National Telecommunications
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Environmental Assessment
Volume 1: EA and Appendices A - E

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

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Table of Contents

Tables

List of Acronyms

AAC	Alaska Administrative Code
ACP	Arctic Coastal Plain
ADF&G	Alaska Department of Fish and Game
AHRS	Alaska Heritage Resources Survey
AIDEA	Alaska Industrial Development and Export Authority
ANCSA	Alaska Native Claim Settlements Act
ANILCA	Alaska National Interest Lands Conservation Act
APE	area of potential effect
AWC	Anadromous Waters Catalog
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BP	Before Present
C	Celsius
CBS	Chukchi/Bering Sea
CCP	Comprehensive Conservation Plan
dB	Decibels
DEC	Department of Environmental Conservation
DNR	Department of Natural Resources
DOD	Department of Defense
DOE	Determination of Eligibility
DOI	Department of Interior
DOT&PF	Department of Transportation and Public Facilities
DPS	Distinct Population Segment
DTS	Desktop Studies
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
FLPMA	Federal Land Policy and Management Act
FOC	Fiber Optic Cable
HDD	Horizontal Directional Drilling
Hz	Hertz
IPN	Indigenous Place Names
KIC	Kikiktagruk Inupiat Corporation
km	Kilometers
MBTA	Migratory Bird Treaty Act
NAB	Northwest Arctic Borough
NANA	NANA Regional Corporation
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OHA	Office of History and Archaeology

PILT	Payment in Lieu of Taxes
RDM	Red Dog Mine
RMP	Resource Management Plan
ROP	Required Operating Procedures
ROW	Right-of-Way
SGCN	Species of Greatest Conservation Need
SSS	Special Status Species
SWAP	State Wildlife Action Plan
TBCP	the Tribal Broadband Connectivity Program
TES	Threatened and Endangered Species
TUS	Transportation and Utility Systems
USACE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VIF	Village Improvement Fund
VRM	Visual Resource Management
WAH	Western Arctic Herd
yrBP	years before present

1 INTRODUCTION

1.1 Background

NANA Regional Corporation, Inc. (NANA) is proposing to construct a broadband fiber as the recipient of a $65,168,000 grant from National Telecommunications and Information Administration (NTIA) under the Tribal Broadband Connectivity Program (TBCP), as part of grant award number NT23TBC0290014. The NANA Regional Broadband Network Project or "Project" would provide broadband internet to eight rural, unserved, predominately Alaska Native communities in the Northwest Arctic Borough, Alaska, including Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, and Shungnak by deployment of fiber optic cable. Additionally, the proposed project would provide additional broadband infrastructure to Noorvik and Selawik.

U.S. Department of Interior (DOI) agencies received an Application for Transportation, Utility Systems, Telecommunication and Facilities on Federal Lands and Property (SF 299) on March 28, 2025. After receiving supplemental information, Bureau of Land Management (BLM) accepted the application as complete on July 14, 2025, and USFWS (US Fish and Wildlife Service) accepted the application as complete July 25, 2025.

The proposed project would require authorizations from Federal agencies, State of Alaska agencies, municipalities, and private landowners. NANA applied for and received coverage under the Fixing America's Surface Transportation Act (FAST-41) (42 USC 4370 m). FAST-41 is a legislatively established process for improving federal agency coordination and timeliness of environmental reviews for infrastructure projects. NTIA has assumed the role of Lead Agency for completion of an Environmental Assessment (EA), with the role of technical analysis, communication, and decision making under the National Environmental Policy Act (NEPA) (42 USC 4321 et seq.) as amended. BLM, NPS (National Park Service), FWS, USACE, NOAA are Cooperating Federal agencies and contributed to the EA by providing information and reviewing components to ensure it meets individual agencies' permitting requirements. The EA discloses environmental impacts and demonstrates compliance with applicable federal laws, regulations, and policies of the involved agencies.

1.2 Proposed Action

The proposed action under review in this EA includes the construction, operation and maintenance, and decommissioning of a fiber optic cable network across various routes within northwest Alaska. Additionally, the proposed action includes a change in management designation from Minimal to Moderate management category for lands within Selawik National Wildlife Refuge.

1.3 Purpose and Need

The purpose of this EA is to consider authorizations for infrastructure development that would provide broadband high-speed internet to the communities of Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, and Shungnak, and addition infrastructure in Noorvik and Selawik.

In the case of NTIA, the need for this action is established by the NTIA's responsibility under the TBCP Notice of Funding Opportunity (NOFO) to make funding available to tribal entities to provide qualifying broadband service to unserved[1] areas and its obligations under NEPA with regard to its

[1]TBCP NOFO 1, Section 2 (j) defines "qualifying broadband service" as service with "— (i) a download speed of not less than 25

own NEPA procedures as well as the NEPA requirements of the jurisdictional federal agency land this project would cross . In the case of the BLM, the need established by the BLM's responsibility is under Title V of the Federal Land Policy and Management Act (FLPMA) of October 21, 1976 (90 Stat. 2776; 43 United States Code [USC] 1761), as amended, to respond to requests for ROWs across public lands. In the case of the USFWS, the need is to respond to applications for transportation and utility systems (TUS) in and across, and access into conservation system units under Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) (16 USC §§3161-3173) and the National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge System Improvement Act (16 USC 3101, 664, 668dd and 668ee and 43 USC 666).

In the case of the USACE, the need is to make a permitting decision under Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act in response to NANA's Department of the Army permit application.

1.4 Decision to be Made

The decision to be made by NTIA is to authorize the release of funds to deploy the Proposed Action.

The decision to be made by BLM and USFWS is whether to authorize grants for the installation and construction of a fiber optic cable network and associated structures, long-term operations of the network, maintenance and repairs of the network, and decommissioning of the project. The BLM and USFWS are required to evaluate the potential effects on the natural and human environment of the proposed action and alternatives.

This EA provides the technical analysis needed for each agency to independently make an informed decision regarding approval or rejection of the applications received, and if approved, the appropriate terms and conditions under which such approval would be granted.

1.5 Regulatory Authorities and Land Use Plan Conformance

As the lead federal agency, NTIA is responsible for evaluating the project under NEPA. A list of some major state, federal, and local permits needed for the project is provided in Section 1.5. This document is written in compliance with 43 CFR 46, and U.S. Department of the Interior Handbook of National Environmental Policy Act Implementing procedures (516 DM 1).

1.5.1 BLM

BLM's decisions on granting right-of-way grants are guided by the underlying authority derived from Title V, of the FLPMA (90 Stat. 2776; 43 USC 1761), as amended, and in accordance with regulations found in 43 CFR § 2800. Any BLM action must also be in conformance with the local Land Use Plan. The proposed action is in conformance with the 2008 Kobuk Seward Peninsula Approved Resource Management Plan/ Record of Decision (ARMP/ROD), and the applicable goals, objectives, or management decisions within as included below.

megabits per second; (ii) an upload speed of not less than 3 megabits per second; and (iii) a latency sufficient to support real time, interactive applications. For purposes of this program, NTIA will interpret the 25/3 standard to mean the ability to provide 25 Mbps downstream and 3 Mbps upstream simultaneously to every household in the eligible service area. NTIA will interpret latency to mean 95 percent or more of all peak period measurements of network round trip latency (i.e., the total round-trip latency between the customer premises and the closest designated Internet core peering interconnection point) are at or below 100 milliseconds."

H. Lands, H-1 Goals (page A-RMP-18)

1. *Meet public needs for use authorizations such as ROW, leases, and permits while minimizing adverse impacts to other resource values.*
2. *Retain public lands with high resource values in public ownership.*
3. *Adjust land ownership to consolidate public land holdings, acquire lands with high public resource values, and meet public and community needs.*

H. Lands, H-2-a: Management Actions (Land Use Authorizations) (page A-RMP-19)

6. *Rights-of-way*
   - *Rights-of-way (ROWs) will be located near other ROWs or on already disturbed areas to the extent practical.*
   - *Communication site ROWs shall be co-located when feasible.*

1.5.2 USFWS

USFWS authorizes requests for rights-of-way in accordance with the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 USC 3101, 664, 668dd and 668ee and 43 USC 666) and Title XI of the Alaska National Interest Lands Conservation Act (16 USC 3161 et seq.); and ensures conformance with applicable Comprehensive Conservation Plans.

The project would affect lands designated under the Selawik National Wildlife Refuge Revised Comprehensive Conservation Plan (2011) (CCP) for Minimal Management. Authorization of a TUS across lands designated for Minimal Management would require the CCP to be amended or revised to change the designation of affected lands to Moderate or Intensive Management, and to ensure goals and objectives within the CCP remain achievable.

1.6 Scoping and Issues

NTIA and other cooperating agencies reviewed application materials provided by NANA and developed a list of issues for analysis. Additionally, public input on the scope of analysis were accepted August 4-19, 2025. These resource categories analyzed in the EA are listed below, and discussed in Chapter 3:

Table 1.6-1: Resource Categories Analyzed in the EA

Resource Category	Resource Category	Resource Category
Noise	Birds	Land Use
Hazardous Materials and Spills	Terrestrial Mammals	Socioeconomics
Geology and Soils	Marine Mammals	Subsistence
Water Resources	Threatened and Endangered Species	Recreation
Wetlands and Vegetation	Cultural/Historic Resources	
Fish and Fish Habitat	Visual Resources	

After consideration of the anticipated impacts of the proposed action and other alternatives, the following resources summarized in Table 1.6-2 were identified as not having potential for impacts and are dismissed from further consideration:

Table 1.6-2: Non-Issue Resource Categories

Resource Category	Evaluation
Air Quality	The projects would have negligible effect to the air quality of the affected environment. These effects would be limited in time to the duration of installation of the proposed cable and during maintenance activities.
Paleontology	There is the potential for paleontology resources in the project area. Almost all of the project area is Potential Fossil Yield Classification (PFYC) U, "Geologic units that cannot receive an informed PFYC assignment." A small amount of the project area near Buckland has a PFYC of 1, "Geologic units that are not likely to contain recognizable paleontological resources." Despite the "Unknown" classification, there is unlikely to be a significant impact to significant paleontological resources. This project primarily involves laying the fiber optic cable on the surface, which does not have the potential to impact paleontological resources. There is some ground disturbance proposed, however this extremely minimal amount of overall ground disturbance does not have the potential to impact significant paleontological resources.
Floodplains	Construction methodology (ground-lay fiber, ground fiber, aerial fiber) does not have the potential to change hydrodynamics due to its minimally invasive nature and lack of above-ground profile. Above ground structures are limited to vaults, poles, and similar infrastructure.
Water Quantity	The project would have negligible effect to water quantities. No use of water is proposed, outside of minor water used for construction. Water would not be used from shallow waterbodies or other resources with limited water quantities.
Wilderness Areas	The project does not propose development that would impact wilderness areas.
Small Mammals	The project does not propose activity which would have a significant impact to small mammals. Direct impact may occur to individuals (i.e. interaction with heavy equipment, habitat modification from vegetation clearing), but no impacts are anticipated to exceed negligible impacts to small mammal populations.
Visitor Services	The project would have temporary impacts, primarily from construction activity (i.e. noise, visual). Design features have been incorporated to minimize impacts (i.e., aerial cable is high enough to not interfere on waterways with boaters; public information would be made available, and outreach would be conducted). Construction activities are primarily during the winter, the low season from recreation and visitor services. Noise and visual impacts would be short term. Impacts to sport hunters and fishermen would be avoided with winter construction methodology. Post construction activity (inspection, operations, repair and reclamation activities) would be limited and transitory.
Travel	The proposed project is not anticipated to change travel. Winter trails are an important infrastructure component of the landscape, and the project has been designed specifically to avoid impacts to winter trails. Waterway crossings include Horizontal Directional Drilling (HDD) on major rivers, aerial crossings on some rivers, and ground-lay on the remaining waterbodies. Obstructions to airspace are being permitted and marked in accordance with the Federal Aviation Administration requirements.

2 Alternatives

This section presents the alternatives for achieving the project's purpose and need, as well as a no action alternative (Figure 1). This EA includes completed figures (Appendix A), project description (Appendix B), Plan of Development (Appendix C), Avoidance Minimization and Mitigation Measures (Appendix D) and Management Plans (Appendix E). Detailed alternative screening is provided in Appendix F. An online map is available at https://kunaengineering.maps.arcgis.com/apps/mapviewer/index.html?webmap=3569cf0e80f3494bb544a3babd8e08cd.

NANA Regional Corporation submitted an application to NTIA for funding under the Tribal Broadband Connectivity Program to install a fiber optic cable line that would facilitate the provision of affordable, high speed internet access throughout the NANA region. In preparation for submitting applications for right-of-way authorizations to the USFWS and BLM, NANA held pre-application meetings with both agencies to solicit preliminary input on the proposed routes. Agencies selected alternatives which are analyzed in the EA, and alternatives considered but discarded are discussed in Appendix F.

2.1 Alternatives

2.1.1 No Action Alternative

Under the No Action Alternative, the project would not be constructed and the environmental effects described in Section 3 would not occur. The BLM would not grant a right-of-way grant, and the USFWS would not authorize a right-of-way, or be required to change the CCP.

The No Action Alternative would not meet the purpose and need of the project. Existing broadband infrastructure would remain in place.

2.1.2 Alternative 1

This route connects the communities of the Northwest Arctic Borough (Appendix A, Figure 1). Two loops provide resiliency and redundancy, and connect: Kotzebue-Noorvik-Selawik, and Ambler-Kobuk-Shungnak. Lines extend from the loops, and connect to Noatak and Kivalina; Buckland and Deering, and Kiana.

This alignment features a crossing of Hotham Inlet (near Kotzebue), and a single corridor through most of the Selawik National Wildlife Refuge (NWR) to the loop that connects the Upper Kobuk communities.

The full project description is provided in Appendix B. The Plan of Operations (Appendix C) provides detailed construction methodology. The construction methodologies apply for all of the alternatives; the significant differences between the alternatives are the routing differences.

2.1.3 Alternative 2

Alternative 2 is a variation of Alternative 1, with changes in the eastern part of the alignment (Appendix A, Figure 1). This alternative eliminates the single cable "loop" connecting the easternmost communities, and replaces it with a double run cable, going north to Ambler, then Shungnak, and then Kobuk.

2.2 Alternatives Considered but Not Carried Forward for Detailed Analysis

Alternatives may be considered but not carried forward for detailed analysis under NEPA if it would not be technically or economically feasible or if it would not meet the purpose and need. These alternatives are described in Appendix F. They include alternative technologies (i.e. microwave tower and satellite services) and alternative alignments. These were eliminated from consideration because they did not meet the purpose and need because of quality-of-service requirements, or technical or economic feasibility.

Table 2.3-1: Route Summary

Item	No Action	Alternative 1	Alternative 2
Fiber Optic Cable (cable miles)	0	675.25	694.86
Subsea Fiber Crossings (miles)	0	10.21	10.21
Fiber Overland (cable miles)	0	640.19	658.67
Fiber Trench (cable miles)	0	0.89	1.3
Fiber Aerial (cable miles)	0	23.97	24.69
Stream/River Crossings (#)	0	761	768
River Crossings (Aerial) (#)*	0	20	19
River Crossings (Bore/HDD*) (#)	0	14	11
River Crossings (Ground Lay) (#)	0	727	738
Lake/Pond Crossings (#)	0	58	55
Permanent Loss of wetlands (acres)	0	0.004	0.004
Land Ownership (Right-of-Way: 60’ buffer (30’ either side))	0	4,276.96	4,032.04
Alaska Native Lands Patented or Interim Conveyed	0	2,048.93	1,944.31
Bureau of Land Management	0	1,046.10	984.40
Fish and Wildlife Service	0	637.73	567.93
Local Government	0	0.66	0
Private	0	24.96	19.12
State	0	401.19	401.19
Undetermined (i.e. water)	0	117.40	115.10

* 2 aerial crossings are attached to existing bridges (Kivalina and Selawik)
**Cable miles can be larger than miles of disturbed area, when cable is co-located.

3 Affected Environment and Impacts

The alternatives outlined in Chapter 2 may cause changes to the environment. This chapter assesses and analyzes the affected environment and potential changes and discloses the effects to decision makers and the public. The following bullets clarify some of the concepts:

- Impacts/Effects: The terms "effect" and "impact" are synonymous under NEPA. Effects may refer to adverse or beneficial phenomena that may be caused by the alternatives (40 CFR 1508.8).
- Direct/Indirect: A direct effect is caused by the action and occurs at the same time and place as the action (40 CFR 1508.8(a). An indirect effect is reasonably foreseeable, also caused by the action, that occur later in time or are removed in distance from the action (40 CFR 1508.8(b)).
- Significance (40 CFR 1508.27): Significance is defined as a measure of the intensity and context of the effect. Intensity refers to the severity of impact. Context means that the effect(s) of an action must be analyzed in context such as society as a whole (human, national), the affected region, the affected interests, and the locality.
- Intensity
    - Negligible: Change is too small to be measured, or no noticeable effect.
    - Minor: Change is just measurable. Change may affect a small portion (<15%) of individuals but not the overall population. There are no changes in management.
    - Moderate: Change is easily measured. Change may affect 15-75% of individuals of a population. There are required changes in management.
    - Major: A large, measurable change that is easily recognized. Change affects >75% of individuals of a population. There are profound changes in management.
    - Duration: Temporary (Short-lived [i.e., during construction]), Short-term (10 years or less), Long-term (More than 10 years)

3.1 Physical and Chemical Environment

3.1.1 Noise

3.1.1.1 Affected Environment

The Red Dog 2009 Environmental Impact Statement examined the background noise level for that project (EPA 2009), which is likely similar for the remote locations in this area. It found that typical natural noise levels varied between 15 - 45 dB(A), and storms were at about 65 dB(A). Monitoring at South Walker Lake in Gates of the Arctic National Park and Preserve (a similar location for remote sections of the project with best available data) found a time-averaged natural ambient sound pressure level of 20.9 dBA (Betchkal 2019). Subsistence activities with snowmachines, outboard motors, and float planes generated noise of 85 dB(A) at a distance of 50 feet from the source.

The Environmental Protection Agency (EPA) recommends a protective noise level for public health of 55 dB(A) for outside activities, and 45 decibels for indoor activities over a 24-hour period (EPA 1974).

The Northwest Arctic Borough code only limits 'excessive noise' that may disturb beluga or bowhead whales between April 15 and July 10 (Chapter 9.08.076.25(C)(3)), off-shore and on-shore uses within

the areas of beluga, bowhead whale, or bearded seal, caribou or other species' migration which significantly interfere with subsistence activities or jeopardize the continued availability of migrating animals for subsistence purposes during the migration seasons (Chapter 9.08.076.25(C)(4)); and near species that are sensitive to noise (Chapter 9.25.020(D)(1)(a)). There are no quantitative limits to noise. That said, more recent studies on caribou suggest that they are extremely sensitive to low frequency noises (down to 30 Hz), which spans all potential industrial noises, including aircraft (Perra et al. 2022). Drolet et al. (2016) found white tailed deer had noise thresholds at 70 dB (discussed in the wildlife section). The WAH (Western Arctic Herd) is of critical importance to subsistence; it may be particularly sensitive to disturbance during calving and migration.

3.1.1.2 Environmental Consequences

The project would be anticipated to produce noise primarily during the construction phase. Limited noise, except for that produced through the potential route/cable inspections and repairs as described below, is anticipated for the operations and maintenance phase.

3.1.1.2.1 No Action Alternative

3.1.1.2.2 Under the No Action Alternative, no construction would take place, and no noise impacts would occur because no new sources of noise would be introduced into the project area. Alternative 1 Impacts

3.1.1.2.2.1 Construction Impact

Construction of the project would not result in any permanent increase in ambient noise levels.

Noise generated for all alternatives is anticipated to be relatively similar. Noise generated during construction activities would be transient and temporary, due to the anticipated rapid pace of cable placement. Table 3.1.1-1 provides a list of anticipated equipment that would be used to support cable deployment and field camp operations. All engines would only run when necessary, and include mufflers, which are specifically designed to reduce noise emitted by exhaust. The proposed operations may be anticipated to produce a maximum combined noise level of 93 dB(A) at 50-ft from project construction. At a distance of 2.3 miles, the construction noise would be indistinguishable from the EPA standard for indoor activity (45 dB(A)). At a distance of 38.1 miles, the noise would match the ambient levels observed at South Walker Lake. The anticipated rapid progress of the construction activities would minimize potential sustained noise levels in any area, and in most cases, the engines/equipment listed in Table 3.1.1-1 would not run simultaneously or at maximum output levels. Speeds are anticipated to be less than 10 mph for the overland equipment, and less than 10 knots for the vessels. Noise levels for the boats and equipment used for the subsea cable placement across Hotham Inlet are anticipated to be less than the levels for the equipment listed in Table 3.1.1-1. Additionally, the drilling equipment used for the installation of poles for the aerial waterbody crossings would have engines similar to those identified for the majority of the construction operations (Table 3.1.1-1).

Table 3.1.1-1: Noise of the loudest construction equipment proposed for the project

Sound Source	Sound Pressure Level [dB(A)]	Frequency/Duration	Maximum Combined Noise [dB(A)]	Wildlife Impacts [70 db(A)]	EPA Standard Indoor Activity [45 dB(A)]	South Walker Lake [20.9 dB(A)]
CAT D6	85 @ 50 ft (15m)	Transient/Temporary	93	706 feet (0.1 miles)	12,200 feet	201,358 feet

PistenBully 600	85 @ 50 ft (15m)	Transient/Temporary			(2.3 miles)	(38.1 miles)
Steiger 535	84 @ 50 ft (15 m)	Transient/Temporary				
Mulcher/Hydro-Ax	90 @ 50 ft	Transient/Temporary				
Generator	82 @ 50 ft	Transient/Temporary				
Snowmachine	85 @ 50 ft	Transient/Temporary				

Source: FHWA 2006, EPA 2009; Combined noise level is calculated using online calculator at: https://www.snapfour.com/CombinedNoise_Calculations.aspx. Distance to background calculated using online calculator at:https://www.engineeringtoolbox.com/inverse-square-law-d_890.html.

No established noise level standards exist in local or state regulations for the proposed activities. Since project construction noise would be transient, short-term, and primarily performed at distances greater than 1 mile from population centers, the project would produce no significant noise-related impacts.

3.1.1.2.2.2 Operations and Maintenance

The routine operation would not generate any noise. Aerial lines are not expected to cause a significant noise in the wind.

However, during routine and emergency maintenance activities some noise would occur. This includes annual helicopter (or fixed wing aircraft) overflights of the line for aerial inspection, and helicopter flights to address any maintenance that is required. In addition, winter overland travel may be required if winter maintenance is required (and this would likely be similar to the noise generated during the construction phase). Noise impacts, including helicopter use, can impact wildlife (i.e. caribou, migratory birds), recreation, and other environmental resources. These are discussed in their resource categories. Maintenance activities would occur intermittently and for short durations; thus, no significant noise-related impacts would be realized for project operation. In general, the noise created during the construction and operational phases of the project would not be louder than noise levels commonly heard in the region (Table 3.1.1-2).

Table 3.1.1-2: Noise levels from common engine sources that occur in the region

Equipment	Typical Sound Pressure Level (dB(A))
Outboard boat motor	85-90
Snowmachine	85
Highway vehicle	70-80

Noise impacts from Alternative 1 would be temporary and minor.

3.1.1.2.3 Alternative 2 Impacts

Noise impacts from Alternative 2 would be similar to Alternative 1 and would be temporary and minor.

3.1.2 Hazardous Materials and Spills

3.1.2.1 Affected Environment

The Alaska Department of Environmental Conservation (DEC) maintains a web map of known contaminated sites in the region (DEC 2025). DEC categorizes contaminated sites by the status described below (Table 3.1.2-1). All sites within 500 feet of one of the alternative routes were selected for a screening level analysis, in Appendix G. Sites are typically located in proximity to communities, although some sites are in more remote locations (Figure 3.1.2-1).

Table 3.1.2-1: Contaminated Site Status*

Contaminated Site Status	Definition	No Action	Alt 1	Alt 2
Open	Sites with confirmed contamination above action levels which require additional characterization, monitoring, or cleanup before a closure decision can be made.	0	13	13
Cleanup Complete – Institutional Controls	Sites where no further remediation is planned and the potential for future exposure to residual contamination warrants the use of institutional controls.	0	2	2
Cleanup Complete	Sites where remediation efforts are complete and any remaining contamination is below the levels that would pose a threat to human health or the environment.	0	7	7
Informational	Site record entered to track area-wide, site-wide, or facility-wide information that does not represent a distinct site, etc.	0	1	1

*sites within 500 feet to either side of an alternative

3.1.2.2 Environmental Consequences

3.1.2.2.1 No Action Alternative

Under the No Action Alternative, no construction, operation, or maintenance would occur; therefore, there would be no impacts associated with hazardous materials and spills because no such substances would be introduced into the project area.

3.1.2.2.2 Alternative 1 Impacts

The project alignment was buffered 500 feet on either side, and all Open and/or Informational sites were reviewed for the potential to have negative interactions with the proposed project (see Appendix G). The Open and Informational sites listed in Table 3.1.2-1 are located near all alternatives, unless otherwise noted in the table.

There are sites in the vicinity of the proposed alternatives that have the potential to lead to inadvertent discovery of contaminated soil. Coordination would occur with appropriate agencies to address potential contamination found during construction. A contaminated soil management plan shall be prepared for review and approval by DEC under 18 AAC 75.325(i), providing instructions on how to identify, segregate, and address contamination discovered during construction. DEC guidance on managing contamination during utility construction would be followed (DEC 2018).

Construction would require the use of some hazardous materials including fuel, lubricating oil, and other constituents. This would include measures to prevent impacts on water quality (e.g., fueling activities must be conducted >100 feet away from surface waters).

Normal operations are passive and do not require hazardous materials. The fiber optic cable transmits data through light signals that travel along thin strands of glass or plastic and does not generate any radiation or heat.

During maintenance or repair activities the use of hazardous materials would be necessary, including fuel, lubricating oil, and other constituents. These activities would be completed under BMPs (Appendix E3) to address the storage, handling, and cleanup of potential spills. As a result, no significant impacts are expected during operations.

Impacts from Alternative 1 would be temporary and negligible to minor.

3.1.2.2.3 Alternative 2 Impacts

Impacts would be similar to Alternative 1 and would be temporary and negligible to minor.

3.1.3 Geology and Soils

3.1.3.1 Affected Environment

The area includes coastal lowlands and foothills, which reach up to 3,000 feet (BLM 2008). Permafrost underlies the majority of the area, and in the summer an active layer develops. Common landforms include tussock tundra, thermokarst lakes, and polygonal ground. Soils tend to be finely grained, poorly drained; while those on slopes or riverine environments can be gravelly, colluvial and weathered bedrock.

The Natural Resources Conservation Service (NRCS) has created a detailed digital soil survey for Alaska, named the Soil Survey Geographic Database (NRCS 2025). This provides information on the kinds and distribution of soils over the landscape, including soil characteristics, properties, and potential limitations or suitability for development or construction. This information is mapped at a scale of 1:250,000, and is the best available data for the project, but does not provide fine scaled mapping.

A soil component of particular interest for development is the erodibility factor (K-Factor). K-Factor quantifies how vulnerable an area is to erosion. Higher K-Factors indicate greater susceptibility to soil loss during construction. Soil properties that influence the K-Factor include texture, organic matter, structure, and permeability. Figure 3.1.3-1 maps the K-Factors for soils along the project alignments.

Another soil component of interest is the hydric class, which classifies soils according to degree of wetness. This can be an important factor in development, as hydric soils can be unstable, difficult to travel across, or protected as wetlands. Soil that is classified as hydric is saturated, flooded, or ponded long enough to develop anaerobic conditions in the upper soil layers during the growing season. Hydric soil is an important factor in determining if an area is a wetland (in combination with hydric vegetation and hydric hydrology). Figure 3.1.3-2 maps the soil hydric class. Permafrost extent and character is an important construction consideration. Warming temperatures and increased precipitation are contributing to warming and thawing of permafrost (Smith et al. 2022). Vegetation clearing and disruption of the insulating surface organic layer can result in thawing of underlying permafrost and loss of soil volume (thermokarst). The severity of these impacts depends strongly on the ice content of the frozen soil. Statewide mapping of permafrost features by Jorgenson et al. (2008) covers most of the project area (Jorgenson et al. 2015 provides coverage only part of the project area). The data provided for each mapped polygon includes estimated excess ice content (by

volume) in the top 5 meters (16.4 feet) of soil, based on surficial geology (Figure 3.1.3-3). Approximately 15 percent of the project area is classified as having high (greater than 40 percent) excess ice content. Ice content is moderate (10 to 40 percent) in an additional 50 percent of the project area. In the remaining 35 percent of the project area, ice content is low (less than 10 percent) or variable, or the ground is unfrozen.

All alternatives for this project avoid the protected areas of known active sand dunes but crosses stabilized re-vegetated dunes. Outside of the protected areas, there are areas in the project with sensitive successional sand dunes (i.e. lichen covered dunes) - located in the northeast corner of Selawik National Wildlife Refuge, depicted on Patton (1968). These areas are particularly sensitive to disturbance.

The only past or present actions that are known to significantly influence soil conditions are the established developments around communities, which can include gravel pads for housing, roads, utilities, and other infrastructure. These can lead to local impacts to soil and geotechnical stability, particularly in permafrost rich areas.

3.1.3.2 Environmental Consequences

3.1.3.2.1 No Action Alternative

Under the No Action Alternative, no construction would take place; therefore, there would be no impact to geology and soils because there would be no ground disturbance.

3.1.3.2.2 Alternative 1 Impacts

3.1.3.2.2.1 Construction Impact

Changes to the surface organic layer can result in thawing of underlying permafrost. Where the minimum snow cover is not followed, and snow cover is low or absent, winter travel may damage the insulating surface organic layer and lead to thawing of the underlying frozen ground. Vegetation clearing can also impact permafrost, by removing shade and changing how snow interacts with the ground. In areas with moderate to high ground ice content, this thawing could result in loss of soil volume and subsidence (thermokarst), as well as possible changes to local runoff patterns. For this reason, the recommended snow coverage minimums should be followed and disturbance of insulating organic layers should be avoided and/or minimized.

The Fiber Optic Cable (FOC) would be buried for short distances near several communities, requiring the excavation of trenches during the summer. Trenching would disrupt the surface organic mat, including the living moss layer. The areas of potential impacts would be limited, as the trenches would be narrow (approximately 1 feet wide) and 1,500-feet or less in length. Trenching is proposed for 2,161 sq ft in low ice content, 2,194 sq ft in moderate ice content, 60 sq ft in high ice content, and 200 sq ft in variable ice content. If trenching encounters permafrost, it would not excavate into the permafrost. If trenching occurs in areas with moderate to high ice content, thawing may occur while the frozen ground is exposed during trenching. If thawing begins, it may continue after the trench is backfilled, unless the backfill material has high insulation value. Impacts from trenching would be minimal in areas with low soil ice content. Table 3.1.3-1 summarizes the soil ice content for the action alternatives.

Table 3.1.3-1. Areas of each category of ground ice content (excess ice in top 5 meters [16.4 feet]), based on surficial geology, within the right-of-way for the action alternatives.

Ground Ice Content (Volume)	No Action	Alternative 1		Alternative 2	
		30 ft Buffer Area (acres)	60 ft Buffer Area (acres)	30 ft Buffer Area (acres)	60 ft Buffer Area (acres)
High (> 40%)	0	301.88	603.71	302.06	604.08
Moderate (10-40%)	0	990.63	1,981.06	978.45	1,956.74
Low (<10%)	0	379.03	758.13	269.95	539.98
Variable	0	2.72	5.44	2.72	5.44
Unfrozen	0	366.11	732.10	364.69	729.29
Not Determined	0	98.27	196.51	98.27	196.51
Total	0	2,138.63	4,276.96	2,016.14	4,032.04

Source: Jorgenson et al. 2008

The relative proportions of low, moderate, variable, and high ground-ice classes within the ROW are similar for the action alternatives, indicating little difference in the potential for permafrost impacts.

Construction of the project would not result in permanent changes to soils (i.e., erodibility, soil hydric class, sands). The construction methodology has been chosen to avoid impacts to soils. these methods include ground-laying cable, HDD bores, and aerial installation. Anchors, poles, and splices may disturb the local vegetation and soils, but their limited size is not anticipated to result in impacts to soils. Where the minimum snow cover is followed, soil erosion, compaction, or degradation of the permafrost is not expected (including stabilized sand dunes in the northeast corner of Selawik National Wildlife Refuge).

Trenching is proposed in the summer in the vicinity of communities, improving safety for community members. Trenching would minimize the potential thermal degradation of permafrost by not trenching into the depth that permafrost is encountered, and temporarily side casting material and quickly replacing the material into the trench. There may be localized thawing of permafrost along these sections, which would be a long-term minor impact.

Some trenching may be required on stream crossings with overhanging banks. This trenching would occur during the winter. These crossings would involve clearing snow, shallowly excavating (12 inches wide, 10 feet long) into the bank using a mini excavator, placing the fiber in the trench, and backfilling the trench with side cast bank material. During excavation, the organic layer would be temporarily removed, but excavations would not reach the permafrost layer. It is estimated that 10 of the ground-lay stream crossings would require bank excavation, and these have been permitted with ADF&G and analyzed by NMFS in the Essential Fish Habitat consultation. Winter trenching in permafrost is commonly used in the North Slope, to preserve the permafrost. This method is expected to limit impacts to at most negligible effects to soil and permafrost for stream crossings. There may be localized thawing of permafrost along these sections, which would be a long-term minor impact.

3.1.3.2.2.2 Operations and Maintenance

The routine operation of the FOC is passive, since the cable remains undisturbed in the soils unless it needs to be accessed for maintenance activities, as discussed below, and therefore would not generate any changes in soils (i.e., erosion, hydric status).

During maintenance activities however, some disturbance of soil may occur. These impacts would be similar to the impacts generated during the construction phase, although generally much smaller in scale. Maintenance activities would occur intermittently, as needed, but the amount of activity is undetermined and will be localized to damage to the cable.

Impacts from Alternative 1 would be long-term and minor.

3.1.3.2.3 Alternative 2 Impacts

Alternative 2 eliminates the southern portion of the eastern loop and replaces it with co-located cable. This results in fewer acres of impact, but slightly more ground-lay stream crossings, 1 fewer aerial stream crossing, and three fewer HDD stream crossings. Impacts from Alternative 2 would be long-term and minor.

3.1.4 Water Resources

3.1.4.1 Affected Environment

3.1.4.1.1 Surface Waterbodies

3.1.4.1.1.1 Streams and Rivers

The several large rivers and hundreds of smaller rivers and streams that intersect the project provide water conveyance, fish and wildlife habitat, floodplain storage, and watercourse/wetland connectivity. Stream gage records of discharge and stage in the area are limited. Locations with either current or historic streamflow data from the U.S. Geological Survey (USGS) include Dahl Creek (near Kobuk, USGS 15743850), Kobuk River (near Kiana, USGS 15744500), Noatak River (near Noatak, USGS 15746000), Tutak Creek (near Kivalina, USGS 15746998), and two locations on the Wulik River (near Kivalina, USGS 15746900 and USGS 15747000). Generally, maximum discharge occurs during spring break-up, which usually happens in late May, and minimum stream flows occur in March. Flows typically increase in the fall during rain events. Long-term monitoring of the Kobuk River stream gage near Kiana indicates a lengthening of the open water period since recording began in the mid-1970s (O'Donnell et al. 2015, Tape et al. 2016). During spring break-up, the timing of peak discharge occurred earlier by 3.5 days per decade. Similarly, in the fall, river freeze-up occurred later by nearly 7 days per decade (NPS 2017).

Hydrologic conditions are generally changing in the Arctic due to climatological drivers such as warming temperatures and increasing precipitation. Trends include increasing mean annual flow, extreme low winter flows, a decrease in the snowmelt-driven annual maximum flow, and more frequent secondary peak flow events in late summer. Future projections of peak flow events remain unclear because peak flow could either increase or decrease depending on the specific region and localized weather and climate trends (Shrestha et al. 2021).

DEC provides information on impaired surface waters and water quality monitoring data to the public. There are no impaired waters in the NAB (Northwest Arctic Borough) (ADEC 2024, 2025). Additionally, various agencies and projects have infrequent records of water temperature and other water quality parameters at several locations within the region (AKTEMP 2025). Generally, water

quality in the region is considered good. However, there have been reports and concerns of elevated concentrations of metals and organic carbon in the region, pointing to the vulnerability of surface waters due to changes in permafrost thaw and erosion (O'Donnell et al. 2015, 2024).

