pb	0.000000
NH_3	0.004714
CO_2e	372.6

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

6.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 110000
Height of Building to be demolished (ft): 30

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Site Grading Phase

6.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

6.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 140000
Amount of Material to be Hauled On-Site (yd^3): 16300
Amount of Material to be Hauled Off-Site (yd^3): 16300

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 3
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 110000

Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 110000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6.5 Paving Phase

6.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration

Number of Month: 1
Number of Days: 0

6.5.2 Paving Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Paving Information
Paving Area (ft^2): 27500

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047

MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

7. Emergency Generator

7.1 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: Emergency Generator for Building 3425

- Activity Description:
New emergency generator for Building 3425 replacement.

- Activity Start Date
Start Month: 10
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

7.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

7.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e

0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

7.4 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)

8. Emergency Generator

8.1 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: Emergency Generator for JROC

- Activity Description:
Emergency generators for new JROC facility.

- Activity Start Date
Start Month: 10
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.011300
SO_x	0.009518
NO_x	0.046575
CO	0.031104
PM 10	0.010166

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.010166
Pb	0.000000
NH_3	0.000000
CO_2e	5.4

8.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 2

- Default Settings Used: Yes

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- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

8.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

8.4 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 U.S. Air Force's (USAF) Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP; 32 CFR 989) and the General Conformity Rule (GCR; 40 CFR 93 Subpart B). 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 Development Environmental Assessment for Consolidated Projects at Eielson AFB, Alaska

c. Project Number/s (if applicable):

d. Projected Action Start Date: 5 / 2025

e. Action Description:

Project 01. Alternative 1: Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two final denial barriers, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

Project 02. Alternative 1: Construct a 5,950-square-foot addition to the north side of the existing shed, capable of thawing eight railcars (four per rail), and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

Project 03. Alternative 1: Construct an additional facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

Project 04. Alternative 1: Demolish the existing Cryogenics Facility and construct a new liquid oxygen (LOX)/liquid nitrogen (LIN) storage building and associated administrative building, comprised of an administrative area and a War Readiness Material warehouse.

Project 05. Alternative 3: Demolish the damaged building (108,119 square feet) and construct multiple facilities and/or additions to existing facilities for each user group (either simultaneously or in phases, based on user group necessity) totaling 75,570 square feet.

f. Point of Contact:
Name: Mandy Hope
Title: Contractor
Organization: Brice Environmental Services
Email: mandy.hope@bricesolutions.com
Phone Number: 907-342-7943

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

_____ applicable
__X__ not applicable

Total 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" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used 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 potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQS). These insignificance indicators are the 250 tons/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR *de minimis* values (25 tons/yr for lead and 100 tons/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any 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 pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, see Chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2025

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.286	250	
NOx	2.337	250	
CO	3.367	250	
SOx	0.014	250	
PM 10	2.219	100	
PM 2.5	0.087	100	
Pb	0.000	25	No
NH3	0.005	100	
CO2e	836.5		

2026

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.585	250	
NOx	0.913	250	
CO	1.162	250	
SOx	0.029	250	
PM 10	0.987	100	
PM 2.5	0.054	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	293.1		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

2027

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.377	250	
NOx	1.062	250	
CO	1.483	250	
SOx	0.036	250	
PM 10	0.697	100	
PM 2.5	0.067	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	358.2		

2028

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.374	250	
NOx	1.987	250	
CO	2.426	250	
SOx	0.039	250	
PM 10	24.443	100	
PM 2.5	0.104	100	
Pb	0.000	25	No
NH3	0.002	100	
CO2e	657.0		

2029 - (Steady State)

Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (tons/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.040	250	
NOx	0.163	250	
CO	0.109	250	
SOx	0.033	250	
PM 10	0.036	100	
PM 2.5	0.036	100	
Pb	0.000	25	No
NH3	0.000	100	
CO2e	18.9		

None of the estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQS. No further air assessment is needed.

Mandy Hope

Mandy Hope, Contractor

2/21/24

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 Development Environmental Assessment for Consolidated Projects at Eielson AFB, Alaska

- Project Number/s (if applicable):

- Projected Action Start Date: 5 / 2025

- Action Purpose and Need:

Project 01: Construct Hursey Gate Final Denial Barrier and Road. Purpose: Provide an active vehicle barrier system final denial barrier (FDB) in accordance with Unified Facilities Criteria (UFC) 42-22-01, Entry Control Facilities Access Control Points and Military Surface Deployment and Distribution Command Transportation Engineering Agency standard criteria. Provide adequate staging space for commercial vehicles in queue to enter Eielson AFB and prevent bottlenecks at the entry gate that hinder non-commercial vehicle traffic flow. Need: The current FDB is insufficient to protect the base from a determined adversary. The entry control facility and access control point FDB must be able to be closed in time to prevent a threat vehicle from breaching the perimeter security. The current location of the FDB requires a faster closure time, to help security guards prevent malicious entry.

Project 02: Construct Addition to Coal Thaw Shed (Building 6203). Purpose: Mitigate the risks of processing frozen coal and increase overall safety and efficiency. Need: Mission changes at Eielson AFB have resulted in additional facilities and infrastructure and a subsequent increased demand for steam and electricity from the Central Heat and Power Plant (CH&PP). The existing thaw shed has capacity for 12 coal rail cars (six per track). Frozen coal-laden rail cars require 48 hours of thaw time before offloading, to prevent chunks of frozen coal from plugging the feed to the boilers and putting the power plant and Eielson AFB at risk for severe damage. Currently, the CH&PP can process coal from eight rail cars per day, usually for 24 to 36 hours. The need is to store 10 railcars per rail, with a total thaw time as close to 48 hours as possible before unloading.

Project 03: Construct New Joint Pacific Alaska Range Complex Range Operations Center (JROC). Purpose: Provide a facility to adequately house range operations supporting RED FLAG-Alaska in the Joint Pacific Alaska Range Complex, including classified spaces in accordance with Intelligence Community Directive 705, Sensitive Compartmented Information Facilities; Intelligence Community Standard 705-1, Physical and Technical Security Standards for Sensitive Compartmented Information Facilities; technical specifications for Intelligence Community Directive/Intelligence Community Standard 705; and the requirements of UFC 4-010-05, Sensitive Compartmented Information Facilities Planning, Design, and Construction. Need: The existing operations center facility lacks the capacity and capability to plan, execute, and capture required mission data for fifth generation combat training. Insufficient space exists for required offices, a video teleconference/main briefing auditorium, and secured rooms. Current exercise participants must share space, which requires workspaces and briefing/debriefing rooms to be relinquished whenever RED FLAG-Alaska operations take place. The training value of RED FLAG-Alaska is diminished because of inadequate workspace, which not only presents a security concern but also results in a loss of effectiveness for planning, executing, and debriefing.

Project 04: Demolish/Rebuild Cryogenics Facility (Building 3245). Purpose: Demolish the existing Cryogenics Facility (Building 3245) and construct a new base Cryogenics Facility with enough space to operate, maintain, and store 11,000 gallons of liquid oxygen (LOX) and 10,000 gallons of liquid nitrogen (LIN), as prescribed in Air Force Manual 32-1084, Facility Requirements. Need: The existing facility houses 11,000 gallons of LOX across two tanks and 7,000 gallons of LIN between another two tanks. The facility is beyond the end of its useful life, based on its construction type and age, and it lacks space for several critical functions, including personal protective equipment storage/cleaning, tool storage, vacuum unit and purge unit storage, laboratory testing, employee administrative space, and supporting spaces. Additionally, the number of primary aircraft assigned at Eielson AFB recently has increased, accelerating the rate of LOX/LIN cart filling and delivery necessary to support flight operations.

Project 05: Demolish/Rebuild Building 3425. Provide usable facilities for the Civil Engineer Squadron (Furnishings Management Office [FMO] Warehouse storage); Logistics Readiness Squadron (LRS; heated vehicle storage); Munitions Support Squadron (MUNS; heated vehicle and equipment storage); Maintenance Squadron (MXS; aerospace ground equipment storage); and Communications Squadron (COMMS; communications distribution). Need: Building 3425, which provides space for five different user groups, was subjected to weather-related damage in 2022, which caused the roof to fail. The building is no longer safe to occupy, as the structure has been compromised. The entities that used the building before it was damaged require new space.

- Action Description:

Project 01. Alternative 1: Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two FDBs, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

Project 02. Alternative 1: Construct a 5,950-square-foot addition to the north side of the existing shed, capable of thawing eight railcars (four per rail), and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

Project 03. Alternative 1: Construct an additional facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

Project 04. Alternative 1: Demolish the existing Cryogenics Facility and construct a new LOX/LIN storage building and associated administrative building, comprised of an administrative area and a War Readiness Material (WRM) warehouse.

Project 05. Alternative 3: Demolish the damaged building and construct multiple facilities and/or additions to existing facilities for each user group (either simultaneously or in phases, based on user group necessity) totaling 75,570 square feet.

- Point of Contact

Name:	Mandy Hope
Title:	Contractor
Organization:	Brice Environmental Services
Email:	mandy.hope@bricesolutions.com
Phone Number:	907-342-7943

- Activity List:

	Activity Type	Activity Title
1.	Construction / Demolition	Construct Hursey Gate Final Denial Barrier and Road
2.	Construction / Demolition	Construct Addition to Coal Thaw Shed (Building 6203)
3.	Construction / Demolition	Construct New JROC
4.	Construction / Demolition	Demolish and Rebuild Cryogenics Facility (Building 3245)
5.	Construction / Demolition	Alternative 3: Demolish Building 3425
6.	Construction / Demolition	Alternative 3: Construct New FMO Warehouse
7.	Construction / Demolition	Alternative 3: Construct New LRS Administration Building
8.	Construction / Demolition	Alternative 3: Construct New LRS Heated Vehicle Storage
9.	Construction / Demolition	Alternative 3: Construct New MUNS/MXS Storage Facility

10.	Construction / Demolition	Alternative 3: Construct New COMMS Building
11.	Emergency Generator	Alternative 3: Emergency Generator for New COMMS Building
12.	Emergency Generator	Alternative 3: Emergency Generator for New MUNS/MXS Facility
13.	Emergency Generator	Alternative 3: Emergency Generator for New LRS Facilities
14.	Emergency Generator	Alternative 3: Emergency Generator for New FBO Warehouse
15.	Emergency Generator	Alternative 3: Emergency Generator for JROC

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Hursey Gate Final Denial Barrier and Road

- Activity Description:
Move the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two FDBs, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road.

- Activity Start Date
Start Month: 5
Start Month: 2028

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.334712
SO_x	0.006148
NO_x	1.824221
CO	2.316705
PM 10	24.407667

Pollutant	Total Emissions (TONs)
PM 2.5	0.068385
Pb	0.000000
NH_3	0.001909
CO_2e	638.2

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 143240
Height of Building to be demolished (ft): 0

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074

LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 812363
Amount of Material to be Hauled On-Site (yd^3): 14942
Amount of Material to be Hauled Off-Site (yd^3): 14942

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

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- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 3185
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

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	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Paving Phase

2.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 2
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

2.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 154153

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

2.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct Addition to Coal Thaw Shed (Building 6203)

- Activity Description:
Construct a 5,950-square-foot addition to the north side of the existing shed capable of thawing eight railcars (four per rail) and a 2,275-square-foot addition to the south side of the existing shed, capable of thawing four railcars; and stabilize the temperature in the shed by de-stratifying the thermal differential via air circulation.

- Activity Start Date
Start Month: 5

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Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.156771
SO_x	0.001236
NO_x	0.332199
CO	0.509643
PM 10	0.092780

Pollutant	Total Emissions (TONs)
PM 2.5	0.010912
Pb	0.000000
NH_3	0.000622
CO_2e	130.5

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8225
Amount of Material to be Hauled On-Site (yd^3): 2500
Amount of Material to be Hauled Off-Site (yd^3): 2500

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Building Construction Phase

3.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

3.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 8225

Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346

LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Architectural Coatings Phase

3.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

3.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 8225
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778

HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

3.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct New JROC

- Activity Description:
Construct an additional 36,735-square-foot facility to support the RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

- Activity Start Date
Start Month: 5
Start Month: 2026

- Activity End Date
Indefinite: False

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End Month: 9
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.553515
SO_x	0.002377
NO_x	0.784472
CO	1.076346
PM 10	0.959376

Pollutant	Total Emissions (TONs)
PM 2.5	0.026392
Pb	0.000000
NH_3	0.002278
CO_2e	278.3

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 85764
Amount of Material to be Hauled On-Site (yd^3): 14890
Amount of Material to be Hauled Off-Site (yd^3): 14890

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 2
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 8000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

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4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 3
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 36735
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

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- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

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Building Category: Non-Residential
Total Square Footage (ft^2): 36735
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.5 Paving Phase

4.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

4.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 36735

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

4.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre $(43560 \text{ ft2 / acre})^2$ / acre)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolish and Rebuild Cryogenics Facility (Building 3245)

- Activity Description:
Demolish the existing Cryogenics Facility and construct a new LOX/LIN storage building and associated administrative building composed of an administrative area and a WRM warehouse.

- Activity Start Date
Start Month: 5
Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.180578
SO_x	0.001940
NO_x	0.567262
CO	0.864028
PM 10	0.568434

Pollutant	Total Emissions (TONs)
PM 2.5	0.020230
Pb	0.000000
NH_3	0.001155
CO_2e	208.8

5.1 Demolition Phase

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5.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2420
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

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- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Site Grading Phase

5.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 46876
Amount of Material to be Hauled On-Site (yd^3): 7080
Amount of Material to be Hauled Off-Site (yd^3): 7080

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Trenching/Excavating Phase

5.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.3.2 Trenching / Excavating Phase Assumptions

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- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 7200
Amount of Material to be Hauled On-Site (yd^3): 910
Amount of Material to be Hauled Off-Site (yd^3): 1120

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778

HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Building Construction Phase

5.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 3
Number of Days: 0

5.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 6700
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.5 Architectural Coatings Phase

5.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential

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Total Square Footage (ft^2): 6700
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.6 Paving Phase

5.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

5.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40176

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60

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Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

5.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demo Building 3425

- Activity Description:
Demolition of Building 3425 under Alternative 5.2.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.018476
SO_x	0.000398
NO_x	0.165942
CO	0.196616
PM 10	0.697163

Pollutant	Total Emissions (TONs)
PM 2.5	0.004027
Pb	0.000000
NH_3	0.001151
CO_2e	68.8

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

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- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

6.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 110000
Height of Building to be demolished (ft): 30

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

6.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 3: Construct New FMO Warehouse

- Activity Description:
Construct new 14,544-square-foot warehouse as part of Building 3425 replacement.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.255418
SO_x	0.001679
NO_x	0.463524
CO	0.719784
PM 10	0.195433

Pollutant	Total Emissions (TONs)
PM 2.5	0.016305
Pb	0.000000
NH_3	0.000858
CO_2e	176.5

7.1 Site Grading Phase

7.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

7.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 17000
Amount of Material to be Hauled On-Site (yd^3): 2520
Amount of Material to be Hauled Off-Site (yd^3): 2520

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

7.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Trenching/Excavating Phase

7.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

7.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 300
Amount of Material to be Hauled Off-Site (yd^3): 300

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

7.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 3
Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 14544
Height of Building (ft): 30
Number of Units: N/A

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047

MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)

BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.4 Architectural Coatings Phase

7.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

7.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 14544
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

7.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7.5 Paving Phase

7.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

7.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 14544

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

7.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 3: Construct New LRS Administration Building

- Activity Description:
Construct new 17,406-square-foot facility as part of Building 3425 replacement.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.269542
SO_x	0.001268
NO_x	0.383508
CO	0.555455
PM 10	0.371527

Pollutant	Total Emissions (TONs)
PM 2.5	0.013321
Pb	0.000000
NH_3	0.000918
CO_2e	140.9

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 36000
Amount of Material to be Hauled On-Site (yd^3): 5334
Amount of Material to be Hauled Off-Site (yd^3): 5334

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6

Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 3
Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 17406
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Architectural Coatings Phase

8.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

8.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 17406
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

8.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.4 Paving Phase

8.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

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8.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 17500

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778

HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

8.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 3: Construct New LRS Heated Vehicle Storage

- Activity Description:
Construct new 19,880-square-foot heated vehicle storage facility as part of Building 3425 replacement.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.299028
SO_x	0.001291
NO_x	0.397742
CO	0.563420
PM 10	0.411552

Pollutant	Total Emissions (TONs)
PM 2.5	0.013532
Pb	0.000000
NH_3	0.001098
CO_2e	148.1

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 40000

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Amount of Material to be Hauled On-Site (yd^3): 5926
Amount of Material to be Hauled Off-Site (yd^3): 5926

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047

MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.2 Building Construction Phase

9.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 3
Number of Days: 0

9.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 19880
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

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	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

9.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.3 Architectural Coatings Phase

9.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

9.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 19880

Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

9.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

9.4 Paving Phase

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9.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

9.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

9.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 3: Construct New MUNS/MXS Storage Facility

- Activity Description:
Construct new 22,940-square-foot storage facility as part of Building 3425 replacement.