A comprehensive water quality and physical parameters survey was conducted on the Selawik River from July 24-August 11, 2023 which documented data at fourteen sampling locations (DEC 2023). Some of the results from the survey include an average pH of 8.11, an average water temperature of 14.11°C, average specific conductance of 75.09 µS/cm, and average dissolved oxygen of 9.39 mg/L.

3.1.4.1.1.2 Lakes and Ponds

Numerous lakes and ponds are within the proposed project corridor, and they are primarily located along wetland areas and lower gradient sections of rivers. There is very limited data available on water quantity, quality, or bathymetry for these lakes. Surveys of shallow lakes in Kobuk Valley National Park, however, indicate generally good water quality, as well as decreased surface area due to warming permafrost (NPS 2017).

3.1.4.1.1.3 Navigable Waters

The U.S. Army Corps of Engineers (USACE) has authority over navigable waters in Alaska that are regulated under Section 10 of the Rivers and Harbors Act. These are defined as tidal water and those waters subject to the ebb and flow of the tide shoreward to the mean highwater mark and/or those waters that are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Four rivers in the project area meet the regulatory definition of navigable water under jurisdiction of the USACE, including the Noatak River up to its confluence with Portage Creek, the Kobuk River for 200 miles upstream from tidal waters, the Buckland River from its mouth upstream to its confluence with the West Fork Buckland River, and the entire length of the Selawik River. The Kivalina Lagoon is also a Section 10 water, as is Hotham Inlet. Additional USACE Clean Water Act permitting would require that the infrastructure does not interfere with the public's ability to freely navigate on these navigable waters. Impacts are avoided to these waters by using HDD, attaching to existing bridges (i.e. Selawik and Kivalina Lagoon), and burial in the marine benthic environment (Hotham Inlet).

The State of Alaska Department of Natural Resources (DNR) has management authority for state lands, including the submerged land, water, tidelands, and shorelands of navigable waters within the State. This authority includes management of navigable waters that are navigable for title purposes, tidelands, and shorelands within and adjacent to the boundaries of federal lands, including conservation system units created under ANILCA. There are 31 rivers designated as navigable by DNR that are crossed by the project (Appendix H, Stream Crossings).

Through the Submerged Lands Act of 1988, the BLM has the delegated authority to determine navigability for waterbodies for federal lands. Navigability for title purposes is yet to be determined for many of the waterbodies throughout the project area.

3.1.4.1.2 Coastal Zones

Impacts to the region's coastal zones would be limited to FOC crossing locations within Hotham Inlet, an arm of Kotzebue Sound. Hotham Inlet is approximately 50 miles long and almost entirely bounded by land with the exception of a narrow 2-mile outlet into Kotzebue Sound. Between the mouth of the Noatak River to the north and the tip of the Baldwin Peninsula to the south, this narrow channel connects Hotham Inlet to Kotzebue Sound, just east of the city of Kotzebue. In addition to

the Noatak, the Kobuk and Selawik Rivers also flow into the inlet, contributing a major influx of freshwater and significant amounts of sediment and terrestrial organic matter to this shallow coastal area (Whiting et al. 2011, McMahon et cl. 2021). Benthic substrate within the inlet is primarily composed of mud and sand with small areas of coarse gravel. Northern beachfronts tend to be composed of sand and gravel. Tidal fluctuations are minor and are generally within +2 to -2 feet.

Hotham Inlet freezes over in the winter with ice forming in October and break-up starting in May. An unprecedented anomaly to this persistent winter sea ice occurred in the winters of 2017/18 and 2018/19 when Kotzebue Sound remained largely ice free. Observations from these winters reported that the only persistent sea ice remained at the outflow of the Noatak and Kobuk Rivers, where cold, low-salinity freshwater flows into the inlet (Witte et al. 2021).

In addition to Hotham Inlet Kugruk Estuary, a freshwater-brackish lagoon along the southern coast of Kotzebue Sound near the village of Deering, is also contained in the proposed project area. This estuary is defined as a stable-channel lagoon that provides a continual source of water between the freshwater and marine environments (Fraley et al. 2022). Kugruk Estuary is fed by Kugruk River, which originates from the Kuzitrin River on the Seward Peninsula.

3.1.4.1.3 Groundwater and Drinking Water Resources

Groundwater and drinking water resources are present along the proposed project corridors. DNR maintains a list of water rights and temporary water use authorizations for surface and groundwater (subsurface) water sources. Near the proposed project corridor there are five subsurface water rights in the communities of Noatak, Kiana, Ambler, and Kobuk and eleven surface water rights in the communities of Kivalina, Kotzebue, Buckland, Deering, Selawik, and Noorvik, as well as several private uses. There are currently six surface temporary water uses. The Selawik NWR has explicit, but unquantified federal reserved water rights conferred as part of the Refuge establishment under ANILCA (1980), which expanded the Refuge's purposes to include, "to ensure, to the maximum extent practicable and in a manner consistent with the purposes of the Refuge, water quality, and necessary water quantity within the Refuge. Additionally, the Alaska Department of Fish and Game (ADF&G) holds instream water rights through Reservations of Water on the Wulik and Kobuk rivers.

Within the project area, there is one known source of groundwater contamination from petroleum in Kotzebue where two separate and now comingled spills occurred at the former school/hospital (DEC Site File No. 410.38.02). The contamination is actively being monitored and remediated.

3.1.4.2 Environmental Consequences

3.1.4.2.1 No Action Alternative

Under the No Action Alternative, no construction, operation, or maintenance activities would occur; therefore, there would be no impacts to water resources because there would be no disturbance of water resources or potential to create sedimentation, turbidity, or other impacts.

3.1.4.2.2 Alternative 1 Impacts

3.1.4.2.2.1 Construction Impact

Waterbody and streambank crossings have the potential to be impacted by construction through increased sedimentation, habitat disruption, altered hydrology, introduction of invasive plant species, and pollution introduction. As such, a concerted effort has been made to limit the number of waterbody crossings to minimize any potential construction impacts. The number of waterbody crossings and miles for subsea crossings for alternatives are listed in Table 2.3-1, and Appendix H.

Hydrologic connectivity would be maintained through all watercourse crossing methods. FOC crossing methods primarily involve ground-lay of FOC across the riverbed in smaller streams. The FOC would cross larger waterbodies through a mixture of HDD, aerial, and ground-lay crossings.

The ground-lay fiber installation, while chosen to minimize environmental impacts, may involve some temporary ground disturbing activities at streambanks with steep cutbanks. Where steep cutbanks exist, the streambank would be shallowly excavated (12 inches wide, 10 feet long), allowing for the cable to be trenched. It is estimated that 10 of the ground lay stream crossings would require bank excavation. These crossings would involve clearing snow, shallowly excavating into the bank using a mini excavator, placing the fiber in the trench, and backfilling the trench with side cast bank material. During excavation, the organic layer would be temporarily removed. Backfill of any excavations near streams or other waterbodies, including those necessary for the placement of anchors or poles and anchor wires, would use native material. This disturbance has the potential to contribute to erosion and sedimentation. Revegetation and monitoring would help prevent long-term impacts to stream banks and water quality.

Ice may become compacted in waterways during construction activity from the weight of the vehicles crossing rivers and lakes and compressing the ice. However, in most cases, each waterbody would only be crossed one time, so this minimal impact is not expected to impact water quality, scour, or hydrologic connectivity.

Horizontal directional drilling (HDD) avoids the potential impacts to waterbodies. For all the alternatives, HDD crossings occur entirely on privately owned lands with one HDD crossing on State land. HDD methods require use of local water sources, ranging from 200 – 1,000 gallons for each individual crossing. These would be withdrawn from the local waterbody. A water use permit will be obtained from the State of Alaska, if proposed use requires such permitting. HDD methods do pose a low risk of frac-outs, where bentonite drilling mud inadvertently escapes through subsurface fractures and discharges into surface waters (Appendix C Section 3.2.2). This can lead to localized turbidity, disturbing aquatic habitat, and chemical changes in water quality, although bentonite is generally considered non-toxic. Groundwater resources can potentially be affected in permafrost zones where fractures or ice lenses can allow drilling fluids to migrate beyond the borehole and into subsurface layers. Frac-out risk is mitigated through careful planning, proper design and execution, and a well-defined contingency plan (Appendix E). There is also the potential for short-term impacts due to bank destabilization from construction crews and equipment crossing streambanks to access the land. Drilling operations would comply with site-specific erosion and sediment control plans and include 24/7 monitoring to ensure the integrity of the drill path and avoid inadvertent returns of drilling fluid to the river.

Aerial crossings are not expected to impact waterbodies because the ground infrastructure (e.g., support poles and guy wires) would be placed a distance away from the streambank that allows for a sufficient buffer to protect riparian zones and minimize disturbance to waterbodies. Additionally, aerial crossings do not require in-water work or disturbance of streambeds. Wooden poles used to support aerial crossings are not expected to impact waterbodies or water quality, as they would be setback at least 25 feet from the ordinary high water mark. Aerial crossings are proposed to occur on privately owned lands, BLM lands, and within Selawik NWR.

Potential impacts to coastal zones may occur where FOC trenching is proposed, which can disrupt sediment transport and coastal hydrology if not properly routed. Construction has the potential to

increase turbidity due to erosion and increase the risk of hazardous chemical spills. BMPs would be implemented throughout the operation to protect the aquatic environment, minimize bank erosion, and avoid creating drainage paths (see Section 4 for more details). No significant impacts are anticipated to waterbodies.

No impacts are anticipated for the water rights, temporary water use authorizations, and/or Reservations of Water due to the small amount of water that is a component of this project.

3.1.4.2.3 Operations and Maintenance Impact

Ongoing operation of the FOC network would not have any impact on surface or groundwater quality or quantity. Occasional maintenance activities may be required to repair breaks in the cable. These repairs would be conducted in a similar manner to those described for construction. Cable breaks would most likely be accessed by aerial or winter off-road travel. These are expected to be limited in duration and intensity and have no significant impact on waterbodies.

Alternative 1 is expected to have 761 stream/river crossings, with 727 ground-lay crossings, 20 aerial crossings, and 14 HDD crossings. Approximately 10 miles of the marine environment would be crossed. These crossings are not expected to significantly impact the waterbodies, due to the above-described construction methods, i.e., winter ground-lay, aerial and HDD crossings at large rivers, and enactment of BMPs.

Impacts from Alternative 1 would be long-term and negligible to minor.

3.1.4.2.4 Alternative 2 Impacts

Alternative 2 eliminates the southern portion of the eastern loop and replaces it with co-located cable. This results in fewer acres of impact, but slightly more ground-lay stream crossings, 1 fewer aerial stream crossing, and 3 fewer HDD stream crossings.

3.2 Biological Environment

3.2.1 Wetlands and Vegetation

3.2.1.1 Affected Environment

3.2.1.1.1 Vegetation

The project area for the Wetlands and Vegetation analysis is the combined area of the proposed ROW that encompasses the action alternatives. The Landfire Existing Vegetation Type dataset for Alaska (Landfire 2025a) was used to describe the range of vegetation types occurring in the project area. The existing vegetation in the project area consists of a mixture of arctic and boreal vegetation classes, including tundra, shrublands, and forests (Appendix I, *Vegetation and Wetlands*, Table 1). The most abundant vegetation type is Tussock Tundra which is dominated by *Eriophorum vaginatum* (tussock cottongrass) and a variety of dwarf shrubs. Other common vegetation types in the project area include Dwarf Shrubland and Willow Shrubland. Figure 3.2.1-1 shows the Landfire (2025a) vegetation types in the project area. Portions of the route cross 2 Ecosystems of Conservation Concern; the Arctic Pingos and Beringian Alpine Limestone Dryas ecosite types (ACCS 2025). Both of these ecosystem types are widespread in the region (Boggs et al. 2019). BLM's listed sensitive plant species are included in Appendix I.

This project is expected to require some clearing of vegetation that projects more than 8 inches above the snow surface within the ROW to allow for construction equipment passage. It is assumed clearing would occur in all vegetation types that include trees or low to tall shrubs. Dwarf shrubs (defined as being less than 8 inches in height) were excluded, as clearing would not take place below 8 inches. Landfire (2025b) was used to estimate the acreage with vegetation greater than 0.2 meter (8 inches) in height for each alternative (Figure 3.2.1-2). Data are classified by average height of the dominant vegetation grouped in 30-meter (98.5 feet) cells.

3.2.1.1.2 Wetlands

National Wetlands Inventory (NWI) wetland mapping is available for approximately half the project area (Figure 3.2.1-3). Wetlands or waters encompass a majority of the project area. The wetlands consist primarily of seasonally saturated Freshwater Forested/Shrub Wetlands and Freshwater Emergent Wetlands, which are abundant across the northwest Alaska region. For the portions of the project area where NWI mapping does not exist, likely wetland status (i.e., wetland or upland) was assessed based on a more detailed set of vegetation types included in the Landfire Existing Vegetation Type data set (Landfire 2025a; see Appendix I, *Wetlands and Vegetation*, Table 1). The areas without NWI mapping included only minimal acreages of open water.

The wetlands and vegetation in the area are largely undisturbed by current or past development. The exceptions are developed areas around communities and historic travel routes.

3.2.1.1.3 Fire

Wildland fire management and response are coordinated through the Alaska Interagency Coordination Center (Figure 3.2.1-4). Management options are defined through four fire management options, including: “critical,” “full,” “modified,” and “limited.” *Critical* have highest priority, *Full* response are aggressive initial attack, *Limited* are allowed to burn while protecting human life and site-specific values. The *Modified* option is treated as *Full* during the peak of fire season, then switches to *Limited* when large fire growth is less likely.

3.2.1.2 Environmental Consequences

3.2.1.2.1 Resilience to Winter Tundra Travel

Wells et al. (2018, 2020) developed rankings for ecotypes[2] of the Arctic Coastal Plain (ACP) for resilience to a range of potential disturbances, including winter tundra travel. Ecotypes were ranked as having low, moderate, or high resilience to each disturbance type, based on vegetation and physical characteristics. Ecotype characteristics that were used to determine resilience included the abundance of evergreen shrubs, vegetation height, and microtopographic relief (e.g., polygonal ground features). Appendix I provides the ecosystem translation tables for each resilience category.

The ACP is dominated by wet sedge terrain, tussock tundra, sedge-Dryas tundra, and low willow thickets. The project’s ecosystems differ, and include forests, shrublands, and lowland vegetation similar to the ACP. Additional descriptions of differences are available in Nowacki 2001. Although the project area is in a different bioclimatic zone, many of the vegetation types are similar to those that occur on the ACP (Nowacki 2001, S. Bishop, pers. comm., based on extensive field experience in both areas). Therefore, the same criteria were used to develop rankings for resilience to winter tundra travel in the project area. These rankings should be considered only as general guidance,

[2] Ecotypes are “areas of the landscape with a unique set of state factors that are relatively stable through time” (Wells et al. 2020).

since differences between the ACP and the project area may affect resilience in ways that are not currently understood. This analysis is based on the more detailed vegetation types included in the Landfire data set, which were also used to determine likely wetland status. Vegetation types that include cottongrass tussocks were ranked as having low resilience, as this plant growth form is vulnerable to damage from winter tundra travel. Vegetation types that include trees, which do not occur on the ACP, were also ranked as having low resilience, because they may require clearing, and trees need many years to regrow.

Based on these preliminary rankings, the majority of the area consists of vegetation types with low resilience to winter tundra travel. Approximately half of this total is ranked as having low resilience due to the presence of tussocks. The remaining areas with low resilience are included due to the presence of trees, evergreen shrubs, or polygonal ground. Overlap occurs because both tussock tundra vegetation types include evergreen shrubs.

3.2.1.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, or maintenance activities; therefore, there are no impacts to vegetation or wetlands because there would be no ground disturbance or modification of those resources.

3.2.1.2.3 Alternative 1 Impacts

The proposed project's impacts to vegetation and wetlands would result primarily from winter tundra travel associated with construction activities. Sensitive habitats, including pingos, were avoided to the extent practicable during route selection. More limited, but higher intensity direct impacts, would come from the need to clear vegetation and from summer trenching activities near the target communities. Areas that may be impacted were calculated based on effects to a 30-foot-wide (15-foot on either side) corridor; however, most travel would occur within a narrower 15-foot-wide corridor, so actual acreages affected would be smaller.

No changes are expected from how fire behaves in the area or how fire is managed, and fire suppression is not anticipated to be required along the ROW. If fire threatens the cable, fire management practices would remain the same as for areas not around the cable. No change in fire suppression strategy, initial attack response, or fuel reduction projects is anticipated or requested for this project. If the area burns, the cable could be assessed for functionality after the fire moves away. Rapid repairs could be made to replace specific points of loss, and then permanent design and repair could take place after initial triage is complete.

The potential for introduction of nonnative and invasive species is expected to be low, since most project work would be conducted during the winter. Waterbodies (marine and freshwater) would be frozen at the surface and the placement of the FOC would require no in-water work. Summer construction involving in-water work would be conducted at the Hotham Inlet and Kugruk Estuary crossings; however, the vessels used in these locations would already be operating in area waters and are unlikely to introduce any nonnative or invasive species. Equipment used for summer, terrestrial work would be cleaned before use to minimize the risk of introducing non-native plants.

3.2.1.2.3.1 Impacts from Winter Tundra Travel

The most likely impacts to vegetation from winter tundra travel are damage to shrubs and cottongrass tussocks that project above the snow surface and disruption of the surface organic mat, which provides insulation for the underlying frozen ground. The surface organic mat includes living

mosses and lichens, as well as partially decomposed vascular and nonvascular vegetation. In some areas, these impacts would be cumulative with disturbance from existing winter trails used by local residents for subsistence activities. No soil compaction or changes in phenology is expected due to the snow cover, frozen ground, and low-pressure vehicles.

Deciduous shrubs, particularly willows (*Salix* spp.) are generally adapted to natural disturbance, such as flooding and browsing, and typically recover rapidly from both natural and human-caused disturbance (Jorgenson et al. 2010). Evergreen shrubs, including common tundra species, such as mountain avens (*Dryas* spp.), lowbush cranberry (*Vaccinium vitis-idaea*), Labrador tea (*Ledum* spp.), and crowberry (*Empetrum nigrum*), are less tolerant of disturbance. Cottongrass tussocks often protrude above the surface if snow cover is shallow and are vulnerable to scuffing or breakage because of their morphology. Damaged tussocks may lead to a change in vegetation type as they are replaced by forbs and other graminoid species.

Studies of long-term effects of seismic exploration on the ACP (Jorgenson et al. 1996, 2010) provide the best available information on potential impacts to vegetation from winter tundra travel associated with the project. Many of the vegetation types in the project area are similar to those on the ACP, and the vehicle types and activities involved are generally similar. These studies found that sites with low to moderate levels of initial disturbance showed good recovery within 18 years, while recovery was poor at highly disturbed sites. A similar time frame for recovery is expected for vegetation in the project, with good recovery in 1-2 decades at sites with low to moderate disturbance. Recovery would be slower for sites with higher levels of disturbance, including damage to tussocks, tree cutting, or permafrost disruption. The authors concluded that winter travel should be avoided in sensitive vegetation types, including tussock tundra, that some types of disturbance may not recover, but that riparian shrub communities recovered rapidly from disturbance. Impacts would be reduced by conducting winter overland travel only when soils are frozen and sufficient snow cover exists to prevent snow compaction and loss or damage to vegetation. Measurements will be completed using the methodology in DNR (2025 and Appendix C). Minimum snow coverage on USFWS lands will be 9 inches. The proposed sampling methodology helps accommodate differences in snow depth across the landscape (i.e. due to wind, topographic differences).

Table 3.2.1-1. Areas of each vegetation resilience for the action alternatives.

Resilience	No Action	Alternative 1		Alternative 2	
		30 ft Buffer Area (acres)	60 ft Buffer Area (acres)	30 ft Buffer Area (acres)	60 ft Buffer Area (acres)
High	0	111.23	222.59	106.39	212.98
Medium	0	453.19	905.63	425.50	850.16
Low	0	1,574.20	3,148.70	1,484.24	2,968.86
#N/A	0	0.01	0.04	0.01	0.04
Total	0	2,138.63	4,276.96	2,016.14	4,032.04

3.2.1.2.3.2 Impacts from Clearing Vegetation

The project would require clearing of vegetation. Areas that may be impacted were calculated based on effects to a 30-foot-wide (15-foot on either side) corridor; however, most travel would occur within a narrower 15-foot-wide corridor, so actual acreages affected would be smaller. Vegetation less

than 8 inches in height may be impacted in areas where snow cover is below average. Conversely, taller vegetation may not be cleared where snow depth is greater than average. The impacts caused by clearing trees would require regrowth of several decades. The vegetation types where clearing would occur are dominated by deciduous shrubs (e.g., willow, alders), which typically recover relatively rapidly (~10 years, Jorgenson 2010). Evergreen shrubs generally recover slowly from disturbance, but most evergreen shrubs in the project are less than 8 inches in height and would largely be protected by snow cover. The total area of forest and shrub vegetation types (excluding dwarf shrubs) ranges from 25-30% of the total ROW (Appendix I). Based on the Landfire (2025b) vegetation height data, approximately 30-50% of the ROW is occupied by woody vegetation greater than 8 inches in height (Appendix I). The higher total for the Landfire data may reflect the fact that some areas of tussock tundra can include shrubs greater than 0.2 meters (8 inches) in height. These areas would be included in the total area to be cleared based on the Landfire height data but were excluded from the analysis based on vegetation type.

Table 3.2.1-2. Areas of each vegetation class (acres) that may require clearing, based off of vegetation height.

Vegetation Height	No Action	Alternative 1	Alternative 2
		30 ft Buffer Area (acres)	30 ft Buffer Area (acres)
Veg Height (No Clearing - <0.2m)	0	1,347.35	1,287.76
Veg Height 0.2 m to 1 m	0	665.45	615.81
Veg Height 1m - 2 m	0	50.41	44.90
Veg Hight >2m	0	75.41	67.66
#N/A	0	0.01	0.01
Total Requiring Clearing	0	791.27	728.38

Source: USFWS 2025c

3.2.1.2.3.3 Impacts to Vegetation at Stream Crossings

Both summer and winter construction at stream and river crossings may result in impacts to riparian vegetation. Thickets of tall willows, which commonly occur on the banks of streams and rivers, are likely to be temporarily disturbed by vehicle traffic and other construction activities, however, the total area affected would be limited and riparian willows are generally adapted to disturbance.

3.2.1.2.3.4 Impacts to Wetlands

In most cases, the primary concern for impacts to wetlands is placement of fill, which would not occur in this project. Other potential impacts to vegetation, including wetlands, have been described above under the Impacts from Winter Tundra Travel.

Table 3.2.1-3 summarizes wetlands within the action alternative footprints based on the available NWI mapping (USFWS 2025c). Table 3.2.1-4 summarizes the likely wetland and upland status of the action alternatives using the Landfire Existing Vegetation type dataset (Landfire 2025a).

Table 3.2.1-3. Areas of each wetland class (acres) with National Wetland Inventory mapping for the action alternatives.

Wetland Class	No Action	Alternative 1		Alternative 2	
		30 ft Buffer Area (acres)	60 ft Buffer Area (acres)	30 ft Buffer Area (acres)	60 ft Buffer Area (acres)

Estuarine and Marine Deepwater	0	39.43	78.87	39.43	78.87
Estuarine and Marine Wetland	0	1.32	2.63	1.32	2.63
Freshwater Emergent Wetland	0	338.57	677.00	326.32	652.58
Freshwater Forested/Shrub Wetland	0	395.85	792.02	392.99	786.27
Freshwater Pond	0	3.56	7.19	3.29	6.65
Lake	0	11.78	23.48	11.78	23.48
Riverine	0	10.20	20.57	9.90	19.95
Total NWI Mapped Area (Including Uplands)	0	800.72	1,601.76	785.04	1,570.42
Total Wetlands (excluding Estuarine and Marine Deepwater)	0	759.96	1,520.26	744.29	1,488.93

Source: USFWS 2025c

Note: NA (not applicable); NWI (National Wetlands Inventory)

Table 3.2.1-4. Areas of likely uplands and wetlands based on vegetation type, based on detailed vegetation types included in the Landfire (2025a) vegetation type data set, for the action alternatives.

Likely Wetland Status	No Action	Alternative 1		Alternative 2	
		30 ft Buffer Area (acres)	60 ft Buffer Area (acres)	30 ft Buffer Area (acres)	60 ft Buffer Area (acres)
Wetlands	0	1,872.75	3,745.87	1,767.56	3,535.20
Uplands	0	86.08	171.36	77.88	155.11
Floodplain	0	73.65	147.34	68.04	136.23
NA (unvegetated)	0	106.15	212.39	102.66	205.49
Totals	0	2,138.63	4,276.96	2,016.14	4,032.04

Source: Landfire 2025a

Project impacts to wetlands and vegetation would be similar for all action alternatives. The estimated vegetation clearing is substantially larger for Alternative 1 than for Alternatives 2.

Disturbance to wetlands and marine Waters of the United States would be limited to areas of trenching, HDD pads, installation of aerial poles, and marine activities. An approximate area of these impacts is provided in Table 3.2.1-5. Updated calculations would be provided in the US Army Corps of Engineers permit application.

Table 3.2.1-5. Approximate areas of wetland and marine disturbance (acres).

Habitat	No Action	Alternative 1		Alternative 2	
		Temporary	Permanent	Temporary	Permanent
Wetlands	0	~0.1	~0.1	~0.1	~0.1
Marine	0	~0.9	~0.1	~0.9	~0.1

Source: Jorgenson et al. 2015

Assumes 1ft total wide disturbance for trenching, and 3 inch total wide disturbance for marine

Impacts from Alternative 1 would be long-term and negligible to minor.

3.2.1.2.4 Alternative 2 Impacts

Impacts from Alternative 2 would be similar to Alternative 1, but smaller due to the smaller footprint. Impacts would be long-term and negligible to minor.

3.2.2 Fish and Fish Habitat

3.2.2.1 Affected Environment

3.2.2.1.1 Waterbodies and Fish Habitat

The project would be constructed in northwest Alaska, from the Chukchi Sea coastal waters, including crossing the marine waters of Hotham Inlet near Kotzebue, to the foothills along the southern flank of the Brooks Range, crossing rivers, streams, lakes, and ponds (Figure 3.2.2-1, Appendix H). The waterbodies provide important spawning, rearing, and overwintering habitat for resident and anadromous fish. Non-anadromous waters (e.g., headwater streams) still contribute to anadromous and resident species as they contribute to the overall habitat quality and food resources found downstream through both autochthonous and allochthonous inputs.

The freshwaters in the area factor into the production of fish for both subsistence use and in commercial fisheries activities, and they are largely undisturbed by current or past development. Stream types range from small and ephemeral to large and wide rivers. The lower, middle, and upper reaches of larger streams provide migration, spawning, and rearing habitat for Pacific salmon, as well as a variety of resident and anadromous whitefish species and other subsistence species (e.g., Dolly Varden (*Salvelinus malma*), northern pike [*Esox lucius*], burbot [*Lota lota*], Arctic grayling [*Thymallus arcticus*]). The lower reaches of major rivers (e.g., Kobuk and Noatak rivers) that are influenced by saltwater with fine-material substrates are used by Pacific salmon as migratory routes to access spawning areas in the river's upper reaches and tributaries. Sheefish spawning areas have been avoided by the proposed alignments, although sheefish are present and utilize additional areas in the landscape, including areas between spawning locations and the maritime environment.

3.2.2.1.2 Fish

Fish species that may be found in the project area have been identified by the ADF&G in the Alaska Freshwater Fish Inventory and USFWS and are shown in Table 3.2.2-1.

Table 3.2.2-11. Fish Species Likely Present in the Project Area

Common Name	Scientific Name		Common Name	Scientific Name
Alaska blackfish	*Dallia pectoralis*		Longnose sucker	*Catostomus catostomus*
Arctic grayling	*Thymallus arcticus*		Ninespine stickleback	*Pungitius pungitius*
Arctic lamprey	*Lampetra camtschatica*		Northern pike	*Esox lucius*
Broad whitefish	*Coregonus nasus*		Pacific herring	*Clupea pallasii*
Burbot	*Lota lota*		Pink salmon	*Oncorhynchus gorbuscha*
Capelin	*Mallotus villosus*		Pond smelt	*Hypomesus olidus*
Chinook salmon	*Oncorhynchus tshawytscha*		Rainbow smelt	*Osmerus mordax*
Chum salmon	*Oncorhynchus keta*		Round whitefish	*Prosopium cylindraceum*

Coastrange sculpin	*Cottus aleuticus*	Saffron Cod	*Eleginus gracilis*
Coho salmon	*Oncorhynchus kisutch*	Sheefish (inconnu)	*Stenodus leucichthys*
Dolly Varden	*Salvelinus malma*	Slimy sculpin	*Cottus cognatus*
Humpback whitefish	*Coregonus pidschian*	Sockeye salmon	*Oncorhynchus nerka*
Lake trout	*Salvelinus namaycush*	Starry Flounder	*Platichthys stellatus*
Least cisco	*Coregonus sardinella*		

Source: ADF&G 2025a, USFWS 2025e

Historically, information for non-salmon species in the project area is more limited. Brown (2004, 2013) describes whitefish on the Selawik National Wildlife Refuge, and other research provides sheefish life history characteristics (Underwood, Whitten, Secor 1998, Underwood 2000, Hander, Brown, Underwood, 2008, Hander Brown, Carter 2019). Subsistence fishers are not required to report resident fish harvest, and most ADF&G sponsored studies focus on anadromous species. Post-harvest household surveys suggest that whitefish species, of which some unknown percentage of fish are resident, account for nearly a quarter of annual harvest for the communities of Ambler, Kiana, Kobuk, Noorvik, and Shungnak and another 13% for the Noatak River (Magdanz et al. 2011). Consultation with local communities and indigenous knowledge of subsistence practices supports and informs this conclusion.

3.2.2.1.3 Anadromous Fish

Anadromous fish live most of their lives in the sea but return to freshwater to spawn. Anadromous streams are those that support fish species that migrate between freshwater and marine waters, such as Pacific salmon. ADF&G maintains the Anadromous Waters Catalog (AWC) database (ADF&G 2025), which is the most comprehensive data source for anadromous waters in northwestern Alaska; however, the absence of documented anadromy does not indicate that a waterbody is not anadromous, as survey data is not available for all waterbodies the project would cross. The AWC identifies waterbodies the project would cross that contain anadromous fish species (Appendix H, *Water Crossing Table*). Anadromous fish species identified in the AWC that may be present in the project area are summarized in Table 3.2.2-2. Again, consultation with local communities and indigenous knowledge of subsistence practices supports and informs this conclusion.

Table 3.2.2-22. Anadromous Fish Species Likely Present in the Freshwaters in the Project Area

Common Name	Scientific Name	Life Stage	Activity
Chinook salmon	*Oncorhynchus tshawytscha*	Adult	Present
Chum salmon	*Oncorhynchus keta*	Adult spawning	Present, spawning
Coho salmon	*Oncorhynchus kistuch*	Adult	Present
Dolly Varden	*Salvelinus malma*	Juvenile, adult	Present, spawning
Humpback whitefish	*Coregonus pidschian*	Juvenile, adult	Present
Inconnu/sheefish	*Stenodus leucichthys*	Juvenile, adult	Present
Pink salmon	*Oncorhynchus gorbuscha*	Adult spawning	Present, spawning
Sockeye salmon	*Oncorhynchus nerka*	Adult spawning	Present

Whitefishes (undifferentiated)	*Coregoninae spp.*	Juvenile, adult	Present

Source: ADF&G 2025c

3.2.2.1.4 Essential Fish Habitat

In project area freshwaters, Pacific salmon are the only fish species managed under an Essential Fish Habitat (EFH) federal Fishery Management Plan (NPFMC 2024). National Marine Fisheries Service (NMFS) defines freshwater EFH for Pacific salmon as "freshwater areas used by egg, larvae, and returning adult salmon." ADF&G maintains the Anadromous Waters Catalog (AWC), which identifies freshwater habitats important for Pacific salmon, and NMFS considers such habitats as EFH for identified managed species. Chinook, chum, Coho, pink, and sockeye salmon have designated EFH in Hotham Inlet and freshwater streams and rivers that would be crossed by the project (Appendix H and Appendix A). The project would also construct a subsea crossing of Hotham Inlet, where Pacific salmon EFH is located. Hotham Inlet also includes EFH for saffron cod. An Essential Fish Habitat (EFH) Assessment was submitted on August 11, 2025, to initiate consultation with NMFS under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The assessment determined that the proposed action may adversely affect EFH, but that those effects would be minimal and temporary in nature. The assessment described mitigation measures and BMPs that would be implemented. On August 15, 2025, NMFS concurred with the assessment and stated that no conservation recommendations were necessary.

3.2.2.1.5 Other Aquatic Organisms

There is limited comprehensive data on phytoplankton, zooplankton, and periphyton communities for the region, as well as the macroinvertebrate communities that are dependent on these primary and secondary producers. Invertebrates, in particular, are important for rearing juvenile and adult species of resident and anadromous fish, and they are the main food resource for most key fish species in the region. Aquatic invertebrates also perform important nutrient cycling functions by helping decompose materials in the water and are indicators of overall stream health. Typically, off-channel habitat would provide higher densities of invertebrate communities compared to larger waterbodies like the Kobuk River (Durand et al. 2011). Changes in annual precipitation, freeze-up, and thaw, along with nutrient inputs to area waters, would influence overall stream productivity.

3.2.2.2 Environmental Consequences

3.2.2.2.1 No Action Alternative

Under the No Action Alternative, no construction, operation, or maintenance activities would take place; therefore, there would be no impacts to fish and fish habitat because there would be no ground disturbance nor disturbance of water resources.

3.2.2.2.2 Alternative 1 Impacts

The planned winter construction timing and construction techniques would reduce or minimize many of the effects to fish and fish habitat.

3.2.2.2.2.1 Habitat Loss or Alteration

Direct habitat loss from the placement of the FOC across fish bearing waterbodies is likely to occur, underscored at the temporary construction phase; however, the nominal size of the cable (0.5-inch diameter) would result in minimal impact at water crossings. A summary for water crossings is listed in Table 2.3-1.

At most waterbody crossing locations, the project proposes to place FOC directly on frozen waterbody surfaces and allow it to passively fall to the waterbody bottom during spring breakup when the ice melts, which would minimize impacts to fish and fish habitat that would occur from active placement during summer. Length of required cable would be determined by using an ice core to determine the depth to bottom of the waterbody. For the marine crossing of Hotham Inlet however, the FOC would be direct buried into the seafloor using a cable plow; this would temporarily disturb the muddy and silty surface during construction.

During subsequent spring breakup, the cable's position at the bottom of the stream is anticipated to remain submerged. If the cable does encounter breakup debris strong enough to break, it would be repaired by maintenance crews.

Ground laying FOC across frozen waters instead of trenching would prevent inducing sedimentation. At HDD crossings, surface ground disturbances may result in some erosion and sedimentation. These effects would be limited, as the ground disturbance at the HDD crossings would be limited. Similarly, any trenching activity on stream crossings could result in minor erosion and sedimentation if directly adjacent to waterbodies.

HDD crossings would require water withdrawals from local waterbodies. The HDD crossings are planned for several large river crossings, and these rivers would be the likely source water for mixing drilling fluids. Water withdrawals would be from major rivers (HDD is only proposed on major rivers). The volume of water required to mix the drilling fluids would not result in an appreciable impact to water quality (e.g., dissolved oxygen) and impacts to fish are not expected. Impacts to fish resources from HDD could occur if drilling fluids used to lubricate, remove cuttings, and stabilize the bore hole are unintentionally released into surface waters due to site geological conditions or if drilling fluids are not properly contained or disposed, and a frac-out plan has been prepared to minimize the impact (Appendix E4).

Summer barge activity and equipment activity has the potential to impact fish and fish habitat. Access routes from the edge of streambank to the equipment staging area would be planned for only the minimum width needed for operations to stage equipment and would follow natural contours, where practicable to minimize cut and fill. Natural riparian buffers would be maintained for 50 feet between the staging area and the edge of the stream.

The introduction of nonnative and invasive species is reduced because the timing of construction would be during winter when local waterbodies are frozen at their surface and the placement of the FOC on the frozen surface would require no in-water work. Cleaning equipment to ensure weed-free surfaces is the only way to ensure preventing invasive species spreading to new areas. Summer construction involving in-water work would be conducted at the Hotham Inlet and Kugruk Estuary crossings; however, the vessels used in these locations would already be operating in area waters and are unlikely to introduce any nonnative or invasive species.

3.2.2.2.2.2 Disturbance or Displacement

Temporary disturbance and displacement would occur during the summer construction of the Hotham Inlet crossing. Constructing the subsea crossing would result in temporary noise impacts from the cable laying vessel and temporary, localized sedimentation and increased turbidity from the operation of the cable plow. These disturbances would be short term, and fish would be expected to temporarily move to other nearby areas of similar habitat. Similar temporary

disturbances may occur during the summer HDD crossing construction as the HDD barge and support vessels travel along project area rivers.

During winter construction, fish may be temporarily disturbed by equipment traffic traveling over frozen waters. Fish may be temporarily displaced in the immediate area of the crossing equipment, but the activity would occur for only a short time and no lasting impacts to fish are anticipated.

3.2.2.2.2.3 Injury or Mortality

The project is unlikely to lead to injury or mortality for fish present in the project area due to the planned winter construction for much of the project and the planned construction techniques. Water withdrawals from rivers or streams to supply water for HDD fluids, however, could result in the injury or mortality of individual fish should they become trapped or entrained by the pump's water intake hose. Using ADF&G-approved fish screening devices would reduce this impact.

3.2.2.2.2.4 Spills or Other Accidental Releases

Fuel spills or other hazardous substance releases from the project that reach waterways would degrade fish habitat, although the extent of these impacts could be mitigated by response actions. A large spill or accidental release into a smaller waterbody could result in injury or mortality to individual fish, depending on the spilled material and overall concentration in the receiving waterbody. Implementing project BMPs would reduce the risk of spills impacting fish or fish habitat.

Impacts from Alternative 1 would be long-term and negligible to minor.

3.2.2.2.2.5 Alternative 2 Impacts

Alternative 2 eliminates the southern portion of the eastern loop and replaces it with co-located cable. This results in fewer acres of impact, but slightly more ground-lay stream crossings, 1 fewer aerial stream crossing, and three fewer HDD stream crossings.

3.2.3 Birds

3.2.3.1 Affected Environment

The project area falls within the Bird Conservation Region 2 (Western Alaska), Region 3 (Arctic Plains and Mountains), Region 4 (Northwestern Interior Forest) and Marine Region 13 (Chukchi and Beaufort Seas); USFWS 2021a). One of the Selawik Refuge's purposes is conservation of waterfowl, shorebirds, and other migratory birds. Audubon Alaska recognizes Important Bird Areas in the region, including the Selawik Basin (Potentially Global Level of Priority), Kobuk River Mouth (Potentially Global Level of Priority), and Krusenstern Lagoon (State Level of Priority). Up to 180 bird species migrate through, breed, or overwinter in the region (Kessel 1989; Drew et al. 2005; NPS 2018; USFWS no date). Of these, 113 species are expected to occur in the project area during breeding, migration, or winter based on checklists from Western Arctic National Parklands (NPS 2018), and the Selawik National Wildlife Refuge (USFWS 2025d), excluding species classified as vagrants, casual, or accidental. Species occurrence was confirmed in the project area based on habitat preferences and species range (Kessel 1989; Drew et al. 2005; Billerman et al. 2025); 84 of these species are also USFWS Birds of Conservation Concern (BCC; USFWS 2021a), BLM Special Status Species (SSS; BLM 2019), Kobuk-Seward Peninsula Resource Management Plan Special Status Species (BLM 2008), or the ADF&G Species of Greatest Conservation Need (SGCN; ADF&G 2025; Appendix J, *Birds*). For example, Steller's eider, spectacled eider, yellow-billed loon, bristle-thighed curlew, whimbrel, bar-tailed godwit, Hudsonian godwit, red knot, dunlin, buff-breasted sandpiper, Kittlitz's murrelet,

Aleutian tern, olive-sided flycatcher, gray-headed chickadee, McKay's bunting, and rusty blackbird are all BCC, SSS, and SGCN.

Two threatened species (Steller's eider and spectacled eider) occur in the region, but critical habitat does not overlap the project area (www.ipac.ecosphere.fws.gov, USFWS 2021b, 2025b, 2025f). Steller's eider breed primarily on the Arctic coastal plain of Alaska and Russia and winter in large aggregations along the coasts of Alaska Peninsula, Kodiak Island and Kamchatka Peninsula. Little is known about spring and fall migration routes, but evidence suggests most birds congregate in nearshore marine waters of the Bering and Chukchi seas within 5km of the coastline (Martin et al. 2015). Spectacled eiders historically spend the winter months in the Bering Sea pack ice south of Saint Lawrence Island (Sexson et al. 2016) and breed primarily on the Yukon-Kuskokwim Delta and Arctic coastal plain from Point Lay to the Canning River. In spring, pre-breeding birds stage in ice leads immediately off-shore of breeding areas. In fall, they molt in off-shore waters of the northern Bering Sea, eastern Chukchi Sea and western Bering Strait (Sexson et al. 2016). More information on these species is in Section 3.2.6.

Federal protections for eagles and migratory birds includes the Bald and Golden Eagle Protection Act (BGEPA: 16 USC 668-668d) and the Migratory Bird Treaty Act (MBTA; 16 U.S.C 703-712). The BGEPA protects eagles from take[3] at any time of the year, including disturbance of nest sites, roosts, and foraging sites (50 CFR 22.6). The Spring 2025 inspection of the area did not note the presence of eagle nests. In addition, bald and golden eagle nests are considered rare in the Selawik National Wildlife Refuge (USFWS undated). If an eagle nest is observed within the disturbance buffers (i.e. ½ mile) during construction, consultation with the USFWS would be initiated.

The MBTA protects migratory birds by prohibiting the take of protected species, their eggs, or nests, unless authorized by permit or state-authorized subsistence use. Eagles and a variety of other migratory birds are found seasonally in the marine and terrestrial portions of the project area.

Most birds are only seasonally present in the region to during the migratory and breeding periods (March – October) (Kessel 1989). The first migrants begin arriving in March and include snow buntings, cliff-nesting raptors and bald eagles, and seabirds that congregate in sea ice leads. Eider migration over these leads typically starts by mid-April and is followed by the arrival of glaucous gulls, murrelets, and murres. A major influx of migrants occurs as the sea ice retreats and temperatures warm in late May, when most other species arrive. Most species are present by June as nesting begins, with peak fledging occurring July-August. Fall migration for many species begins in August and peaks in September with the departure of waterbirds and cliff-nesting seabirds. After November, only resident birds remain. Of the 133 species that occur in the project area, 15 species are expected to be present during the winter (Appendix J, *Birds*).

The project is dominated by shrub-tussock tundra, extensive freshwater emergent wetlands and shrubland habitats, and smaller areas of boreal forest and woodlands, which includes moderate- to high-value habitat within 30 meters of the fiber optic cable route for 84 SGCN bird species across Alternatives 1, and 2 (Appendix J, *Table 3*). Habitat evaluations completed for ADF&G's draft State Wildlife Action Plan (SWAP; ADF&G 2025b) were used to describe species distribution and habitat associations. The habitats are based on the Landfire mapping for Alaska (Landfire 2024) (ADF&G 2025b). The 84 SGCN includes all bird species that are on the other avian conservation lists (i.e.,

[3] The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." (USFWS 2025a)

USFWS BCC and BLM SSS; Appendix J, Birds). Each landcover class was ranked as high, moderate, low, or negligible habitat value for each species. High-value habitats are frequently used during the migration and breeding season for nesting and/or foraging/hunting by nonresident species or for shelter, breeding, denning, overwintering, foraging, and/or hunting by resident species. Moderate-value habitats may be used regularly during the breeding, migration, or wintering seasons for foraging/hunting or as travel corridors but less so than high-value habitats (ADF&G 2025b). Moderate- and high-value classes were combined to determine suitable habitat acreages for each species and species counts for each landcover class (Appendix J, *Birds*).

Birds in the area are described using five bird guilds: waterbirds (21 species), seabirds (20 species), raptors (10 species), landbirds (35 species), and shorebirds (27 species). Descriptions of habitat associations and species composition for each guild are provided in Appendix J, *Birds*.

3.2.3.2 Environmental Consequences

3.2.3.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, or maintenance of the network; therefore, there would be no impacts to birds because there would be no noise generated, no vegetation clearing, and no ground disturbance.

3.2.3.2.2 Alternative 1 Impacts

The project's environmental impacts on birds would vary based on construction timing and bird presence. However, the intensity of impacts to birds is expected to be low to medium, as impacts would be localized and not at the population level. Most of the FOC would be installed during winter months (January through early May 2026), when approximately 15 resident, or wintering, bird species would be present in the project area. Construction activities scheduled during summer (June through September), when migratory birds would be present, include construction of the HDD crossings at major rivers (e.g., Kobuk and Noatak rivers), subsea FOC laying across Hotham Inlet, FOC ground-laying across the Kugruk Estuary east of Deering, and aerial-based overflights to inspect the winter-laid FOC. These activities may result in temporary habitat alteration from winter travel and vegetation clearing. Disturbance from summer construction activities and aerial overflights may likewise occur, as described below. Occasional maintenance activities may be required to repair breaks in the cable. Cable breaks would most likely be accessed by aerial or winter off-road travel. The project would avoid scheduling regular field maintenance activity when helicopter access would be required during the USFWS bird nesting window (1 June through 31 July); however, FOC outages that could occur during that time period may necessitate emergency repairs and field visits, including helicopter access. If emergency access is required within the nesting season window, the project would coordinate with USFWS to determine the appropriate course of action prior to mobilizing crews or equipment. These are expected to be limited in duration and intensity.

3.2.3.2.2.1 Habitat Alteration and Loss

Winter travel over bird habitats would create varying impacts depending on localized snow cover depths and vegetation type, with some habitats (e.g., deciduous shrubs) recovering rapidly while others (e.g., evergreen shrubs and tussocks) taking longer. Approximately 70 percent of the project area consists of vegetation types with low resilience to winter tundra travel (see Section 3.2.1). Trees and shrubs above the snow cover would be cleared along the 30-foot-wide corridor (usually only 15-foot-wide corridor) to allow for construction vehicle passage. The FOC route alternatives would avoid tall, dense shrub and forested habitats where practicable, and clearing would occur during winter, limiting direct disturbance to nesting birds, and complying with the USFWS timing

recommendations for land disturbance and vegetation clearing (May 10-July 20). Up to 2,138.63 acres (and 2,016.14 acres) of bird habitat may occur within 30 feet of the fiber optic cable route across Alternatives 1 (and Alternative 2); Appendix J, Table 2. This habitat loss to birds is expected to be low to medium, as impacts would be localized and not at the population level.

Studies of birds nesting near seismic exploration lines on the North Slope of Alaska provide analogous information on the potential impacts of habitat alteration to arctic and boreal birds because of the similar winter travel methods, vegetation communities, and linear disturbance features (Machtans 2006; Ashenhurst and Hannon 2008; Kalukapuge et al. 2024). Ongoing consultation with local indigenous communities likewise informs this conclusion. Habitat alteration may affect breeding passerines through changes in community structure, territory use, and abundance patterns, with effects varying by disturbance age, width, and vegetation recovery rates (Machtans 2006; Ashenhurst and Hannon 2008; Boelman et al. 2015; Kalukapuge et al. 2024). Ground and shrub-nesting species may increase territory size to span disturbed habitat, while forest-nesting species may avoid these areas.

3.2.3.2.2.2 Disturbance and Displacement

Vessel traffic associated with laying the FOC across Hotham Inlet and Kugruk Estuary may elicit avoidance responses from seabirds, loons, and waterbirds feeding in marine waters. Hotham Inlet and Kugruk Estuary are important staging areas for waterfowl in late August and September (DNR 2008) and construction activities are scheduled during summer (June through September), when migratory birds would be present. These reactions may vary based on species, flock size, and boat speed. Arctic and Red-throated loons are likely to react to vessels and have been shown to avoid areas of high vessel traffic (Schwemmer et al. 2011; Fliessbach et al. 2019; Jarett et al. 2021). Large flocks of birds are more likely to elicit a response to vessels than small flocks, and birds are more likely to engage in avoidance activities as vessel speed increases (Bellefleur et al. 2009). Bird exposure to vessel traffic associated with the project would be limited to approximately 4 to 12 days (depending on action alternative) and impacts are expected to be minor.

Aerial overflights of the FOC alignment during summer have the potential to elicit avoidance reactions from birds. These reactions depend on aircraft attributes (e.g., flight pattern, engine type, altitude) and animal characteristics (e.g., species type, life-stage, level of aggregation; Mallory 2016; Mulero-Pázmány et al. 2017). Timing relative to the breeding season also affects bird responses, with breeding animals generally less inclined to flee than non-breeders, likely due to reluctance to abandon nests, although this varies by species, incubation stage and disturbance type (Ackerman and Eadie 2003, Mulero-Pázmány et al. 2017). In contrast, birds during non-breeding periods, including staging and molting waterfowl, are more likely to show behavioral reactions and may flush at greater distances (Mulero-Pázmány et al. 2017; Davis and Wisely 1974; Salter and Davis 1974). Considerable variation exists among species in response to aircraft overflights; one study in the high Arctic found that breeding gulls flushed when aircraft were within 200 meters but long-tailed ducks and common eiders did not (Malloy 2016). In contrast, aerial overflights at that altitude at a wader colony in Florida typically elicited minor reactions of short duration, but birds that flushed from nests returned within 5 minutes (Kushlan 1979). The extent of aerial overflight impacts on birds would depend primarily on the frequency of overflights and landings in the same area, as a single overflight or landing would be a limited exposure. Aerial flights have the potential to disturb eagles, including during sensitive periods of nesting and rearing young. Impacts could include attack (Fyfe and Olendorff 1976), avoidance (Fraser et al. 1985), or displacement (Grubb and King 1991; Tobajas et al. 2021; Grubb and Bowerman 2024), all of which are energetically costly and behaviorally

disruptive. Eagle presence is listed as rare in portions of the projects, and flights would avoid multiple low flying transects in potential eagle nest habitats. If an eagle nest is observed within the disturbance buffers (i.e. ½ mile 330 feet during winter, 660 feet during summer) during the aerial survey, the nest would be avoided and consultation with the USFWS would be initiated.

3.2.3.2.2.3 Other Impacts

Birds could be exposed to small petroleum spills, leaks, and other sources of accidental contamination because of FOC-laying activities. Oiling and ingestion of oil can result in bird death (Szaro 1977; Piatt et al. 1990; Leighton 1993; Wells et al. 1995). Appendix E5 has a spill response plan that shall be implemented to mitigate the risk.

Direct mortality of eggs or abandonment of nests is not expected as the terrestrial portions of the FOC would be installed during winter months when birds are not breeding, with the exception of the construction of the HDD crossings at major rivers (e.g., Kobuk and Noatak rivers). Activities on the riverbank during the breeding season could cause nest failure in a small number of avian SGCN. Aerial FOC crossings at major rivers could present a collision hazard for birds causing injury and mortality particularly in thick fog or during circular mating displays; however, bird diverters would be installed to increase the visibility of the FOC, and such diverters have been shown to be effective at reducing bird collisions (Ferrer et al. 2020, Barrientos 2011).

Impacts from Alternative 1 would be long-term and negligible to minor.

3.2.3.2.3 Alternative 2 Impacts

The alternatives are similar in terms of potential impacts to moderate-to high-value bird habitat (Appendix J Table 2). This alternative impacts fewer acres and so has proportionally less impact.

Impacts from Alternative 2 would be long-term and negligible to minor.

3.2.4 Terrestrial Mammals

3.2.4.1 Affected Environment

A total of 40 different terrestrial mammal species are known or expected to occur in the project area (Table 3.2.4-1; MacDonald and Cook 2009), although some species are rare and are likely to occur only in a portion of the project area, or are restricted to certain habitats. None of the terrestrial mammals in the program area are listed under the federal ESA or the BLM list of sensitive species (BLM 2019). Polar bears do occur on land in the project area, but they are classified as a marine mammal and are discussed in the section on *Threatened and Endangered Species*.

One of the Selawik Refuge's purposes is conservation of the Western Arctic Caribou Herd (Western Arctic Caribou Herd Working Group 2019, 2024). The most recent numbers from ADF&G research and following the Cooperative Management Plan suggest the WAH is at preservative levels; this would be discussed in further detail below.

For terrestrial mammals, the project area is defined as the area within 2.5 miles (4 km) of the FOC route. This distance was selected because multiple studies have shown that caribou occur at lower density within 2.5 miles of active infrastructure during calving, a period of low tolerance to human activity (Dau and Cameron 1986; Cameron et al. 2005; Johnson et al. 2020; Prichard et al. 2020a), suggesting that most impacts to terrestrial mammals would occur within this area.

Table 3.2.4-1. Terrestrial mammal species known or suspected to occur in the project area.

Common Name	Latin Name	Common Name	Latin Name
Alaska Marmot	*Marmota broweri*	Barren Ground Shrew	*Sorex ugyunak*
Arctic Ground Squirrel	*Spermophilus parryii*	Holarctic Least Shrew	*Sorex minutissimus*
Red Squirrel	*Tamiasciurus hudsonicus*	Little Brown Myotis (Bat)[1]	*Myotis lucifugus*
American Beaver	*Castor canadensis*	Canadian Lynx	*Lynx canadensis*
Collared Lemming	*Dicrostonyx groenlandicus*	Coyote[1]	*Canis latrans*
Brown Lemming	*Lemmus trimucronatus*	Wolf	*Canis lupus*
Singing Vole	*Microtus miurus*	Arctic Fox	*Vulpes lagopus*
Root (Tundra) Vole	*Microtus oeconomus*	Red Fox	*Vulpes vulpes*
Meadow Vole	*Microtus pennsylvanicus*	American Black Bear	*Ursus americanus*
Taiga Vole	*Microtus xanthognathus*	Brown Bear	*Ursus arctos*
Northern Red-backed Vole	*Myodes rutiles*	Wolverine	*Gulo gulo*
Common Muskrat	*Ondatra zibethicus*	North American River Otter	*Lontra canadensis*
Northern Bog Lemming	*Synaptomys borealis*	American Marten	*Martes americana*
North American Porcupine	*Erethizon dorsatum*	Ermine (Short-tailed Weasel)	*Mustela erminea*
Snowshoe Hare	*Lepus Americanus*	Least Weasel	*Mustela nivalis*
Alaska Hare	*Lepus othus*	American Mink	*Neovision vison*
Cinereus Shrew	*Sorex cinereus*	Moose	*Alces alces*
Pygmy Shrew	*Sorex hoyi*	Caribou	*Rangifer tarandus*
Dusky Shrew	*Sorex monticolus*	Muskox	*Ovibos moschatus*
Tundra Shrew	*Sorex tundrensis*	Dall's sheep	*Ovis dalli*

[1] Outside of typical range but has been observed in the area.

3.2.4.1.1 Caribou

Caribou (*Rangifer tarandus*) provide for a subsistence way of life in northwest Alaska and are the most abundant large game species in the project area. The project area is within the winter range of the Western Arctic Herd (WAH) of caribou (Joly and Cameron 2022; BLM 2024; Gurarie et al. 2024; Hansen et al. 2024) and is occasionally used by caribou from the Teshekpuk Caribou Herd (TCH; Person et al. 2007; Fullman et al. 2021). Caribou would also cross portions of the project route during fall and spring migrations. The WAH has declined in recent years from a peak of 490,000 caribou in

2003 to a current (2023) estimated population size of 152,000, thus in Preservative versus Critical status (Hansen et al. 2024).

The WAH wintering range varies but exhibits long-term decadal patterns (BLM 2024, Gurarie et al. 2024). For many years, the majority of the WAH wintered on or near the Seward Peninsula (Prichard et al. 2020b; Gurarie et al. 2024), but in recent years, more caribou have wintered farther north (i.e. Kobuk Valley, Brooks Range) (BLM 2024; Gurarie et al. 2024), making it more likely that caribou would be present in the project area during winter FOC deployment. During winter, the daily movement rates of caribou drop to their lowest levels of the year (Prichard et al. 2014). When walking in snow, the energy costs of movement to individual caribou increases exponentially with snow depth (Fancy and White 1987) as caribou may need to dig into deep snow to reach lichens (Fancy and White 1985).

The annual WAH winter range was mapped based on radio-collared caribou for the years 1987–2022 (some years were combined due to small sample sizes) for the Ambler Road Supplemental Environmental Impact Statement (BLM 2024). The entire FOC route would be in areas used for low-density wintering range at least 7 of 16 years (Table 3.2.4-2). The portion of the project area on the Seward Peninsula is in an area that has frequently been used for high-density wintering range and the northern section of the project area is largely outside of the high-density wintering ranges (Figure 3.2.4-1; Table 3.2.4-2).

In addition, the winter range for 2017-2021 was mapped to show more recent winter herd distribution (BLM 2024; Figure 3.2.4-2). Based on the WAH winter distribution map for 2017–2021, most of the southern and eastern segments of the project alternatives are within the high-density wintering range for that time period (the smallest area expected to include 50% of the herd), and the northern segments of the alternative are largely within the medium density winter range (the smallest area expected to contain 75% of the herd (Figure 3.2.4-2; Table 3.2.4-3). A total of 66.0% of the Selawik Refuge is within the high-density wintering area for 2017–2021 and 99.8% of the Selawik Refuge is within the high or medium density wintering area for 2017–2021.

Table 3.2.4-2. The acreage and percentage of the high- and low-density Western Arctic Herd wintering areas within 2.5 miles of the action alternative routes by number of years where different areas had high- or low-winter caribou density. For instance, 84,817 acres of the Alternative 1 was in an area that was used 7 out of 16 years for high-density winter range, and a total of 154,208 acres was in areas that were never used for high-density winter range during the 16-year period.

Year	No Action	Alternative 1		Alternative 2	
		High Density (acres/percent)	Low Density (acres/percent)	High Density (acres/percent)	Low Density (acres/percent)
0	0	154,208 (9.6)		154,209 (10.1)	
1	0	453,738 (28.2)		453,738 (29.8)	
2	0	112,806 (7)		112,807 (7.4)	
3	0	391,620 (24.3)		351,945 (23.1)	
4	0	155,860 (9.7)		107,319 (7)	
5	0	40,160 (2.5)		40,160 (2.6)	
6	0	19,603 (1.2)		19,603 (1.3)	
7	0	84,817 (5.3)	7,890 (0.5)	84,817 (5.6)	7,890 (0.5)

8	0	120,362 (7.5)	17,714 (1.1)	120,362 (7.9)	17,714 (1.2)
9	0	78,527 (4.9)	126,541 (7.9)	78,527 (5.2)	126,541 (8.3)
10	0		94,011 (5.8)		94,011 (6.2)
11	0		351,172 (21.8)		350,946 (23)
12	0		281,394 (17.5)		193,405 (12.7)
13	0		268,997 (16.7)		268,998 (17.7)
14	0		69,982 (4.3)		69,982 (4.6)
15	0		28,659 (1.8)		28,659 (1.9)
16	0		365,344 (22.7)		365,344 (24)

Table 3.2.4-3. The acres and percentage of the area within 2.5 miles of the action alternatives within different density categories of the Western Arctic Herd of caribou winter distribution for 2017–2021.

Year	No Action	Alternative 1		Alternative 2	
		Acres	Percent (%)	Acres	Percent (%)
High	0	840,942	98.6%	752,726	88.3%
Medium	0	610,329	71.6%	610,329	71.6%
Low	0	242,199	28.4%	242,215	28.4%

3.2.4.1.2 Other Ungulates

Muskoxen (*Ovibos moschatus*) disappeared from the project area before or during the 19th century, but the ADF&G translocated muskoxen to the area in 1970, 1977, and 1981 (Harper and McCarthy 2015, Figure 3.2.4-3). The Cape Thomson muskox population was estimated to be 227 animals in 2013 (Harper and McCarthy 2015) and the Seward Peninsula muskox population was estimated at 2,353 individuals in 2018 (Dunker and Germain 2022). Muskoxen could occur in all parts of the project area, but they are most likely to occur in coastal portions of the route.

Moose (*Alces alces*) occur at low densities throughout the project area with locally higher densities occurring in riparian areas and other areas with abundant tall shrubs, especially willow (Joly et al. 2016, Figure 3.2.4-3). Moose use low elevation riparian habitat more during moderate and severe winters but use higher elevations during mild winters. Females with calves also tend to use higher elevations and more forested areas during winter than males, presumably to avoid predators (Joly et al. 2016). Previously burned areas can provide high quality moose habitat, typically 11-30 years after a burn (Maier et al. 2005).

Dall's sheep (*Ovis dalli*) occur at low densities in the alpine areas of the western Brooks Range (Osburn 2025). In 2011-2013, the population decreased by roughly 80%, possibly due to icing events (Osburn 2025). Because Dall's sheep primarily use alpine habitats, they are unlikely to occur close to the project routes.

3.2.4.1.3 Large Carnivores

Wolves (*Canis lupus*), wolverines (*Gulo gulo*), and brown bears (*Ursus arctos*) all occur in the project area at low densities. The project area is on the edge of the typical coyote (*Canis latrans*) range, though they have been observed in the area (Prugh 2004; MacDonald and Cook 2009). Black bears (*Ursus americanus*) are strongly associated with forested habitat and are more likely to occur in the eastern portion of the project area. During summer, large aggregations of grizzly bears may occur on some salmon streams along the Kobuk River (Sorum et al. 2023). Black and brown bears of both sexes den during most of the winter and pregnant females give birth in the den. Brown bears often select moderately steep slopes and high snow load potential areas for denning (Sorum et al. 2019). Brown bears in the central Brooks Range have an average denning period from 30 September to 25 April (Deacy et al. 2025). Wolverines dig dens for both reproducing and resting, often selecting deep snowbanks to construct these dens (Glass et al. 2022). Wolverine natal and maternal dens are often found in areas with snowdrift-forming terrain features including streambeds, cutbanks on lake edges, and boulders (Glass et al. 2022).

3.2.4.1.4 Furbearers and Small Mammals

Furbearers, particularly lynx (*Lynx canadensis*), marten (*Martes americana*), beaver (*Castor canadensis*), and arctic and red fox (*Vulpes lagopus* and *V. vulpes*), are targeted by trappers throughout the project area, but harvest numbers are relatively low. Small mammals, including shrews (*Sorex* spp.), lemmings (*Synaptomys borealis, Dicrostonyx groenlandicus,* and *Lemmus trimucronatus*), voles (*Microtus* spp. and *Myodes rutiles*), ground squirrels (*Spermophilus parryii*), and weasels (*Mustela* spp.) often have cyclical population fluctuations, and some have specific habitat preferences while others are habitat generalists. Arctic ground squirrels hibernate during winter, while lemmings, voles, weasels, and shrews are active year-round. The project area is largely outside of the range of little brown bats (*Myotis lucifugus*), but they have been reported in the area. The distribution of the Alaska hare (*Lepus othus*) covers most of the project area, although there is limited information on the species.

We used habitat evaluations conducted for ADF&G'S draft State Wildlife Action Plan (ADF&G 2025b; Appendix J, *Birds*, 3), as well as continuing consultation with impacted indigenous communities. The draft State Wildlife Action Plan evaluated western Alaska habitat associations for 18 different mammal species present in the project area and designated as Species of Greater Conservation Need (SGCN; Table 3.2.4-4). These 18 species were selected based on being at-risk, having most of their range in Alaska, or being culturally or ecologically important; however, species that were already subject to high levels of research funding were excluded from the list. Each landcover class was classified as high, moderate, low, or negligible habitat value for each species. We combined moderate and high value classes to determine how much of the project area contained moderate- or high-value habitat for each of the 18 SGCN species and how many of the 18 SGCN species used each landcover type.

Table 3.2.4-4. The acres of landcover classes classified as high or moderate value in the draft State Wildlife Action Plan (ADF&G 2025b) for different selected species within a 15-foot and 2.5-mile buffers of the action alternatives.

Species	No Action	15 foot Buffer		2.5 mile Buffer	
		Alternative 1	Alternative 2	Alternative 1	Alternative 2
Arctic fox	0	1,942	1,907	636,527	626,570
Ermine (short-tailed weasel)	0	3,517	3,277	1,276,135	1,194,840

Alaska hare	0	3,855	3,638	1,272,535	1,202,814
Alaska marmot	0	1,621	1,590	535,604	525,787
Arctic ground squirrel	0	457	450	178,188	176,579
Common muskrat	0	63	60	168,799	161,916
North American porcupine	0	1,274	1,157	545,619	501,091
Snowshoe hare	0	1,852	1,653	716,394	648,382
Barren ground shrew	0	3,782	3,576	1,238,984	1,172,631
Dusky shrew	0	2,661	2,522	1,000,634	947,627
Holarctic least shrew	0	1,824	1,631	678,580	615,961
Collared lemming	0	2,230	2,196	743,221	732,756
Northern red-backed vole	0	3,847	3,613	1,357,725	1,278,613
Pygmy shrew	0	1,471	1,263	589,116	518,254
Root (tundra) Vole	0	2,748	2,628	887,644	852,659
Singing vole	0	1,912	1,880	635,395	625,574
Taiga vole	0	2,709	2,485	1,084,678	1,005,667
Tundra shrew	0	2,708	2,568	1,014,484	962,234

3.2.4.2 Environmental Consequences

3.2.4.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, or maintenance of the broadband network; therefore, there would be no effect to terrestrial mammals because there would be no ground disturbance or generation of noise or vibration.

3.2.4.2.2 Alternative 1 Impacts

The project's environmental impacts on terrestrial mammals would largely be related to the human activity required to deploy the FOC along the project route during winter construction. This would include the temporary use of tracked vehicles and trailers for transporting the cable, camps, personnel, fuel, and construction equipment. In addition to potential disturbance and displacement of wildlife from project vehicles, there would be some impacts from snow compaction and vegetation clearing along the route. Summer activities, including summer overflights to inspect the placed FOC and construction activity at some river crossings, could also impact terrestrial mammals, including caribou. Similarly, helicopter use to support summer construction or respond to repair or maintenance needs may result in disturbance and displacement of caribou or other terrestrial mammals.

Any direct disturbance as a response to project vehicles or human activity associated with FOC deployment would result in localized and temporary displacement, as well as some energetic impacts to most species present during winter. Caribou are known to overwinter in the project area, and males have been tracked by biologists in the project area, as well as observed by indigenous residents during summer, but in more sporadic numbers (Gurarie et al. 2024). Moose and muskoxen

are likely to be present in all seasons. Reimers et al. (2003) measured flight distances of wild reindeer in Norway in response to skiers and snowmobiles and found that the total flight distances were 3,180 feet and 2,160 feet in response to skiers and snowmobiles, respectively. They calculated the increase in total daily energy expenditure and estimated that 3 daily encounters during late winter would have moderate energy costs that would not result in demographic impacts. Drolet et al. (2016) found white tailed deer had noise thresholds at 70 dB (~706 feet in Table 3.1.2-1). Other studies have indicated other distances, including Dau (2023) who observed changes in direction within 30 miles of the road to the Red Dog Mine, and attributed these changes to caribou responding to the behavior of other caribou. Leblond et al. (2011) found disturbance of road proximity effects up to 1.25 km (0.77 miles). Caribou of the WAH currently have little exposure to human infrastructure or vehicles other than encountering hunters on snowmobiles or boat, and, as a result, they may have stronger reactions to human activity. Some WAH exhibit large alterations in movements in response to an industrial road within their migratory range (Wilson et al. 2016, Fullman et al. 2025). Behavioral disturbance could result in an increase in energy expenditure due to higher stress levels and an increase in startle and flight responses.

Impacts from deploying the FOC are likely to be similar to impacts from activity associated with seismic surveys for oil exploration, because both activities involve transporting convoys of large vehicles cross country across the snow. Seismic survey activity may temporarily displace muskoxen as far as 2 miles away (Clough et al. 1987) and some muskox herds moved 1.2-3.4 miles in response to seismic activity (Reynolds and LaPlant 1985), while others did not leave the area. Moose often have a high tolerance for human activities, but because moose in many of these areas have had limited exposure to human activity, they may be more likely to be temporarily displaced by project activities. Project vehicles could encounter and disturb bear dens or wolverine dens during winter. The chance of brown bear dens occurring along the project route would be low due to the tendency of brown bears to den on steeper slopes. Impacts to Dall's sheep would be minimal due to the low density of sheep and their high use of alpine areas, resulting in a low probability that project vehicles would be in Dall's sheep habitats. Aerial flights used for summer overflights of the FOC would result in localized and temporary disturbance to large mammals present in the area during summer.

Some additional impacts to herbivores could result from snow compaction and vegetation clearing along the project route, but these impacts would be localized and would only affect a small fraction of the available foraging habitat. Impacts to vegetation would be mitigated by requiring a minimum snow cover and frost layer levels for overland vehicle travel. Some impacts to vegetation from clearing and overland travel could be long lasting as described in Section 3.2.1. Compacted snow trails could also be used by predators, including wolves and wolverines, resulting in an alteration of predator distribution and movements. This could result in some higher levels of predation along the route, but the extent of the impacts is difficult to predict. Moose and caribou could also use these routes, resulting in lower energetic costs, but possibly higher levels of predation. Snow compaction from project vehicles could result in direct mortality of small mammals denning along the route, as well as limiting their movements and access to habitat under the snow.

Project activities have the potential to result in contaminant spills and adding food waste to the environment with subsequent impacts to terrestrial mammals. Protocols for handling food waste and avoiding dispersal of contaminants would be implemented to minimize potential impacts. Project impacts could also disturb bears in dens along the route or could result in defense of life and property bear mortality. Bears would largely be denning along hillsides during winter, and waste handling and wildlife interaction plans (Appendix E) can minimize impacts during summer and

winter. Wolverines in dens could be disturbed by FOC deployment, but because they occur at low density, this is unlikely to occur. The potential impacts would be greatest for natal dens.

Rodents and other wildlife can chew into cables and other infrastructure. The makeup of the proposed cable resists such damage. The cable has a cable breaking load of 50 kN (11,200 pounds) and has a crush resistance of 350 bar (5,076 psi). For example, cutting the cable burns through multiple standard construction saw blades. If the cable is damaged by wildlife, the outage can be detected, and repair crews can replace the section of cable.

Impacts from Alternative 1 would be long-term and negligible to minor.

3.2.4.2.3 Alternative 2 Impacts

The potential impacts on terrestrial mammals from Alternative 2 would be generally similar to impacts from Alternative 1, but smaller, because the acres of the proposed route is smaller (Figures 3.2.4-1–3.2.4-2).

Impacts from Alternative 2 would be long-term and negligible to minor.

3.2.5 Marine Mammals

3.2.5.1 Affected Environment

The project area for marine mammals is defined as the area within 1.2 miles (2 km) of the FOC deployment corridor in Hotham Inlet (ABR 2025b) from the northern end of the Baldwin Peninsula to the mainland and the route of project activities in Kugruk Estuary. A distance of 1.2 miles around the FOC deployment route was estimated to be the distance at which disturbance from the presence of vessels may occur (ABR 2025b). This area could be used by up to 12 marine mammal species, including 5 that are listed as threatened or endangered (Table 3.2.5-1, discussed in Section 3.2.6). Note that the spotted seal, beluga whale, killer whale, and gray whale, included below, are listed, however the ESA listing applies to Distinct Population Segments (DPSs) that occur outside of the project area.

Table 3.2.5-1. Marine Mammals known or suspected to occur in the project area

Common Name	Scientific Name	Status
Pacific walrus	Odobenus rosmarus	Not listed
Ribbon seal	Histriophoca fasciata	Not listed
Spotted seal	Phoca largha	Threatened [Foreign] (*Southern DPS)*
Beluga whale	Delphinapterus leucas	Endangered (*Cook Inlet DPS*)
Killer whale	Orcinus orca	Endangered (*Southern Resident DPS*)
Harbor Porpoise	Phocoena phocoena	Not listed
Gray whale	Eschrichtius robustus	Endangered (*Western North Pacific DPS*)
Polar bear[1]	Ursus maritimus	Threatened
Ringed seal[1]	Phoca hispida hispida	Threatened
Bearded seal[1]	Erignathus barbatus	Threatened
Bowhead Whale[1]	Balaena mysticus	Endangered

Humpback Whale[1]	Megaptera novaenglica	Endangered (WNP)/Threatened (Mexico)

[1] Discussed in Threatened and Endangered Species section.