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.368270
SO_x	0.001789
NO_x	0.593981
CO	0.847885
PM 10	0.479438

Pollutant	Total Emissions (TONs)
PM 2.5	0.021772
Pb	0.000000
NH_3	0.000934
CO_2e	186.7

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

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Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 46000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

10.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.2 Building Construction Phase

10.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 3
Number of Days: 0

10.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 22940
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

10.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

10.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

10.3 Architectural Coatings Phase

10.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

10.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 22940
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

10.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10.4 Paving Phase

10.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

10.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 23000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

10.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 3: Construct New COMMS Building

- Activity Description:
Construct new 800-square-foot facility to house communication equipment as part of Building 3425 replacement.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Start Date
Start Month: 5
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.067320
SO_x	0.001129
NO_x	0.299468
CO	0.461403
PM 10	0.056782

Pollutant	Total Emissions (TONs)
PM 2.5	0.011010
Pb	0.000000
NH_3	0.000278
CO_2e	111.7

11.1 Site Grading Phase

11.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

11.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1600
Amount of Material to be Hauled On-Site (yd^3): 237
Amount of Material to be Hauled Off-Site (yd^3): 237

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

11.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Trenching/Excavating Phase

11.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

11.2.2 Trenching / Excavating Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 3000
Amount of Material to be Hauled On-Site (yd^3): 445
Amount of Material to be Hauled Off-Site (yd^3): 445

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778

HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

11.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.3 Building Construction Phase

11.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

11.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 800
Height of Building (ft): 14
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

11.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.4 Architectural Coatings Phase

11.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 7

11.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Total Square Footage (ft^2): 800
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

11.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

11.5 Paving Phase

11.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 2
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 14

11.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 1600

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.218	000.001	000.111	004.357	000.004	000.004		000.024	00299.370
LDGT	000.227	000.001	000.186	004.730	000.006	000.005		000.025	00387.955
HDGV	000.737	000.003	000.743	016.517	000.024	000.021		000.051	00903.074
LDDV	000.105	000.001	000.080	002.791	000.003	000.002		000.008	00299.346
LDDT	000.104	000.001	000.119	001.905	000.003	000.003		000.008	00347.778
HDDV	000.130	000.004	002.496	001.500	000.041	000.037		000.032	01267.047
MC	001.822	000.001	000.703	012.902	000.017	000.015		000.054	00390.897

11.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

12. Emergency Generator

12.1 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: Alternative 3: Emergency Generator for New COMMS Building

- Activity Description:
Emergency generator to support new COMMS building.

- Activity Start Date
Start Month: 8
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

12.2 Emergency Generator Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

12.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

12.4 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)

13. Emergency Generator

13.1 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: Alternative 3: Emergency Generator for New MUNS/MXS Facility

- Activity Description:
Emergency generator for new MUNS/MXS storage facility.

- Activity Start Date
Start Month: 10
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)

Pollutant	Emissions Per Year (TONs)

VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

13.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

13.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

13.4 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)

14. Emergency Generator

14.1 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: Alternative 3: Emergency Generator for New LRS Facilities

- Activity Description:
Emergency generators for new LRS admin and storage facilities

- Activity Start Date
Start Month: 10
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.011300
SO_x	0.009518
NO_x	0.046575
CO	0.031104
PM 10	0.010166

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.010166
Pb	0.000000
NH_3	0.000000
CO_2e	5.4

14.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 2

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

14.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

14.4 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)

15. Emergency Generator

15.1 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Title: Alternative 3: Emergency Generator for New FBO Warehouse

- Activity Description:
Emergency Generator for New FBO Warehouse

- Activity Start Date
Start Month: 10
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

15.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

15.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

15.4 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)

16. Emergency Generator

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

16.1 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: Alternative 3: Emergency Generator for JROC

- Activity Description:
New emergency generator for JROC facility.

- Activity Start Date
Start Month: 10
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.011300
SO_x	0.009518
NO_x	0.046575
CO	0.031104
PM 10	0.010166

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.010166
Pb	0.000000
NH_3	0.000000
CO_2e	5.4

16.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 2

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

16.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

16.4 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

APPENDIX C
WETLANDS DELINEATION REPORT

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Preliminary Jurisdictional Determination Report

Eielson Air Force Base

2023 Consolidated Infrastructure Projects

7 August 2023

Prepared for:

Brice Environmental Services Corporation
3700 Centerpoint West, Suite 8133
Anchorage, AK 99503

Prepared by:

Stantec Consulting Services, Inc.
725 East Fireweed Lane Suite 200
Anchorage, Alaska 99503

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Executive Summary

This 2023 Preliminary Jurisdictional Determination Report presents the findings of the baseline (current existing conditions) extent of wetlands and waters within the Eielson Air Force Base Project study area for Brice Environmental Services Corporation. Stantec has completed field work within Eielson Air Force Base for various facility upgrades since 2021. This report consolidates all wetlands and waters delineations completed since 2021. The total study area size is 360.0 acres.

The 2023 study area wetland mapping is based on the criteria in the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0) (USACE 2007), and the 2020 National Wetland Plant List (USACE 2020a).

The results of the field verified mapping shows wetlands account for 0.48 acres (0.1 percent) of the study area, and waters account for 11.06 acres (3.1 percent) of the study area.

Project Study Area: Waters of the U.S. Determination

Status	Acres	Percent of Study Area
Wetlands	0.48	0.1
Waters	11.06	3.1
Upland (Non-wetlands)	348.46	96.8
Total Study Area	**360.00**	**100.0**

Abbreviations

2007 Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0)
APT	Antecedent Precipitation Tool
FVP	Field Verification Point
GPS	Global Positioning System
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
Stantec	Stantec Consulting Services Inc.
study area	Consolidated Infrastructure Project study area
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WB	Waterbody Point
WD	Wetland Determination Point
WETS	Climate Analysis for Wetlands
WOUS	Waters of the U.S.

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has determined the baseline status of the 360.0-acre Consolidated Infrastructure Projects study area (study area) for Brice Environmental Services Corporation. Stantec conducted field work to determine the extent of wetlands and waters. The study area is located within Eielson Air Force Base (EAFB), Alaska. Stantec has been collecting data on EAFB since 2021 to evaluate wetland status for various facility upgrades at the base.

This Preliminary Jurisdictional Determination Report provides the baseline data necessary to determine the total Waters of the U.S. (WOUS) within the study area.

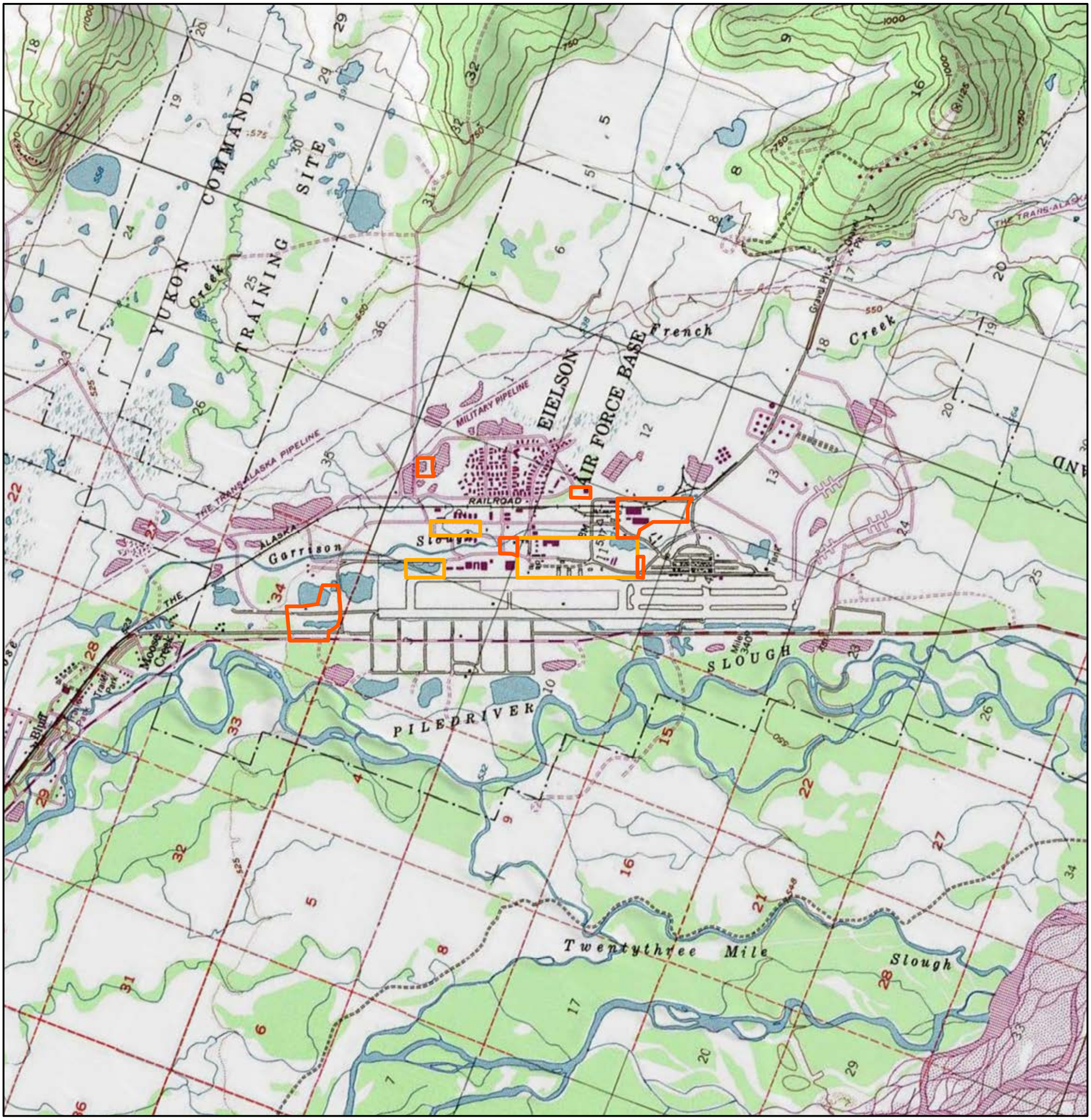
The field team collected field data in May 2023. The results were mapped in accordance with the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0) (2007 Supplement; USACE 2007). This Report also meets the guidelines set forth in Special Public Notice 2020-00399 (USACE 2020b), Consultant Supplied Jurisdictional Determination Reports.

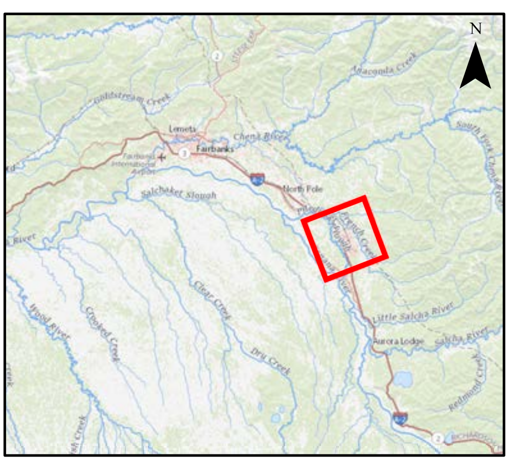
1.1 STUDY AREA LOCATION

The study area is located within the urban environments of EAFB, Alaska, in locations of proposed infrastructure projects and alternatives (Figure 1). It is in the Fairbanks C-1 NE United States Geological Survey (USGS) quadrangle, in the Fairbanks Meridian, and is in 7 Public Land Survey System sections, shown in Table 1.

Table 1 Study Area Location

Meridian	Township	Range	Section
Fairbanks	2S	3E	34
	3S	3E	2, 3, 11-14





Study Area (2022 Report)

Study Area (2023 Additions)

0 0.5 1 Miles

(At original document size of 8.5x11)

1:63,360 1 in = 1 miles

Client

Brice Environmental Services Corporation

Project

2023 Consolidated Infrastructure Projects

Figure

Project Location

Figure Number

1

Stantec

2.0 EXISTING DATA AND METHODOLOGY

2.1 EXISTING DATA

Sources of existing data used in developing baseline environmental data include: U.S. Department of Agriculture (USDA) ecoregion and soil survey information, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) wetland mapping, USGS project watersheds and stream data, and local climate data.

2.1.1 Previous Field Work

This 2023 report supersedes and expands on the 2022 data collection, mapping, and wetland report (Stantec 2022). In 2022 Stantec reported the results of field work conducted in 2021/2022 for a 199-acre area within the urban and airfield area of EAFB. The findings of the 2022 field work are listed in Table 2.

Table 2 2022 Waters of the U.S. Determination

Status	Acres	Percent of Study Area
Wetlands	0.41	0.2
Waters	7.69	3.9
Upland (Non-wetlands)	190.52	95.9
Total Study Area	**198.62**	**100.0**

One wetland was found in the study area, classified in the Cowardin system (Cowardin et al. 1979) as Emergent Wetland, and one pond was found in the study area, classified in the Cowardin system as Freshwater Pond.

2.1.2 National Wetlands Inventory

The NWI on-line Wetlands Mapper (USFWS 2023a) shows the study area is covered by digital NWI data. Fairbanks area NWI mapping was most recently updated using 1997 Color Infrared aerial photography. Mapping was conducted at a scale of 1:30,000.

The NWI shows several Freshwater Ponds and Freshwater Emergent Wetlands within the study area. Two NWI streams (Riverine Waters) were also mapped within the study area (Figure 2).

2.1.3 National Hydrography Dataset

The study area is within the Moose Creek – Tanana River USGS Hydrologic Unit Code 10 watershed (1908030710) (USGS 2023).

Two National Hydrography Dataset (NHD) -mapped streams were mapped in the study area in the same location as the NWI-mapped Riverine waters. One is Garrison Slough, the other is an unnamed perennial stream (USGS 2023).

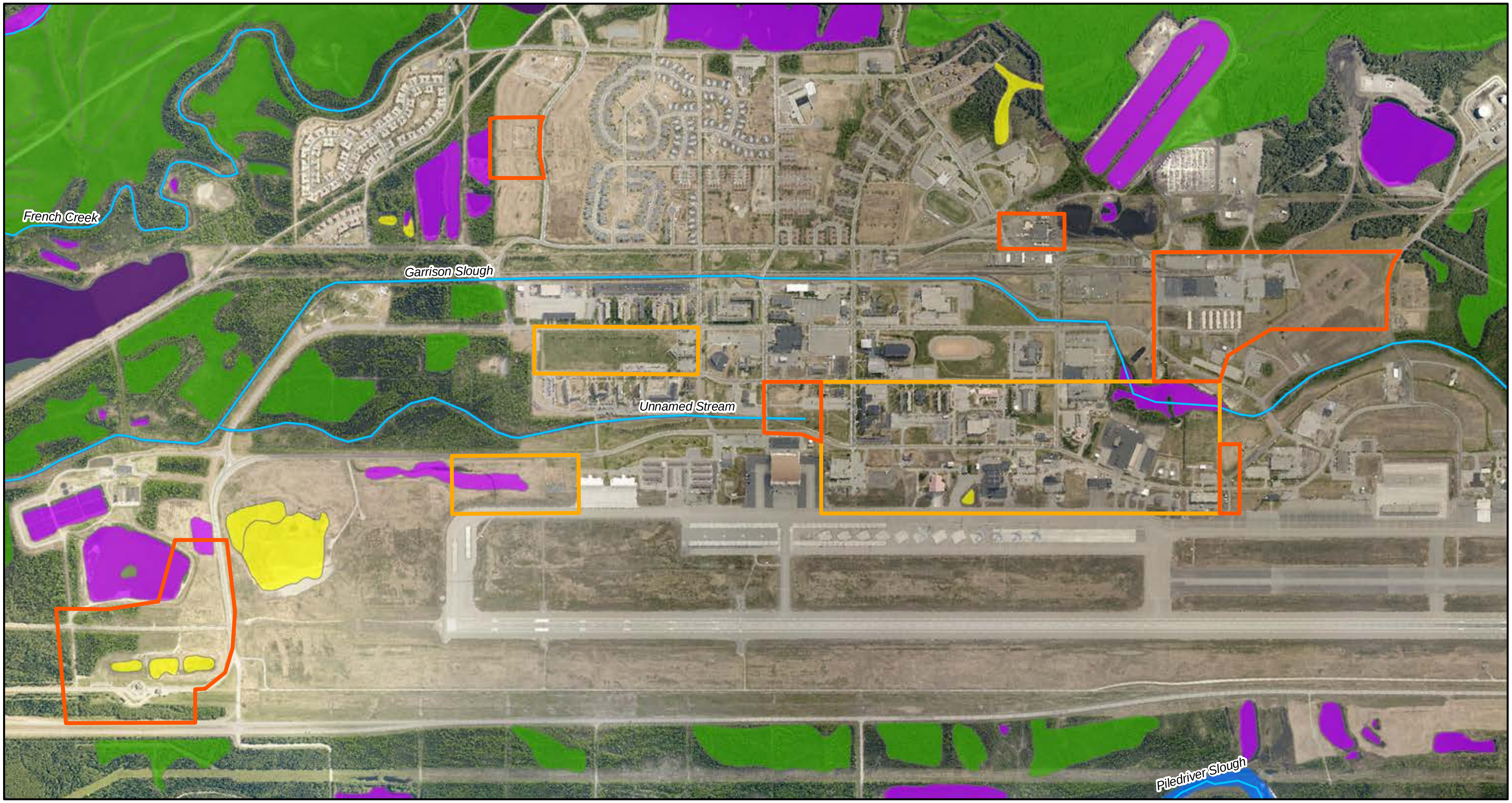
2.1.4 Soil Surveys

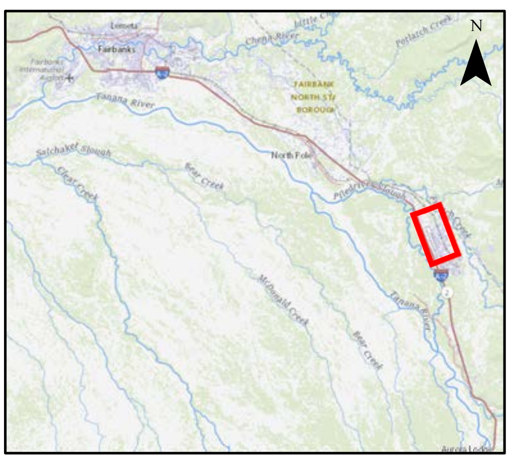
The Soil Survey of Fort Wainwright Area, Alaska (USDA 2006) covers the study area.

The study area falls within five map units (Table 3 and Figure 3). The table lists the potential hydric components for each of the map units. The map units within the study area are generally predicted to have very few hydric components.

Table 3 Soil Survey Units within the Study Area

Map Unit Symbol	Map Unit Name	Acres in Study Area	Percent of Study Area	Percent Hydric Components
61	Piledriver very fine sandy loam	<0.1	<0.1	5
363	Jarvis-Salchaket complex	89.7	24.9	7
CL	Typic Cryorthents, pit spoil	4.1	1.1	0
UC	Urban land-Typic Cryorthents complex, 0 to 2 percent slopes	257.5	71.5	0
W	Water	8.7	2.4	0
	Total	**360.0**	**100.0**	





Study Area (2022 Report)

Study Area (2023

NHD Flowline

NWI Type

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Riverine

0 1,000 2,000 Feet

(At original document size of 8.5x11)

1:20,000 1 in = 1,666.67 feet

Client

Brice Environmental Services Corporation

Project

2023 Consolidated Infrastructure Projects

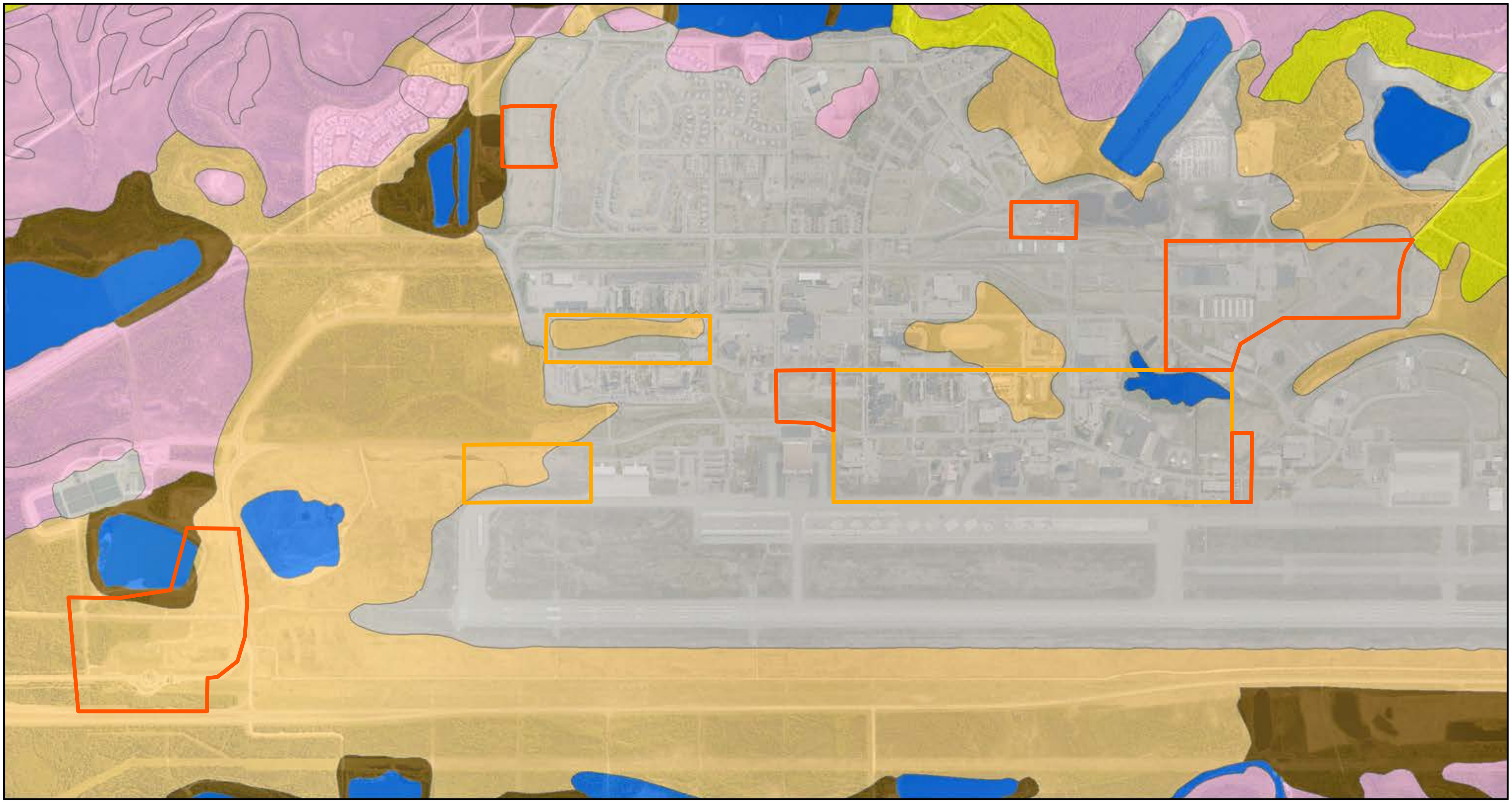
Figure

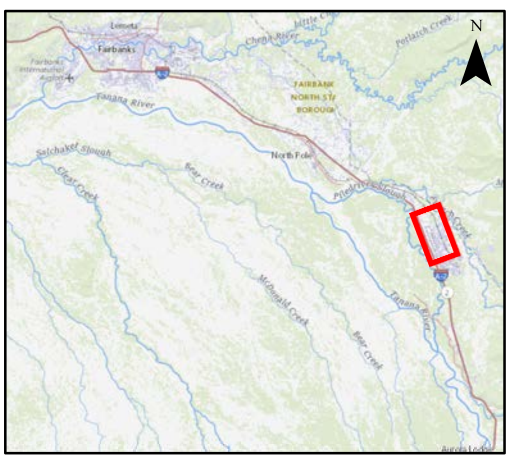
NWI and NHD Mapping

Figure Number

2

Stantec





Study Area (2022 Report)
Study Area (2023 Additions)

Soil Map Unit

- Piledriver very fine sandy loam
- Jarvis-Salchaket complex
- Typic Cryorthents, pit spoil
- Urban land-Typic Cryorthents complex, 0 to 2 percent slopes
- Water
- Other Soil Map Unit not Within Study Area

0 1,100 2,200 Feet

(At original document size of 8.5x11)
1:20,000 1 in = 1,666.67 feet

Client

Brice Environmental Services Corporation

Project

2023 Consolidated Infrastructure Projects

Figure

Soil Mapping

Figure Number

3

Stantec

2.1.5 Climate Data

The growing season for this area begins on May 3 and ends on October 3 (USACE 2007).

Precipitation data, using the Climate Analysis for Wetlands (WETS) tool, leading to 2023 field work is listed in Table 4. The weather conditions preceding the field investigations were considered during onsite determinations. Normal precipitation is based on 1991-2020 records for North Pole, Alaska (National Oceanic and Atmospheric Administration 2023). Field work was conducted June 4 and June 13, 2023. Precipitation for the water year, starting October 2022, was 107 percent of normal (Total Monthly/Average Monthly Accumulated Precipitation, Table 4). These data suggest that conditions during field work were normal.

Table 4 2023 Water Year WETS Precipitation for North Pole, Alaska

Month	Total Monthly Accumulated Precipitation (Inches)	Average Monthly Accumulated Precipitation 1991-2020 (Inches)	Percent of Average Precipitation	30% Chance Precipitation	
				Less Than (In.)	More Than (In.)
October 2022	0.84	0.96	88	0.44	1.11
November 2022	0.64	0.61	105	0.23	0.73
December 2022	1.13	0.48	235	0.26	0.59
January 2023	0.36	0.48	75	0.23	0.62
February 2023	0.75	0.44	170	0.16	0.50
March 2023	0.43	0.32	134	0.12	0.42
April 2023	0.18	0.34	53	0.00	0.31
May 2023	0.48	0.66	73	0.22	0.73
June 2023	1.82	1.91	95	1.11	2.24
Total	**6.63**	**6.20**	**107**	**-**	**-**

The Antecedent Precipitation Tool (APT, EPA 2023) was also run for the study area and returned a value of Normal Conditions for both dates. The APT output is shown in Appendix A.

2.1.6 Threatened and Endangered Species

There are no threatened or endangered State or Federally listed species within the general area around the study area (USFWS 2023b).

2.2 METHODOLOGY

This section provides the methodology used during field data collection and digital mapping.

2.2.1 Field Data Collection

During the 2021-2023 wetland field evaluations, Global Positioning System (GPS) locations and detailed information on plots (1/10) were recorded in representative project vegetation types. Additional field data, notes, and photographs were used to evaluate mapping areas with similar characteristics.

Field data was collected and recorded using four types of plots:

Wetland Determination (WD) Plots. At these sites, investigators recorded detailed descriptions of vegetation, hydrology, and soils on field data forms. Wetland status for this plot type was determined based on the presence or absence of hydrophytic vegetation, hydrology, and hydric soils (USACE 2007).

Field Verification Points (FVP). Photographs and GPS locations were taken for vegetation communities and landscape positions that were clearly wetland, water, or upland. If a wetland or water, Hydrogeomorphic and Cowardin classifications were recorded.

Stream Crossing (SC) Points. Photographs and GPS locations were taken when streams were encountered. Cowardin classifications were recorded.

Waterbody (WB) Points. Photographs and GPS locations were taken when ponds and lakes were encountered. Cowardin classifications were recorded.

Plant Data

Alaska is divided into subregions, where plant indicator statuses may differ from the rest of the State. The study area is within the National Wetland Plant List subregion Interior Alaska Lowlands (USACE 2020). Plants were identified to the taxonomic level of species.

The presence of hydrophytic vegetation was determined using the prevalence index and the dominance test (USACE 2007).

Hydric Soils Assessment

Field indicators of hydric soils and determination of hydric soil status was based on USDA National Resource Conservation Service (NRCS) guidance (USDA 2018) and the 2007 Supplement (USACE 2007). The 2007 Supplement contains a subset of hydric soil indicators found in the U.S. as determined by the National Technical Committee for Hydric Soils (USACE 2007). Additional soil characteristics recorded within the soil horizons were based on NRCS guidance (Schoeneberger et al. 2012).