Belugas, harbor porpoises, and killer whales are most likely to be in Kotzebue Sound from June to November, although some belugas are present in early winter and some harbor porpoises are present from January to March (Castellote et al. 2022). Harbor porpoises are widely distributed and generally found in areas with depths less than 100 meters (Muto et al. 2021). There are an increasing number of harbor porpoise sightings in the Chukchi Sea (Muto et al. 2021), and they are frequently detected within Kotzebue Sound (Castellote et al. 2022). Both belugas and harbor porpoises use shallow areas to avoid predation by killer whales (Castellote et al. 2022). Belugas in Kotzebue Sound appear to be a separate stock from other belugas in the region, but their numbers declined dramatically in the 1980s (O'Corry-Crowe et al. 2021). The harvest of belugas dropped from 84/yr in 1977–1983 to 16/yr in 1984–2021 (Castellote et al. 2022). Belugas aggregated and were traditionally hunted near Sisualik on the mainland west of the Noatak delta (Huntington et al. 2016, O'Corry-Crowe et al. 2021, Castellote et al. 2022). In recent years, belugas are rarely sighted in Kotzebue Sound. Large groups of belugas are still occasionally observed, but these sightings likely result from unusual movements from other beluga stocks (O'Corry-Crowe et al. 2021, Castellote et al. 2022). Killer whales appear to be increasingly prevalent in U.S. arctic waters (Clarke et al. 2013, Castellote et al. 2022). Gray whales are often found in shallow water and forage on the ocean floor, but they are unlikely to be in the project area (Satherwaite-Phillips et al. 2016, Moore et al. 2022).

Bearded seals are frequently in the project area and are known to occasionally travel up the Noatak River (Huntington et al. 2016). Hotham Inlet is used by bearded seals for rearing grounds, and the area around the Noatak River is a high concentration feeding area (Satterthwaite-Phillips et al. 2016). Spotted seals migrate into the Chukchi and Beaufort seas during summer and haul-out on land. They are found in Hotham Inlet, Kobuk Lake, Selawik Lake and up the Noatak River (Huntington et al. 2016) and they feed and haul-out near the mouth of the Noatak River (Satherwaite-Phillips et al. 2016). Ribbon seals winter in the Bering Sea and about 29% of the central and eastern Bering Sea breeding population go to the Chukchi Sea in late summer and fall where they are widely dispersed and pelagic (Frouin-Muoy et al. 2019). They are rarely observed in Kotzebue Sound and the number of sightings appears to be declining (Huntington et al. 2016).

Pacific walrus are often observed in southeastern Kotzebue Sound in spring (Huntington et al. 2016). They winter in the Bering Sea with most juveniles and females, and some males, moving north along the edge of the pack ice in the Chukchi Sea during the summer (Fischbach et al. 2022). They feed on benthic invertebrates and are concentrated in the northeastern Chukchi Sea during summer.

3.2.5.2 Environmental Consequences

3.2.5.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, no impacts would occur to marine mammals because there would be no work done in or near the marine environment.

3.2.5.2.2 Alternative 1 Impacts

The primary impacts to marine mammals in the project area along the winter trails route are temporary disturbance and displacement during the marine FOC deployment conducted during the summer. The primary source of potential disturbance to marine mammals from the project would be anthropogenic noise from vessels associated with the project during cable laying operations.

Marine mammals use hearing and sound transmission to perform vital life functions and the introduction of anthropogenic noise into their environment can disrupt their behavior. In addition, a small amount of air traffic over the marine environment could cause additional disturbance. This air traffic would primarily occur along the subsea cable route which already experiences moderate levels of air traffic associated with the airport in Kotzebue.

Vessel traffic can potentially pose a threat to some whales in the project area, because of the risk of ship strikes. The small number of vessel transits that could expose whales to strikes through the project area, slow barging transit speeds, low likelihood of whales occurring in the nearshore area where the project area occurs, and the ability of whales to detect and avoid slow-moving vessels would reduce the probability of ship strikes to whales to negligible levels. Ship strikes would not be an issue for seals or porpoises as they are agile swimmers and would be able to maneuver away from vessels to avoid interactions. Limiting the speed of travel for project vessels, as well as maritime best practices in navigation and distance requirements, would reduce the potential for ship strikes.

For the subsea crossings, the cable would be trenched between the shore and the lowest tide point. An excavator would then trench the cable, until the water is too deep to allow trenching, then the cable would be gravity laid or fixed-plowed across the sea floor to the opposite side of the inlet. This activity would result in temporarily increased suspended sediment in the water. This would also result in the burial and/or disturbance of the benthic habitat and benthic invertebrates. Given the amount of proposed work, and the available habitat of this type within the surrounding environment, effects would be minor and restricted to the area around the activity.

A small spill of fuel or other contaminants could occur from the vessels constructing the subsea crossing. If a spill were to occur during the ice-free portion of the summer and fall, some marine mammals may become exposed to the substance through direct contact, or perhaps through contaminated food items. Prey contamination from small spills would be localized and temporary because small refined offshore spills are expected to rapidly dissipate. Because the primary impacts of this alternative shall be short-term localized displacement or disturbance to marine mammals, the effects of the project are not likely to have a significant impact on marine mammals.

Impacts from Alternative 1 would be temporary and negligible to minor.

3.2.5.2.3 Alternative 2 Impacts

Potential impacts of Alternative 2 to marine mammals species would be similar to the impacts of Alternative 1. Because these two alternatives have the same level of activity in the marine zone, there would be minimal differences in the potential impacts to marine mammals.

Impacts from Alternative 2 would be temporary and negligible to minor.

3.2.6 Threatened and Endangered Species

3.2.6.1 Affected Environment

There are a total of five marine mammals and two avian species that are threatened and endangered species (TES) and may occur in the project area (Table 3.2.6-1). Fin whales are typically found in deep, offshore waters and are not expected to occur in the vicinity of the project area and are therefore not included. The potential impacts to TES are described in Biological Assessments prepared for the U.S. Fish and Wildlife Service (USFWS; ABR 2025a) and the National Marine Fisheries Service (NMFS; ABR 2025b). Both documents are summarized and incorporated by

reference. The project area for TES is defined as the area within 1.2 miles (2 km) of the FOC deployment corridor in the marine zone (ABR 2025b). In addition, we included terrestrial areas within 30 miles (48 km) of the coast and along the FOC routes for polar bears (*Ursus maritimus*) and eiders because these species can occur on land but are most likely to occur in coastal areas (ABR 2025a).

Table 3.2.6-1. Threatened and Endangered species known or suspected to occur in the project area

Common Name	Scientific Name	Status	Critical Habitat
Marine Mammals			
Polar bear	Ursus maritimus	Threatened	Yes
Ringed seal, Arctic subspecies	Phoca hispida hispida	Threatened	In Kotzebue Sound but not FOC deployment area
Bearded seal, Beringia DPS	Erignathus barbatus	Threatened	In Kotzebue Sound but not FOC deployment area
Bowhead whale	Balaena mysticus	Endangered	No
Humpback whale, Western North Pacific/Mexico DPS	Megaptera novaeangliae	Endangered (WNP DPS)/ Threatened (Mexico DPS)	No
Avian Species			
Spectacled Eider	Somateria fischeri	Threatened	No
Steller's Eider	Polysticta stelleri	Threatened	No

Notes: DPS (distinct population segment); FOC (fiber optic cable); WNP (Western North Pacific)

Bowhead whales (*Balaena mysticus*) in the project area belong to the western Arctic stock, also known as the Bering-Chukchi-Beaufort stock, and are the only one of the four stocks that inhabit U.S. waters (Muto et al. 2021). Bowhead whales transit past the project area during spring (April – June) and fall (August – December) migration but rarely enter Kotzebue Sound; this is likewise informed by local indigenous knowledge and consultation (See also Quakenbush et al. 2013; Quakenbush and Citta 2019). Similarly, humpback whales (*Megaptera novaeangliae*) have been documented in the Chukchi Sea but are very unlikely to be found in the shallow waters of the project (Clark et al. 2013).

The Beringia DPS of the *Erignathus barbatus nauticus* subspecies of bearded seal was listed as threatened under the ESA on December 28, 2012 (77 FR 76379). Bearded seals use sea ice as a platform for whelping and nursing of pups, pup maturation, molting (shedding and regrowing hair and outer skin layers), as well as for resting (Cameron et al. 2010). During the open-water season, some bearded seals (largely juveniles) occur in small bays, lagoons, near river mouths, and up some rivers, particularly in late summer and fall (Oceana and Kawerak, Inc. 2014; Gryba et al. 2021). As summer sea ice has retreated, reports of bearded seal haul-outs on land have increased (London et al. 2024). During the summer, individual bearded seals are present in Kotzebue Sound and may be present in the project.

Ringed seals are highly associated with sea ice, which they use as a platform for whelping and nursing pups in spring, molting in spring to early summer, and resting throughout the year (Kelly et al. 2010). At some breathing holes with sufficient snow cover, ringed seals excavate lairs in snowdrifts on the surface of the ice within which they rest and give birth to and nurse pups (Smith

and Stirling 1975; Williams et al. 2006). During the summer, ringed seals forage along ice edges offshore and in productive open water (Harwood et al. 2015). As a result, individual ringed seals may be present in the project during the summer, but most are anticipated to be north of Kotzebue Sound.

The USFWS listed the polar bear as threatened (73 FR 28212, 15 May 2008) throughout its range in 2008. The listing was primarily due to the rapidly diminishing sea ice cover and thickness, especially during summer. In the U.S., the polar bear is also protected under the Marine Mammal Protection Act and the Convention on International Trade in Endangered Species. The USFWS designated polar bear critical habitat in 2010 (75 FR 76086). Polar bears that inhabit the project area are from the Chukchi/Bering Sea (CBS) subpopulation or stock. In the 2019 stock assessment, USFWS estimated the minimum population at 2,000 bears (USFWS 2019). The project area overlaps with ESA-designated critical habitat for polar bears in the project area, for the Barrier Island Critical Habitat Unit, the Sea Ice Critical Habitat Unit, and the No Disturbance Zone (Figure 3.2.6).

The CBS stock is widely distributed on the pack ice in the Chukchi Sea and northern Bering Sea and adjacent coastal areas in Alaska and Russia. The majority of denning and summer/autumn land use by the CBS stock occurs on the Chukotka coast and Wrangel and Herald islands (Rode et al. 2015). Other datasets have also found that CBS polar bears have some limited use of coastal habitats on Alaska's western coast. The USFWS conducted polar bear capture efforts in the Chukchi Sea from 2008 to 2015. During this time, they captured 351 animals and fitted eighty-six females with radio collars to monitor their movements. They found that the majority of CBS polar bears remain on the ice year-round (Rode et al. 2015). The U.S. Geological Survey den catalog has no records of dens near the project area (1910-2018; Durner et al. 2020).

The Alaska breeding population of Steller's eider (*Polysticta stelleri*) was listed as threatened under the ESA in 1997 (62 FR 31748). There is no designated Steller's eider critical habitat in the project area. The current Alaska breeding population nests primarily on the ACP mainly concentrated around Utqiaġvik (Quakenbush et al. 2002), although a very small subpopulation may remain on the Yukon-Kuskokwim Delta (Flint and Herzog 1999; 68 FR 20020). No Steller's eider molting habitat is known to exist within the project area. Recent research suggests that they use deep (greater than 30 meters [100 feet]), offshore waters for wintering habitat (Martin et al. 2015). No Steller's eider wintering habitat is known to exist within the project area.

The spectacled eider (*Somateria fischeri*) was listed as a threatened species throughout its range under the ESA in 1993 (58 FR 27474, May 10, 1993). There is no designated spectacled eider critical habitat in the project area (66 FR 9145). Spectacled eider breeding is restricted to the Yukon-Kuskokwim Delta and the ACP and use of these areas occurs from May through September (Petersen et al. 2020). Spectacled eiders do not typically breed or molt around Kotzebue Sound (Petersen et al. 2020). No spectacled eider nesting habitat is known to exist in the project area. Molting occurs in Norton Sound and Ledyard Bay but not generally in Kotzebue Sound (Petersen et al. 2020). The entire global population of spectacled eider is believed to winter in the Bering Sea around Saint Lawrence Island (Petersen et al. 1999).

3.2.6.2 Environmental Consequences

3.2.6.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, or maintenance of the broadband network; therefore, there would be no effect on listed species or designated critical habitat because no ground disturbance, noise, vibration, or other effects would occur.

3.2.6.2.2 Alternative 1 Impacts

Habitat loss and temporary alteration of polar bear habitat could occur as a result of project activities. Noise and visual disturbance from human activity and operation of equipment, especially aircraft and vehicle traffic, have the potential to disturb polar bears. Disturbance of denning females with cubs can increase the probability of cub mortality, however, because most denning CBS stock of polar bears occurs in Russia, the probability of denning occurring along the project route is very low. Non-denning polar bears may alter their travel route to avoid contact with human activities or because intentional deterrence (i.e., hazing) deflects them away from an area. Short-term behavioral responses are not likely to have population-level effects and are thus considered less problematic than are den disturbance and abandonment impacts (USFWS 2008, 2009).

Proximity to humans poses risks of injury and mortality for both bears and humans and may necessitate nonlethal take through deterrence or, on rare occasions, lethal take to defend human life (Perham 2005). These risks can be mitigated effectively by following the wildlife interaction plan (Perham 2005) as well as engaging in local indigenous community consultation and knowledge-sharing. All project-related activities must be conducted to minimize the attractiveness of work sites to polar bears and to prevent their access to food, garbage, putrescible waste, and other potentially edible or harmful materials. Trained bear monitors would be present on site and all polar bear sightings would be reported immediately to safety personnel.

Vessel noise has the potential to disturb or temporarily displace marine mammals in the project area. Seals would be most affected by vessel traffic because activities could occur in the nearshore area. Ship strikes have the potential to injure whales, but the slow barging transit speeds, low likelihood of whales occurring in the nearshore area, and the ability of whales to detect and avoid slow-moving vessels would greatly reduce the effects of ship strikes to whales. Ship strikes would not be an issue for seals as they are agile swimmers and would be able to maneuver away.

While a small number of Steller's and spectacled eiders may be present in the project area during the ice-free season, they are not known to breed in this area, and it is anticipated that summer subsea construction would have minimal effects on eiders. Summer activities, including vessel traffic laying the cable, or aerial-supported cable inspection, may cause limited disturbance and displacement of eiders. No habitat loss or alteration, nor injury or mortality is expected.

Individual polar bears, whales, or seals could be exposed to small petroleum spills, leaks, and other sources of contamination as a result of cable-laying activities. Terrestrial spills during winter would have a low impact on polar bears because of the low probability of polar bears being present in a terrestrial portion of the project. There is a potential for eiders to be impacted by accidental spills of contaminants. If a spill were to occur in Hotham Inlet during the ice-free portion of the summer and fall, some threatened or endangered marine mammal species may become exposed to the substance through direct contact, or perhaps through contaminated food items. Prey contamination from small spills would be localized and temporary because small refined offshore spills are expected to rapidly dissipate. Few eiders are present in the area of summer project activities.

On July 25, 2025, NANA, as a designated non-federal representative, initiated consultation under Section 7 of the Endangered Species Act with the submission of a Biological Assessment (BA) to the USFWS (ABR 2025a) and the NMFS (ABR 2025b), with supplementary information provided, on August 6, 2025. The BA addressed effects associated with both alternatives. The BA determined that, for species under the jurisdiction of the USFWS, the Project may affect and is not likely to

adversely affect polar bears, polar bear critical habitat, Steller's eiders, and spectacled eiders and would not adversely modify critical habitat for listed eiders. The BA further determined that, for species under the jurisdiction of the NMFS, the Project may affect, but is not likely to adversely affect bowhead whales, bearded seals, and ringed seals, and would have no effect on humpback whales, and the Project would not adversely modify humpback whale, ringed seal, or bearded seal critical habitat. The USFWS and NMFS concurred on September 18, 2025 and November 6, 2025, respectively.

Impacts from Alternative 1 would be temporary and negligible to minor.

3.2.6.2.3 Alternative 2 Impacts

Potential impacts of Alternative 2 to TES would be similar to the impacts of Alternative 1. Because these two alternatives have the same level of activity in the marine zone and similar activity in the coastal zone, there would be minimal differences between routes in the potential impacts to TES.

Impacts from Alternative 2 would be temporary and negligible to minor.

3.3 Social and Economic Environment

3.3.1 Cultural/Historic Resources

3.3.1.1 Affected Environment

Section 106 of the National Historic Preservation Act of 1966 (NHPA) (54 USC *§§* 300101 *et seq*.) requires federal agencies to consider the effects on historic properties[4] of projects they carry out, assist, fund, permit, license, or approve. Additionally, under Section 106, each federal agency must consult and consider the views and concerns of relevant federal and state agencies, federally recognized tribes, local governments, the public, and other interested parties, about cultural resources when making final project decisions. This section focuses on characterizing the cultural resources that could be potentially affected by the construction and operation of the project and primarily draws from cultural resource datasets including the Alaska Heritage Resources Survey (AHRS) sites, indigenous place names (IPN), as well as ongoing indigenous and community consultations that are taking place in the impacted villages in the region. Indigenous place names are included as a dataset because they are a source of indigenous knowledge regarding cultural use of a landscape. Place names can provide information about natural and social environments as well as about human populations and their histories. Place names also provide insights into a culture's worldview and its perceptions of features of the environments it inhabits. Place names can be a key component for identifying cultural resources in an area, as well as establishing territorial range and means of travel throughout a traditional territory (Kari 2006). The information presented in this section is based on a previous cultural resource desktop study (DTS) that was prepared for this project for Alternative 1 (SRB&A 2025). Additional analyses for Alternative 2 are also presented in this section.

At the time of the DTS report (SRB&A 2025), the proposed ROW and area of potential effect (APE) had not been defined[5] and thus the analysis in that document focused on a 2,000 ft wide Study Area

[4] A historic property is defined in the NHPA (54 U.S.C. § 300308) as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property or resource.

[5] Defining the Area of Potential Effects (APE) is a requirement under the National Historic Preservation Act, which is being coordinated with the National Environmental Policy Act process.

corridor. Subsequent to that report, NANA identified a proposed 60 ft ROW where construction and operational activities will occur along fiber lay corridor. This APE has been discussed with stakeholders and agencies, with no objections. Therefore, the APE for the FOC corridor is a 60 ft corridor centered on the FOC, and for all project components outside of the FOC corridor, the APE is the footprint. Because many of the IPNs represent geographic features that cover a large geographic area (e.g., summit) or lengthy linear distance (e.g., streams), the IPN information presented in this section focuses on the larger 2,000 ft wide Study Area. Due to the nature of the AHRS sites, which generally have more discrete site-specific locational information than IPNs, the information in the Affected Environment focuses on AHRS sites that are within or intersect the APE.

3.3.1.1.1 Alaska Heritage Resource Survey (AHRS)

A total of six previously documented AHRS sites (AHRS 2026) and two new sites (KTZ-00477 and SHU-00045) that were documented during the 2025 cultural resource survey for the project (see discussion below) are located within one or both of the alternatives' ROWs. Site types include two large archaeological districts, two indigenous camps and reindeer herding sites, one precontact lithic site with a subsurface component, and three trails. Table 3.3.1-1 provides a summary of the eight sites. Two of the sites are eligible for listing on the NRHP, one has previously been determined not eligible, two have completed agency and State Historic Preservation Officer (SHPO) consultation, and the remaining three sites have had no determinations of eligibility to the NRHP. The Cape Krusenstern Archaeological District National Historic Landmark (NHL[6]) is over 2 million acres in size and encompasses the Cape Krusenstern National Monument (approximately 560,000 acres), which was established under the Carter administration in 1978. (Only the NHL is crossed by the project, and the National Monument is not).

Table 3.3.1-1: Documented AHRS Sites within the Alternative ROWs

AHRS #	Site Name	NRHP Status	Landowner	Site Description
KTZ-00169	DEERING ARCHAEOLOGICAL DISTRICT	DOE-S	NANA	Archaeological district including human burials, buried prehistoric houses, a qargi (ceremonial house), cache pits, faunal remains (e.g., seals, caribou, Arctic hare, ducks, geese, murres, ptarmigan, salmon), artifacts, and dozens of related features.
KTZ-00477	SRB&A-25-NANAFOC-002	NDE	NANA	Historic reindeer corral, collapsed structure, and a small trash dump
NOA-00042	Cape Krusenstern Archeological District National Historic Landmark	NHL	BLM, NPS, State of Alaska, NANA, KIC, Private	Archaeological district (over 2 million acres) that contains houses, burials, cache pits.
NOA-00361	KOTZEBUE - NOATAK TRAIL	DOE-P-S	BLM, KIC	Historic trail
SHU-00037	KIANA-SELAWIK-SHUNGNAK TRAIL	DOE-P-S	BLM, USFWS, NANA	Traditional indigenous winter trail and historic mail route. Also see SLK-00147.

[6] NHPA includes provisions that specifically address federal agencies' responsibilities when their activities involve National Historic Landmark (NHL) properties. Section 110(f) of the NHPA (54 U.S.C. 306107) also outlines the specific actions that an agency must take when NHLs may be directly and adversely affected by an undertaking. Agencies must, "to the maximum extent possible . . .minimize harm" to NHLs affected by undertakings (ACHP 2002).

SHU-00045	SRBA-25-NANAFOC-003	NDE	USFWS	Surface and subsurface lithic scatter
SLK-00142	Qitiq	NDE	BLM	Cemetery, sea mammal hunting camp, and a reindeer herding station with reindeer fence.
SLK-00147	KIANA-SELAWIK-SHUNGNAK TRAIL	DREJ-S	NANA	Traditional indigenous winter trail and historic mail route. Also see SHU-00037.

Notes:
* Site documented during August 2025 surveys for this project, and AHRS number request from OHA is in progress.
Site Description field is verbatim from AHRS except confidential, site-specific, locational information has been removed.
NRHP Status Codes:
DOE-S Determined Eligible through SHPO and agency
DOE-P-S Pending Consultation between agency and SHPO
DREJ-S Determined not eligible by agency and SHPO concurs
NDE No Determination of Eligibility
NHL National Historic Landmark

3.3.1.1.2 Indigenous Place Names (IPN)

A review of the Alaska Native Place Name database (Smith and Kari 2025) and the accompanying Alaska Native Place Name of mapped waterbodies indicates that 101 previously documented IPNs intersect with the Study Area for the alternatives (Appendix K01 Table 2). These place names include locations for villages, camp sites, subsistence areas, lakes, streams, lagoons, and summits. While the majority of place names are of Iñupiaq origin, there are also four Koyukon place names in the Study Area. Ongoing indigenous and community consultations continue to take place in the impacted villages in the region to identify further areas.

3.3.1.1.3 Previous and Currently Ongoing Surveys

A review of the State of Alaska Office of History and Archaeology (OHA) document repository (ADNR OHA 2025) for previous surveys, within the overall Study Area for the alternatives, revealed nearly 40 surveys that have occurred within or near the proposed ROW (Appendix K01 Table 3). Most of these previous surveys have been concentrated in locations of proposed development surrounding the communities and near Red Dog Mine. Very few overland areas between the eight unserved Alaska Native villages for this project (Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, and Shungnak) have received any previous survey efforts.

As a result of the overall lack of survey coverage, NANA and the relevant agencies associated with this project agreed that additional aerial and pedestrian[7] surveys of the proposed alternatives were warranted, in light of the potential to uncover previously unknown artifacts at specific sites.

Field surveys occurred during the entire month of August 2025 and included an initial 3-day helicopter overflight assessment of the entire Alternative 1 and 2 routes followed by pedestrian survey of areas of moderate to high potential for containing cultural resources along ground lay portions of the project, revisits to known AHRS and IPN locations within the proposed APE, examination of proposed trenching and gravel pads near the communities, and surveys at HDD locations at major river crossings. The field crew ranged from two to four archaeologists and the area of survey coverage was a 65 ft (20 m) wide corridor for the ground lay portions and an approximately 50 ft x 50 ft (15 m x 15 m) area for the gravel pads. The survey was larger than the APE to account for

[7] A field method where archaeologists systematically walk across a landscape, often in evenly spaced lines (transects), to locate and record cultural resources.

potential changes in project design. A summary of each of these survey activities is provided in the following sections.

3.3.1.1.4 Aerial Reconnaissance

An initial aerial reconnaissance of the proposed alternative routes in their entirety via helicopter prior to performing on-the-ground cultural resource investigations for the project. The aerial reconnaissance consisted of a low altitude (< 100ft), low speed (< 80 miles-per-hour), flyover of the alternative to visually examine the terrain conditions and landscape characteristics of the alternative, assess the cultural resource potential, and identify target areas of moderate to high potential for pedestrian survey and subsurface testing. The reconnaissance also assisted in identifying potential cultural resource sites visible on or near the surface that are most susceptible to impacts from the project construction activities, particularly for the ground lay portion of the FOC installation. Additional aerial reconnaissance survey was regularly conducted over a majority of the route as the field crew traveled to and from the different project areas and survey locations daily. Overall, the survey determined that approximately 80-90 percent of the project area has low potential for cultural resources due to an engineering design that avoids high relief terrain and landforms, low potential landscape characteristics such as large expanses of featureless hydric tundra and wetlands, reworked floodplain deposits within broad meandering river drainages, and/or previous disturbance resulting from both natural and manufactured processes, particularly in the vicinity of the communities. The aerial reconnaissance resulted in the identification of one previously unreported cultural resource site (KTZ-00477) within the proposed ground lay route 5 mi east of Kotzebue.

3.3.1.1.5 Ground Lay

The proposed ground lay segments account for the largest portion of the project and cover a diverse range of terrain and ecological settings with varying potential for cultural resources. Most of the proposed ground lay is within areas determined to have low potential for cultural resources based on landscape characteristics, which include large expanses of featureless hydric tundra underlain by shallow permafrost, low relief wetlands covered with small lakes or ponds and areas of standing water, and reworked floodplain deposits within large meandering river drainages lacking terraces or well-defined banks. Areas within the proposed ground lay identified as having moderate-to-high potential for cultural resources included well drained upland areas with prominent and microtopographic landforms, isolated landforms in otherwise featureless terrain, and relict dune fields. The survey primarily conducted site specific pedestrian survey and subsurface testing of moderate-to-high potential ground lay areas by landing the helicopter and examining the immediate area. Over 40 unique areas along the ground lay were inspected through pedestrian survey. Two new sites were identified during the course of ground lay surveys, one of which is outside the APE (NOA-00640). The second site was a precontact site that included lithic artifacts identified on the ground surface and within a subsurface test (SHU-00045).

3.3.1.1.6 Gravel Pad and Trenches

The project proposes subsurface installation of the FOC and/or construction of gravel pads to support infrastructure equipment within several communities. Subsurface installation will require trenching as the FOC enters and exits the community. Within the community the FOC will be installed aerially on existing utility lines. All gravel pad and trench locations were visually inspected during field survey. Subsurface shovel tests were excavated at pad locations in Kiana, Ambler, Shungnak, and Deering, and along the trench location in Noatak. Overall, except for the gravel pad location in Deering, the survey determined the proposed trench and gravel pad locations had low

potential for cultural resources due to previous disturbance and/or were situated in poorly drained areas that lacked prominent or microtopographic features. No cultural materials were identified within the gravel pad and trench locations except for in Deering where both precontact, historic, and modern cultural materials were documented within disturbed context at the proposed gravel pad location, which is situated within the larger, previously documented Deering Archaeological District (KTZ-00169).

3.3.1.1.7 HDD

The project includes a total of 18 locations of proposed HDD crossings. Surveys at these locations expanded to 100ft wide corridors to allow for greater flexibility in HDD placement by the construction crews and accommodate staging and placement of construction equipment. Eight of these locations were inspected via pedestrian survey as they included moderate to high potential landforms. The remaining 10 were inspected aerially and were determined to have low potential and primarily consisted of HDD locations in floodplain and meandering channels of major rivers in the region such as the Noatak and Kobuk rivers. Survey crews did not identify any cultural materials at the HDD locations.

3.3.1.1.8 AHRS and IPN Site Revisits

In addition to the three newly documented sites that were identified during the course of the field survey (one that is not in the APE), the survey conducted revisits to the six previously documented AHRS sites and 17 IPN areas that provided indication of possible harvest or other cultural activities (versus simple topographic or environmental descriptions). In general, the results of the site revisits did not identify cultural materials associated with the AHRS or IPNs within the proposed ROW. Two sites, however, did contain cultural materials within the APE. These included the Deering Archaeological District (KTZ-00169) and Qitiq (SLK-00142).

Discussion of the potential impacts to the associated cultural materials/features of both newly and previously documented sites are discussed below.

3.3.1.2 Environmental Consequences

3.3.1.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, or maintenance of the Proposed Project; therefore, there would be no effect to cultural resources because there would be no ground disturbance, no installation of aerial fiber, and no potential to encounter cultural resources.

3.3.1.2.2 Alternative 1

Under both alternatives, impacts from the project on cultural resources are most likely to occur during the construction phase of the project. Direct impacts to cultural resources as a result of ground disturbance are considered permanent impacts. An inadvertent discovery plan will be used to address inadvertent discoveries (Appendix K). For ground lay areas, vegetation clearing activities and tracked vehicle operations during construction would be the cause with the greatest potential to impact cultural resource sites located on the surface or in shallowly buried areas. Areas of proposed trenching and HDD could also impact the same types of cultural resources as well as more deeply buried sites.

Given the nature of installation activities (i.e., winter ground lay), other impacts are less likely but could include artifact displacement via machinery, change of the physical features in the resource's

setting (e.g., visual impacts), or change in access to traditional use sites by land users. These other impacts would be less likely to occur because the minimum required snow cover during installation would reduce the potential for impacts to the surface, and visual impacts would be minor and limited to the aerial crossings over streams, although none of the identified sites are near these crossings.

Operational impacts are expected to be minor and would be limited to unforeseen damage such as trampling or displacement of surface artifacts during any repair activities that may need to occur. Large-scale repair activities (e.g., replacement of large sections) would pose the highest risk for impacts to cultural resources during the operation phase. Indirect impacts that are reasonably foreseeable and could potentially result from FOC installation include damage to sites from erosion caused by destabilizing the vegetation cover in relict dune fields or thawing of permafrost that could occur as a result of the removal or damage to the insulating vegetation mat within the ROW during installation. It is recommended that NANA consult with NTIA, SHPO, and the appropriate land managers before any largescale repair occurs, and that a cultural resource monitor is recommended if the repairs are occurring in a high potential area.

Project areas were surveyed where moderate or high potential for sites to exist were present, and all previously identified sites were revisited. A total of six AHRS sites are located within the APE for Alternative 1 (Table 3.3.1-2). NANA's goal is to avoid impacts to all individually documented sites.

Impacts to the Cape Krusenstern NHL are not anticipated as no sites were identified within the APE that crosses the NHL, and the route avoids the Cape Krusenstern National Monument. Consultation with NPS included distribution of the scoping, pre-draft EA, and the final determination of no adverse effect. NPS concurred with this determination.

Impacts to the Deering Archaeological District would also not be expected as the majority of the project within the district is aerial installation on existing utility lines except for the gravel pad location. Fieldwork in 2025 for this project identified cultural materials within the pad location but the cultural materials appear to be in a previously disturbed context, and NANA's design strategy is to place the Conex container on four leveling legs with wood dunnage support (and possible additional gravel fill) without any subsurface excavation. Both the Native Village of Deering and City of Deering have provided letters of non-objection to NANA regarding this design strategy.

Impacts to the Qitiq site (SLK-00142) are not expected to be adverse as the site is represented by a polygon that spans the width of the Baldwin Peninsula and individual site components will be avoided. The recently completed cultural resource survey efforts in August of 2025 delineated the location of the historic fence component of the site within the ROW and avoidance measures through an existing gap in the fence have been identified based on consultation with BLM, SHPO, and NTIA as the proposed method to avoid any known features of the site.

The two new sites (KTZ-00477 and SHU-00045) were identified in the field and were avoided by changing the alignment in both Alternative 1 and 2.

Lastly, impacts to the three historic trails would not be adverse as the FOC route intersects the trails in discrete perpendicular locations and does not occur within or parallel to the historic trails for any substantial length. Vegetation clearing will be minimized at the intersections to minimize impacts.

As previously mentioned, 101 IPNs are present within the larger study area. Of these 101, 87 IPNs are common to both alternatives. Table 3.3.1-3 shows the remaining 14 IPNs that only intersect with

Alternative 1 and provide a relative indicator of which alternative may have a greater potential for cultural resource impacts to previously undocumented sites based on the assumption that the more IPNs that are present within an alternative Study Area, the greater the potential for cultural resources to be found near those IPNs. This assumption is based on multiple observations by indigenous communities and anthropologists across Alaska including examples such as "If it has a Dena'ina name the Dena'ina were there and used that land" (Stone 2008:3); "Place names provide important information regarding navigation, resource availability, cultural history, land ownership, and changes in land use" (Kari 1978:1); "Place names provide clear evidence of land use and demonstrate Native presence in an area" (Gary Holton, Director of the Alaska Native Language Archive, Alaska Native Language Center as cited in McCloskey, Jones, Paskvan, Moncrieff, Bodony, Toohey, and Jones 2014:1); "Other names are associated with lake locales, smaller streams, and an overland trail. These are of relative higher probability for association with preserved cultural remains" (Smith 2021:iii). As shown in the table, Alternative 1 has an additional 14 IPNs within the Study Area for a total of 101 IPNs.

Based on the cultural resources surveys and initial consultations with stakeholders, no potential adverse impacts on documented specific cultural resource sites would be expected in areas where agencies have determined that adequate investigation has occurred prior to installation and where appropriate avoidance, minimization, or mitigation measures are implemented. The Native Village of Deering and City of Deering have issued letters of non-objection.

3.3.1.2.2.1 Section 106 Consultation

The NHPA requires that federal agencies must consult with any federally-recognized tribal organizations that attach religious and cultural significant to historic properties affected by an undertaking in carrying out the Section 106 review process. Apart from tribal organizations, the Section 106 consultation process may include federal agencies, who may or may not have Section 106 obligations of their own, state and local agencies and government, other invited consulting parties, and the public.

Acting as the lead federal agency for NHPA, NTIA initiated Section 106 consultation on June 25, 2025 with a letter sent via email to 41 identified stakeholders, consisting of ten federal and state agencies, eleven city and borough governments, twelve Native Villages, and five ANSCA corporations and associated organizations (See Appendix K). The purpose of the letter was to notify stakeholders of the proposed project, provide a detailed project description, formally invite them to participate, and request any comments, questions, concerns, or information that they would like to provide about the project and/or regarding cultural resources. Three of the stakeholders were identified as having incorrect email addresses; however, alternate email addresses were identified and the letter was successfully sent to the stakeholders. A follow-up was also made via email two weeks after the initial outreach. The follow-up emails reminded stakeholders of initial outreach and requested that entities confirm receipt of the information. A distribution list was also included with this outreach to inquire if stakeholders had identified any other parties that should be included as a stakeholder.

The BLM, USFWS, NPS, USACE, and Alaska SHPO all responded acknowledging receipt of the emails and their desire to be involved in the Section 106 process. The ACHP also responded that they had received the invitation and would like to be informed of progress but would only be involved to provide technical assistance, if needed. Alaska Department of Natural Resources and Alaska Department of Transportation both responded that they did not feel the need to participate as their

interests would be achieved by the Alaska SHPO's participation. No other stakeholders responded to the initial invitation emails.

As discussed in Section 3.3.1, the field survey identified seven sites (KTZ-00169, KTZ-00477, NOA-00361, SHU-00037, SHU-00045, and SLK-000142, and SLK-000147). NTIA determined a finding of "No Adverse Effect" to historic properties (listed or treated as eligible) in the APE. In addition, it was determined that there would be no adverse effect to the Cape Krusenstern Archaeological District NHL (NOA-00042), which the APE crosses. NTIA provided a summary of the survey results, availability of the survey report, and the determination of effect to stakeholders. SHPO, BLM, FWS, NPS, and USACE concurred with NTIA's determination of effect. No other identified stakeholders responded to the survey results/determination of effect letter.

Table 3.3.1-2: AHRS Sites by Alternative ROWs

AHRS #	Site Name	NRHP Status	Alt 1	Alt 2
KTZ-00169	DEERING ARCHAEOLOGICAL DISTRICT	DOE-S	1	1
KTZ-00477	SRBA-25-NANAFOC-002	NDE		
NOA-00042	Cape Krusenstern Archeological District National Historic Landmark	NHL	1	1
NOA-00361	KOTZEBUE - NOATAK TRAIL	DOE-P-S	1	1
SHU-00037	KIANA-SELAWIK-SHUNGNAK TRAIL	DOE-P-S	1	
SHU-00045	SRBA-25-NANAFOC-003	NDE		
SLK-00142	Qitiq	NDE	1	1
SLK-00147	KIANA-SELAWIK-SHUNGNAK TRAIL	DREJ-S	1	1
Total			6	5

Table 3.3.1-3: Unique IPNs by Alternative Study Areas

Place Name	Translation	English Name	Type	Alt 1	Alt 2
Aullaqsruġaitchiaq	Way to go pick berries	Shungnak	Village	1	
Igaun Narvaak	Igaun's lakes		Lake	1	
Imaġluktuq	turbid water	Black River	Stream	1	
Itrigusruk	Cold		Lake	1	
Kaŋisugruk	Head of a lake	The head of Black River Lake	Lake	1	
Kuutchauraq	New river	Kerchurak Creek	Stream	1	
Mayuġiaġruaq	Way to go uphill	The bluff at Shungnak	Summit	1	
Napaaqtulik			Lake	1	
Napuuraq			Stream	1	
Paaŋuutitallak	Double paddle		Lake	1	
Sikłaksram kuuŋa	material for an adze, pick axe	Pick River	Stream	1	
Tayabralik	A wrist band		Lake	1	
Tayaġaralik	A wrist band		Stream	1	
Uqquqdim Kawii			Lake	1	
Additional IPNs Common to Both Alternatives				87	87
Total				101	87

In the unlikely event that unanticipated historic properties, cultural artifacts, archeological deposits, or human remains are inadvertently encountered during the proposed construction and associated excavation activities, all ground disturbing activities must halt immediately, and NTIA along with the

appropriate land manager and tribal agencies must be contacted, in accordance with applicable state law, federal regulation (36 C.F.R. § 800.13(b)), and the proposed project's Inadvertent Discovery Plan.

3.3.1.2.3 Alternative 2

A total of five AHRS sites are located within the ROW for Alternative 2 (Table 3.3.1-2). These five sites include the Cape Krusenstern and Deering Archaeological districts, two trails, and Qitiq. Impacts to these five sites would be the same as described above for Alternative 1. One fewer site would be impacted under Alternative 2. This includes the Kiana-Selawik-Shungnak trail which is not crossed by Alternative 2. As shown in Table 3.3.1-3, Alternative 2 has 14 fewer IPNs within the Study Area that are not present within Alternative 1, for a total of 87 IPNs. Alternative 2 has the lowest number of documented AHRS sites (5) and IPNs (87) compared to Alternative 1 and based on these metrics has the lowest potential to disturb known sites and IPNs of the project alternatives.

No potential adverse impacts on documented specific cultural resource sites would be expected in areas where agencies have determined that adequate investigation has occurred prior to installation and where appropriate avoidance, minimization, or mitigation measures are implemented.

3.3.2 Visual Resources

3.3.2.1 Affected Environment

The project connects the communities of the NAB and as a result occurs in a variety of visual settings. Most of the project is within anthropomorphic-undeveloped lands, with a variety of form, line, color, texture, contrast, and seasonal visual settings that are focused on the natural topography, precipitation, vegetation, and water. Some project locations are in more anthropomorphic-developed communities, which have buildings, roads, modified vegetation, or other characteristics of the built environment.

All public lands provide visual settings, and these can include:

- Natural topographic vistas, including rivers, mountains, refuges, parks, recreational areas, and subsistence gathering locations
- Locations of human habituation, which include communities, travel corridors (e.g. rivers, winter trails), cabins, and seasonal camps
- Industrial or commercial development, including communities, ports, aviation, and mines

BLM provides Visual Resource Management (VRM) classifications for all of its lands and provides a description of the visual landscape incorporated by reference (BLM 2008). The Kobuk-Seward Peninsula Resource Management Plan (RMP) is the managing document for the BLM lands located throughout the area. It designates visual resource management classes within the RMP Planning Area. The BLM's VRM classifications are provided on map Figure 3.3.2-1. These were digitized by the BLM from the RMP, with the condition that they are approximate and not exact.

VRM classifications include (BLM 2008):

- Class III: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes caused by management activities may be evident but not detract from the existing landscape.

- Class IV: The Class IV objective is to provide for management activities that require major modification of the existing character of the landscape. Changes may attract attention and be dominant landscape features but should reflect the basic elements of the existing landscape. A Class IV rating is generally reserved for areas where visual intrusions dominate the viewshed but are in character with the landscape. The change to the characteristic landscape can be high.

Categories of management currently designated under USFWS's (2011) Comprehensive Conservation Plan for Selawik National Wildlife Refuge include Minimal Management, Wilderness Management and Wild River Management. The proposed ROW is entirely within areas designated for Minimal Management. Minimal Management is designed to maintain the refuge environment with minimal or no evidence of human modifications or changes. A change in management category would be required for all of the action alternatives.

Other landowners along the corridor do not provide visual resource management guidelines that are as specific as USFWS or BLM.

3.3.2.2 Environmental Consequences

3.3.2.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, there would be no effect on visual resources because there would be no installation of fiber, equipment, or structures.

3.3.2.2.2 Alternative 1 Impacts

All the alternatives cross BLM lands managed under VRM Class III and Class IV. These allow moderate or high levels of changes to the visual characteristic landscape, respectively. The alternatives do not propose changes to the visual landscape that rise to moderate or major impacts. As has been described, the method of construction would have minimal visual impacts. Therefore, the alternatives would not adversely impact the scenic or aesthetic quality of the landscape or be inconsistent with the VRM Classes, which provide for moderate to high levels of change.

The FOC cross-section is provided in Figure 3.3.2-2, with an example of the actual cable size. The cable has a 0.472-inch diameter, which is smaller than a penny.

The primary construction involves placing cable directly on the ground during winter when the underlying tundra is frozen and snow-covered, allowing it to settle naturally into the surrounding vegetation during spring thaw. In some locations, the cable is anticipated to become overgrown by vegetation and incorporated into the surrounding landscape, similar to the ASTAC ground-lay FOC construction (Figure 3.3.2-3). Other habitats would not have vegetation overgrow the cable. This ground-lay method would have minimal visual impacts.

Vegetation clearing would create a linear change of habitat across the project. This would provide a change in visual resources, as visual evidence of the installed telecommunication infrastructure. This would be a long-term visual impact. The magnitude of impact to recreation is minor, as the visual change would be a line of different vegetation, and the proposed action does not propose development of an access road or other high visual impact long linear infrastructure.

Cable anchors (~640 anchors) and splice points (~24 splices) would be placed to facilitate construction of the project. These are low-profile devices and enclosures, spaced at regular intervals

of no greater than 6,000 feet or 24 miles (respectively). Anchors would additionally be placed on either side of ~787 streams and lakes where ground-lay fiber occurs. These would be above the organic mat but would have minimal visual impacts.

HDD borings and subsea crossings would be buried and have no visual impacts. For the subsea crossing, concrete beach manholes would be placed on either side of the crossing to facilitate the transition between infrastructure. These would have negligible visual impacts.

When crossing some large rivers, the cable would be suspended 20-ft. above the water on wooden poles (Table 3.3.3-1). The visual impacts would be similar to the ASTAC aerial crossings (Figure 3.3.2-4). These crossings would be visible and there would be a change to the surrounding landscape.

Table 3.3.3-1: Aerial Crossings

Alternative	Alaska Native	State	BLM	USFWS
1	14	1	2	3
2	14	1	2	2

Segments of the line will be trenched near communities to reduce the risk to public safety (trip and entanglement hazards). The Department of Transportation and Public Facilities (DOT&PF) may also require some trenching along ROWs adjacent to their roads. Trenches will be backfilled to the same topographic elevation, and salvaged vegetation mat from the excavation would be replaced on top of the trench. The vegetation is expected to regrow and provide negligible impact to visual resources.

As part of the authorization process for a USFWS ROW, the CCP would be amended to change the management category in the affected area from Minimal to Moderate Management. In Moderate Management, the natural landscape is the dominant feature although signs of human activities may be visible. Structures would be designed to minimize visual impact, and facilities would be designed to blend with the surrounding environment to minimize visual impacts. All of the land within the refuge under the ROW would need to be changed to Moderate Management.

Other landowners along the alternative routes do not provide as specific management guidelines concerning visual resources, but given the low visual changes proposed by the project, no impacts are expected for these other landowners.

During construction, equipment, material, and personnel would be present which would temporarily change the visual character of the immediate area. These changes would be transient and temporary, due to the rapid pace of cable placement. The anticipated rapid progress of the construction activities would minimize the potential sustained impacts to visual resources.

During routine and emergency maintenance activities, some visual activity would occur. These would be similar to the visual impacts for the construction phase. Maintenance activities would occur intermittently and for a short duration.

Impacts from Alternative 1 would be long-term and negligible to minor.

3.3.2.2.3 Alternative 2 Impacts

Impacts would be similar to Alternative 1, but smaller, because there is less acres of proposed disturbance and one less aerial crossing. Impacts would be long-term and negligible to minor.

3.3.3 Land Use

3.3.3.1 Affected Environment

Landownership is depicted on Figure 3.3.3-1 and Figure 3.3.3-2.

3.3.3.1.1 U.S. Fish and Wildlife Service

The Selawik National Wildlife Refuge encompasses approximately 2.3 million acres surrounding the Selawik River and Kobuk River Delta. The establishment clauses state (Public Law 96-487, 16 US Code 668dd):

> *(B) The purposes for which the Selawik National Wildlife Refuge is established and shall be managed include—*
>
> *(i) to conserve the fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Western Arctic caribou herd (including participation in coordinated ecological studies and management of these caribou), waterfowl, shorebirds and other migratory birds, and salmon and sheefish;*
>
> *(ii) to fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats;*
>
> *(iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and*
>
> *(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge.*

Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) (16 USC 3161 et seq.) and the implementing regulations in 43 CFR Part 36 established procedures for approval or disapproval of Transportation and Utility System authorizations in conservation system units in Alaska. In making a decision on authorization, each Federal agency shall consider and make detailed findings supported by substantial evidence.

The proposed action would occur completely within lands designated as Minimal Management (USFWS 2011). Minimal Management is designed to maintain the refuge environment with minimal or no evidence of human modifications or changes. Habitats are allowed to change and function through ecological processes. Public uses, economic activities or uses, and facilities should minimize disturbance to habitats and resources. Generally, no roads or permanent structures are allowed (except cabins). Compatible economic activities may be allowed where the evidence of those activities does not last past the season of use, except as noted in the prior cabin discussion.

Authorization of a ROW across lands designated for Minimal Management would require a revision or amendment to the CCP.

3.3.3.1.2 Bureau of Land Management

The Kobuk-Seward Peninsula Resource Management Plan (RMP) is the managing document for the BLM plans located throughout the area (BLM, 2008). BLM Land Use Plans and RMPs frequently require that ROWs are co-located to prevent proliferation of ROWs across the landscape. This statement in our LUPs requires consideration of a co-location alternative of site-specific actions. This is analyzed in Alternative 5 and Alternative 6 of Appendix F.

The RMP also specifies standard Required Operating Procedures (in Appendix A of BLM 2008, and Appendix D of this document), which are to be applied unless alternative procedures are agreed upon. These have been found to be applicable to the project, without requiring project specific alteration, and so are compliant with the RMP.

3.3.3.1.3 National Park Service

The National Park Service manages Kobuk Valley National Park, located between Kiana and Ambler. Section 202(6) of ANILCA states that this park was established to maintain the environmental integrity of the natural features of the Kobuk River Valley, including the Kobuk, Salmon, and other rivers, the boreal forest, and the Great Kobuk Sand Dunes, in an undeveloped state to protect and interpret, in cooperation with Alaskan Natives, archaeological sites associated with Native cultures, to protect migration routes for the Arctic caribou herd, to protect habitat and population of fish and wildlife, including, but not limited to, caribou, moose, black and grizzly bears, wolves, and waterfowl, and to protect the viability of subsistence resources.

3.3.3.1.4 U.S. Department of Defense

The Alternative route overlaps with a location mapped by the BLM as owned by the Department of Defense (DOD), in Kivalina, Alaska. Locally, this building is known as the old Boys and Girls Club. Rights-of-way would be obtained for construction in these areas.

3.3.3.1.5 Alaska Department of Natural Resources

The Northwest Area Plan (DNR 2008) governs the State of Alaska DNR land in the vicinity of the project. The role of state land use plans is "…to establish a balanced combination of land available for both public and private purposes" (DNR 2008, Alaska Statute 38.04.005).

This management plan lists specific management intent for each surface classification crossed by the alternatives, and these are provided in Appendix M.

The DNR also asserts ownership and management authority of submerged lands of navigable waters, including the tidelands and submerged lands between the mean high tide and 3 miles offshore from the coast. It is noted, however, that through the Submerged Lands Act of 1988 the BLM has the sole authority to determine navigability for federal lands. These differing assertions lead to disputes over management authority where rivers flow through federal lands, which remain largely unresolved in the Northwest Arctic Borough.

3.3.3.1.6 Alaska Department of Transportation and Public Facilities

The alignments cross some properties owned by the DOT&PF, including land in the vicinity of the local airports and roads. Rights-of-way would be obtained for construction in these areas.

3.3.3.1.7 Alaska Industrial Development and Export Authority

The Alaska Industrial Development and Export Authority (AIDEA) owns the Delong Mountain Transportation System, including the industrial road serving the Red Dog Mine. Rights-of-way would be obtained for construction in these areas.

3.3.3.1.8 Northwest Arctic Borough

The NAB Planning Department governs land use through their Northwest Arctic Borough 2030: Planning for Our Future Comprehensive Plan Update (NAB 2021, 2011). Statements from this plan regarding existing infrastructure and infrastructure needs include:

- The region also lacks access to affordable high-speed internet. Reliable internet connectivity has become increasingly important for education, training, commerce…
- …lack of high-speed affordable internet makes it harder to offer reliable distance learning.

And the plan states that the Community Facilities, Infrastructure and Housing Strategy #3 is to: "*Improve internet connectivity in the region through infrastructure investments*."

In addition, the NAB Title 9 land use code specifies Zoning Districts, which include village districts, subsistence conservation districts, habitat conservation districts, general conservation districts, resource development districts, and transportation corridors.

3.3.3.1.9 Regional and Village Corporations (ANC Private Lands)

NANA is the Regional Corporation for the area. The individual village corporations were merged with NANA, except for Kikiktagruk Inupiat Corporation (KIC). KIC is the corporation organized to serve the shareholders of Kotzebue. NANA is the project proponent and recipient of the TBCP grant from NTIA.

3.3.3.1.10 Other Private Lands

While other private lands are present in the vicinity of the project, the alignments intentionally avoid private lands, including Native allotments, to the greatest extent possible. Private lands are crossed on utility ROWs once inside of each community.

The Bureau of Indian Affairs provides land management services to Alaska Native landowners who own interests in restricted property throughout the state of Alaska. Restricted property is generally defined as either Native Allotments issued under the Native Allotment Act of May 17, 1906 (34 Stat. 197), as amended by the Act of August 2, 1956 (70 Stat. 954), or restricted townsite lots issued under the Native Townsite Act of May 25, 1926 (44 Stat. 629), as amended. Native allotments are avoided in all the alternatives.

3.3.3.1.11 RS2477

RS 2477, or Revised Statute 2477, is a federal right of way granted as part of the 1866 Mining Law, over federal lands. While the law was repealed in 1976, rights granted prior to its repeal are still in effect. Development must not prevent public access along the rights-of-way.

3.3.3.1.12 17(b) Easements

17(b) Easements are rights-of-way granted to the public to cross lands conveyed to Alaska Native Village and Regional Corporations. These were granted in the Alaska Native Claims Settlement Act to preserve public access to lands and water; development must not prevent public access along the rights-of-way.

3.3.3.1.13 Trails

Trails remain an important method of transportation in Northwest Alaska. Communities are not connected by road and rely on winter trails for seasonal overland access. Winter trail routes provided by the Northwest Arctic Borough (Appendix M) includes both roads and trails.

3.3.3.1.14 Wild and Scenic Rivers

The Wild and Scenic Rivers Act was created in 1968 to preserve the natural, cultural, and recreational values of specifically listed rivers. These rivers are protected to preserve their character, and development must preserve their wild, scenic, and recreational values.

Section 7(a) of the WSRA directs federal agencies to evaluate federally assisted or permitted water resource projects to ensure the existing conditions of river values (free-flowing condition, water quality, and outstandingly remarkable values) are not diminished. Water resource projects must meet the requirements of Section 7 of the Wild and Scenic Rivers Act and NEPA prior to implementation. The proposed project crosses the Kugarak River, which flows into the Selawik River at the terminus of the Selawik Wild and Scenic River. Depending on relative water levels, water from the Kugarak River may enter the WSRA designated portion of the Selawik River.

3.3.3.2 Environmental Consequences

3.3.3.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, there would be no effects to land use because no activities would take place to modify land uses. The Selawik National Wildlife Refuge Comprehensive Conservation Plan would not be amended or revised.

3.3.3.2.1.1 Alternative 1 Impacts

Alternative 1 crosses USFWS, BLM, DOD, DNR, DOT&PF, NANA, KIC, local government, utility ROW, and waterways. This alternative also crosses a number of RS2477 easements, 17(b) easements, and mapped trails. Permission is required from each of these landowners to be practicable.

The quantity of acreage by landownership are detailed in Table 3.3.3-2. These acreages are assuming a 60-foot corridor (30-foot buffer on either side of the cable).

Potential effects on different landownerships are discussed in the following sections.

Table 3.3.3-2: Landownership (Acres)

Landowner	No Action	Alternative 1	Alternative 2
		60 ft Buffer Area (acres)	60 ft Buffer Area (acres)
Alaska Native Lands Patented or Interim Conveyed	0	2,048.93	1,944.31
Bureau of Land Management	0	1,046.10	984.40
Fish and Wildlife Service	0	637.73	567.93
Local Government	0	0.66	
Private	0	24.96	19.12
State	0	401.19	401.19
Undetermined (i.e. water)	0	117.40	115.10
Total	0	4,276.96	4,032.04

Note: Apparent inconsistencies in totals are due to rounding

3.3.3.2.1.2 U.S. Fish and Wildlife Service

Alternatives 1 and 2 would result in issuance of a permit for a 60' wide ROW across Selawik Refuge for the construction, operation and maintenance, and decommissioning of a fiber optic network. Under Alternative 1, the ROW would be 86 miles long, encompassing 638 acres. Under Alternative 2 the ROW would be 76 miles long, encompassing 568 acres.

Both Alternatives 1 and 2 would result in amending the 2011 Selawik Refuge CCP to change the management category for the entirety of the 60' wide ROW corridor from Minimal Management to Moderate Management. Moderate Management allows for changes to the refuge environment that are temporary or permanent but small in scale and that do not disrupt ecological processes. The natural landscape remains the dominant feature, although signs of human activities may be present.

Under Alternatives 1 and 2 the CCP would be amended to include additional Objectives relevant to existing Management Goals. Additional objectives would include:

- Monitoring ROWs for changes in ecological processes.
- Monitoring the effects of ROWs on fish and wildlife and their habitats.
- Monitoring the effects of ROWs on refuge water resources.
- Monitoring the effects of ROWs on subsistence activities.
- Monitoring the effects of ROWs on visitor experiences.
- Providing the public with information about ROWs and their effects.

3.3.3.2.1.3 Bureau of Land Management

Development on BLM lands requires ROW authorization. Alternatives 1 has more impact on BLM lands than Alternative 2, because the southern part of the alignment includes BLM lands. Each of the alternatives have ROPs (Required Operating Procedures) which would be applied to the project, under negotiation with the BLM.

The project would be in conformance with the Kobuk-Seward Peninsula Record of Decision and Approved Management Plan. This use is specifically provided for in H-2: Land Use Authorizations:

6. Rights-of-way

- *Rights-of-way (ROWs) will be located near other ROWs or on already disturbed areas to the extent practical.*
- *Communication site ROWs shall be co-located when feasible.*

A review of all of the ROPs from the Kobuk-Seward Peninsula Record of Decision and Approved Management Plan is provided in Appendix D2. The applicant does not request exception from ROPs applicable to the project.

3.3.3.2.1.4 U.S. Department of Defense

Development on the parcel owned by DOD, near Kivalina, requires ROW authorization.

3.3.3.2.1.5 Alaska Department of Natural Resources

The alternatives would comply with the management for the Northwest Area Plan, as described "…to establish a balanced combination of land available for both public and private purpose."

The management units crossed by the alternatives support this style of development. Important management intents are detailed in the land use plan, including specific considerations required for the WAH and other sensitive species and habitats.

3.3.3.2.1.6 Department of Transportation and Public Facilities

Rights-of-way would be obtained for construction on DOT&PF lands.

3.3.3.2.1.7 Alaska Industrial Development and Export Authority

Rights-of-way would be obtained for construction on AIDEA lands for all of the alternatives.

3.3.3.2.2 Northwest Arctic Borough

The Northwest Arctic Borough's land use planning documents support the development of broadband internet infrastructure.

The alternatives cross various borough zoning districts and subdistricts. The acreage of impacts for each alternative for borough zoning districts are listed in Table 3.3.3-3. The impacts to the borough habitat conservation and subsistence subdistricts are listed in Table 3.3.3-4. These acreage estimates are overestimated, since they are calculated on a 60-foot impact. In a similar manner, no impacts are anticipated to the subsistence conservation or habitat conservation subdistricts.

Table 3.3.3-3: Northwest Arctic Borough Zoning Districts (acres), assuming a 60-foot impact

District Name	No Action	Alternative 1	Alternative 2
Village	0	274.57	259.22
Subsistence Conservation	0	3,080.74	3,035.35
General Conservation	0	908.25	724.08
Resource Development	0	-	-
Transportation Corridor	0	13.36	13.36
Total (acres)	0	4,276.96	4,032.04

Note: Apparent inconsistencies in totals are due to rounding

Table 3.3.3-4: Northwest Arctic Borough Subdistricts (acres), assuming a 60-foot impact

District Name	No Action	Alternative 1	Alternative 2
Habitat Conservation District			
Kobuk River Sheefish and Whitefish Spawning Area	0	27.64	17.20
Noatak River Chum Salmon Spawning Area	0	9.97	9.97
Total Habitat Conservation (acres)	0	37.61	27.17
Subsistence Subdistricts			
Inmachuk River	0	34.50	34.50
Buckland River	0	134.70	134.70
Kobuk-Selawik Lakes	0	72.81	72.81
Selawik River Delta	0	106.25	106.25
Kobuk River Delta	0	19.91	19.91
Total Subsistence Subdistrict (acres)	0	368.17	368.17

3.3.3.2.3 Regional and Village Corporations (ANC Private Lands)

The alternatives all cross NANA lands. The project is consistent with NANA's goals for its region and shareholders. Alternatives also cross KIC lands and require permission to be obtained from KIC.

3.3.3.2.4 Other Private Lands

While other private lands are present in the vicinity of the project, the alignments intentionally avoid private lands, including Native allotments, to the greatest extent possible.

Private lands are crossed on utility ROWs inside of each community.

Native allotments are avoided in all of the alternatives.

3.3.3.2.5 RS2477

The RS2477 easement (ADL412734) is the Ambler River. This easement would be crossed by all of the alternatives, with no impedance of public access. No significant impact is anticipated.

3.3.3.2.6 17(b) Easements

The 17(b) Easements crossed by the Alternatives are listed in Appendix M Table 2. Alternative 1 crosses 33 easements, and Alternative 2 crosses 30 easements. None of the alternatives are expected to impede public access for any of the mapped trails. No significant impact is anticipated.

3.3.3.2.7 Trails

The trails would be crossed by the alternatives. Alternative 1 intersects with 41 mapped trails, and Alternative 2 intersects with 37 mapped trails. None of the alternatives are expected to impede public access for any of the mapped trails.

3.3.3.2.8 Wild and Scenic Rivers

Action alternatives would not invade the area or unreasonably diminish the preliminary outstandingly remarkable values (i.e. recreation, geology, fish, wildlife, cultural, and subsistence) of the Selawik Wild and Scenic River.

Impacts from Alternative 1 and 2 would be long-term and moderate.

3.3.4 Socioeconomics and Effects on the Quality of Life of the American People

3.3.4.1 Affected Environment

The Northwest Arctic Borough includes 11 communities that are not connected to any road system or to the rest of Alaska. The largest community and borough hub is Kotzebue. Similar to other rural Alaska communities, limited economic opportunities have existed historically due to the remote and isolated nature of the region.

Existing internet connectivity includes access through the existing microwave network (Terra network), new microwave infrastructure (OTZ Buildout, BLM 2024), and satellite technology (i.e. Starlink). Some communities (i.e. Kotzebue, Kivalina, Deering) have existing fiber optic cable access.

The largest private employer is Red Dog Mine (RDM), located about 50 miles east of Kivalina and 30 miles north of Noatak. Other large employers are NANA, the Maniilaq Association, the Northwest Arctic Borough School District, and borough and tribal governments. Despite the mine's impact on economic development, high unemployment continues to exist throughout the region. The mine is also projected to close in 2031 as the current ore bodies would be expended; this is anticipated to present significant financial challenges to the individuals employed at the mine, NANA, and region.

Current social and economic metrics for the region are given in Table 3.3.4-1. As previously noted, each community in the borough has higher poverty rates than the U.S. and Alaska in general.

Table 3.3.4-13: 2023 Socioeconomics

Community	Population	Native American	Median Income	Below Poverty Level
Northwest Arctic Borough	7,611	80.3%	24,181	18.4%
Ambler	201	92.0%	16,389	31.3%
Buckland	629	91.7%	14,417	17.1%
Deering	205	82.4%	21,875	18.5%
Kiana	471	93.4%	18,977	22.9%
Kivalina	813	96.8%	19,313	22.1%
Kobuk	-	-	-	-
Kotzebue	3,046	64.4%	46,458	13.4%
Noatak	700	98.3%	14,519	9.2%
Noorvik	722	79.8%	18,235	19.5%
Selawik	403	89.8%	12,361	44.1%
Shungnak	211	100.0%	20,341	31.5%

Note: Data is from US Census Bureau (USCB 2023), Kobuk information is not available.

An agreement exists between the borough and RDM to provide a regular Payment in Lieu of Taxes (PILT). The PILT currently makes up over 80% of the revenue for the borough. The NAB-RDM agreement also includes separate contributions from RDM to the borough's Village Improvement Fund (VIF), used to provide grants for various capital projects for each community in the borough.

Many residents of the region rely on subsistence to support their food requirements (Section 3.3.5).

3.3.4.2 Environmental Consequences

3.3.4.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, existing gaps in service and coverage would continue. Existing insufficiencies in upload and download speeds, latency, and other key performance indicators would persist, and the region would continue to lack essential telecommunications infrastructure that prevents many residents from accessing services, including telehealth and remote learning, and opportunities such as remote jobs, that could contribute to economic growth within the region. The lack of such access would continue to put the region at a disadvantage for economic opportunities.

3.3.4.2.2 Alternatives 1 and 2

Regardless of the route of FOC placement, numerous social and economic advantages are anticipated to be recognized. These are best summarized through the following table.

Table 3.3.4-2: Socioeconomic Impacts

Potential Advantages	Potential Disadvantages
Social Impacts and Effects	
Improved Government and Emergency Services Access. Residents would be able to access government programs, public services, and emergency alerts more easily, improving safety and local engagement.	Cybersecurity and Privacy Concerns. An increase in technology use can lead to challenges like cyber threats, potential online scams, and concerns about data privacy. NANA is committed to providing cybersecurity and privacy education to mitigate these concerns.
Improved Educational Opportunities. Students and teachers would have better access to online educational resources, remote learning and tutoring, and access to distance education opportunities. This would help bridge the educational gap between rural and urban areas.	Changes in Youth and Adult Engagement and Entertainment. Better access to internet could change how people spend their free time, increasing screen time and participation in activities like gaming and social networking. This can be at the expense of other activities, including participation in cultural or subsistence activities.
Enhanced Healthcare Services. The availability of telemedicine appointments and virtual consultations would reduce the need for costly and time-consuming travel to urban medical facilities – a necessity that is currently unavoidable for many residents.	Lack of Trained Personnel. The implementation of the FOC network would require trained personnel to construct and maintain the network. NANA is committed to training and developing this workforce, providing additional career/job opportunities for local residents.
Strengthened Social Connections. Residents would have improved internet access that would enhance connections to families and friends in neighboring communities and outside the region.	Potential Societal Changes. Greater exposure to international media, customized media content, and customized/selected online interactions may influence traditional lifestyles, cultural practices, and engagement in subsistence activities.
Economic Impacts and Effects	
Increasing Economic Development Opportunities. High-speed internet can support local businesses, enable remote work, and create new job opportunities. These can help diversify rural economies beyond traditional activities like fishing and subsistence living.	Impact on Local Businesses and Retail. Easier online shopping may affect local businesses, as residents gain access to e-commerce options that could compete with local stores.
Population Retention. Many rural communities struggle with outmigration, often driven by limited economic and educational opportunities. Improved internet access may help retain residents.	
Impacts to Rural Lifestyle	
Emergency Communication. Improved internet connectivity speeds information sharing that would identify risks and concerns for individuals headed out for subsistence activities.	Trained Personnel. Training of community members and the permanent and transient workforce would be necessary to properly use and maintain the equipment to avoid misuse or damage.

Potential Advantages	Potential Disadvantages
More Efficient Search and Rescue. Faster internet would improve emergency coordination and response times, offering better coordination and mapping systems.	Work and School Productivity. Online activities can be a distraction and may potentially result in adverse impacts to workplace and educational environments.
Technology Upgrades and Advanced Equipment. Public facilities like schools, clinics, stores, and others would have the ability to upgrade to newer, high-tech equipment and software for staying current with industry and technology.	Cost of Hardware/Software. New technology has a high initial cost but would ultimately provide greater affordability in the long term.
Preservation and Sharing of Indigenous Culture. Faster internet can help Alaska Native communities document and share their languages, traditions, and histories through digital media and virtual platforms.	

Impacts from Alternative 1 and 2 would be similar, and effects on public health and safety; economics, and effects on quality of life of the American people would be beneficial. These effects would be long-term and minor to moderate.

3.3.5 Subsistence

3.3.5.1 Affected Environment

This section focuses on subsistence uses and activities for Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, and Shungnak (Figure 3.3.5-1). All 11 study communities are highly dependent on subsistence to meet their nutritional, cultural, social, and economic needs. Subsistence is a central aspect of rural Alaska life and is the cornerstone of the traditional relationship between Alaska Native people and their environment. Residents of the study communities rely on subsistence harvests of plant and animal resources both for nutrition and for their cultural, economic, and social well-being. Activities associated with subsistence—processing, sharing, redistribution networks, cooperative and individual hunting, fishing, gathering, and ceremonial activities—strengthen community and family social ties, reinforce community and individual cultural identity, and provide a link between contemporary Alaska Natives and their ancestors. Traditional knowledge, based on a long-standing relationship with the environment, guides these activities.

A dual management system by the State of Alaska and federal government regulates subsistence hunting and fishing in Alaska. Subsistence activities on all lands in Alaska, including private lands, are subject to state or federal subsistence regulations, with the state managing subsistence harvest of fish and wildlife on state and privately-owned land. ANILCA Section 802(2) allows the federal government to prioritize subsistence taking of fish and game on federal lands over other taking of fish and game when it is necessary to restrict taking in order to assure the continued viability of the fish or wildlife populations. The project area would be located on state, federal, and private lands (including NANA lands, and KIC lands).

Detailed subsistence harvest tables, seasonal round figures, and subsistence use area maps for each of the study communities are provided in Appendix N. The following sections provide a summary of subsistence use areas, harvest amounts, and subsistence seasons.

3.3.5.1.1 Harvest Data

Appendix N shows the average composition of subsistence harvests (by pounds) for the study communities across all available study years. Appendix N provides data on individual study years for each of the study communities. As shown on the figure, subsistence harvests across the region are characterized by a heavy reliance on large land mammals, non-salmon fish, salmon, and for some communities, marine mammals. Large land mammals account for at least one-quarter of edible pounds harvested in all of the study communities, and up to 48 percent in Shungnak. Caribou is the primary large land mammal species harvested, although communities also hunt moose, bear, muskox, and Dall sheep. Non-salmon fish harvests account for at least one-quarter of harvests in six of the 11 study communities; non-salmon fish contribute over two-thirds toward Selawik's annual subsistence harvest, on average. Top non-salmon fish species include broad and humpback whitefish, sheefish, Dolly Varden (referred to by some as trout or char), smelt, saffron cod, northern pike, burbot, Arctic grayling, and least cisco (Appendix N). Salmon (primarily chum salmon) contribute at least 20 percent of the harvest in Deering, Kiana, Kobuk, and Noatak. Marine mammals are an important resource in the coastal and Kotzebue Sound communities of Kivalina, Kotzebue, Deering, Buckland, and Noatak (which hunts from Sheshalik in Kotzebue Sound), contributing between 14 and 47 percent toward the harvest in those communities. The other study communities harvest marine mammals but in smaller quantities. Kivalina is the only study community that hunts bowhead whales but has not had a successful hunt since the 1990s. Key marine mammal species in the region are beluga whales (Kivalina, Noatak, and Kotzebue), walrus, and seal (bearded, ringed, and spotted). Other subsistence resources, including vegetation, migratory birds, upland birds, and eggs are important to the study communities but contribute less in terms of usable pounds.

Harvest levels vary from year to year, and for most communities data are only available for one to three study years; however, based on available data, residents of the study community harvest an average of between 309 (Kobuk) and 918 (Kivalina) pounds of subsistence foods per capita. The Kivalina harvest average is high due to the inclusion of data from the 1960s when residents harvested large quantities of fish to feed dog teams. Most of the study communities harvest an average of between 300 and 700 pounds of subsistence foods per capita. For most of the study communities, harvest amounts have remained relatively stable over time, with some changes seen in individual resources (see Appendix N). In recent years, subsistence users from the study communities have expressed concern about the abundance or availability of certain subsistence resources including the WAH which has experienced population decline and sport hunting pressure in recent years.

Household participation in subsistence activities is high, with between 98 and 100 percent of households using subsistence resources during the study communities' most recent study year, and between 78 and 100 percent of households participating in subsistence activities (Appendix N). In 10 of 11 study communities (all but Kotzebue), at least 90 percent of households participated in subsistence harvesting activities during the most recent study year. Sharing is a traditional value which is central to the subsistence way of life. Over three-quarters of households in all of the study communities either gave or received subsistence resources during the most recent study year.

3.3.5.1.2 Subsistence Use Areas

Subsistence use areas for all study communities are depicted on Figure 3.3.5-2. Subsistence use areas for individual study communities are provided in Appendix N. As shown on Figure 3.3.5-2, subsistence use areas for the 11 study communities extend across a large area and encompass the entirety of the project area. Generally, Kobuk River communities focus their hunting activities along the Kobuk River and in overland areas extending north and south of the river and around other

communities in the region. Kotzebue Sound communities have a greater focus on marine uses, with subsistence activities occurring throughout Kotzebue Sound and into the Chukchi Sea; however, these communities also use local river systems, including the Kobuk and Noatak rivers, to hunt caribou and other large land mammals and to harvest fish, berries, and other resources. Kivalina subsistence uses occur primarily in the Chukchi Sea and in and around the Wulik and Kivalina rivers. All communities report overland uses during the winter months, when they travel by snowmachine to hunt caribou, furbearers, and other small game.

3.3.5.1.3 Timing of Subsistence Activities

Data on the timing of subsistence activities for the individual study communities are provided in Appendix N. Appendix N Figures provide data on subsistence timing for the Kobuk River, Kotzebue Sound, and Chukchi Sea (Kivalina) regions. Overall, the seasonal round is similar between the three regions, with residents targeting the most subsistence resources during the summer (June through August) and fall (September and October) months when fishing and hunting of large land mammals and marine mammals are at their peak. Across the study region, the early spring months are a transitional time when residents continue to engage in key winter activities (e.g., hunting and trapping small land mammals and furbearers, caribou, and ptarmigan) while also preparing for the upcoming spring harvests. In Kivalina, the spring is when whaling crews set up camps on the ice and hunt bowhead whales and beluga whales; some residents from other regions travel to Kivalina or Point Hope during this time to participate in the whale hunt. Spring (April/May) is an important time in all study communities to hunt migratory birds, with bird eggs harvested in late spring and early summer (May/June). Residents set nets to harvest whitefish and Dolly Varden during their spring and summer runs, with sheefish particularly important in the Kobuk River communities, and Dolly Varden (locally called trout) a key resource in Kivalina and Noatak. Marine mammal hunting begins in the spring, particularly for the Kotzebue Sound and Chukchi Sea communities, and continues throughout the summer. Bearded seals in particular are targeted as they migrate north with the sea ice, and a first migration of beluga whales generally occurs in May or June.