Hydrology

The 2007 Supplement lists numerous primary and secondary hydrology indicators. All indicators found in each sampling area were recorded in the data form.

Field Data

Field data were collected at 19 sites throughout the study area in 2023. Field data were collected June 4 and 13, 2023, by Professional Wetland Scientist Steve Reidsma. All field data were entered into a project database where the data were reviewed; queries were generated from the database to provide the information needed for mapping and results analyses. Each field plot with photos is presented in Appendix B.

Twelve plots were collected in 2021, and eight in 2022. Details for those plots are available in the 2022 wetland report (Stantec 2022).

2.2.2 Wetland Mapping

Final mapping (waters boundaries, Cowardin classification) was completed using 2-foot contour data and several years of aerial imagery collected by the Fairbanks North Star Borough (2012, 2017, and 2020) in ESRI's ArcMap GIS (10.8) environment.

Field data were used to identify the characteristics of wetlands or waters at a specific location. In addition to imagery interpretations, ancillary data including field notes, general landscape position, slope, and aspect were utilized in the mapping process.

Mapping polygons were drawn to delineate differences among the classification systems used to attribute wetlands and waters polygons. Delineation occurred at a scale of 1:600 (one-inch equals 50 feet).

3.0 RESULTS

3.1 WETLANDS AND WATERS

The field verified wetlands and waters totals are summarized in Table 5. Figure 4 shows an overview of the wetlands and waters in the study area.

Two ponds were found in the study area and a third pond borders it. All were created through previous excavations and have well defined upland banks.

Two wetlands were found in the study area. One is within an excavated drainage feature attached to the excavated pond in the southern portion of the study area. The other wetland is within an excavated drainage near the northeast end of the runway taxiway and was reported in 2022 (Stantec 2022).

Table 5 Wetlands and Waters Within the Study Area

Status	Acres	Percent of Study Area
Wetlands	0.48	0.1
Waters	11.06	3.1
Uplands	348.46	96.8
Total Study Area	**360.00**	**100.0**

The 2023 additions to the 2022 wetland report study area expands on previous mapping efforts and adds new areas for potential facility upgrades and construction. The 2023 field work found that the proposed additional areas were almost all within the current urban footprint of EAFB, and consisted of maintained/mowed vegetation, tree regrowth, or facilities. The wetland mapping was expanded beyond the proposed facility footprints and alternatives to show pond boundaries and to connect these new additions to the previous mapping when possible.

The powerplant is part of the 2023 study area, however, no data were collected on the site due to restricted access and the area is currently fully developed.

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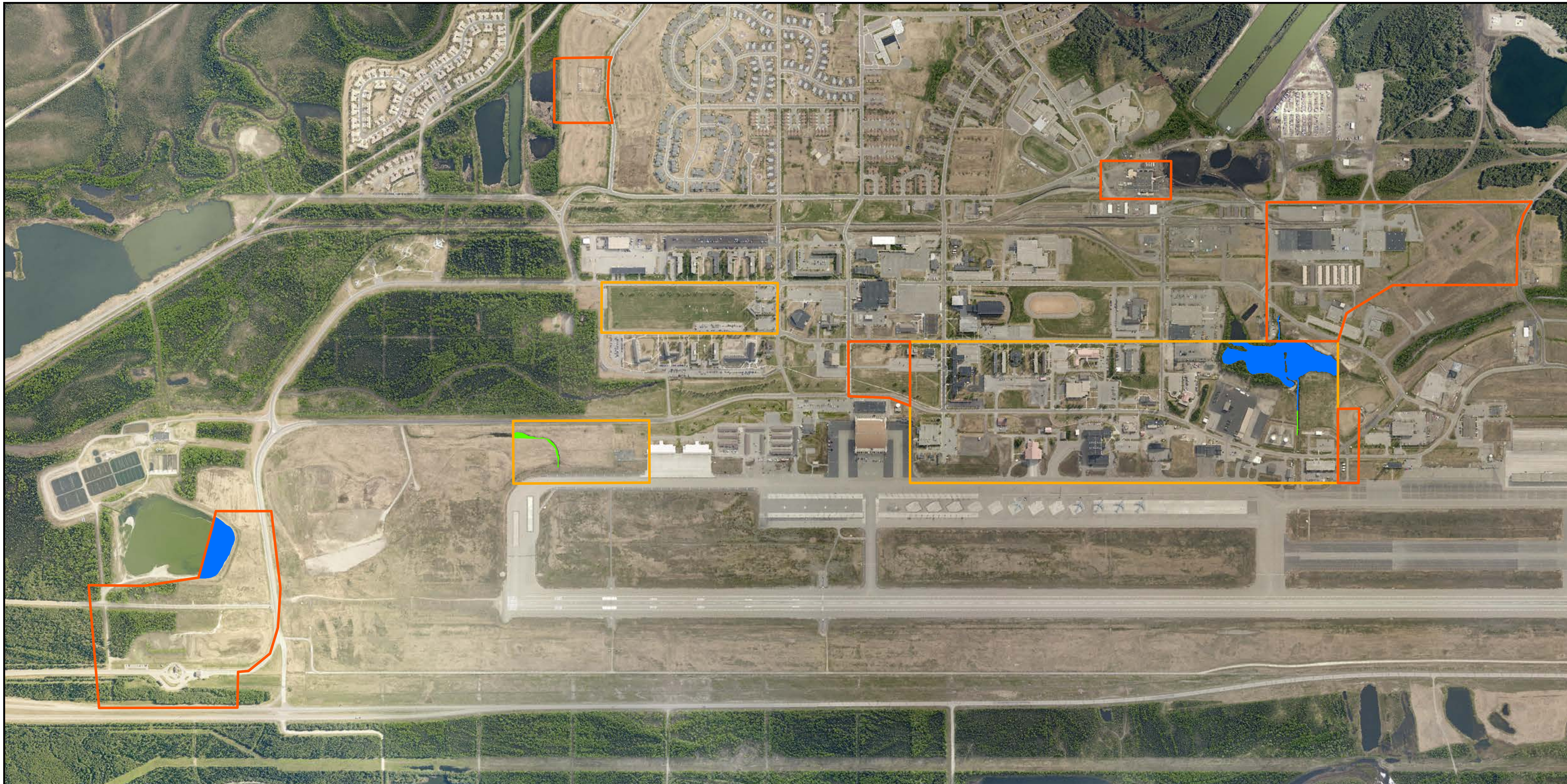

Study Area (2022 Report)
Study Area (2023 Additions)
Wetland
Waterbody

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

0 500 1,000 2,000 Feet

1:12,000 1 inch equals 1,000 feet

N E S W

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Overview

Figure 4 | July 2023

3.1.1 Cowardin Classification

As part of the wetlands mapping, vegetation communities were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

Table 6 shows all waters in the study area are classified in the Cowardin system as Freshwater Pond, covering 11.06 acres of the study area, and all wetlands in the study area are classified as Freshwater Emergent, covering 0.48 acres of the study area.

Table 6 Cowardin Classifications for the Study Area

Cowardin Type	NWI Code	Wetlands and Waters Acres	Percent of Study Area	Percent of Wetlands and Waters
Wetlands				
Freshwater Emergent Wetland	PEM1	0.48	0.1	4.2
	Total Wetlands	**0.48**	**0.1**	**4.2**
Waters				
Freshwater Pond	PUB	11.06	3.1	95.8
	Total Waters	**11.06**	**3.1**	**95.8**
	Total Wetlands and Waters	**11.54**	**3.2**	**100.0**
	Total Uplands	348.46	96.8	
	Total Study Area	**360.00**	**100.0**	

3.2 VEGETATION

The study area is part of the urban environment of Eielson Air Force Base and has been historically cleared, filled, and built. Non-paved areas are primarily characterized by mowed vegetation, landscaped trees or shrubs, or in some cases disturbance regrowth. The ponds were created by gravel mining; forested areas around the edge are disturbance regrowth. The wetland in the southwest occurs in an excavated linear depression; its dominant vegetation species is a sedge, *Carex aquatilis* (Leafy Tussock Sedge).

4.0 REFERENCES

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Appendix A ANTECEDENT PRECIPITATION TOOL

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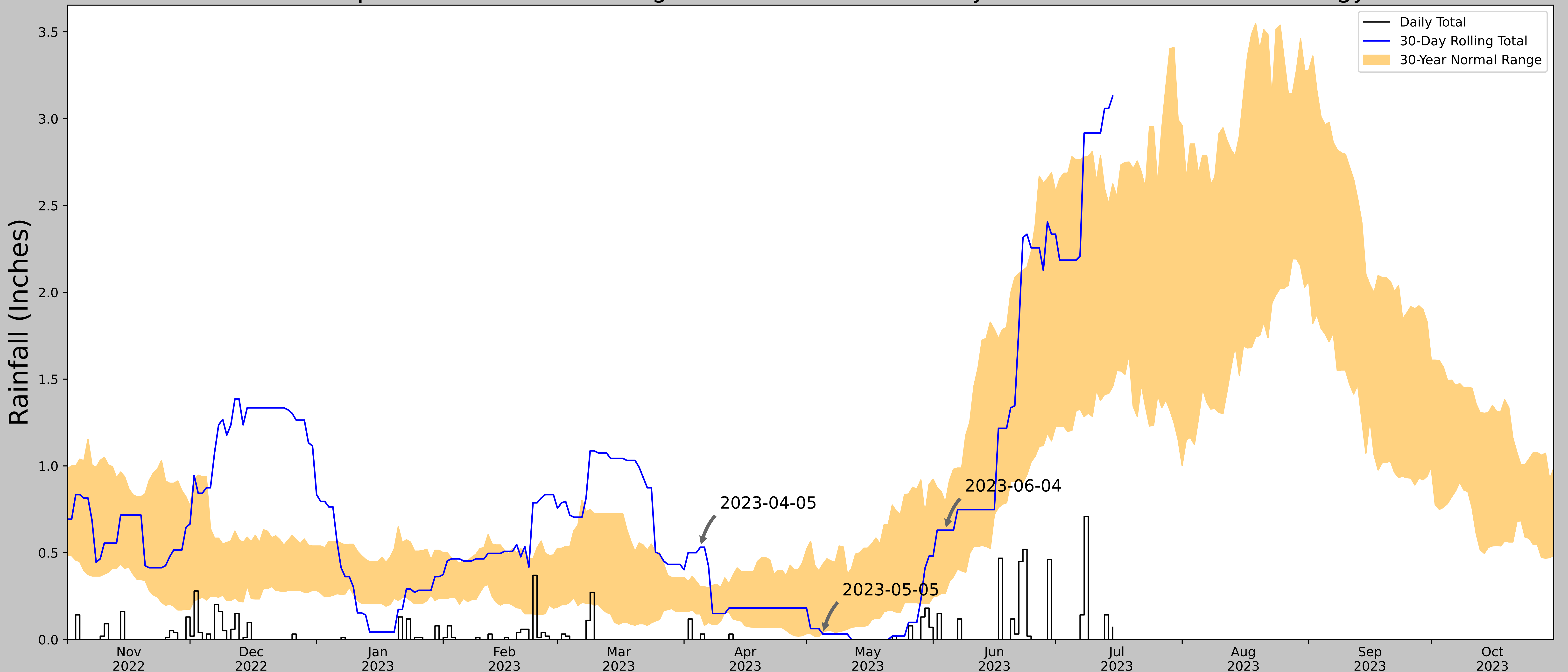
Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	64.676, -147.094
Observation Date	2023-06-04
Elevation (ft)	536.385
Drought Index (PDSI)	Not available
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-06-04	0.265748	0.788583	0.629921	Normal	2	3	6
2023-05-05	0.041732	0.433858	0.031496	Dry	1	2	2
2023-04-05	0.148032	0.303937	0.531496	Wet	3	1	3
Result							Normal Conditions - 11

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
N POLE	64.7581, -147.3253	475.066	8.875	61.319	4.538	11156	90
N POLE 1N	64.76, -147.34	496.063	0.453	20.997	0.213	84	0
MOOSE CREEK	64.7136, -147.1581	517.06	5.811	41.994	2.859	1	0
EIELSON FLD	64.6667, -147.1	546.916	9.17	71.85	4.785	62	0
AURORA	64.8553, -147.7217	442.913	13.455	32.153	6.487	43	0
Fairbanks F.O.	64.85, -147.8	450.131	15.339	24.935	7.285	7	0

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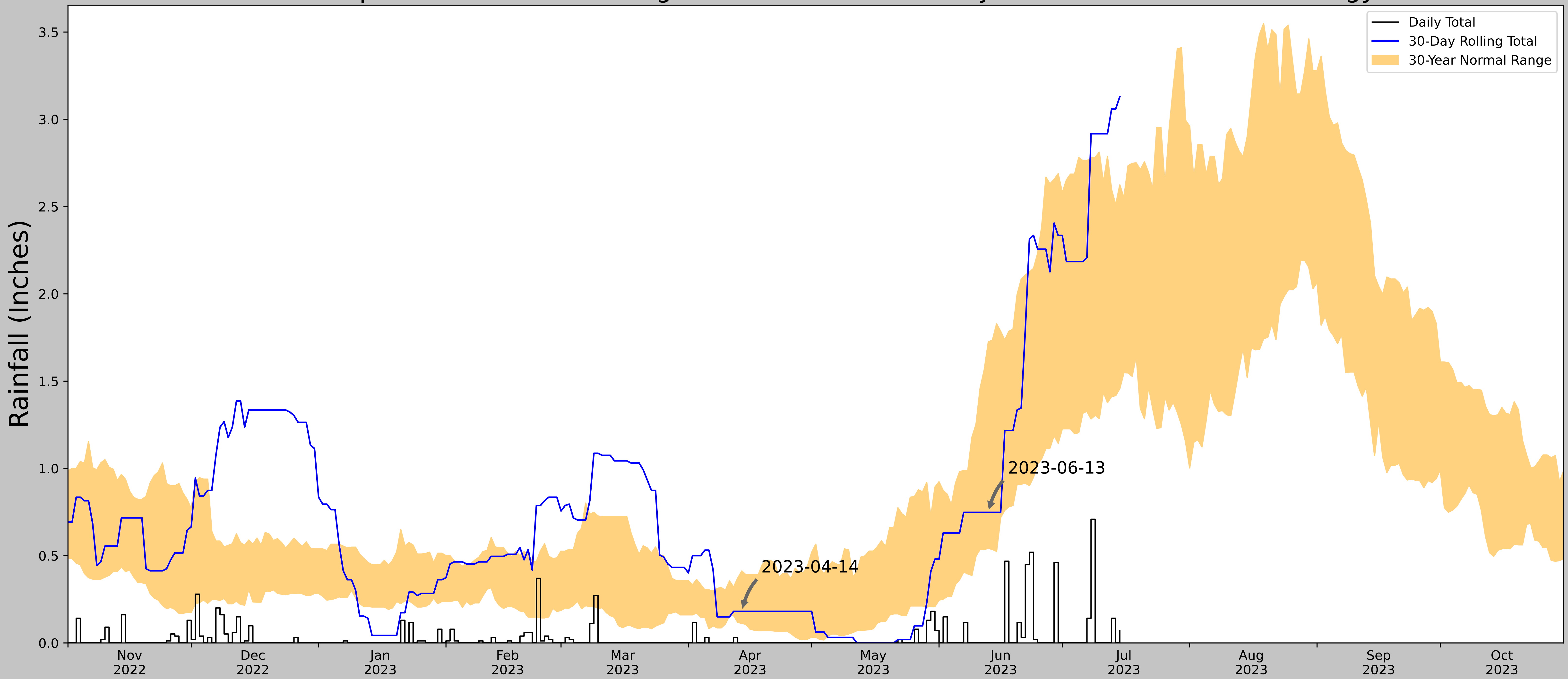
Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	64.676, -147.094
Observation Date	2023-06-13
Elevation (ft)	536.385
Drought Index (PDSI)	Not available
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-06-13	0.542126	1.724016	0.748032	Normal	2	3	6
2023-05-14	0.074016	0.498819	0.0	Dry	1	2	2
2023-04-14	0.112205	0.412205	0.181102	Normal	2	1	2
Result							Normal Conditions - 10