Residents continue to set nets during the summer months for continued harvests of sheefish, whitefish, and chum salmon, and also harvest fish along local rivers with rod and reel throughout the summer months. Many residents from Kotzebue and Noatak travel to camps at Sheshalik during the spring and summer for fishing and other subsistence pursuits. Hunting of marine mammals continues, with residents of Kivalina and some Kotzebue Sound communities hunting beluga during a second migration (the Eastern Chukchi Sea stock). Residents harvest wild plants beginning in early summer and continuing into fall with berry harvesting intensifying in the late summer. In late summer and fall, residents increase their focus on large land mammal hunting. In particular, residents travel by boat along rivers and coastal areas to hunt caribou during their southward migration. Some individuals also hunt for moose, bear and Dall sheep during this time. Fall time is an important time to harvest Dolly Varden and whitefish during their fall runs, and some migratory bird hunting occurs during this time as well. Residents continue to fish through the fall and transition to ice fishing after freeze-up around November. Hunting and trapping of furbearers and small land mammals is a primary winter activity, with residents also hunting ptarmigan and caribou as available.

3.3.5.2 Environmental Consequences

The project has the potential to cause impacts primarily to subsistence user access and resource availability. Impacts would be greatest during the construction phase of the project due to increased human activity, noise, and physical obstructions. Table 3.3.5-1 shows the number of project acres that overlap with subsistence use areas for each of the 11 study communities (using the 60-foot

ROW buffer of the alternatives), and Figure 3.3.5-2 shows subsistence use areas for the study communities, overlaid with the action alternatives. The following sections provide an analysis of potential impacts to subsistence by alternative.

Table 3.3.5-1: Subsistence Use Area Overlaps by Community and Alternative (acres of 60-foot ROW)

Community	No Action	Alternative 1	Alternative 2
Ambler	0	3,008	2,763
Buckland	0	1,497	1,497
Deering	0	1,206	1,206
Kiana	0	2,038	1,848
Kivalina	0	821	821
Kobuk	0	2,884	2,638
Kotzebue	0	3,448	3,415
Noatak	0	2,902	2,903
Noorvik	0	2,709	2,471
Selawik	0	2,111	1,866
Shungnak	0	1,749	1,504

3.3.5.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, there would be no impacts to subsistence because no activities would interfere with access to or availability of subsistence resources.

3.3.5.2.2 Alternative 1 Impacts

The Alternative 1 ROW overlaps with between 821 (Kivalina) and 3,448 (Kotzebue) acres of subsistence use areas for the study communities, with Kotzebue, Ambler, Noatak, Kobuk, and Noorvik all experiencing the highest amount of subsistence use area overlap (over 2,500 acres each) (Table 3.3.5-1). Under Alternative 1, subsistence users could experience reasonable, temporary reductions in access around construction zones or along the ROW. These impacts would be most likely to occur for residents traveling overland by snowmachine in winter to conduct subsistence activities such as hunting for furbearers, caribou, and ptarmigan, as a majority of construction activity would occur in winter. The applicant anticipates that the FOC would settle into the tundra and be subsumed by the surrounding vegetation over time. Once the FOC has been laid and before spring melt, subsistence users may encounter the FOCs while traveling by snowmachine, particularly in areas where the ROW intersects with existing snowmachine trails. While unlikely, it is possible that snowmachines could snag on the FOCs if they are not properly secured or fully flat. In most cases however, residents should be able to navigate over the FOCs without issue. Assuming that there are no areas where FOCs have not fully settled and remain exposed, the project would pose no physical obstructions to overland travelers during operation. Crews would return in the summer to ensure that the cable is properly seated on the tundra. At large river crossings, the FOC would run aerially over the water via wooden poles placed vertically, or crossed with HDD.

During summer construction activities, particularly along the Noatak and Kobuk rivers, subsistence users traveling along riverways by boat could experience temporary impacts to access if

construction crews and equipment, including barges and tugboats, are active. Large river crossings are expected to take four to five days for construction. Overhead lines on smaller river crossings would be high enough to allow for boat access. Along streams where the FOC is dropped to the bottom of the streambed, if FOCs are not seated properly, then cables may interfere with boat travel along these streams. This would be particularly likely in late spring or early summer after construction, before maintenance crews return to conduct inspections and seat the cables (i.e., ensuring that the FOCs have settled either to the bottom of lake and stream beds, or into tundra). Key subsistence activities along riverways in the late spring and early summer include migratory bird hunting, travel to fish camps (including Sheshalik) where residents set nets for whitefish (including sheefish) and Dolly Varden, and travel to and from marine waters for beluga and seal hunting (particularly Noatak traveling to Kotzebue Sound).

In addition to physical obstructions, subsistence users may choose to avoid areas of active construction, including construction camps, due to noise and human activity, and concerns about hunting in the vicinity of infrastructure. The project would consist of three construction crews of 12 to 14 personnel, who would stay in mobile camps on sleighs that would traverse the construction corridor. Vegetation clearing would create a construction corridor along which residents may choose to travel by snowmachine or four-wheeler. This could increase access to subsistence harvesting areas and result in the creation of a hunting corridor. If travel increases along this corridor, it could concentrate harvests and result in increased competition among hunters/communities.

In addition to affecting subsistence user access, the project may also affect subsistence resource availability temporarily due to construction noise and activity; air, ground, and boat vessel traffic; removal of vegetation; human activity; and visual disturbances. Certain resources such as large land mammals, small land mammals, and migratory birds, may avoid areas with high levels of noise and human activity during the construction phase. If the migratory paths of resources are diverted, then subsistence users could experience reduced harvesting success; however, large-scale changes in migration are unlikely as construction activities would be concentrated in small areas at any given time. If residents have traplines that follow or cross the proposed FOC corridors, they may experience some temporary reduced success, as furbearers have been observed to avoid areas of human activity and construction.

While a majority of construction activities would occur during the winter when subsistence activities are less frequent, limited late spring/early summer construction activities such as tundra vehicle, aerial flights, and barge/tugboat could affect caribou behavior and movement through the area, resulting in temporary and localized disruptions to harvest success. Much of the WAH would be north of the project area in the summer and would be more likely to encounter the project area, either during the winter, or during fall migration. In-water activities could cause temporary and localized displacement of fish. If the FOCs become loose or are not properly anchored along stream banks, they could cause erosion and sedimentation, which could affect fish distribution and affect harvester success in certain areas. This may be more likely to occur during periods of high water or flooding. Cables would be laid with enough slack to accommodate terrain contours and to drop to the bottom of lakes and ponds where they would be covered with sediment over time. Crews would return in summer to ensure that cables are properly seated. The majority of the construction activity is in the winter, to avoid impacts to migration activity for caribou, migratory birds, and other species. Cables would be laid with enough slack to accommodate terrain contours and to drop to the bottom of lakes and ponds where they would be covered with sediment over time. Crews would return in summer to ensure that cables are properly seated.

Removal of vegetation would primarily consist of taller woody shrubs such as willows, dwarf birch, and alders and therefore would be more likely to affect species that feed on or use those shrubs for cover. Removal of vegetation may also result in certain resources, such as moose, using the corridor for travel and increasing their availability to subsistence hunters. In-water disturbances and vessel traffic during summer construction activities could temporarily affect the availability of fish and marine resources in the vicinity of those activities. In addition, aerial activity associated with delivery of equipment and maintenance activities could cause localized disturbances to certain resources such as caribou and migratory birds, resulting in temporary disruptions to harvester activities. Wooden poles used to run FOCs aerially over major river crossings would be the primary visual disturbances associated with the project and may cause some avoidance by wildlife. To prevent bird collisions, the project would install bird diverters at each aerial crossing to increase visibility. Bird mortalities would not be high enough to result in an overall reduction in resource abundance for subsistence harvesters. While the project may cause a reduction in habitat for certain resources, the change in habitat availability would be unlikely to affect wildlife survival and production or to affect overall abundance.

Improved internet access could change how individuals spend their free time, increasing screen time and participation in activities like gaming and social networking. This can be at the expense of other activities, including participation in cultural or subsistence activities. Alternatively, social media can be used as a tool in rural communities to improve engagement in subsistence activities.

Impacts from Alternative 1 would be temporary and negligible to minor.

3.3.5.2.3 Alternative 2 Impacts

Impacts to subsistence user access, resource availability, and resource abundance, would be similar to those discussed under Alternative 1, but with a slight decrease in use area overlaps near Ambler, Kobuk, and Shungnak. There would be no unreasonable interference or conflicts posed by this alternative to subsistence activities.

As discussed under Alternative 1, an increase in internet access could have both positive and negative impacts on subsistence, by decreasing the time some individuals spend on subsistence activities but improving communication about subsistence harvests and activities.

3.3.6 Recreation

3.3.6.1 Affected Environment

Recreation activities occur throughout the project area and vicinity, although generally in low density. Primary recreational activities can include hunting, fishing, foraging, boating, birdwatching, sightseeing, float trips, and hiking. Many recreational activities in the area rely on components of the natural environment, 'getting away from it all,' and removal from industrial aspects of the developed human environment. Lack of access is a primary barrier to recreation, and access is generally better near established communities, waterways, winter trails, developed infrastructure and/or suitable aircraft landing locations. Other built infrastructure detracts from the recreational experience, including vegetation clearing, utility lines, and industrial development such as mining.

Sport hunting and fishing in the area is regulated by the ADF&G. The project is located in Game Management Unit 23. Outfitters are permitted to guide hunts within these Game Management Units and in the vicinity of the project area. Sport fishing is popular in the area, and the Alaska State Trophy Fish Recordholder for Arctic Char/Dolly Varden was caught in the Wulik River near Kivalina. The other

waterways such as the Noatak River and Kobuk River are also prized fish habitat. The harvest estimates for Northwest Alaska (Survey Area X) estimate 682 anglers fished for 3,156 days in 2023 (ADF&G 2023). Most anglers targeted Arctic grayling, followed by Dolly Varden, chum salmon, sheefish, Northern pike, and lake trout (in descending order of sport fishing effort).

Sport hunting in the game management unit includes caribou, moose, brown bear, black bear, muskox, wolves, and furbearers. Sheep have no open season for sport harvest. ADF&G reported sport harvest statistics for caribou (273 individuals harvested), moose (72 individuals harvested), and muskox (6 individuals harvested) in 2024 (ADF&G 2024).

The BLM has classified an Extensive Recreation Management Area (ERMA) as semi-primitive motorized under the recreation opportunity spectrum, managed for dispersed recreational use (BLM 2008). Management attention on commercial recreational use is focused on areas that have or may have conflicting uses or issues that require decisions to be made.

3.3.6.2 Environmental Consequences

3.3.6.2.1 No Action Alternative

Under the No Action Alternative, there would be no construction, operation, and maintenance of the broadband network; therefore, there would be no impacts to recreation because there would be no obstacles to recreational access.

3.3.6.2.2 Alternative 1 Impacts

Improved internet access could change how individuals spend their free time, increasing screen time and participation in activities like gaming and social networking. This can be at the expense of other activities, including participation in outdoor recreation. Alternatively, social media can be used as a tool to share information and encourage recreation outdoors.

State hunting seasons vary, and include: black bear (all year), brown bear (all year), caribou (all year), moose (July 1 – December 31 and/or September 1- September 20), muskox (August 1 – March 15), wolf (August 1 – April 30), and wolverine (September 1 – March 31). Construction activity and post-construction maintenance (including helicopter inspections) can impact the experience of recreation uses, including sport hunters, guided hunters, and outfitter business. The primary construction effort is in the winter but also includes summer HDD and aerial crossing construction. Construction overlaps with hunting seasons. Impacts are expected to be of short duration and minor magnitude, as the construction team would only be in a particular spot for a short period of time.

The primary construction involves placing the cable directly on the ground during winter when the underlying tundra is frozen and snow-covered, allowing it to settle naturally into the surrounding vegetation during spring thaw. This ground-lay method would have minimal visual impacts. This winter activity is planned to minimize impacts to recreation during a period of low recreation activity. Impacts would occur during the winter construction (i.e. noise and visual from the construction train) but are limited in duration at any specific location.

Vegetation clearing would create a linear change of habitat across the project. This would provide a change in recreational resources, as evidence of the installed telecommunication infrastructure would be visible. This would be a long-term impact. The magnitude of impact to recreation is minor, as visual impacts are the primary impact to recreation, and no recreation activities would be restricted.

Cable anchors and splice points would be visible to recreation users. These are low-profile devices and enclosures, spaced at regular intervals of no greater than 6,000 feet or 24 miles (respectively). Anchors would additionally be placed on either side of streams and lakes where ground-lay fiber occurs. These would be above the organic mat but would have minimal recreational impacts.

HDD borings and subsea crossings would be buried. Impacts from HDD would be negligible, each boring would take place in ~1 day, and a site may be occupied by the construction team for 3-5 days. For the subsea crossing, concrete beach manholes will be placed on either side of the crossing to facilitate the transition in infrastructure. These would have negligible recreation impacts.

Aerial cable would be suspended 20-ft. above the water. The visual impacts would be similar to the ASTAC aerial crossings (Figure 3.3.2-4). These crossings would be visible and would be a change to the recreational resources in the landscape. These would be visible only in the immediate to moderate landscape and may provide a visual reference point for people navigating on the landscape.

Construction activity may provide a temporary impact on recreation in the immediate area of the activity but are of short duration and minor magnitude. Vegetation clearing and installed infrastructure would provide long-term impacts of minor magnitude.

3.3.6.2.3 Alternative 2 Impacts

Impacts would be similar to Alternative 1, but less, because the alignment disturbs fewer acres and there is one less aerial crossing. Impacts would be temporary and negligible to minor for construction, and long-term and minor for vegetation clearing and installed infrastructure.

3.4 Summary of Impacts

A summary of impacts for each resource category and alternative is provided in Table 3.4-1.

Table 3.4-1: Summary of Impacts

Resource Category	No Action	Alternative 1	Alternative 2
Air Quality	-	Temporary and Minor	Temporary and Minor
Noise	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Hazardous Materials and Spills	-	Long-Term and Minor	Long-Term and Minor
Geology and Soils/Permafrost	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Floodplains	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Water Resources	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Wetlands and Vegetation	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Fish and Fish Habitat	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Birds	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Terrestrial Mammals	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Marine Mammals	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor

Resource Category	No Action	Alternative 1	Alternative 2
Threatened/Endangered Species	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Cultural/Historic Resources	-	Temporary and Moderate	Temporary and Moderate
Visual Resources	-	Long-Term and Minor/Moderate	Long-Term and Minor/Moderate
Land Use	-	Long-Term and Negligible/Minor	Long-Term and Negligible/Minor
Socioeconomics	-	Long-term and Minor	Long-term and Minor
Subsistence	-	Temporary and Minor	Temporary and Minor
Recreation		Temporary and Negligible/Minor	Temporary and Negligible/Minor

4 Applicable Environmental Permits and Regulatory Requirements

Major federal permits likely include a BLM ROW grant for construction on BLM lands, a USFWS ROW permit for construction on Selawik National Wildlife Refuge, and a USACE Section 404/Section 10 Permit for construction/fill in wetlands (Table 5-1).

At the State level, the project likely requires a DNR ROW easement for construction on state land, consultation with the DNR regarding cultural resources, and an ADF&G Fish Habitat Permit.

Local authorizations include a KIC and NANA land access, and a Northwest Arctic Borough Title 9 Permit.

Table 5-1: Listing of major state, federal, and local permit applications

Agency	Permit/ Authorization	Regulated Activity	Status
BLM	ROW Grant	Construction on BLM lands	In progress
USFWS	ROW Permit	Construction on USFWS land	In progress
USACE	Section 404 Permit	Construction/fill in wetlands	In progress
USACE	Section 10 Permit	Construction in Section 10 waters	In progress
FAA	Obstruction Evaluation	Obstruction Marking	In progress
NOAA	NMFS EFH Assessment	EFH consultation	Completed
DNR	ROW easement	Construction on state land	In progress
ADF&G	Fish Habitat Permit	Crossing of state waters	Completed
DNR OHA	Consultation on Cultural Resources	Consultation on Cultural Resources	In progress
KIC	Land Access/ROW Authorization	Construction on KIC lands	Completed
NAB	Title 9 Permit	Development within the Borough	In progress
NANA	Land Use Permit	Construction on NANA lands	In progress

5 Project Outreach and Consultation Activities

5.1 NANA Outreach and Consultation

NANA has prioritized meaningful community engagement throughout the project planning process. A summary of project outreach is below with consultation materials provided in Appendix O.

Between July and October 2024, NANA conducted formal, predominately indigenous community meetings with tribal, ANC, and other community residents, business owners, and interested stakeholders in all eleven villages affected by the project. These meetings included comprehensive presentations on the project scope, timeline, and anticipated benefits, followed by interactive question and answer sessions with all community members. During these sessions, residents reviewed detailed maps of the proposed cable routes and provided valuable input on potential adjustments, drawing by hand in some cases where subsistence activities occurred, as well as where and how to avoid valuable and meaningful traditional and cultural sites. Community concerns and suggestions were meticulously documented to ensure incorporation into the final project design to the extent possible. These meetings were conducted in partnership with tribal governments, ANC leadership, community leadership and other stakeholders.

Fall 2024 meetings. Locals used hard copy maps to draw preferred locations for the alignment, and subsistence areas to avoid. (Number in parenthesis is # of attendees)

- August 6, 2024 in Buckland (21)
- August 7, 2024 in Shungnak (8)
- August 8, 2024 in Kivalina (4)
- August 8, 2024 in Kobuk (20)
- August 9, 2024 in Kiana (11)
- August 12, 2024 in Noatak (17)
- August 13, 2024 in Noorvik (5)
- August 15, 2024 in Ambler (6)
- November 13, 2024 in Selawik (8)
- November 14, 2024 in Deering (7)
- May 20-21, 2025 Presentation to the Northwest Arctic Energy Steering Committee Meeting
- Ongoing website about the project (https://www.nanabroadband.com/)

NANA is committed to maintaining robust community engagement throughout project. Prior to construction, NANA would conduct updated presentations in all affected communities and invite dynamic feedback for maximum impact. NANA will also host an in-person meeting with the Native Village of Kotzebue.

NANA issued scoping letters, including:

- August 1, 2025 Letter to Tribal and City Leaders to provide input on the project
- August 6, 2025 Letter to Allotment Holders to provide input on the project

During the construction phases in Winter 2025-2026, Summer 2026, and potentially 2026-2027, NANA would provide updates to all stakeholders and continue to listen and learn from local community and indigenous leaders. A contact system for construction supervisors would be maintained, complemented by regular community radio announcements, phone number, email, social media, and a quick response system for addressing any subsistence concerns. Following construction completion, NANA would hold community meetings to gather feedback and provide information on broadband availability.

5.2 Federal Agency Outreach and Consultation Activities

Federal agencies conducted outreach and scoping for the project, wherein NTIA requested public input on issues related to the proposed project, alternatives, and other relevant information.

- August 6, 2025 Letter to agencies, stakeholders, and the public to provide input on the project
- August 4 – 19 Federal scoping for the project
    - Public input was received from three stakeholders (Appendix O): Western Arctic Caribou Herd Working Group, Trustees for Alaska, and DNR
- October 15 – November 14, 2025 Draft EA Comment Period
    - Public input was received from six stakeholders (Appendix O): Native Village of Kotzebue, OTZ Telephone Cooperative, Inc., Western Arctic Caribou Herd Working Group, EPA, DNR, and two members of the public (names withheld to protect Private Personal Information).

5.3 Section 106 Consultation

This consultation is discussed in Section 3.3.1 (cultural resources).

5.4 Endangered Species Act Consultation

The Endangered Species Act requires consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service and US Fish and Wildlife Service to assess and advise and to minimize, mitigate, and offset adverse impacts to endangered species that may result from federal actions. This consultation has been initiated with both agencies. USFWS and NMFS have completed their consultation, and their concurrence is included in Appendix O.

5.5 Essential Fish Habitat Consultation

The Magnuson-Stevens Fishery Conservation and Management Act requires consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service to assess and advise and to minimize, mitigate, and offset adverse impacts to Essential Fish Habitat that may result from federal actions. This consultation has been completed and is included in Appendix M.

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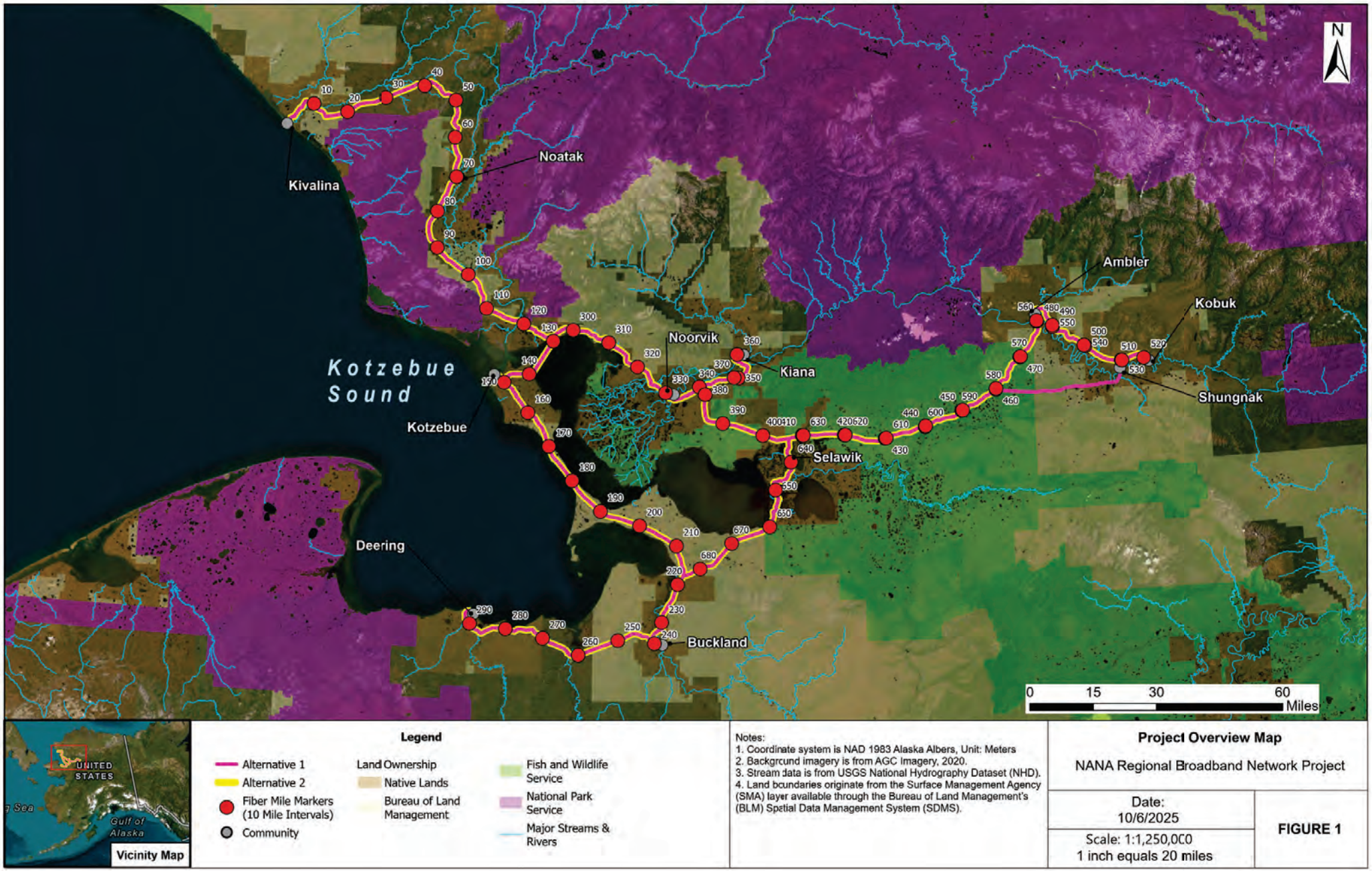
Appendix A – Figures



Notes:
1. Coordinate system is NAD 1983 Alaska Albers, Unit: Meters
2. Background imagery is from AGC Imagery, 2020.
3. Stream data is from USGS National Hydrography Dataset (NHD).
4. Land boundaries originate from the Surface Management Agency (SMA) layer available through the Bureau of Land Management's (BLM) Spatial Data Management System (SDMS).

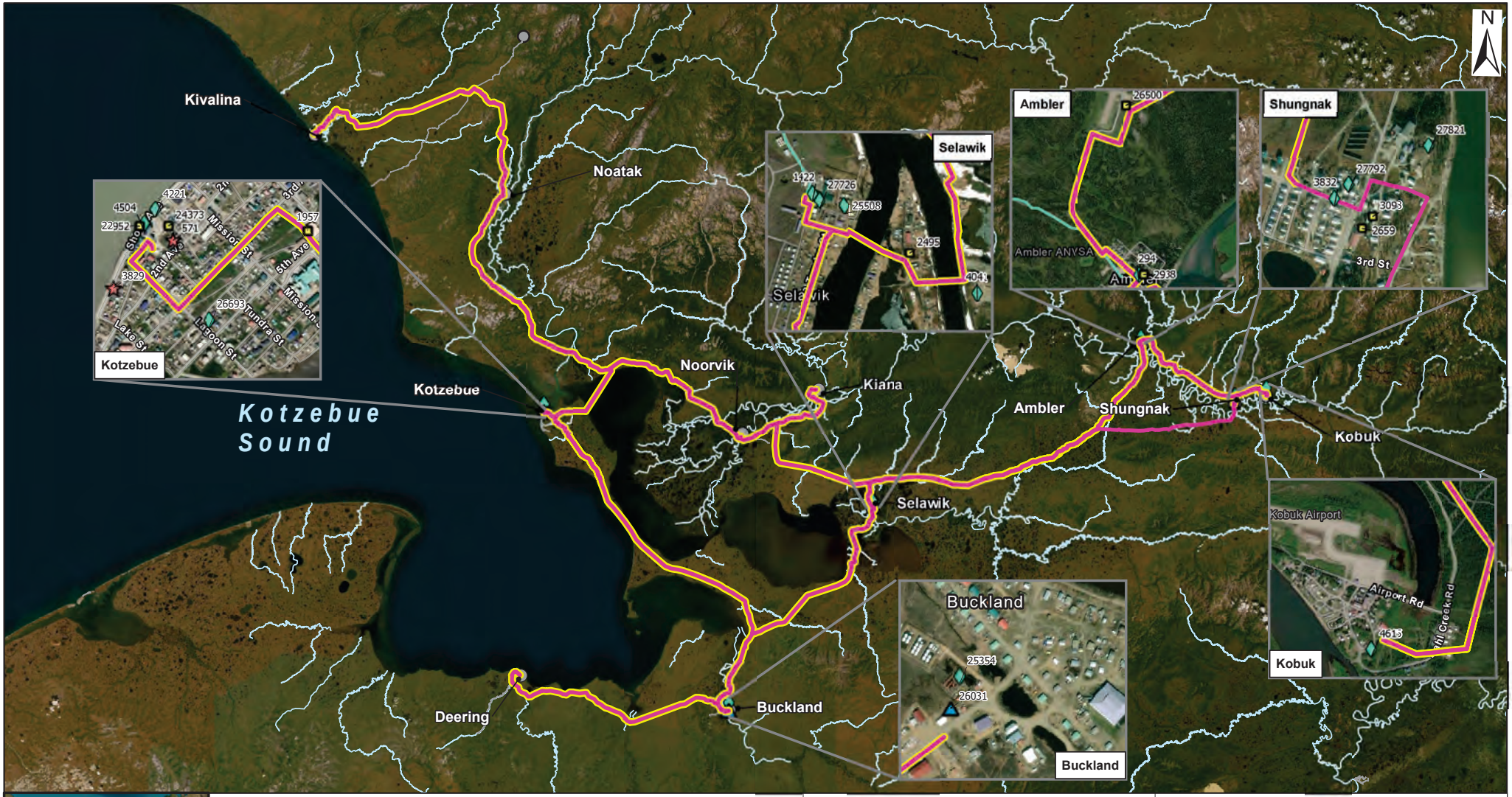
Project Overview Map

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 1



Legend

- Alternative 1
- Alternative 2
- Major Streams and Rivers

Contaminated Sites

- Active
- Cleanup Complete
- Cleanup Complete - Institutional Controls
- Informational
- Community
- ADOT Roads

0 15 30 60 Miles

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Stream data is from Alaska Department of Fish and Game (ADF&G) & USGS National Hydrography Dataset (NHD)
4. Anadromous Waters Catalog (AWC) is created by and updated by the Alaska Department of Fish and Game.

Contaminated Sites Map

NANA Region Middle Mile Fiber Optic Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.1.2-1

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. The soil erodibility factor (K factor) is one of five components used in the Universal Soil Loss Equation (USLE), which quantifies how susceptible soil particles are to detachment and transport by water. The U.S. Department of Agriculture (USDA) utilizes the K factor in identifying highly erodible lands, with mapped values typically incremented at 0.10 K units to reflect varying degrees of soil vulnerability across landscapes.

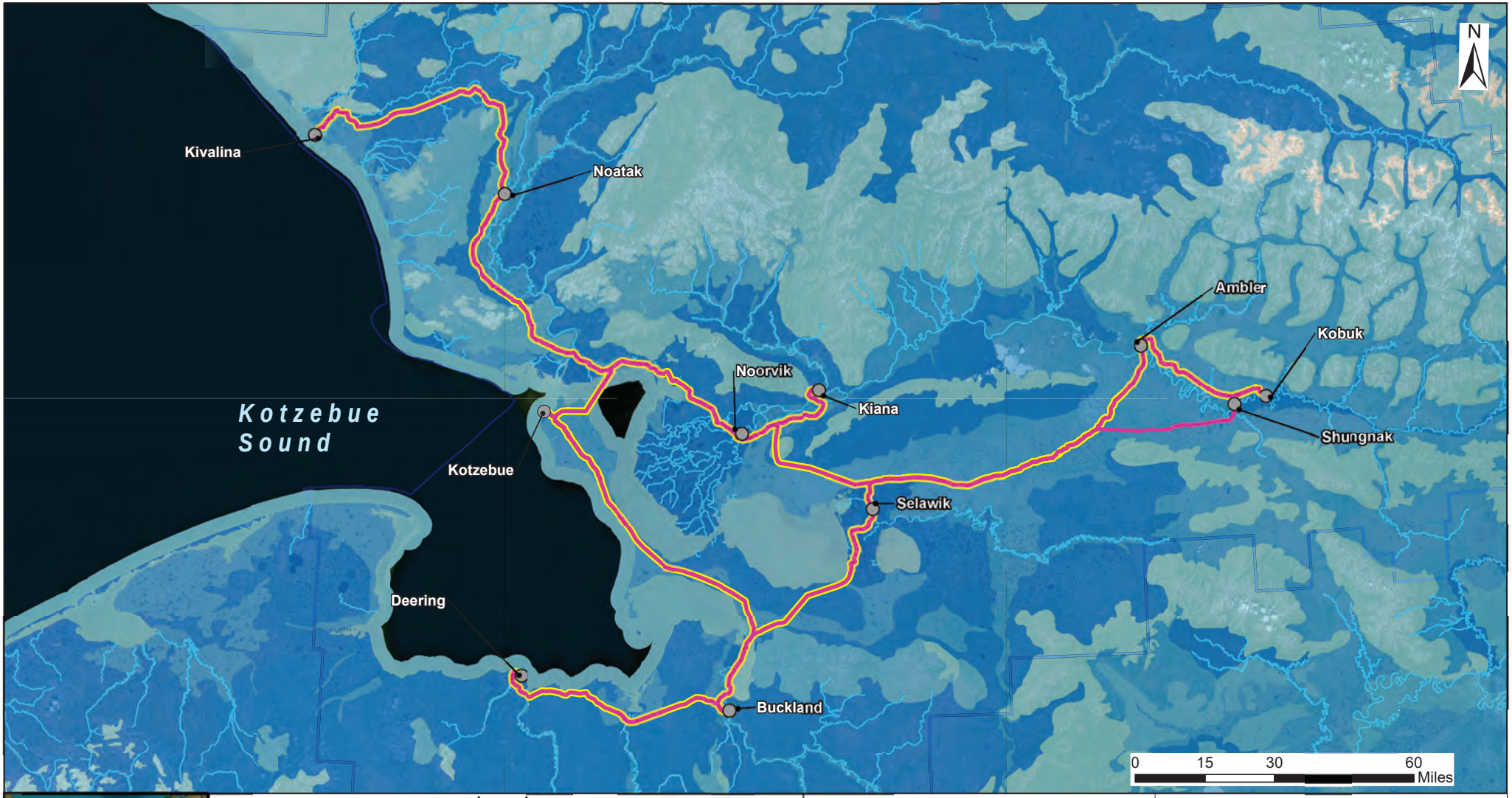
Soil Erodibility

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.1.3-1



Legend

- Alternative 1
- Alternative 2
- Community
- Northwest Arctic Borough Boundary

Soil Hydric Class

- Not Hydric
- Partially Hydric (1 - 25%)
- Partially Hydric (26 - 50%)
- Mostly Hydric (51 -75%)
- Mostly Hydric (76 -95%)
- All Hydric
- Major Streams & Rivers

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. This layer was created using data from the National Gridded Soil Survey Geographic (gNATSGO) database, derived from 30-meter resolution rasters produced by the NRCS. It displays the presence of hydric soils based on the gSSURGO field Hydric Classification Presence (hydclprs), shown as a percentage per map unit. Hydric soils develop under prolonged saturation or flooding conditions.

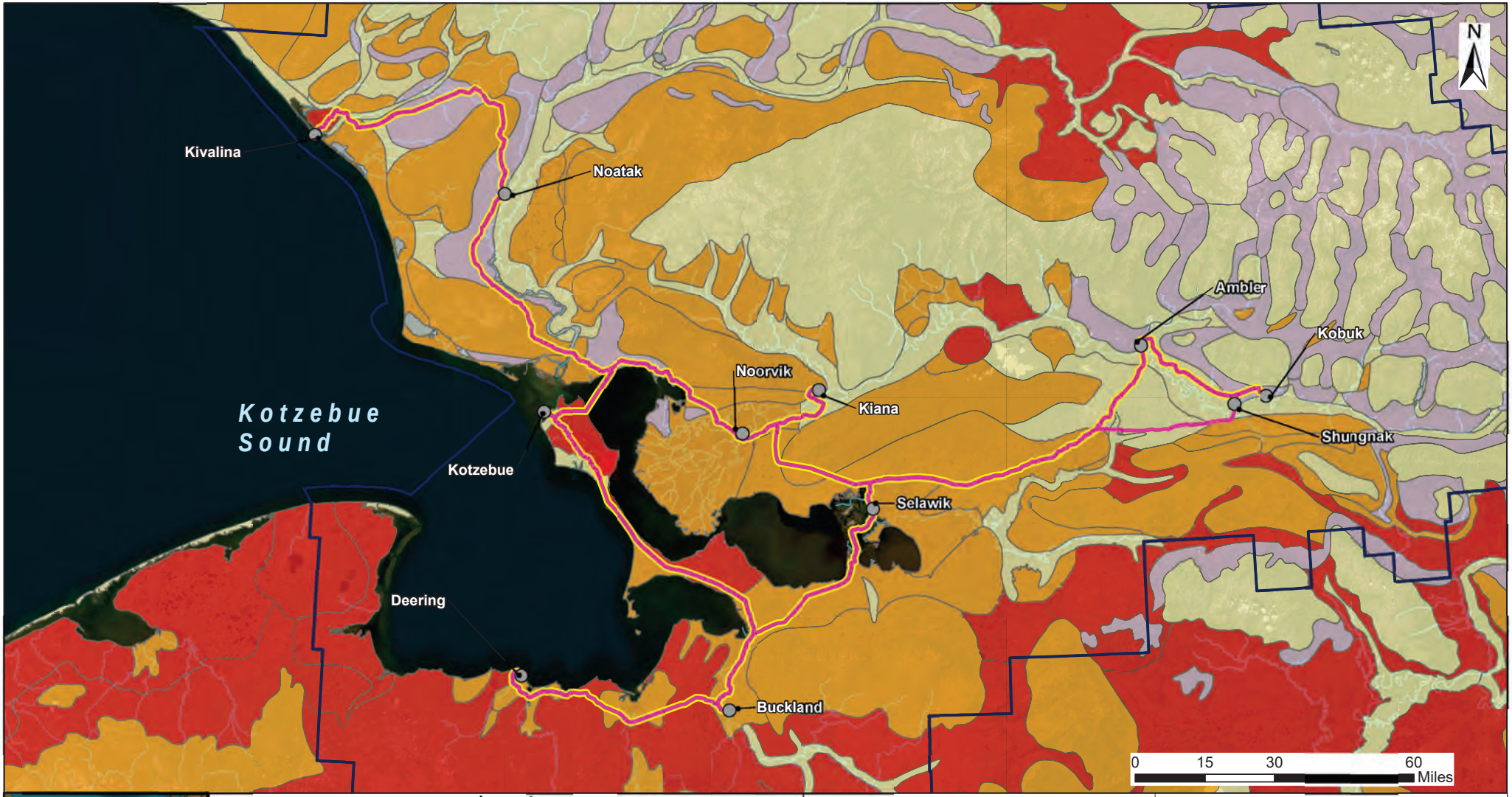
Soil Hydric Class

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.1.3-2



Legend

- Alternative 1
- Alternative 2
- Northwest Arctic Borough Boundary
- Community

Ground Ice Volume

- Variable
- High (<40%)
- Moderate (10-40%)
- Low (<10%)
- Unfrozen
- Major Streams & Rivers

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Data refers to axcess ice in the top 5 meters of the soil. Jorgenson, M. T., M. Kanevskiy, Y. Shur, J. Grunblatt, C.-L. Ping, and G. Michaelson. 2015. Permafrost database development, characterization, and mapping for northern Alaska. Final report prepared for U.S. Fish and Wildlife Service, Anchorage, AK. June 2015.

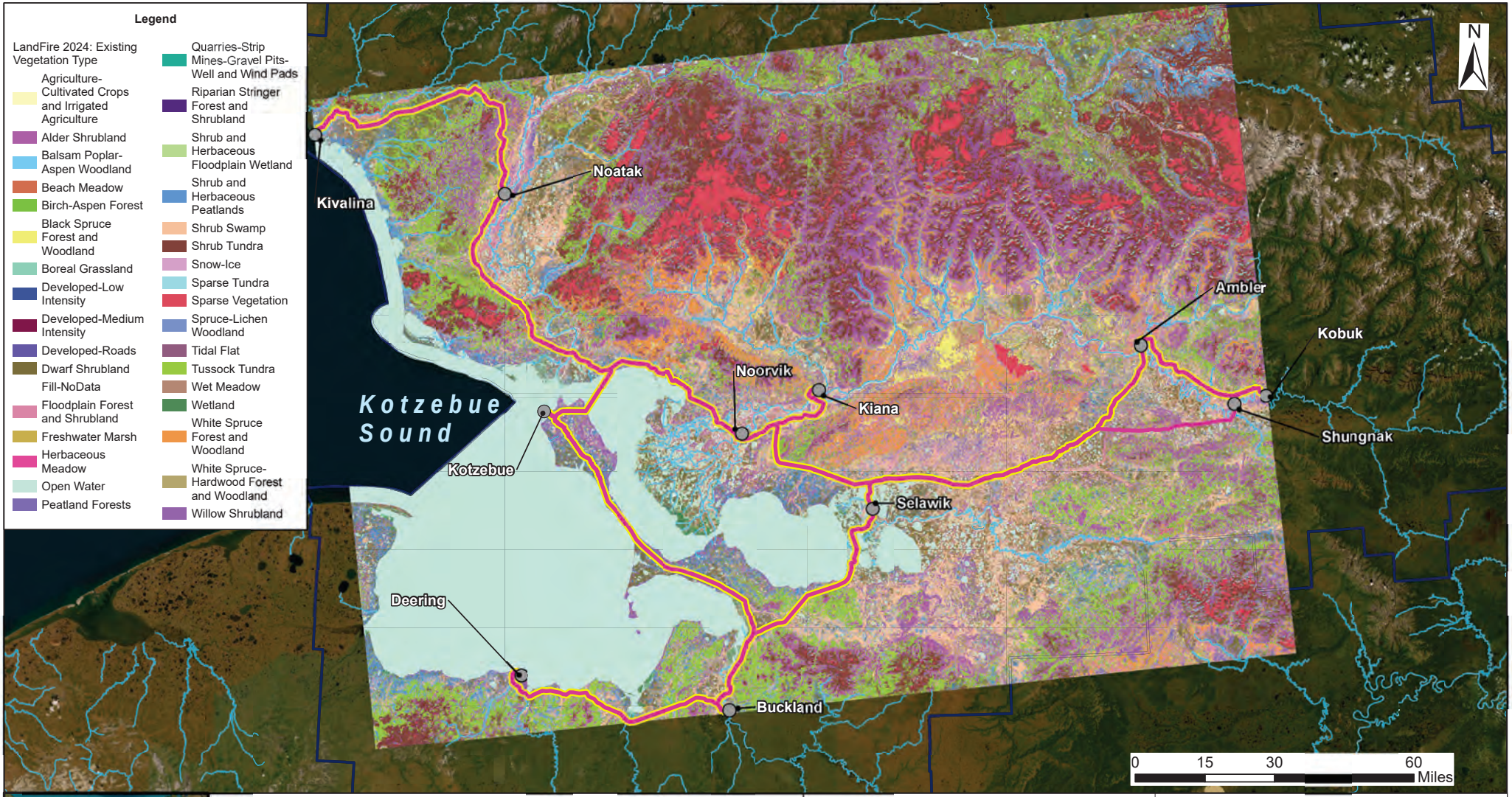
Ground Ice Content

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.1.3-3



Legend

- Community
- Alternative 1
- Alternative 2
- Community
- Major Streams & Rivers
- Northwest Arctic Borough Boundary

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. LandFire (2024). Existing Vegetation Cover. U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior.

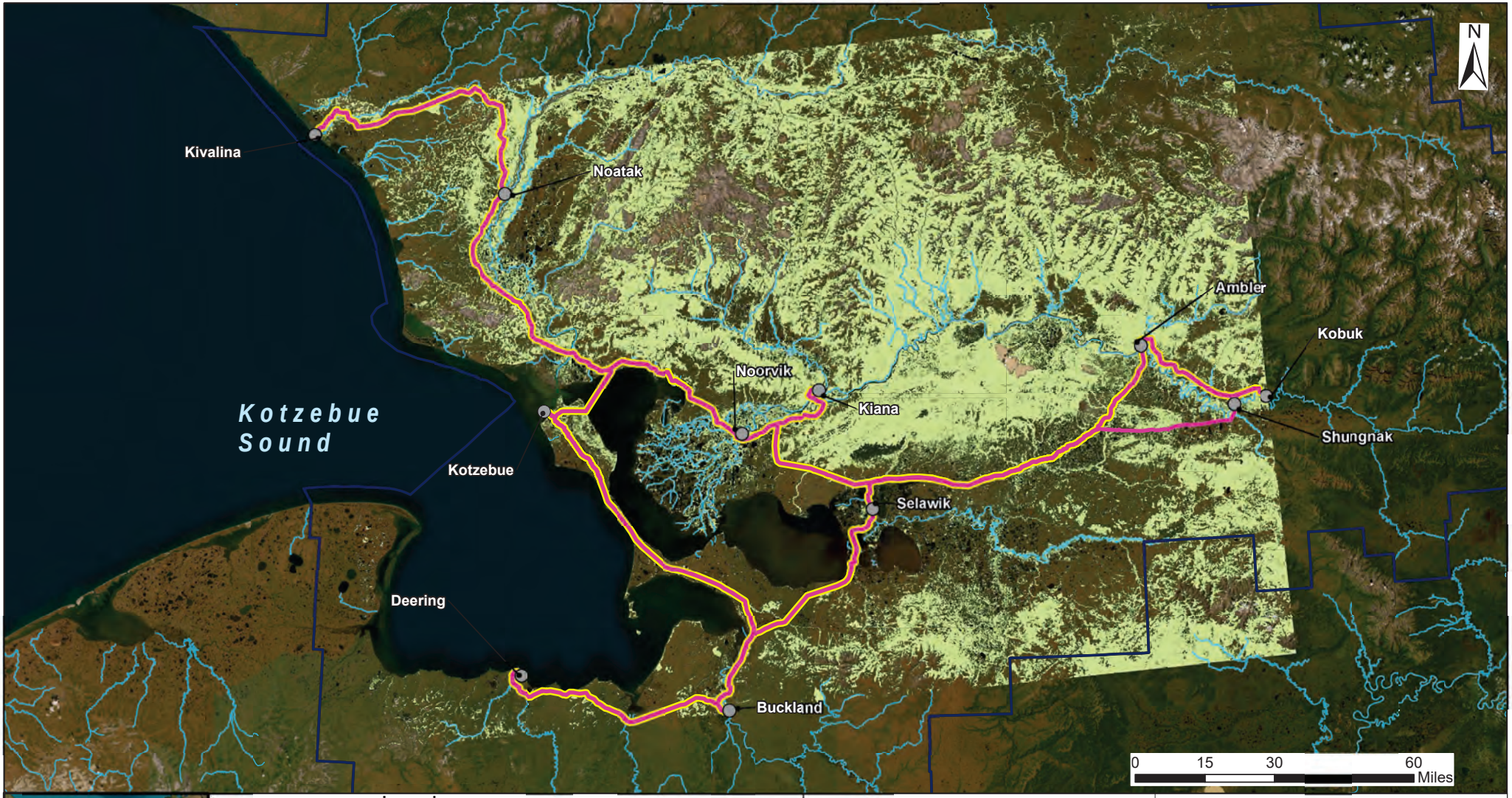
LandFire 2024 Existing Vegetation Type

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.1-1



Legend

- Alternative 1
- Alternative 2
- Northwest Arctic Borough Boundary
- Community
- Major Streams & Rivers
- Height of Woody Vegetation >0.2 meters (8 in)

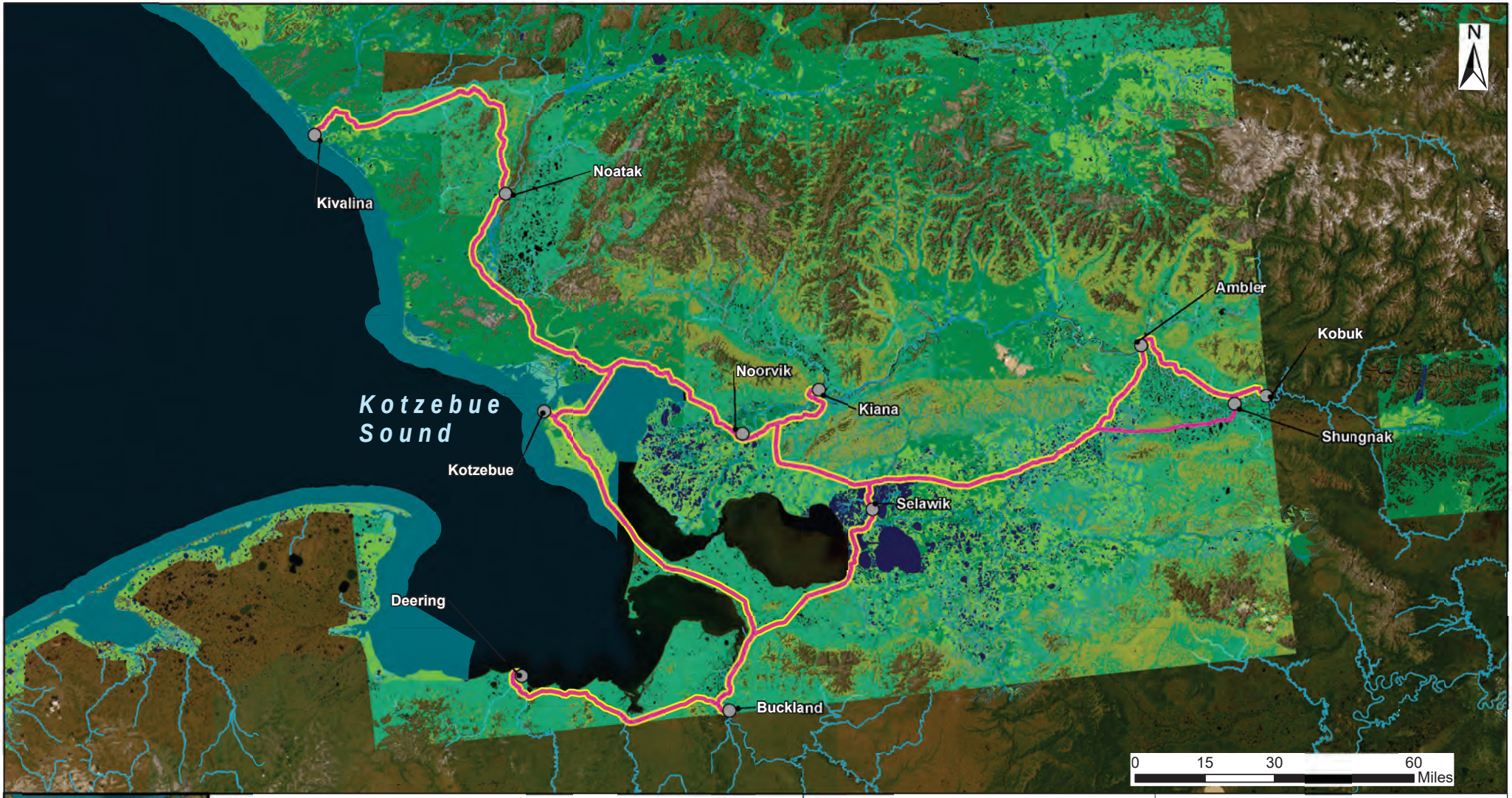
Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. LANDFIRE (2024) Existing Vegetation Height, which provides spatial data on average plant canopy height across the landscape.

Areas Where Mechanical Clearing of Vegetation may be Required
NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.1-2



Notes:
1. Coordinate system is NAD 1983 Alaska Albers Unit: Meters
2. Background imagery is from AGC Imagery, 2020.
3. U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data were used where available, with additional wetland areas mapped using vegetation information derived from LANDFIRE datasets.

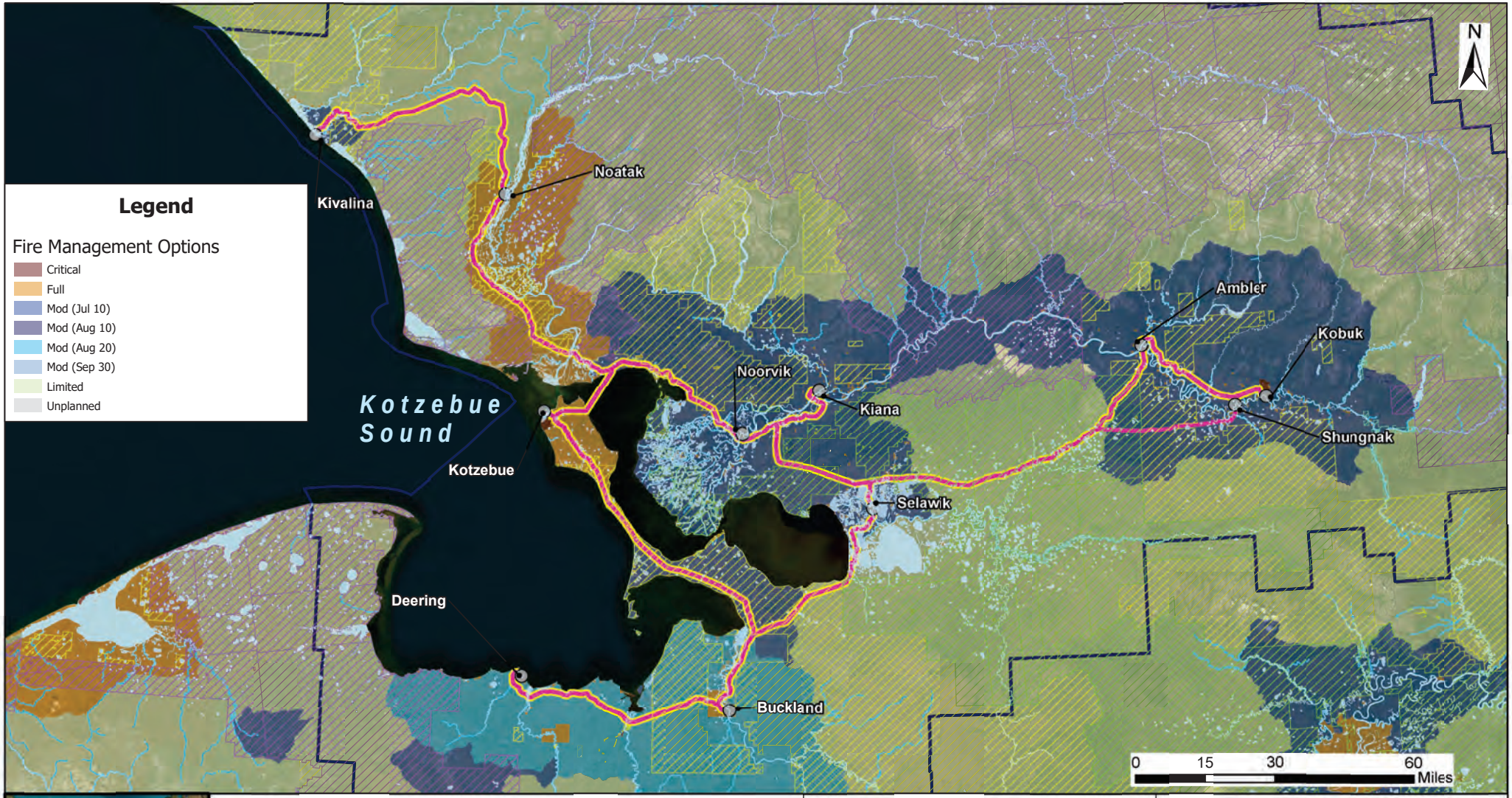
National Wetlands Inventory

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.1-3



Legend

Alternative 1
Alternative 2
Northwest Arctic Borough Boundary

Land Ownership
Bureau of Land Management
Fish and Wildlife Service
Local Government
National Park Service
Waterbody
Community
Major Streams & Rivers

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Within the BLM Statewide Assessment of Terrestrial Areas (SATA), fire management options are evaluated based on the mode of disturbance (MOD) and whether the area is classified as critical or moderate, guiding strategies for prevention, preparedness, suppression, and restoration.

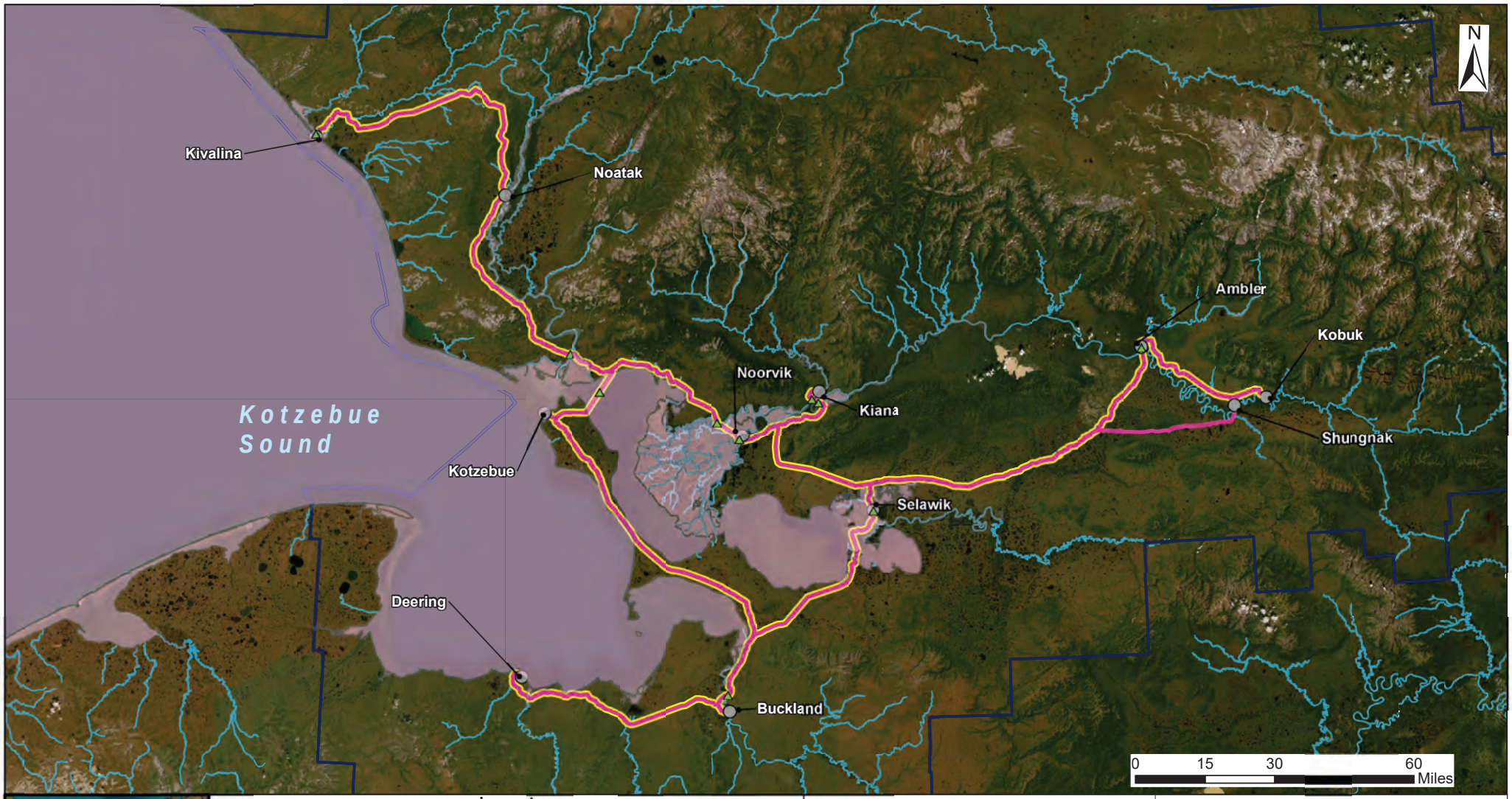
Fire Management

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.1-4



Legend

- Alternative 1
- Alternative 2
- Northwest Arctic Borough Boundary
- Community
- Anadromous Waters
- Alaska Essential Fish Habitat
- Section 10 Crossings

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. The Alaska Department of Fish and Game's (ADFG) Anadromous water bodies data depict theknown anadromous fish bearing lakes and streams within Alaska.
4. Under Section 10 of the Rivers and Harbors Act, any water crossing that spans or disturbs navigable waters requires a permit from the U.S. Army Corps of Engineers to ensure it does not obstruct navigation.

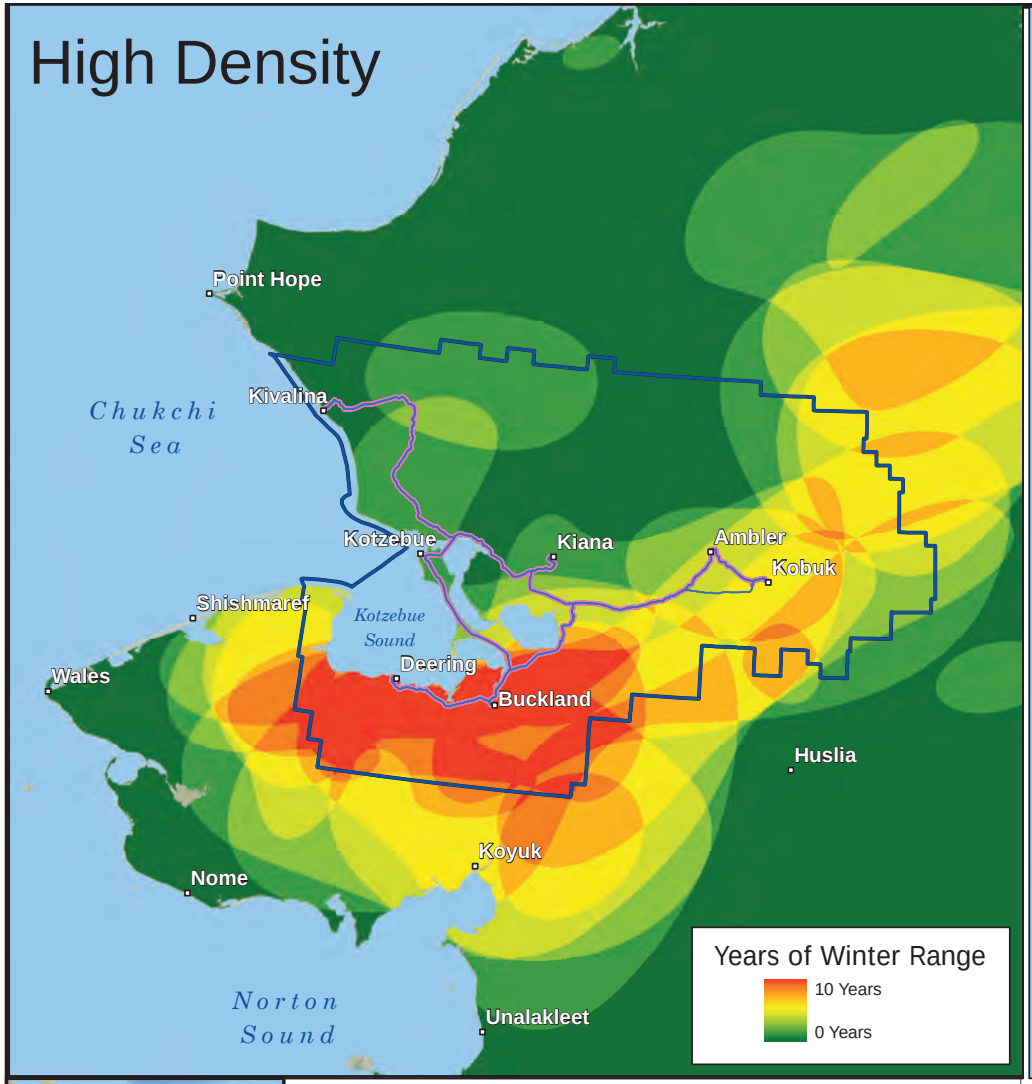
Essential Fish Habitat

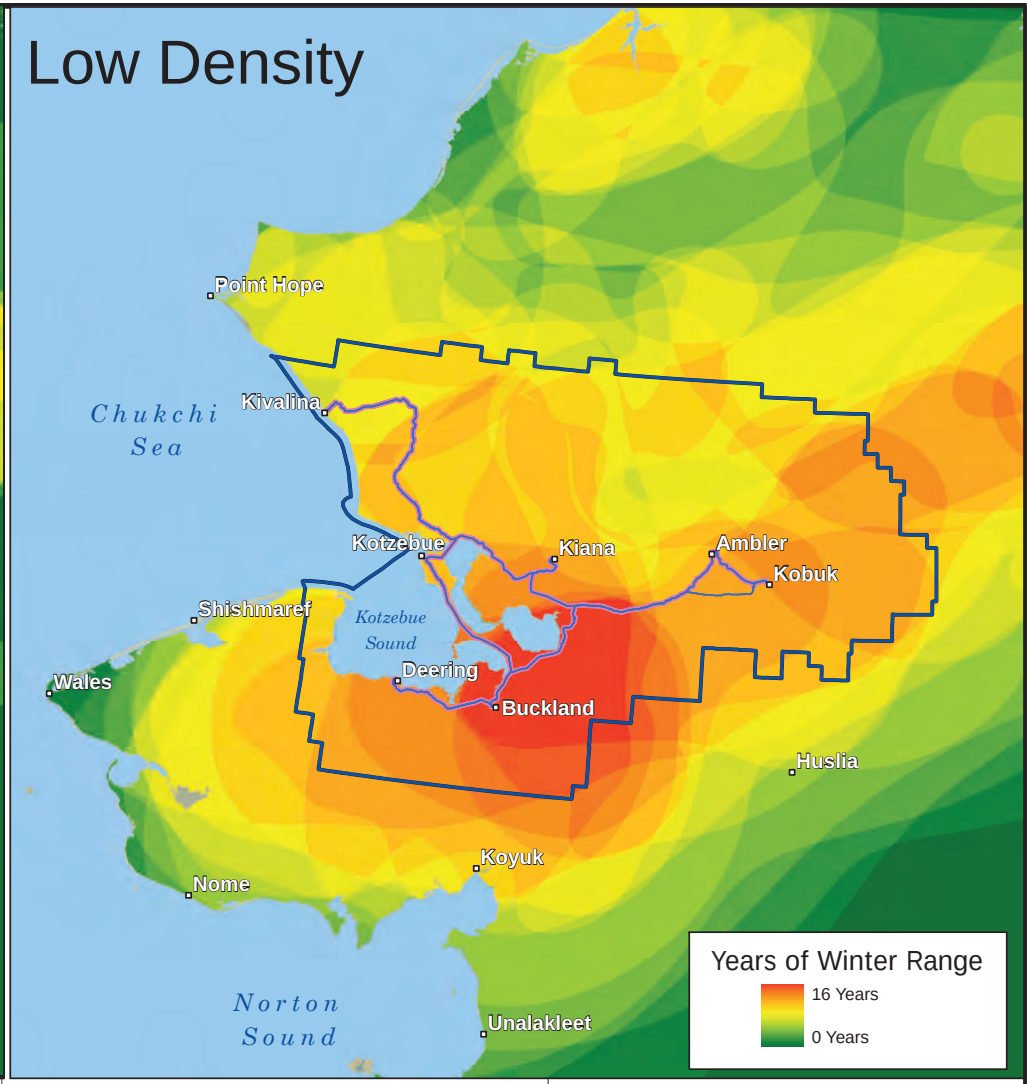
NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.2-1





Legend

- Community
- Alternative 1
- Alternative 2
- Northwest Arctic Borough Boundary

0 35 70 140 Miles

Notes:
1. Coordinate system is NAD 1983 Alaska Albers Unit: Meters
2. Background imagery is from ESRI national Geographic Style Base. Sources: Esri, USGS
3. The years 1987–2009 were combined into 3 kernels for a total of 16 years or year-groups.

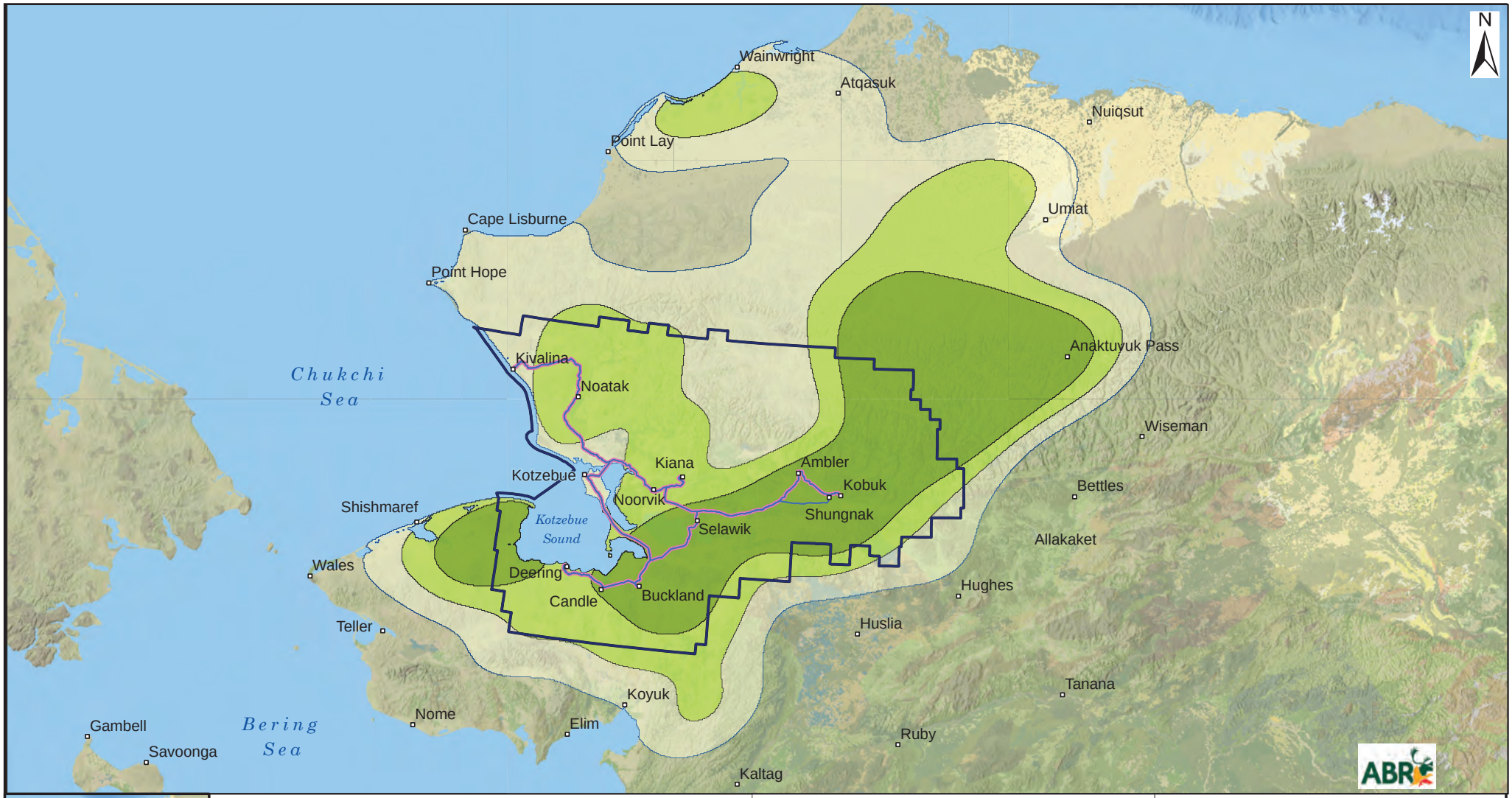
Caribou Winter Range 1987-2022

NANA Region Middle Mile Fiber Optic Project

Date : 9/29/2025

Scale: 1:3,522,379
1 inch equals 56 mile

FIGURE 3.2.4-1



Notes:
1. Coordinate system is NAD 1983 Alaska Albers Unit: Meters
2. Background imagery is from ESRI national Geographic Style Base.
Sources: Esri, USGS

Caribou Winter Range 2017-2021

NANA Region Middle Mile Fiber Optic Project

Date : 9/29/2025

Scale: 1:3,522,379
1 inch equals 56 mile

FIGURE 3.2.4-2

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Moose and muskox range data were developed from Alaska Department of Fish and Game sources and incorporated into the game management and mammal distribution datasets.

Moose and Muskox Range

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.4-3

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Critical habitat designations for the polar bear, Steller's eider, and spectacled eider are vital under the Endangered Species Act because they identify and protect the essential sea-ice, tundra, and coastal marine areas these species need to survive and recover, though no Steller's eider or spectacled eider occur within the project areas.

Threatened and Endangered Species

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.2.6

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. VRM 4 allows modification of the character of the landscape, VRM 3 allows partial retention of the existing character, VRM 2 requires largely retaining the existing character, and VRM 1 calls for preserving the existing character. If there is no VRM, the classification has not yet been determined.