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
N POLE	64.7581, -147.3253	475.066	8.875	61.319	4.538	11156	90
N POLE 1N	64.76, -147.34	496.063	0.453	20.997	0.213	84	0
MOOSE CREEK	64.7136, -147.1581	517.06	5.811	41.994	2.859	1	0
EIELSON FLD	64.6667, -147.1	546.916	9.17	71.85	4.785	62	0
AURORA	64.8553, -147.7217	442.913	13.455	32.153	6.487	43	0
Fairbanks F.O.	64.85, -147.8	450.131	15.339	24.935	7.285	7	0

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Appendix B FIELD DATA FORMS AND PHOTOS

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PHOTO REPORT

Plot Number	ST21
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/4/2023
NWI Classification	U
Latitude (DD)	64.69413
Longitude (DD)	-147.131312

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

PHOTO REPORT

Plot Number	ST22
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/4/2023
NWI Classification	U
Latitude (DD)	64.693657
Longitude (DD)	-147.131785

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST23
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/4/2023
NWI Classification	U
Latitude (DD)	64.699003
Longitude (DD)	-147.135436

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

PHOTO REPORT

Plot Number	ST24
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.664183
Longitude (DD)	-147.087052

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: SW

PHOTO REPORT

Plot Number	ST25
Wetland Status	Wetland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	PEM1A
Latitude (DD)	64.6647695
Longitude (DD)	-147.08747967

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST26
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.663583
Longitude (DD)	-147.087248

Photo Type: Vegetation Direction: NE

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: SW

PHOTO REPORT

Plot Number	ST27
Wetland Status	Pond
Plot Type	WB
Plot Date	6/13/2023
NWI Classification	PUBHx
Latitude (DD)	64.66553
Longitude (DD)	-147.082346

Photo Type: Hydrology Direction: NE

Photo Type: Hydrology Direction: SW

Photo Type: Hydrology Direction: W

PHOTO REPORT

Plot Number	ST28
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.665851
Longitude (DD)	-147.08036

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST29
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.666644
Longitude (DD)	-147.078259

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST30
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.662153
Longitude (DD)	-147.071597

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST31
Wetland Status	Pond
Plot Type	WB
Plot Date	6/13/2023
NWI Classification	PUBHx
Latitude (DD)	64.666351
Longitude (DD)	-147.081435

Photo Type: Hydrology Direction: E

Photo Type: Hydrology Direction: S

Photo Type: Hydrology Direction: W

PHOTO REPORT

Plot Number	ST32
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.677038
Longitude (DD)	-147.093811

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST33
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.675818
Longitude (DD)	-147.094488

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

PHOTO REPORT

Plot Number	ST34
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.687178
Longitude (DD)	-147.084818

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST35
Wetland Status	Pond
Plot Type	WB
Plot Date	6/13/2023
NWI Classification	PUBHx
Latitude (DD)	64.688041
Longitude (DD)	-147.085074

Photo Type: Hydrology Direction: E

Photo Type: Hydrology Direction: N

Photo Type: Hydrology Direction: W

PHOTO REPORT

Plot Number	ST36
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.692093
Longitude (DD)	-147.118896

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: W

PHOTO REPORT

Plot Number	ST37
Wetland Status	Pond
Plot Type	WB
Plot Date	6/13/2023
NWI Classification	PUBHx
Latitude (DD)	64.692298
Longitude (DD)	-147.119804

Photo Type: Hydrology Direction: N

Photo Type: Hydrology Direction: NE

Photo Type: Hydrology Direction: W

PHOTO REPORT

Plot Number	ST38
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.691649
Longitude (DD)	-147.12734

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: S

PHOTO REPORT

Plot Number	ST39
Wetland Status	Upland
Plot Type	FVP
Plot Date	6/13/2023
NWI Classification	U
Latitude (DD)	64.692334
Longitude (DD)	-147.124451

Photo Type: Vegetation Direction: E

Photo Type: Vegetation Direction: N

Photo Type: Vegetation Direction: W

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Appendix C WETLANDS AND WATERS DETAIL FIGURES

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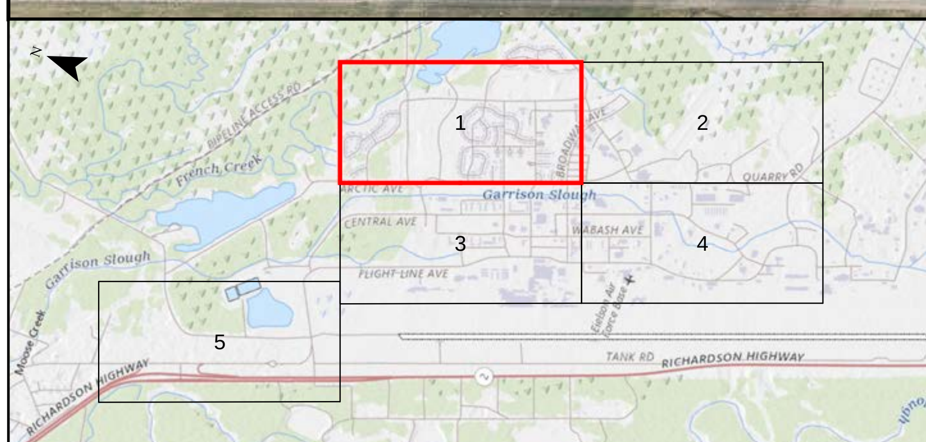

2023 Field Plot
- Wetland
- Pond
- Upland

2021-2022 Field Plot
- Wetland
- Pond
- Stream
- Upland

- Study Area (2022 Report)
- Study Area (2023 Additions)
- Wetland
- Waterbody

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

0 200 400 800 Feet

1:4,800 1 inch equals 400 feet

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Detail

Figure C-1	July 2023

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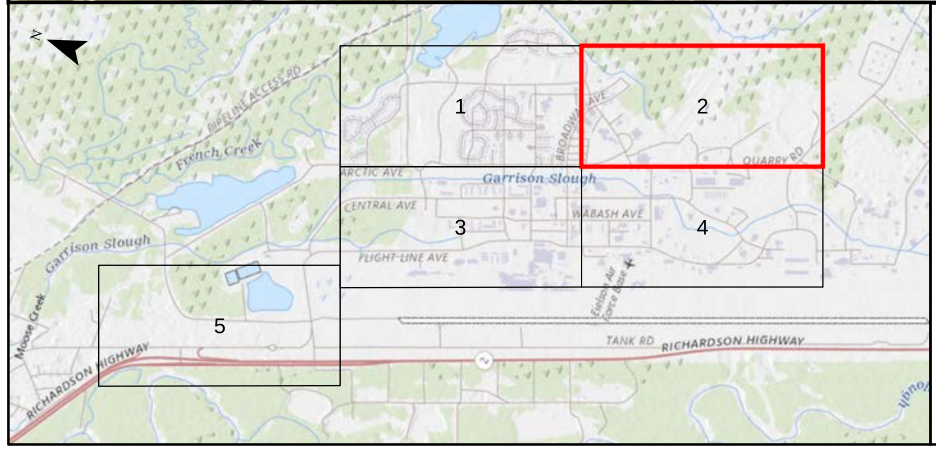

2023 Field Plot
- Wetland
- Pond
- Upland

2021-2022 Field Plot
- Wetland
- Pond
- Stream
- Upland

- Study Area (2022 Report)
- Study Area (2023 Additions)
- Wetland
- Waterbody

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

0 200 400 800 Feet

1:4,800 1 inch equals 400 feet

N E S W

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Detail

Figure C-2 | July 2023

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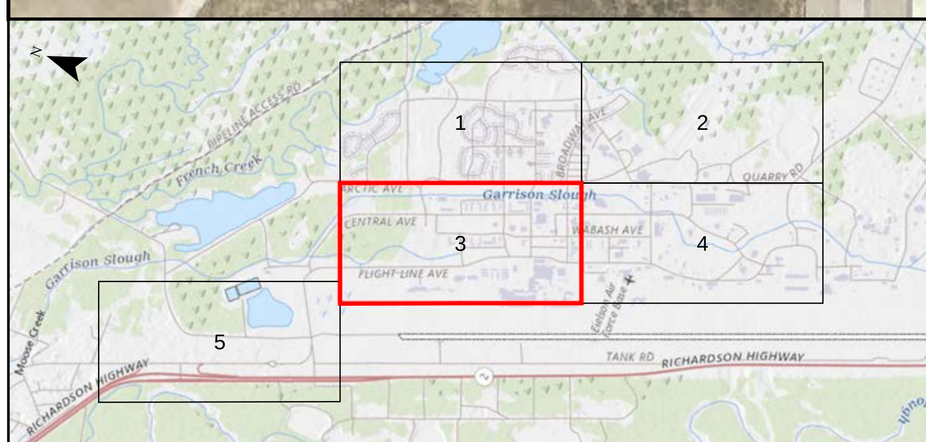

2023 Field Plot

- Wetland
- Pond
- Upland

2021-2022 Field Plot

- Wetland
- Pond
- Stream
- Upland

- Study Area (2022 Report)
- Study Area (2023 Additions)
- Wetland
- Waterbody

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

0 200 400 800 Feet

1:4,800 1 inch equals 400 feet

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Detail

Figure C-3 July 2023

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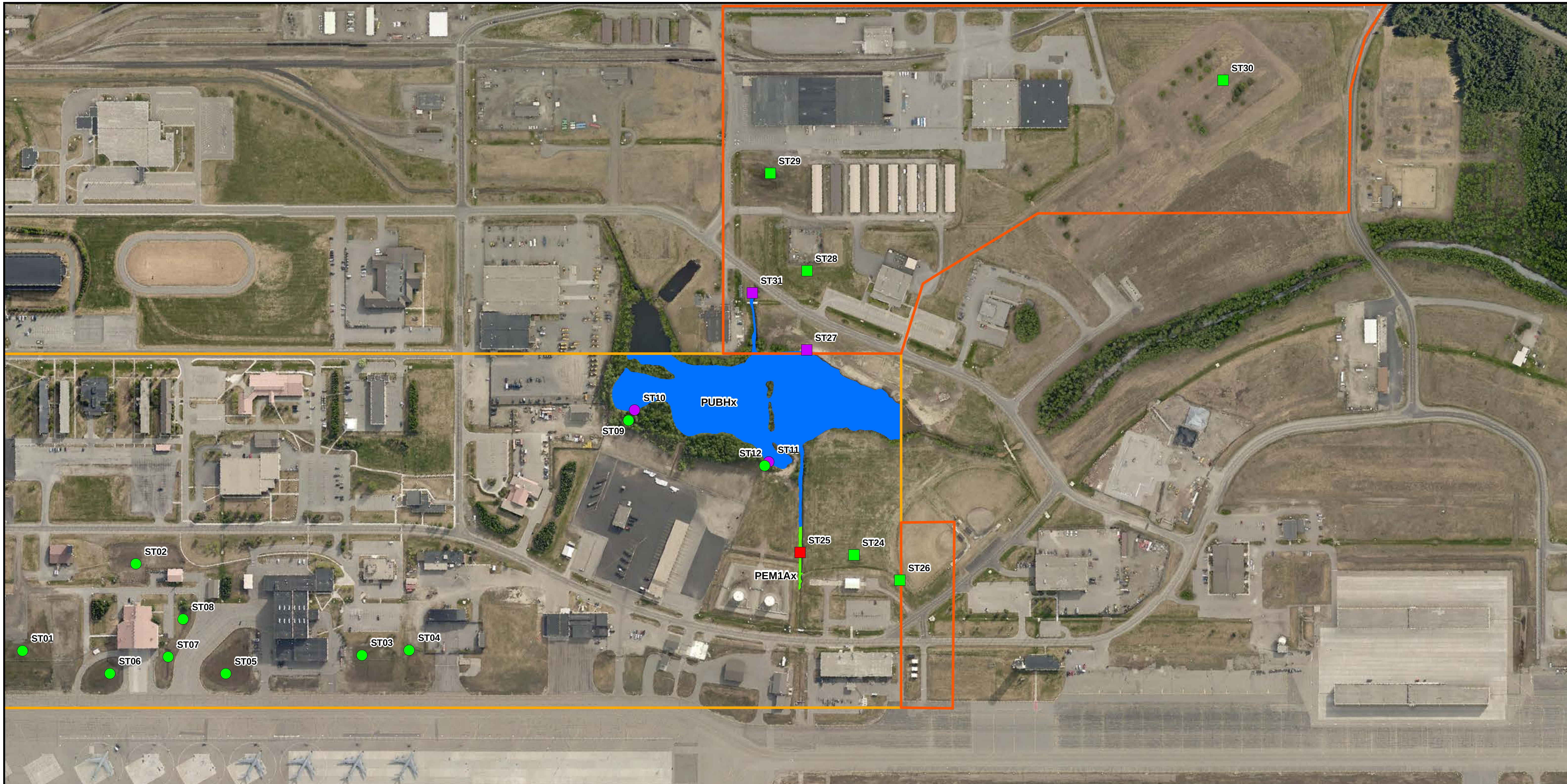

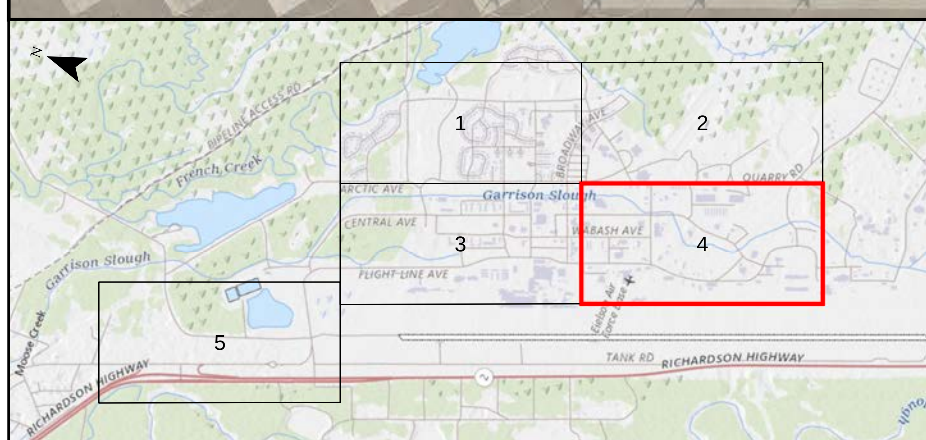

2023 Field Plot

- Wetland
- Pond
- Upland

2021-2022 Field Plot

- Wetland
- Pond
- Stream
- Upland

- Study Area (2022 Report)
- Study Area (2023 Additions)
- Wetland
- Waterbody

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

0 200 400 800 Feet

1:4,800 1 inch equals 400 feet

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Detail

Figure C-4 | July 2023

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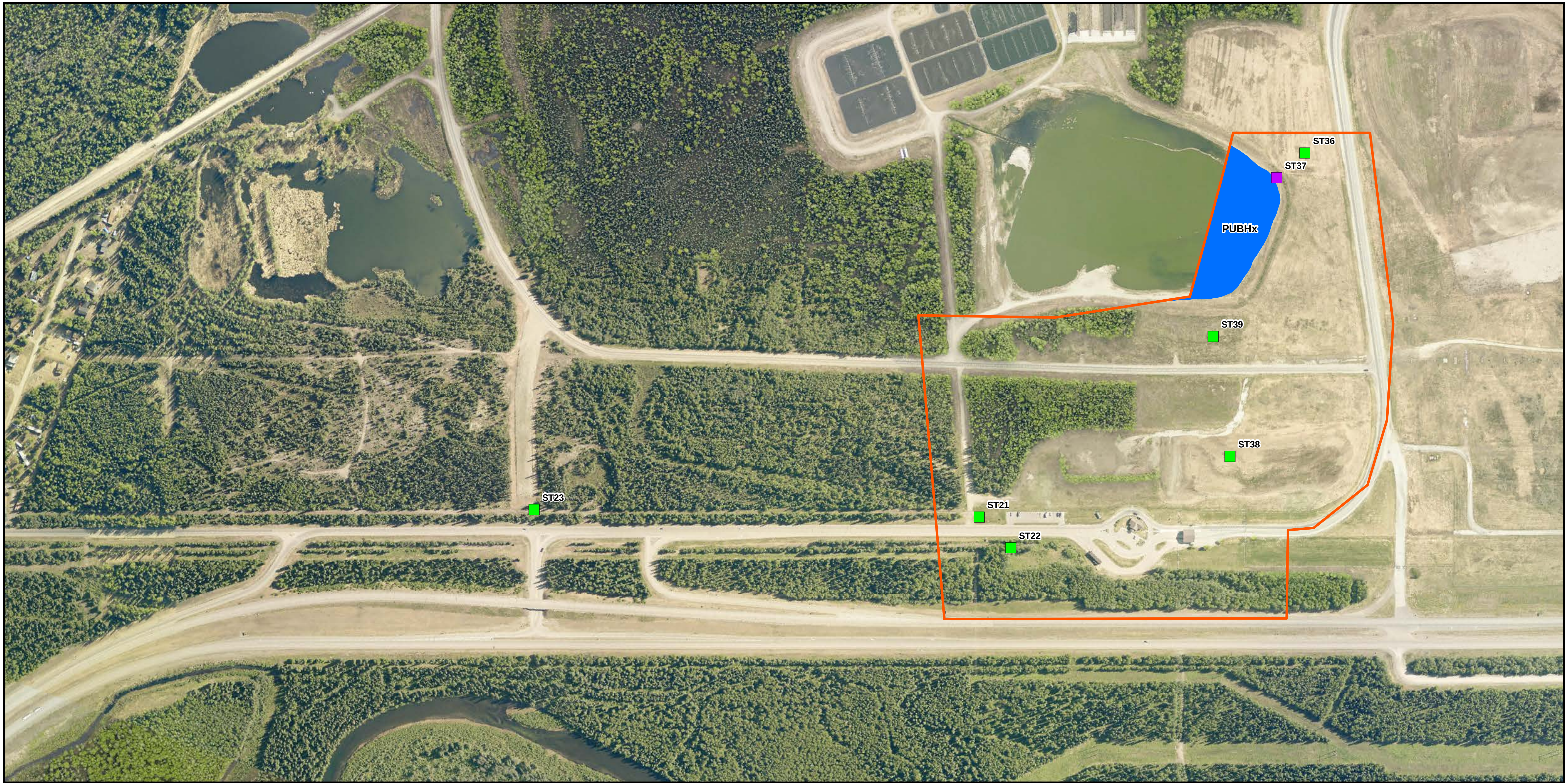

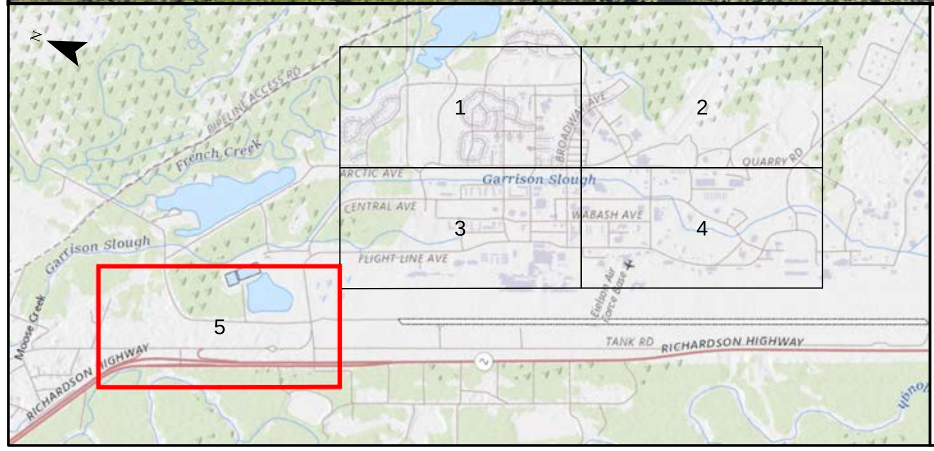

2023 Field Plot
- Wetland
- Pond
- Upland

2021-2022 Field Plot
- Wetland
- Pond
- Stream
- Upland

- Study Area (2022 Report)
- Study Area (2023 Additions)
- Wetland
- Waterbody

0 200 400 800 Feet

1:4,800 1 inch equals 400 feet

N E S W

Coordinate System: WGS 1984 UTM Zone 6N
Projection: Transverse Mercator
Datum: WGS 1984
Imagery: Fairbanks North Star Borough 2017

Eielson Air Force Base
2023 Consolidated Infrastructure Projects

Waters of the U.S. Detail

Figure C-5 | July 2023

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APPENDIX D
NOISE ANALYSIS REPORT

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TECHNICAL MEMORANDUM

Final Noise Analysis Technical Report for Consolidated Projects at Eielson Air Force Base, Alaska

Date:	21 February 2024
Contract:	W911KB18D0016, Task Order W911KB22F0122
Project:	Installation Development Environmental Assessment for Consolidated Projects, Eielson Air Force Base, Alaska
To:	Heidi Long, Project Manager, USACE Alaska District; Jamie Burke, 354 CEN/CEIE
From:	Mandy Hope, Brice Environmental Services Corporation
Attachments:	D-1 – Figures D-2 – Road Construction Noise Model Scenario Reports D-3 – Traffic Noise Screening Tool Report

Brice Environmental Services Corporation (Brice) is completing an Installation Development Environmental Assessment (IDEA) for five planned future projects at Eielson Air Force Base (EAFB), Alaska, for the U.S. Air Force (USAF) 354th Civil Engineering Squadron (354 CES) under U.S. Army Corps of Engineers (USACE) Alaska District contract #W911KB18D0016, delivery order #W911KB22F0122. The USAF Environmental Impact Analysis Process (EIAP) requires description of baseline noise levels and an evaluation of potential direct, indirect, and cumulative noise impacts resulting from the Proposed Action and identified alternatives, including the No Action Alternative. This Technical Memorandum summarizes that analysis, the findings of which are incorporated into the IDEA.

1.0 PROPOSED ACTION AND BUILD ALTERNATIVES

Installation development at EAFB includes continuous construction of new facilities and infrastructure, renovation of existing facilities, and demolition of redundant or obsolete facilities, with the goal of maximizing long-term capabilities in a manner that best meets the ongoing mission needs and future development planning. For the purposes of this analysis, EAFB has identified five individual installation development projects. The locations of these projects are presented on Figure 1 (Attachment D-1) and described below.

1.1 Construct Hursey Gate Final Denial Barrier and Road

This project would address current security deficiencies by moving the active vehicle barrier to the east to allow time for threat containment within the response zone. This would require reconfiguring Flight Line Avenue via construction of a two-lane divided road with vehicle channeling curbs outside the airfield clear zone and installation of two final denial barriers, one on Central Avenue and one on Transmitter Road. The new road would intersect with Transmitter Road. During construction, incoming and outgoing base traffic would be re-routed temporarily along Transmitter Road and Arctic Avenue.

1.2 Construct Addition to Coal Thaw Shed (Building 6203)

This project would enhance the ability of the Central Heat and Power Plant (CH&PP) to meet increasing mission demand by constructing a 5,950 square-foot (sf) addition to the north side of the existing Coal Thaw Shed capable of thawing eight railcars (four per rail), and a 2,275-sf addition to the south side of the existing shed capable of thawing four railcars; and installing air circulation improvements to stabilize the temperature in the shed by de-stratifying the thermal differential.

1.3 Construct New Joint Pacific Alaska Range Complex Range Operations Center

This project would address current Joint Pacific Alaska Range Complex Range Operations Center (JROC) space and security deficiencies by constructing an additional 36,735-sf facility to support the growing RED FLAG-Alaska mission, consisting of administrative space, building support space, and three different tiers of secure workspace for mission critical activities.

1.4 Demolish and Rebuild Cryogenics Facility (Building 3245)

The current Cryogenics Facility is beyond its useful life and lacks the space for multiple critical functions. This project would demolish the existing Cryogenics Facility and construct a new 3,350-sf Cryogenics Facility, a 2,400-sf liquid oxygen (LOX)/liquid nitrogen (LIN) storage building, and an associated 3,350-sf administrative building consisting of an administrative area and a War Readiness Material warehouse. The project would include new paved parking, sidewalks, and landscaping, for a total footprint of 43,326 sf.

1.5 Demolish and Rebuild Building 3425

Building 3425 is a timber-framed warehouse constructed in 1954 with an addition in 1958. The facility housed five different units until it suffered structural damage in March 2022 and a roof section collapse in April 2022, both due to snow loads above the design values. This project would demolish the damaged building and construct replacement facilities. Two alternatives are being considered.

1.5.1 Alternative 2 – Single Facility at 111,000 Square Feet

Alternative 2 would construct a single 110,000-sf facility within the original building footprint as well as an 800-sf communications building immediately adjacent to and west of the existing building.

1.5.2 Alternative 3 – Multiple Facilities Totaling 76,000 Square Feet

Alternative 3 would construct four different structures totaling 76,000 sf in various locations on EAFB, listed in Table 1.

Table 1 Building 3425 Replacement Facilities

FACILITY	LOCATION	AREA (sf)
FMO Warehouse	North side of Glacier Boulevard between Arctic Avenue and French Creek Drive	14,544
LRS Administration Building	Northwest of intersection of Quarry Road and Industrial Drive	17,406
LRS Heated Vehicle Storage Warehouse		19,880
MUNS Storage Facility	Former B3425 footprint	22,940
COMMS Building	East of Central Avenue and West of Former B3425	800
-	-	**TOTAL 75,570**

Notes:
COMMS – Communications Squadron
FMO – Furnishings Management Office
LRS – Logistics Readiness Squadron
MUNS – Munitions Support Squadron
sf – square feet

2.0 EXISTING CONDITIONS AND NO ACTION ALTERNATIVE

2.1 Airspace Noise

2.1.1 Existing Conditions

The noise environment at EAFB comprises sounds produced by military aircraft, including F-16C/D, KC-135R, F-35A, and HH-60, as well as other types of transient aircraft. Figure 1 shows the Day-Night Average Sound Level (DNL) noise contours for EAFB as of October 2020. Departures of F-16 and F-35A based at EAFB contribute the highest DNL north of the base due to their operational maneuvers, the period of the day in which maneuvers occur, and their single event sound level. Transient heavy cargo aircraft and F-35A arrivals contribute the highest DNL south of the base (USAF 2016). Currently, seven sensitive noise receptors located within EAFB experience DNL greater than or equal to 65 A-weighted decibels (dBA): Areas of EAFB housing; base dormitories; Ben Eielson Junior/Senior High School; Crawford Elementary School; and the base chapel, library, and medical clinic.

2.1.2 No Action Alternative

As the Proposed Action does not affect aircraft numbers or operations, airspace noise levels are expected to remain unchanged under either the Proposed Action or No Action Alternative. Base operations would likely continue the general trend of expansion and augmentation but without new construction or the proposed infrastructure improvements. Future projects would be evaluated against the current noise levels to identify when noise abatement measures may be required.

2.2 Land-Based Noise

2.2.1 Existing Conditions

Land-based noise at EAFB is derived from aircraft traffic on the ground, vehicle traffic, generators, construction, and operations and maintenance. Aircraft noise often masks land-based noise, including the approach of trucks on base roads. No measurements of land-based ambient sound levels are known to be available. For purposes of this analysis, Aircraft DNL contours are used as daytime (0700 – 1800) baseline noise levels, with a 5-dBA reduction for evening hours (1800 – 2200). Nighttime (2200-0700) baseline hours were conservatively estimated at 45 dBA.

2.2.2 No Action Alternative

Construction Noise Impacts

Under the No Action Alternative, the noise from the demolition of existing facilities and construction of new facilities under the Proposed Action would not occur. This analysis assumes that independent construction and demolition projects would be required to conduct similar noise analyses and that mitigation measures would be incorporated to ensure that noise impacts remain at less than significant levels.

Traffic Noise Impacts

Under the No Action Alternative, potential changes in base traffic patterns associated with the Proposed Action would not occur. This analysis assumes that independent projects would be required to conduct similar noise analyses, and that mitigation measures would be incorporated to ensure that any traffic noise impacts remain at less than significant levels.

Long-Term Impacts

Existing land-based noise levels and patterns at EAFB are assumed to remain the same as existing conditions under the No Action Alternative. While noise levels and patterns may alter over time due to changes in land or facility use, these changes would be independent of the No Action Alternative and cannot be reasonably predicted at this time.

3.0 NOISE LIMITS AND IMPACT CRITERIA

3.1 Noise Limits

3.1.1 Construction Noise Limits

U.S. Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) default maximum (L_{max}) and equivalent continuous sound level (L_{eq}) dBA limits were used for this analysis (FHWA 2006a). These levels are presented in Table 2. As described in Section 2.2.1, daytime exterior baseline noise levels were based on the 2020 DNL noise contours, with a 5-dBA reduction in the evening. Nighttime exterior noise levels were conservatively assumed to be 45 dBA.

Table 2 Roadway Construction Noise Model Default Noise Limits

LAND USE	DAYTIME (0700 – 1800) L_{max} NOISE LIMIT (dBA)	EVENING (1800 – 2200) L_{max} NOISE LIMIT (dBA)	NIGHTTIME (2200 – 0700) L_{max} NOISE LIMIT (dBA)
Residential	85 Non-Impact[1]; 90 Impact[2]	85	80
Commercial	N/A	N/A	N/A
Industrial	N/A	N/A	N/A

Notes:
[1] Non-impact equipment is equipment that generates a constant noise level while in operation.
[2] Impact equipment is equipment that generates an impulsive noise. Impulse noise is defined as noise produced by the periodic impact of a mass on a surface, of short duration (generally less than 1 second), high intensity, abrupt onset and rapid decay, and often rapidly changing spectral composition.
dBA – A-weighted decibels
L_{max} – Maximum A-weighted sound level associated with a given event
N/A – Not applicable

3.1.2 Traffic Noise Limits

For traffic noise analysis, noise limits were based on the FHWA Category B Noise Abatement Criteria (NAC), which is an average 1-hour A-weighted sound level (LA_{eq}) of 67 dBA at the exterior of the receptor, or a maximum 10-dBA increase over baseline noise levels (FHWA 2011), whichever is lower.

3.2 Noise Impact Criteria

Table 3 describes the relationship between noise levels and human perception.

Table 3 Relationship Between Noise Levels and Human Perception

INCREASE IN dBA	PERCEPTION
1-2	Not perceptible to the average person
3	Barely perceptible to the human ear
5	Readily perceptible to the human ear
10	Perceived as a doubling of loudness to the average person
15	Perceived as more than a doubling of loudness to the average person

Notes:
dBA – A-weighted decibels
Sources: AASHTO 2023; FHWA 2011

For purposes of this analysis, an increase in noise exposure of less than 5 dBA over baseline is considered a negligible impact. An increase in noise exposure between 5 dBA over baseline and the RCNM noise levels (refer to Table 2) is considered a minor impact. An increase in noise exposure above the applicable noise limit is considered a moderate impact, consistent with the definition of "substantial impact" in FHWA (2011) and American Association of Highway and Transportation Officials (AASHTO) (2023) guidelines.

4.0 SHORT-TERM NOISE EXPOSURE AND IMPACTS

4.1 Methodology

This noise analysis was conducted following the guidelines in Section 6.4, Construction Noise Prediction Methodology, of the *FHWA Highway Construction Noise Handbook* (FHWA 2006b). Screening-level analyses for multiple scenarios were conducted to assist in the identification of the appropriate approach (Attachment D-2).

4.1.1 Construction Noise

"Worst-case" noise level scenarios were evaluated using the FHWA RCNM in accordance with the *FHWA Highway Construction Noise Handbook* (2006b) and F*HWA Roadway Construction Noise Model User's Guide* (FHWA 2006a). These scenarios were identified by using the construction or demolition projects with the closest sensitive noise receptor(s). Representative equipment was selected from the default RCNM equipment list, and default noise emission reference levels and usage factors were used for the model. L_{max} exposures were compared to the default noise impact criteria identified in RCNM and the results used to determine whether additional modeling would be warranted. If the "worst-case" scenario resulted in L_{max} that were lower than the applicable RCNM noise levels, then further analysis would not be warranted. If L_{max} under the "worst-case" scenario exceeded the applicable RCNM noise levels, then the quantitative analysis of additional scenarios may be justified.

4.1.2 Traffic Noise

A "worst-case" scenario for temporary traffic noise impacts was evaluated using the FHWA Traffic Noise Screening Tool (TNST) in accordance with *FHWA Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) and the *FHWA TNST 1.0 User's Guide* (FHWA 2021) (Attachment D-3). The scenario was identified by using the construction or demolition project that would re-route traffic closest to a sensitive noise receptor. Site-specific inputs were used to the maximum extent possible, including the most recent available traffic volume data from the nearest applicable traffic count station. One-hour LA_{eq} were compared against both the FHWA NAC and the applicable baseline noise levels for the receptor to determine whether more detailed modeling would be warranted. If the "worst-case" scenario resulted in LA_{eq} that were less than the NAC or that resulted in a less than 10-dBA increase over baseline, then further analysis would not be warranted. If LA_{eq} under the "worst-case" scenario met or exceeded the NAC or resulted in a 10-dBA increase or more over baseline, then more detailed analysis using the FHWA Traffic Noise Model may be justified.

4.2 Worst-Case Construction Scenarios

Sensitive noise receptors at EAFB include residential housing and dormitories, schools, and the base chapel, library, and medical clinic. Due to varied project and receptor locations, "worst-case" scenarios were run for three construction/demolition projects with nearby sensitive noise receptors:

- Furnishings Management Office (FMO) Warehouse in proximity to base housing
- Coal Thaw Shed Extension in proximity to Crawford Elementary School
- JROC in proximity to the base chapel

4.2.1 Scenario Inputs

The following inputs were used in RCNM for this analysis:

Land Use

Land use for all receptors was set as Residential.

Baseline Noise Levels

Daytime baseline noise levels were set using the applicable DNL noise contours for each receptor, with a 5-dBA reduction for evening hours. Nighttime baseline noise levels were set at 45 dBA for all receptors. Baseline noise levels for the three scenarios are shown in Table 4.

Table 4 Baseline Noise Levels for Construction Scenarios

PROJECT/RECEPTOR	DAYTIME (0700 – 1800) BASELINE NOISE LEVELS (dBA)	EVENING (1800 – 2200) BASELINE NOISE LEVELS (dBA)	NIGHTTIME (2200 – 0700) BASELINE NOISE LEVELS (dBA)
FMO Warehouse/Base Housing	65	60	45
Coal Thaw Shed/Crawford Elementary	65	60	45
JROC/Chapel	70	65	45

Notes:
dBA – A-weighted decibels
FMO – Furnishings Management Office
JROC – Joint Pacific Alaska Range Complex Range Operations Center
LRS – Logistics Readiness Squadron

Noise Metric and Noise Limit Criteria

The noise metric was set to L_{eq}. Default noise limit criteria were used as described in Section 3.2.

Equipment

Table 5 presents the equipment selected and associated default noise emission settings selected for use in the three construction scenarios.

Table 5 Equipment Used in Roadway Construction Noise Model

DESCRIPTION	IMPACT DEVICE? (Yes/No)	USAGE (%)	ACTUAL L_{max} (dBA)
Compactor (ground)	No	20	83.2
Compressor (air)	No	40	77.7
Concrete Mixer Truck	No	40	78.8
Crane	No	16	80.6
Dozer	No	40	81.7
Dump Truck	No	40	76.5
Excavator	No	40	80.7
Flat Bed Truck	No	40	74.3
Front End Loader	No	40	79.1
Generator	No	50	80.6

DESCRIPTION	IMPACT DEVICE? (Yes/No)	USAGE (%)	ACTUAL L_{max} (dBA)
Man Lift	No	20	74.7
Paver	No	50	77.2
Pickup Truck	No	40	75.0
Pneumatic Tools	No	50	85.2
Roller	No	20	80.0
Warning Horn	No	5	83.2
Welder/Torch	No	40	74.0

Notes:
dBA – A-weighted decibels
L_{max} – Maximum A-weighted sound level associated with a given event

Distance to Receptor

Table 6 provides the closest distance between each project boundary and the nearest sensitive noise receptor, which was estimated using Google Earth imagery.

Table 6 Receptor Distance Values

PROJECT	RECEPTOR	RECEPTOR DISTANCE (feet)
FMO Warehouse	Base Housing Subdivision	593
Coal Thaw Shed Extension	Crawford Elementary School	582
JROC Facility	Base Chapel	532

Notes:
FMO – Furnishings Management Office
JROC – Joint Pacific Alaska Range Complex Range Operations Center

Estimated Shielding

For a conservative estimate of potential noise exposures, estimated shielding was set to 0 dBA for all scenarios.

4.2.2 Construction Scenario Results

FMO Warehouse

Table 7 lists the potential short-term noise exposure at the exterior of the nearest base housing units, based on the settings identified in Section 4.2.1.

Table 7 FMO Warehouse Potential Short-Term Exterior Noise Exposure

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Compactor (ground)	61.7	54.8	85	85	None	None
Compressor (air)	56.2	52.2	85	85	None	None
Concrete Mixer Truck	57.3	53.3	85	85	None	None

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Crane	59.1	51.1	85	85	None	None
Dozer	60.2	56.2	85	85	None	None
Dump Truck	55.0	51.0	85	85	None	None
Excavator	59.2	55.2	85	85	None	None
Flat Bed Truck	52.8	48.8	85	85	None	None
Front End Loader	57.6	53.6	85	85	None	None
Generator	59.1	56.1	85	85	None	None
Man Lift	53.2	46.2	85	85	None	None
Paver	55.7	52.7	85	85	None	None
Pickup Truck	53.5	49.5	85	85	None	None
Pneumatic Tools	63.7	60.7	85	85	None	None
Roller	58.5	51.5	85	85	None	None
Warning Horn	61.7	48.7	85	85	None	None
Welder/Torch	52.5	48.5	85	85	None	None
TOTAL	**63.7**	**66.2**	**85**	**85**	**None**	**None**

Notes:
[1] For purposes of this analysis, construction activities are assumed not to occur between 2200 and 0700 hours.
dBA – A-weighted decibels
L_{eq} – equivalent continuous sound level
L_{max} – Maximum A-weighted sound level associated with a given event

Coal Thaw Shed Extension

Table 8 lists the potential short-term noise exposure at the exterior of Crawford Elementary School, based on the settings identified in Section 4.2.1.

Table 8 Coal Thaw Shed Extension Potential Short-Term Exterior Noise Exposure

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Compactor (ground)	61.9	54.9	85	85	None	None
Compressor (air)	56.4	52.4	85	85	None	None
Concrete Mixer Truck	57.5	53.5	85	85	None	None
Crane	59.2	51.3	85	85	None	None
Dozer	60.4	56.4	85	85	None	None
Dump Truck	55.1	51.2	85	85	None	None
Excavator	59.4	55.4	85	85	None	None
Flat Bed Truck	52.9	49.0	85	85	None	None
Front End Loader	57.8	53.8	85	85	None	None
Generator	59.3	56.3	85	85	None	None

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Man Lift	53.4	46.4	85	85	None	None
Paver	55.9	52.9	85	85	None	None
Pickup Truck	53.7	49.7	85	85	None	None
Pneumatic Tools	63.9	60.9	85	85	None	None
Roller	58.7	51.7	85	85	None	None
Warning Horn	61.9	48.8	85	85	None	None
Welder/Torch	52.7	48.7	85	85	None	None
TOTAL	**63.9**	**66.4**	**85**	**85**	**None**	**None**

Notes:
[1] For purposes of this analysis, construction activities are assumed not to occur between 2200 and 0700 hours.
dBA – A-weighted decibels
L_{eq} – equivalent continuous sound level
L_{max} – Maximum A-weighted sound level associated with a given event

JROC Facility

Table 9 lists the potential short-term noise exposure at the exterior of the base chapel, based on the settings identified in Section 4.2.1.

Table 9 JROC Facility Potential Short-Term Exterior Noise Exposure

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Compactor (ground)	62.7	55.7	85	85	None	None
Compressor (air)	57.1	53.2	85	85	None	None
Concrete Mixer Truck	58.3	54.3	85	85	None	None
Crane	60.0	52.1	85	85	None	None
Dozer	61.1	57.2	85	85	None	None
Dump Truck	55.9	51.9	85	85	None	None
Excavator	60.2	56.2	85	85	None	None
Flat Bed Truck	53.7	49.7	85	85	None	None
Front End Loader	58.6	54.6	85	85	None	None
Generator	60.1	57.1	85	85	None	None
Man Lift	54.2	47.2	85	85	None	None
Paver	56.7	53.7	85	85	None	None
Pickup Truck	54.5	50.5	85	85	None	None
Pneumatic Tools	64.6	61.6	85	85	None	None
Roller	59.5	52.5	85	85	None	None

EQUIPMENT	L_{max} (dBA)	L_{eq} (dBA)	DAY L_{max} NOISE LIMIT[1] (dBA)	EVENING L_{max} NOISE LIMIT[1] (dBA)	DAY NOISE LIMIT EXCEEDANCE (dBA)	EVENING NOISE LIMIT EXCEEDANCE (dBA)
Warning Horn	62.6	49.6	85	85	None	None
Welder/Torch	53.5	49.5	85	85	None	None
TOTAL	**64.6**	**67.2**	**85**	**85**	**None**	**None**

Notes:
[1] For purposes of this analysis, construction activities are assumed not to occur between 2200 and 0700 hours.
dBA – A-weighted decibels
L_{eq} – equivalent continuous sound level
L_{max} – Maximum A-weighted sound level associated with a given event

4.2.3 Short-Term Construction Noise Impacts

L_{max} noise exposures were below both the RCNM noise limits and baseline noise levels for all three construction scenarios. L_{eq} noise exposures were below RCNM noise limits and background noise levels for the JROC/Chapel scenario, but exceeded background noise levels for FMO Warehouse/Housing and the Coal Thaw Shed/Crawford Elementary School scenarios by 1.2 and 1.4 dBA, respectively. As both exceedances are less than 5 dBA, short-term noise impacts from construction projects are expected to be negligible.

4.3 Worst-Case Traffic Noise Scenario

Under the Proposed Action, incoming and outgoing base traffic, including medium and heavy trucks, would be temporarily re-routed along Transmitter Road and Arctic Boulevard, passing near a base housing subdivision at the intersection of Arctic Avenue and French Creek Drive (Figure 1). Potential traffic noise impacts at the closest housing unit to Arctic Avenue were evaluated using the FHWA TNST.

4.3.1 Scenario Inputs

- Number of Near Lanes – 1
- Number of Far Lanes – 1
- Lane Width – 12 feet
- Pavement Type – Average
- Near Lane Grade – 0%
- Far Lane Grade – 0%
- Receiver Distance – Using Google Earth imagery, the distance between the centerline of the near lane and the closest point on the nearest receptor was estimated at 25 feet
- Receiver Height – 5 feet
- Ground Type – Lawn (based on Google Earth imagery)
- Traffic Average Period – Hourly (to align with 2023 traffic count data for the section of the Richardson Highway just outside the Hursey Gate, publicly available from the Alaska Department of Transportation and Public Facilities [ADOT&PF])
- NAC Category – 'B' (Residential)
- Existing Level – 65 dBA (based on current DNL noise contours [Figure 1])

- Substantial Increase Threshold – 10 dBA (default)
- Lane-Specific Inputs – refer to Table 10

Table 10 Lane-Specific Inputs to the Traffic Noise Screening Tool

INPUT	UNITS	NEAR LANE	FAR LANE
Lane Speed	Miles per Hour	35	35
Average Total Traffic[1]	Vehicles per Hour	90	120
Average Hourly Traffic[1]	Vehicles per Hour	90	120
Average Daily Traffic	Vehicles per Day	2160	2880
% Automobiles[2]	% of Average Total Traffic	91	92.3
% Medium Trucks[3]	% of Average Total Traffic	3.7	3.5
% Heavy Trucks[4]	% of Average Total Traffic	5.3	4.3
Automobiles[2]	Vehicles per Hour	81.9	110.7
Medium Trucks[3]	Vehicles per Hour	3.3	4.2
Heavy Trucks[4]	Vehicles per Hour	4.8	5.1

Notes:
Based on 2023 traffic count and % vehicle data (ADOT&PF 2023).
[1] Average Total Traffic and Average Hourly Traffic are the same value when the Traffic Average Period is set to Hourly.
[2] FHWA Vehicle Classes 1-3 (FHWA 2014).
[3] FHWA Vehicle Classes 4-6 (FHWA 2014).
[4] FHWA Vehicle Classes 7-15 (FHWA 2014).
% – percent

4.3.2 Traffic Noise Scenario Results

Based on the inputs in Section 4.3.1, both the near and far lane 1-hour LA_{eq} values were estimated at 56.8 dBA, combining for a total 1-hour LA_{eq} noise exposure of 59.8 dBA at the exterior of the nearest residence.

4.3.3 Short-Term Traffic Noise Impacts

The total 1-hour LA_{eq} noise exposure at the nearest sensitive noise receptor to increased traffic on Arctic Avenue was less than both the FHWA NAC and current baseline noise levels. Short-term impacts from the temporary re-route of incoming and outgoing base traffic along Arctic Avenue are expected to be negligible.

5.0 LONG-TERM NOISE EXPOSURE AND IMPACTS

None of the projects under the Proposed Action are expected to result in new, long-term noise emission sources other than increased traffic along certain sections of roadway. The activity with the highest potential for long-term noise impacts is day-to-day operations at the new FMO Warehouse, which has the potential to increase traffic, including heavy trucks, on Glacier Avenue. The nearest sensitive noise receptor to this project is a base housing subdivision south of Glacier Avenue.

Based on the guidelines in Section 6.4, Construction Noise Prediction Methodology, of the *FHWA Highway Construction Noise Handbook* (FHWA 2006b), Brice qualitatively evaluated this project as a "worst-case" scenario. The long-term noise exposure scenario was compared to the short-term traffic noise scenario evaluated in Section 4.3. Any long-term increase in traffic on Glacier Avenue due to operations at the FMO Warehouse would be substantially less than the traffic flows analyzed in that scenario. Additionally, the nearest residence to the near lane centerline of Glacier Avenue is approximately 420 feet, compared to the 25-foot distance evaluated in the short-term traffic noise scenario. Given that LA_{eq} exposures were below both the NAC and the existing noise levels of 65 dBA in Section 4.3, it is expected that the long-term noise impacts from increased traffic noise resulting from operations at the FMO Warehouse would likewise be negligible.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Based on the results of this analysis, the Proposed Action would not result in any exceedances of RCNM or TNST Noise Limits. Short-term, negligible (less than 5 dBA) increases in ambient noise may be anticipated during the demolition and construction associated with the Proposed Action. Long-term impacts associated with the Proposed Action are also expected to be negligible.

6.2 Recommendations

To further minimize the potential for short-term impacts to sensitive noise receptors, it is recommended that the USAF limit construction activities to daytime (0700-1800) or evening (1800-2200) hours for projects located near residential areas.

7.0 REFERENCES

American Association of Highway and Transportation Officials (AASHTO). 2023. *Traffic Noise & Transportation.* Center for Environmental Excellence, American Association of State Highway and Transportation Officials. https://environment.transportation.org/education/environmental-topics/traffic-noise/traffic-noise-overview/. Accessed 20 October 2023.

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Attachment D-1

Figures

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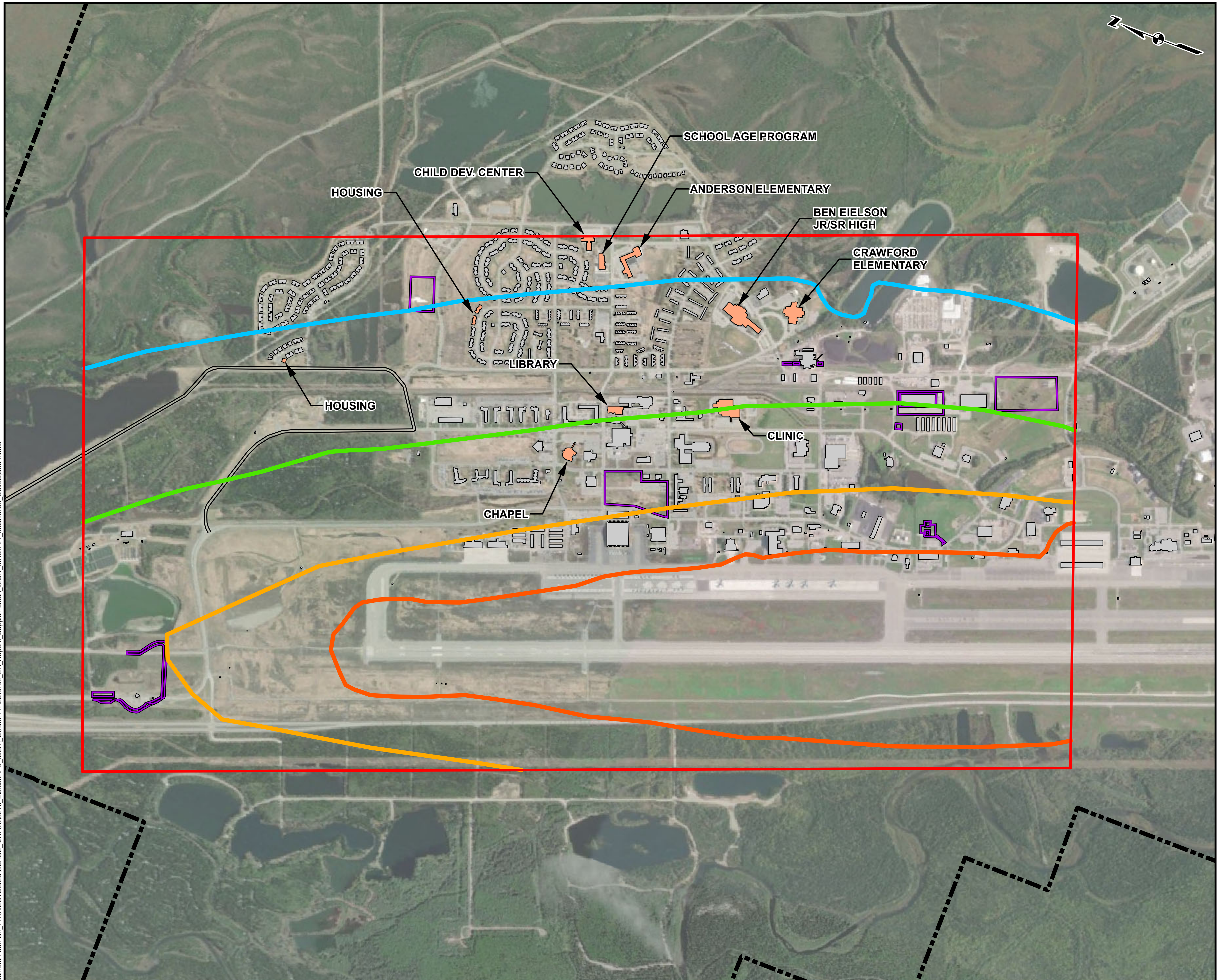
1 INCH



INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT FOR CONSOLIDATED PROJECTS NOISE ANALYSIS TECHNICAL MEMORANDUM
EIELSON AIR FORCE BASE, ALASKA

PROPOSED PROJECTS, BASELINE NOISE CONTOURS, AND SENSITIVE NOISE RECEPTORS

Legend

dBA Day-Night Level

- 65-70 dBA Day-Night Level
- 70-75 dBA Day-Night Level
- 75-80 dBA Day-Night Level
- 80-85 dBA Day-Night Level
- Hursey Gate Temporary Access Road
- Sensitive Noise Receptor
- Building
- Project Areas
- Region of Influence
- Installation Boundary

Abbreviations

dBA A-weighted decibels

Notes

1. For conceptual purposes only. All locations are approximate.

References

1. Imagery source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

ALASKA STATE PLANE ZONE 3. U.S. SURVEY FEET
HORIZONAL DATUM: NAD83(2011) | VERTICAL DATUM: NAVD88

1,500 750 0 1,500 3,000
Feet

PROJECT No.: 321605	DATE: 11/22/2023	FIGURE: D-1
P.M.: S.B.	DRAWN: T.A.	

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Attachment D-2
Road Construction Noise Model Scenario Reports

FMO Warehouse Scenario Report

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10-26-2023
Case Description: FBO Warehouse to Nearest Receptors

**** Receptor #1 ****

Description	Land Use	Daytime	Evening	Night
		Baselines (dBA)		
Residences	Residential	65.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compactor (ground)	No	20		83.2	593.0	0.0
Compressor (air)	No	40		77.7	593.0	0.0
Concrete Mixer Truck	No	40		78.8	593.0	0.0
Crane	No	16		80.6	593.0	0.0
Dozer	No	40		81.7	593.0	0.0
Dump Truck	No	40		76.5	593.0	0.0
Excavator	No	40		80.7	593.0	0.0
Flat Bed Truck	No	40		74.3	593.0	0.0
Front End Loader	No	40		79.1	593.0	0.0
Generator	No	50		80.6	593.0	0.0
Man Lift	No	20		74.7	593.0	0.0
Paver	No	50		77.2	593.0	0.0
Pickup Truck	No	40		75.0	593.0	0.0
Pneumatic Tools	No	50		85.2	593.0	0.0
Roller	No	20		80.0	593.0	0.0
Warning Horn	No	5		83.2	593.0	0.0
Welder / Torch	No	40		74.0	593.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Compactor (ground)	61.7	54.8	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Compressor (air)	56.2	52.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Concrete Mixer Truck	57.3	53.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Crane	59.1	51.1	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dozer	60.2	56.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dump Truck	55.0	51.0	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Excavator	59.2	55.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Flat Bed Truck	52.8	48.8	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Front End Loader	57.6	53.6	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Generator	59.1	56.1	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Man Lift	53.2	46.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Paver	55.7	52.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pickup Truck	53.5	49.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pneumatic Tools	63.7	60.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Roller	58.5	51.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Warning Horn	61.7	48.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Welder / Torch	52.5	48.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Total	63.7	66.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A

Coal Thaw Shed Scenario Report

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10-26-2023
Case Description: Coal Thaw Shed Extension to Nearest Receptors

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Crawford Elementary School	Residential	65.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compactor (ground)	No	20		83.2	582.0	0.0
Compressor (air)	No	40		77.7	582.0	0.0
Concrete Mixer Truck	No	40		78.8	582.0	0.0
Crane	No	16		80.6	582.0	0.0
Dozer	No	40		81.7	582.0	0.0
Dump Truck	No	40		76.5	582.0	0.0
Excavator	No	40		80.7	582.0	0.0
Flat Bed Truck	No	40		74.3	582.0	0.0
Front End Loader	No	40		79.1	582.0	0.0
Generator	No	50		80.6	582.0	0.0
Man Lift	No	20		74.7	582.0	0.0
Paver	No	50		77.2	582.0	0.0
Pickup Truck	No	40		75.0	582.0	0.0
Pneumatic Tools	No	50		85.2	582.0	0.0
Roller	No	20		80.0	582.0	0.0
Warning Horn	No	5		83.2	582.0	0.0
Welder / Torch	No	40		74.0	582.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compactor (ground)	61.9	54.9	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Compressor (air)	56.4	52.4	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Concrete Mixer Truck	57.5	53.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Crane	59.2	51.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dozer	60.4	56.4	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dump Truck	55.1	51.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Excavator	59.4	55.4	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Flat Bed Truck	52.9	49.0	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Front End Loader	57.8	53.8	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Generator	59.3	56.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Man Lift	53.4	46.4	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Paver	55.9	52.9	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pickup Truck	53.7	49.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pneumatic Tools	63.9	60.9	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Roller	58.7	51.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Warning Horn	61.9	48.8	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Welder / Torch	52.7	48.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Total	63.9	66.4	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A

JROC Scenario Report

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10-26-2023
Case Description: New JROC to Nearest Receptors

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Chapel	Residential	70.0	65.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compactor (ground)	No	20		83.2	532.0	0.0
Compressor (air)	No	40		77.7	532.0	0.0
Concrete Mixer Truck	No	40		78.8	532.0	0.0
Crane	No	16		80.6	532.0	0.0
Dozer	No	40		81.7	532.0	0.0
Dump Truck	No	40		76.5	532.0	0.0
Excavator	No	40		80.7	532.0	0.0
Flat Bed Truck	No	40		74.3	532.0	0.0
Front End Loader	No	40		79.1	532.0	0.0
Generator	No	50		80.6	532.0	0.0
Man Lift	No	20		74.7	532.0	0.0
Paver	No	50		77.2	532.0	0.0
Pickup Truck	No	40		75.0	532.0	0.0
Pneumatic Tools	No	50		85.2	532.0	0.0
Roller	No	20		80.0	532.0	0.0
Warning Horn	No	5		83.2	532.0	0.0
Welder / Torch	No	40		74.0	532.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compactor (ground)	62.7	55.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Compressor (air)	57.1	53.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Concrete Mixer Truck	58.3	54.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Crane	60.0	52.1	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dozer	61.1	57.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Dump Truck	55.9	51.9	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Excavator	60.2	56.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Flat Bed Truck	53.7	49.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Front End Loader	58.6	54.6	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Generator	60.1	57.1	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Man Lift	54.2	47.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Paver	56.7	53.7	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pickup Truck	54.5	50.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Pneumatic Tools	64.6	61.6	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Roller	59.5	52.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Warning Horn	62.6	49.6	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Welder / Torch	53.5	49.5	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Total	64.6	67.2	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A

Attachment D-3

Traffic Noise Screening Tool Report

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	Traffic Noise Screening Tool, Version 1.0.0
Report Date:	10-26-2023
Case Description:	Hursey Gate Traffic Reroute to Base Housing
Number of Near Lanes:	1
Number of Far Lanes:	1
Lane Width (ft):	12
Pavement Type:	Average
Near Lane Grade (%):	0
Far Lane Grade (%):	0
Receiver Distance (ft):	25
Receiver Height (ft):	5
Ground Type:	Lawn
Traffic Average Period:	Hourly
NAC Category:	B
Existing Level (dBA):	65
Substantial Increase Threshold (dB):	10
Near Lane #	1
Lane Speed (mph):	35
Average Total Traffic:	90
Average Hourly Traffic (Veh/hr):	90
Average Daily Traffic (Veh/day):	2160
Automobile %:	91
Medium Truck %:	3.7
Heavy Truck %:	5.3
Automobiles / Hour:	81.9
Medium trucks / Hour:	3.3
Heavy Trucks / Hour:	4.8
Far Lane #	1
Lane Speed (mph):	35
Average Total Traffic:	120
Average Hourly Traffic (Veh/hr):	120
Average Daily Traffic (Veh/day):	2880
Automobile %:	92.3
Medium Truck %:	3.5
Heavy Truck %:	4.3
Automobiles / Hour:	110.7
Medium trucks / Hour:	4.2
Heavy Trucks / Hour:	5.1
Near Lane LAeq-1hr (dBA)	56.77
Far Lane LAeq-1hr (dBA)	56.78
Total LAeq-1hr (dBA)	59.79
Total Level was greater than NAC - 3 dB?	NO
There was a substantial increase over existing?	NO

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