BLM Visual Resource Management (VRM) Map

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.3.2-1

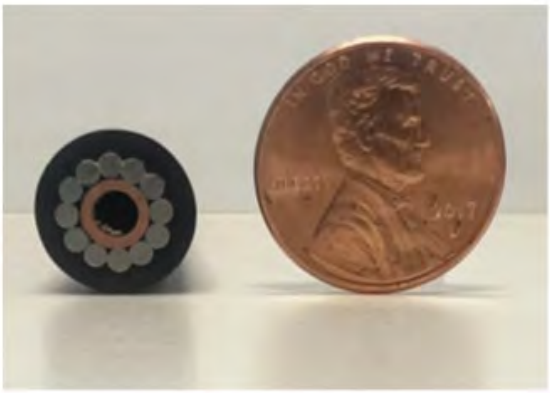
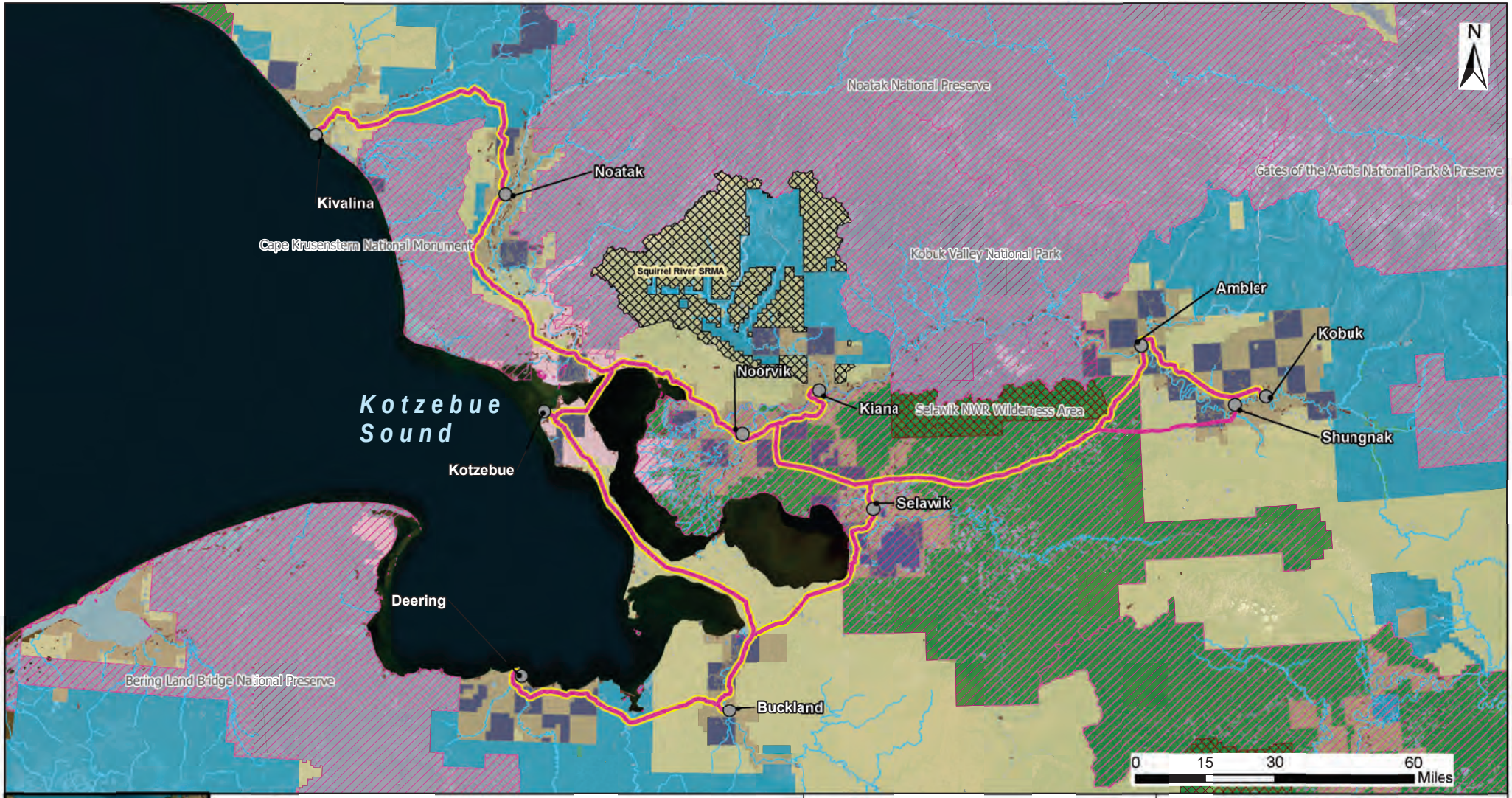


Figure 3.3.2-2: Fiber optic cable.

Figure 3.3.2-3. Photos of the ASTAC GLF one year after placement (July 2023). (Orange stakes present in these ASTAC photos are not proposed for this project)

Figure 3.3.2-4. Photos of the ASTAC aerial crossings one year after installation (July 2023).



Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. BLM land ownership and National Wilderness Areas, Parks, Monuments, Refuges, and other designated management areas were developed using authoritative federal datasets. These boundaries originate from the Surface Management Agency (SMA) layer available through the Bureau of Land Management's (BLM) Spatial Data Management System (SDMS).

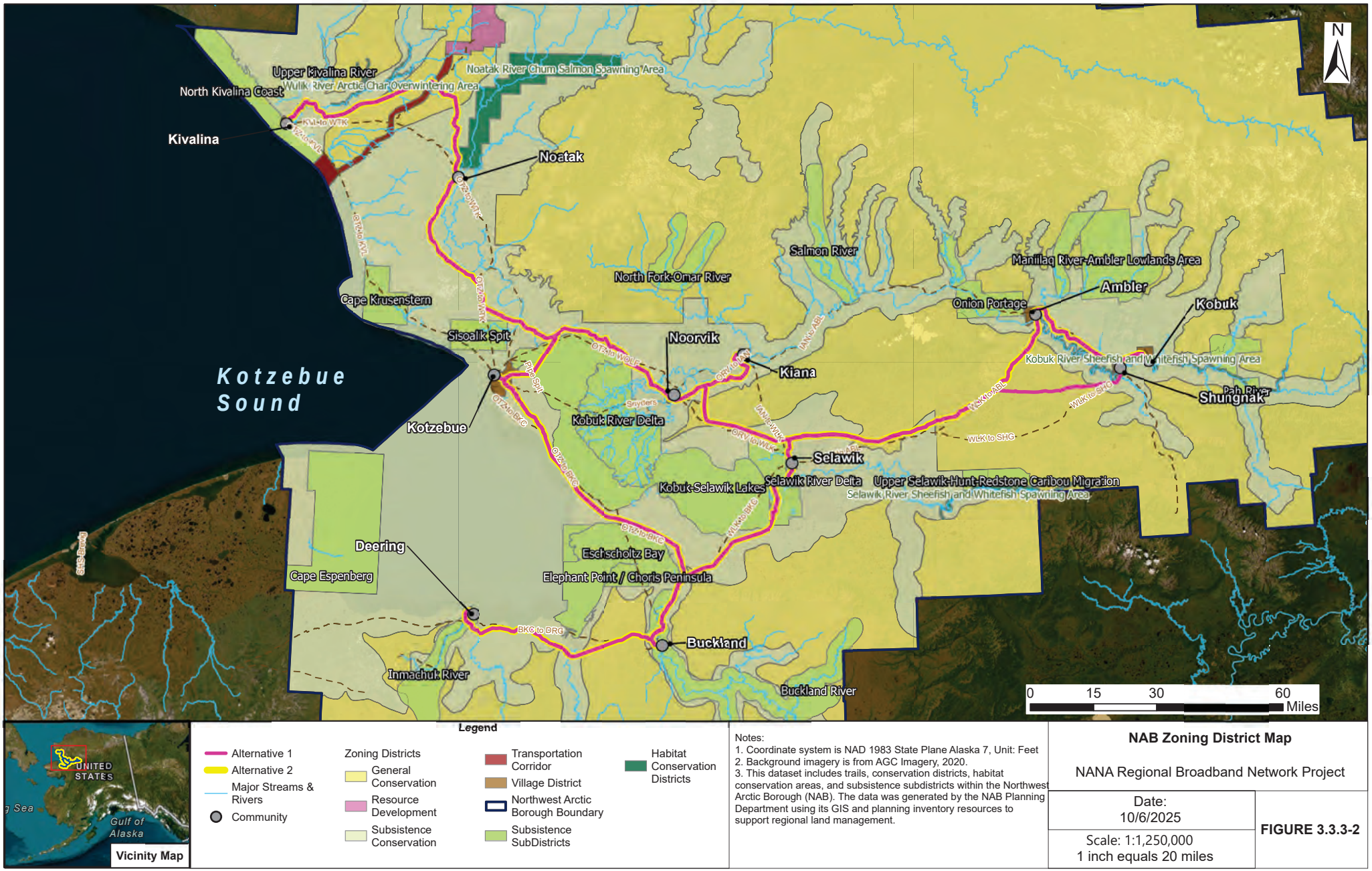
Land Ownership Map

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.3.3-1



Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. This dataset includes trails, conservation districts, habitat conservation areas, and subsistence subdistricts within the Northwest Arctic Borough (NAB). The data was generated by the NAB Planning Department using its GIS and planning inventory resources to support regional land management.

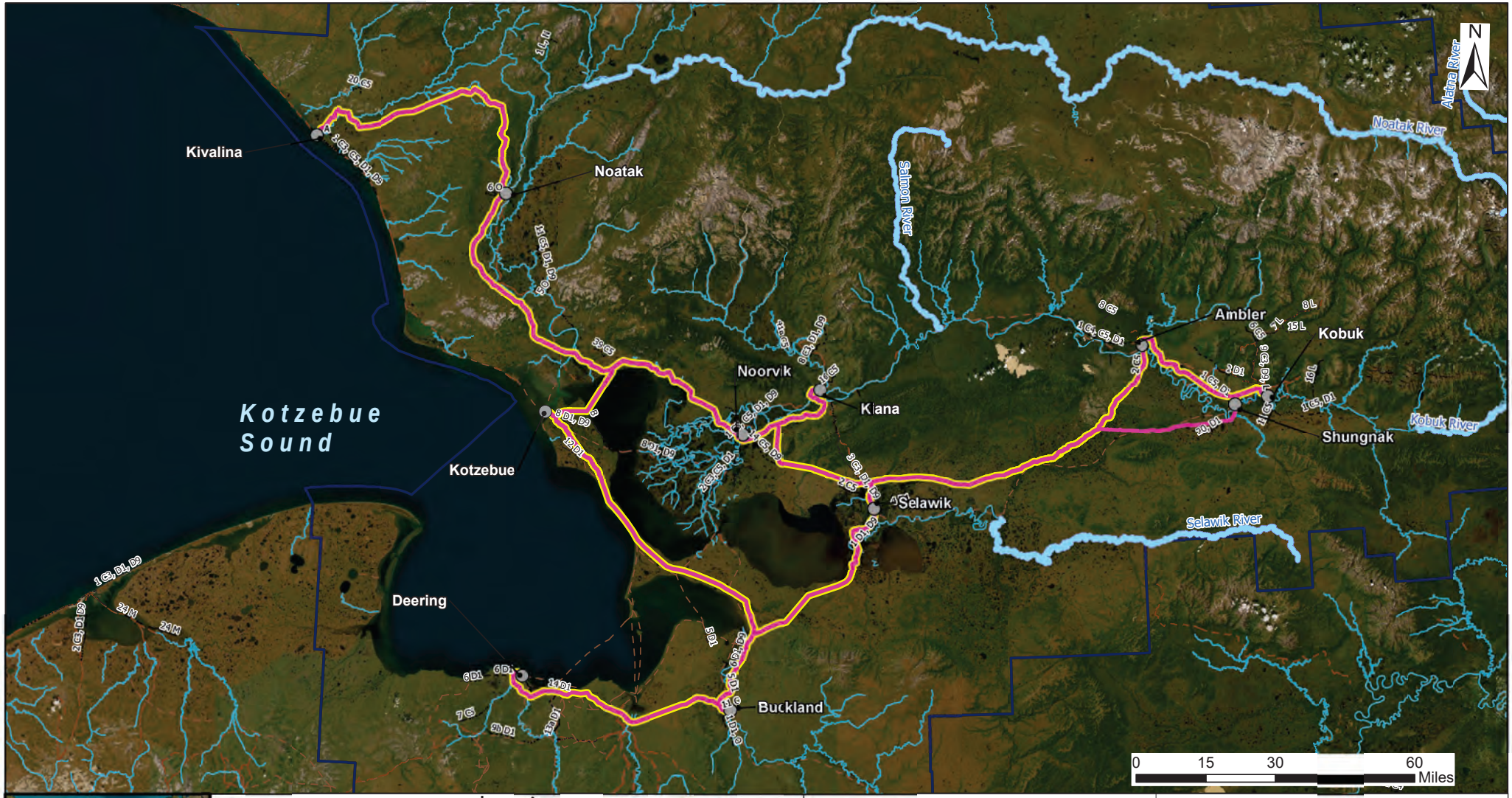
NAB Zoning District Map

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.3.3-2



Legend

- Alternative 1
- Alternative 2
- Major Streams & Rivers
- Community
- RS2477 Trails
- BLM AK Easement 17(b) Line
- Wild and Scenic Rivers

Notes:
1. Coordinate system is NAD 1983 State Plane Alaska 7, Unit: Feet
2. Background imagery is from AGC Imagery, 2020.
3. Data includes RS 2477 trails, which are historic public routes established under Revised Statute 2477 and often used for access across federal lands in Alaska. It also features BLM Alaska Easement 17(b) lines, which are legal access corridors reserved under ANCSA to ensure public and Native corporation access across private lands.

Land Use Map

NANA Regional Broadband Network Project

Date: 10/6/2025

Scale: 1:1,250,000
1 inch equals 20 miles

FIGURE 3.3.3-3

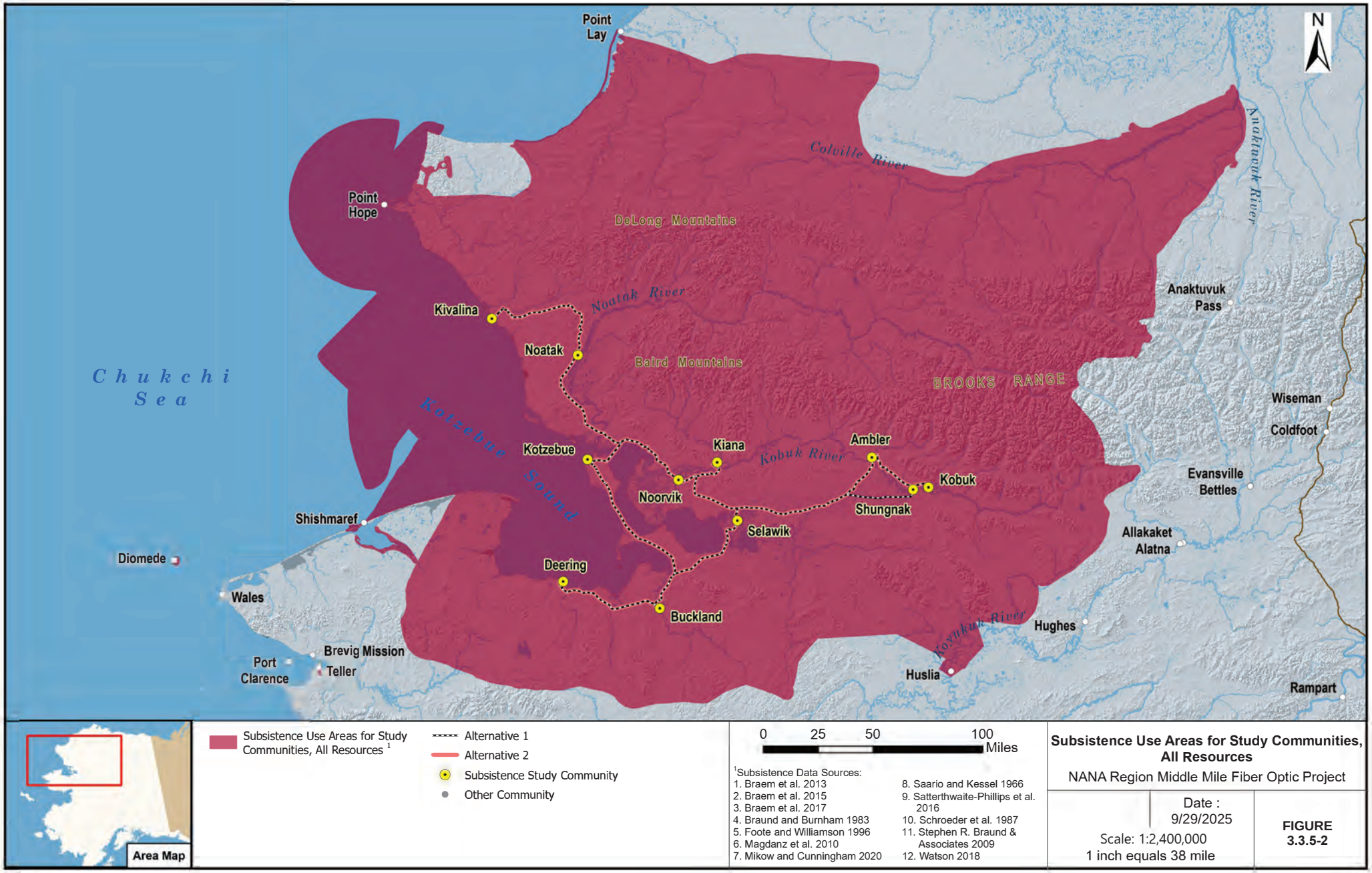
Location of Subsistence Study Communities

NANA Region Middle Mile Fiber Optic Project

Date : 10/2/2025

Scale: 1:2,400,000
1 inch equals 38 mile

FIGURE 3.3.5-1


Point Lay
Point Hope
Kivalina
Noatak
Kotzebue
Kiana
Ambler
Kobuk
Noorvik
Shungnak
Selawik
Deering
Buckland
Shishmaref
Diomede
Wales
Brevig Mission
Port Clarence
Teller
Huslia
Hughes
Allakaket
Alatna
Evansville
Bettles
Wiseman
Coldfoot
Anaktuvuk Pass
Rampart
Chukchi Sea
Kotzebue Sound
Colville River
DeLong Mountains
Noatak River
Baird Mountains
BROOKS RANGE
Kobuk River
Koyukuk River
Anaktuvuk River
N
Area Map
Subsistence Use Areas for Study Communities, All Resources [1]
Alternative 1
Alternative 2
Subsistence Study Community
Other Community
0 25 50 100 Miles
[1]Subsistence Data Sources:
1. Braem et al. 2013
2. Braem et al. 2015
3. Braem et al. 2017
4. Braund and Burnham 1983
5. Foote and Williamson 1996
6. Magdanz et al. 2010
7. Mikow and Cunningham 2020
8. Saario and Kessel 1966
9. Satterthwaite-Phillips et al. 2016
10. Schroeder et al. 1987
11. Stephen R. Braund & Associates 2009
12. Watson 2018
Subsistence Use Areas for Study Communities, All Resources
NANA Region Middle Mile Fiber Optic Project
Date : 9/29/2025
Scale: 1:2,400,000
1 inch equals 38 mile
FIGURE 3.3.5-2

Appendix B – Project Description

National Telecommunications
and Information Administration

Project Description

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

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Table of Contents

1 Project Overview

The NANA Region Middle-Mile Fiber Optic Project (project) aims to establish a reliable, scalable, and future-proof fiber-based broadband network connecting communities in the Northwest Arctic Borough (NAB) to provide affordable high-speed and low-latency internet services to thousands of individuals (Figure 1). This critical telecommunications infrastructure will address long-standing connectivity challenges in the region; it is also designed to serve the region's communities for decades to come.

Figure 1: Map of project area

The fiber optic cable (FOC) route will incorporate a combination of terrestrial ground-laid, subsea, trenched, directionally bored, and aerial cable placement methodologies. The majority of the network will consist of ground-laid fiber (GLF) installed during winter months to minimize impacts to subsistence as well as the sensitive tundra environment. This approach has been successfully implemented in other regions of Alaska, including the Arctic Slope Telephone Association Cooperative (ASTAC) North Slope Fiber Optic Project and the GCI Airraq Fiber Optic Project projects (ASTAC 2019, 2024, BLM 2019, NTIA 2024).

NANA has carefully designed the project to balance environmental protection, respect for subsistence way of life to residents of the NAB, network reliability, construction feasibility, and long-term maintenance requirements. The proposed route represents a refined alignment developed following extensive community consultation, agency feedback, and technical feasibility analysis. Specifically, the process included multiple outreach and engagement activities: visits to each community in 2024 to engage tribes, as well as community members and organizations; a consultation with ASTAC to incorporate lessons learned from their completed North Slope FOC project; and three detailed feasibility or route reviews in partnership with industry experts: New Horizons (2024), Sturgeon Electric, and Kuna Engineering.

2 Project Detailed Descriptions

The project consists of multiple integrated components strategically located throughout the NAB, with project supporting activities planned to occur between Spring 2025 and Fall 2026, and potentially into 2027, while construction activities are expected within that window from Spring 2026 through Fall 2026.

2.1 Project Components

The project consists of the installation of approximately 661 miles of 0.472 in. diameter armored FOC designed specifically for Arctic conditions. This cable contains 24 strands of optical fiber and will connect all communities in the NAB to high-speed broadband internet.

The proposed hybrid GLF approach combines elements of multiple methodologies, primarily utilizing surface-laid terrestrial FOC with strategic marine, aerial, and trenched segments where necessary for system integrity, resident safety, and environmental protection.

GLF (primary method): Cable will be placed directly on the ground during winter when the underlying tundra is frozen and snow-covered, allowing it to settle naturally into vegetation during spring thaw. In suitable habitat, the cable is anticipated to become incorporated into the surrounding landscape, similar to the ASTAC ground-lay FOC construction (Figure 2, ASTAC 2024). In areas of little vegetative cover, the cable will not be incorporated into the vegetation.

Figure 2. Photos of the ASTAC GLF one year after placement (July 2023).

GLF waterbody crossings: When it is not possible to avoid a stream or pond, the cable will be placed with adequate slack on the ice surface so it can passively drop to the bottom of the waterbody after the ice thaws. Anchors on either side of the waterbody will secure the cable at the top of banks. The cable will descend into the waterbody under its own weight after ice thaw. The cable is expected to self-bury within aquatic bed sediments. More details are in the Plan of Development (POD).

Cable Anchors: Low-profile anchoring devices with cable grips will be deployed at splice points, elevation transitions, and at regular intervals of up to 6,000 ft. to mitigate lateral cable movement and preserve splice integrity. These ground anchors will also be on either bank of each stream and lake crossing where necessary (except they are not needed for aerial crossings).

Encased splice points: Splices at intervals of roughly 24 miles, or closer as necessitated by site conditions, will be enclosed within a weatherproof enclosure designed to secure and protect the joint where FOCs are interconnected.

Large River Crossings: There are several more complex river crossings that require additional construction techniques:

Aerial crossings: There are large river crossings where the cable will be suspended 20-ft. above the water on wooden poles, which will allow safe passage for boats and wildlife. More information on aerial crossings is detailed in the POD.

Directionally bored crossings: There are complex river crossings where horizontal directional drilling (HDD) method will be utilized in the summer months—but HDD will not be utilized on federal lands. The HDD rig will bury the FOC approximately 4 ft. beneath the riverbed (in 2-in. conduit) by using a locator beacon to drill a pre-planned path and subsequently pulling the FOC through the drilled path.

Subsea crossing: The project includes one to two subsea crossing(s) at Kotzebue Sound/Hothem Inlet, where the FOC will be anchored into concrete beach manholes on either side of the channel and trenched/laid on the seafloor. Details are available in the POD. Best management practices (BMPs) will be implemented throughout the operation to protect the aquatic environment as well as marine life, minimize bank erosion, and avoid creating drainage paths. Construction of the subsea crossing is expected to take 4-12 days.

Trenched segments: Due to high traffic near villages, the cable will be shallowly buried in trenches to reduce the risk to public safety (trip and entanglement hazards) and prevent cable damage. More information on trenching is detailed in the POD. Cultural resource surveys will be conducted in the area of the trenches, and NANA will coordinate with the village tribes as well as the NAB for these surveys, which will occur summer 2026.

Network Operating Center (NOC): The NOC will be located in Kotzebue to manage and monitor the entire system.

Utility poles: The project will tie into existing utility poles to hang ~1.3 miles of FOC as it exits Kotzebue and ~7 miles as it exits Kivalina. Pole access agreements are being initiated as necessary. This multi-use of existing infrastructure here and elsewhere underscores the limited environmental or species disruption of the project as a whole.

Cable Landing Stations (CLS): There will be a CLS in each connected village to house network equipment.

For access to the construction areas, the project will primarily utilize winter trails created by low ground pressure vehicles (LGPVs) with no permanent access roads being constructed. Equipment and materials will be staged at existing facilities in villages, eliminating the need for additional staging areas and thus environmental or species disruption.

During construction, the deployment trains will include mobile sleigh camps to house crews and move along the route as work progresses (Figure 3). Fuel sleighs with 5,000-gallon capacity will travel alongside these mobile camps to provide necessary fuel for equipment and heating (Figure 4). Spill

prevention and mitigation measures will be deployed in compliance with all applicable requirements and best practices. No permanent construction facilities will remain after project completion.

Figure 3: Deployment train

Figure 4: Mobile fuel sleigh contains two 5,000-gallon double-walled tanks

Regarding waste management, all waste materials generated during construction will be transported back to villages for proper disposal. No dedicated waste disposal sites will be created for this project. Hazardous waste will be handled according to all applicable regulations and transported to approved facilities, as detailed in the project's Hazardous Materials and Waste Management Plan.

Regarding wildfire, the HDPE (high density polyethylene) cable is not highly flammable, but it is combustible (PES-TEC, undated). This means that under certain conditions it can catch fire, but it does not ignite easily compared to other materials, and it has a high melting point. In contrast to

polyvinyl chloride, which emits toxic compounds when burned, it burns with less smoke and primarily combusts into carbon dioxide and water (Table 1). It is resistant to many chemicals such as acids, basses, and most organic solvents. This is not regulated as a hazardous good and is rated as a Grade B2 (normally flammable) and HB (indicating a slow horizontal burn with a rate of less than 3 inches per minute, or the flame self-extinguishes before burning 3 inches) for flammability. Off gases when burned at 550°C yield:

Table 1: Off Gases, when burned at 550 C

Off-Gas	mg/g
Carbon Dioxide	1842
Carbon monoxide	312
Methane	18
Ethylene	70
Ethane	11
Propylene	38
Propane	8
1-Butene	19
Butane	6
Trans-2-utene	11
Cis-2-Butene	2
1-Pentene	13
Pentane	3
1,3-Pentadiene	38
1-Hexene	16
2-Hexene	6

2.2 Project Location and Land Use

The proposed 661-mile FOC route connects 8 communities within NAB's jurisdiction. The project has been carefully designed to minimize environmental and subsistence impacts, including the number and location of waterbody crossings, while ensuring reliable broadband connectivity to all communities.

2.3 Project Timeline

The project will begin with pre-construction activities in Spring/Summer 2025, including cultural resource surveys and barging equipment/supply to Kotzebue during the summer months. Equipment and materials will be staged at villages during Summer/Fall 2025 in preparation for the main construction phase.

Winter construction will commence in January 2026 following personnel mobilization in late December 2025. This will be after the minimum snow depth has accumulated, helping to minimize the impact to vegetation and the landscape. The main FOC ground-lay operations will deploy from two to three separate teams simultaneously: one team starting in Kivalina and working towards Noatak, Noorvik, and Kiana; a second team starting in Kiana and building toward Ambler, Kobuk, Shungnak, and Selawik; and a third team starting in Kotzebue and heading south along the Baldwin Peninsula to Buckland, Deering, and Selawik. This primary GLF installation and aerial stream crossings are expected to be completed by late April 2026 or 2027.

The summer construction phase will begin in May 2026 or when the ice melts, allowing work on subsea and major river crossings utilizing the HDD method as necessary. Subsea crossing construction at Kotzebue Sound will occur during June-July 2026, while HDD river crossings as necessary will be constructed between June and August 2026. During July and August, crews will also conduct aerial-supported cable inspections from the winter construction activities, make seating adjustments where needed, and complete in-village connection work.

The project will enter its completion phase in September 2026 or early 2027, with demobilization and final inspections taking place. System testing and commissioning will follow in 2027, marking the full activation of the broadband network for communities throughout the region.

	2023	2024				2025				2026				2027			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Project Review																	
Environmental Review																	
Permitting Process																	
Preconstruction Activities																	
Winter Construction (after minimum snow cover has accumulated)																	
Summer Construction																	
Testing and Launch																	

Figure 5: Project Timeline

3 Required Permits and Authorizations

Federal permits include a Bureau of Land Management (BLM) Right-of-Way (ROW) grant for construction on BLM lands, a U.S. Fish and Wildlife Service (USFWS) ROW permit for construction on Selawik National Wildlife Refuge, a U.S. Army Corps of Engineers (USACE) Section 404/10 Permit for construction/fill in wetlands and work in Section 10 navigable waterways, and a National Oceanic and Atmospheric Administration (NOAA) NMFS Essential Fish Habitat (EFH) Assessment (Table 2).

At the state level, the project requires an Alaska Department of Natural Resources (ADNR) ROW easement for construction on state land, an ADNR Office of History and Archaeology Section 106 Consultation for National Historic Preservation Act (NHPA) and Alaska Historic Preservation Act compliance, and this Alaska Department of Fish and Game (ADF&G) Title 16 Fish Habitat Permit for crossing state waters.

Local authorizations include a Kikiktagruk Inupiat Corporation (KIC) Land Access/ROW Authorization for construction on KIC lands as necessary, a NANA Regional Corporation Land Use Permit for construction on NANA lands, and a Northwest Arctic Borough Title 9 Permit.

The status of federal authorizations for the project is being tracked through a federal permitting dashboard that will help ensure timelines are met, ultimately enabling the project construction to begin in January 2026.[1] This coordinated permitting approach allows all stakeholders to monitor progress and understand how individual authorizations fit into the overall project timeline. NANA is committed to working diligently with all permitting agencies and landowners to secure timely approvals while ensuring proper environmental protection and stakeholder engagement.

[1] The permitting dashboard, maintained by the Federal Permitting Council under the FAST-41 program can be accessed at: https://www.permits.performance.gov/permitting-project/fast-41-covered-projects/nana-regional-broadband-network-nrbn.

Table 2: Listing of state, federal, and local permit applications needed for the project

Agency	Permit/ Authorization	Regulated Activity	Status
Federal			
BLM	ROW Grant	Construction on BLM lands	Submitted
USFWS	ROW Permit	Construction on USFWS land	Submitted
USACE	Section 404 Permit	Construction/fill in wetlands	In progress
USACE	Section 10 Permit	Work in Section 10 Waters	In Progress
FAA	Airspace Obstruction	Construction of structures, aerial lines, etc.	In Progress
NOAA	NMFS EFH Assessment	EFH consultation	In progress
State			
ADNR DMLW/ Northern Region	ROW easement	Construction on state land	Submitted
ADF&G	Title 16 Fish Habitat Permit	Crossing of state waters	Submitted
ADNR OHA/SHPO	Section 106 Consultation	Compliance with NHPA	In progress
Local			
KIC	Land Access/ROW Authorization	Construction on KIC lands	Submitted
NAB	Title 9 Permit	Development within the Borough	Submitted
NANA	Land Use Permit	Construction on NANA lands	In progress

4 Community Engagement and Subsistence Protection

NANA has prioritized meaningful community engagement throughout the project planning process. Between July and October 2024, the project team conducted formal community meetings in all ten villages affected by the project. These meetings included comprehensive presentations on the project scope, timeline, and anticipated benefits, followed by interactive question and answer sessions with community members. During these sessions, residents reviewed detailed maps of the proposed cable routes and provided valuable input on potential adjustments, prioritizing subsistence and customary way of life for these communities. Community concerns and suggestions were meticulously documented to ensure incorporation into the final project design. These meetings were conducted in partnership with tribal and local leadership.

NANA is committed to maintaining robust community engagement and tribal consultation throughout project implementation with a multi-phase approach. Prior to construction in Fall 2025, NANA will conduct updated presentations in all affected communities, distribute detailed construction schedules, share final route plans and construction methodologies, and encourage meaningful engagement with all tribal and community stakeholders. During the construction phases in Winter 2025-2026, Summer 2026, and potentially 2026-2027, NANA will provide updates to all stakeholders and engage in dynamic feedback and information sharing. A contact system for construction supervisors will be maintained, complemented by regular community radio announcements regarding construction progress and a quick response system for addressing any subsistence concerns that arise. Following construction completion, NANA will hold community meetings to gather feedback on construction impact mitigation efforts, present cable inspection and repair protocols, develop long-term community input mechanisms, and host information sessions on broadband service availability.

5 References

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Appendix C – Plan of Development

NANA Regional Broadband Network Project

Plan of Development

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

Table of Contents

1 INTRODUCTION

The NANA Region Middle-Mile Fiber Optic Project has developed this Plan of Development (POD) to detail the project's in-depth construction methodology and how it was developed.

1.1 BACKGROUND AND MILESTONES

The initial conceptual plan for the project called for subsea and riverine construction of the entire fiberoptic cable (FOC) network. In early 2024, a feasibility study was conducted to evaluate routes and construction methods, with the objective of finding a balanced approach that minimizes environmental and thus subsistence impacts, enhances critical infrastructure resiliency, and considers the costs associated with effective project implementation and operations. Based on that study, it was determined that a primarily ground-lay terrestrial route would offer the most successful and balanced methodology.

In summer and fall 2024, NANA traveled to each village and held tribal and community engagement meetings. The proposed project was introduced and discussed, question and answer sessions were held, project maps were reviewed, and community feedback on proposed cable routes and potential adjustments were gathered.

A virtual project introductory meeting was held with most jurisdictional agencies on December 10, 2024. Attendees included the Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), the Alaska Department of Fish and Game (ADF&G), and the Alaska Department of Natural Resources (ADNR). NANA presented a summary of the proposed project and discussed land status through the project corridor, construction methods, and permit requirements.

Follow-up pre-application meetings were held throughout December 2024-February 2025 with individual agencies, specifically BLM, US Army Corps of Engineers (USACE), USFWS, ADF&G, ADNR, and Kikiktagruk Inupiat Corporation (KIC). The individual meetings allowed for more focused conversations on project details, permit requirements, and timelines. It also allowed NANA to solicit feedback to carry into the final project design.

1.2 LAND USE

The proposed FOC route traverses the Northwest Arctic Borough (NAB) and crosses lands owned by the BLM, USFWS (Selawik NWR), State of Alaska, NANA, and KIC. While the proposed route is shown on maps, the final right of way (ROW) shall be finalized during construction to optimize alignment and minimize impacts.

1.3 FISH AND WILDLIFE

This project shall require compliance with National Environmental Policy Act (NEPA); the NEPA analysis shall detail the project's potential effects on fish and wildlife. This section is a summary of some of the designed mitigation measures currently identified.

The proposed alignment crosses anadromous fish streams and essential fish habitat (EFH), but the project has been designed to minimize any incidental impacts on fish species. Construction methods preferentially design stream crossings to include no streambank impacts, but project integrity requires some bank work at certain crossings to minimize risk to FOC damage. Construction and maintenance activities that have the potential to impact fish and fish habitat shall occur during

timing windows designated by ADF&G and National Marine Fisheries Service (NMFS) to minimize or eliminate detrimental effects on the impacted species, using best available criteria. Long-term operation of the broadband network shall not result in any additional impacts to fish or fish habitat. Further details on avoidance, mitigation, and monitoring measures are outlined in Section 4.0.

NANA shall install bird deterrents and reflective markers for other wildlife (Figure 1, additional information in Section 2.3.5.3). The bird diverters increase the visibility of the cable and decrease bird strikes. This project shall install the same style diverters as used in the Arctic Slope Telephone Association Cooperative FOC project that connects Atqasuk to Utqiaġvik, which are proven to be effective in Arctic environments and recommended by USFWS. The diverters spin in winds over 3 miles per hour, reflect light, glow during dawn and dusk, are visible to birds up to 1/4 mile away, and shall be placed at 30-foot intervals. The luminescent material on the diverters emits visible light for up to 12 hours after dusk and in low light or fog conditions.

Clearing and/or grubbing activities shall be necessary when vegetative cover prohibits wintertime off-road vehicle traffic. The proposed FOC alignment has been carefully selected to minimize forested and shrubby land cover to reduce the amount of clearing that would impact birds and other wildlife (Section 2.3.3).

The polar bear (*Ursus maritimus*) and two bird species, the Steller's eider (*Polysticta stelleri*) and spectacled eider (*Somateria fischeri*), are protected under the Endangered Species Act (ESA) and are known to exist within the project area. No adverse impacts are anticipated to affect these species as a result of this low-impact project.

Figure 1: Example of bird diverters to be installed on aerial crossings.

Subsistence activities (gathering, hunting, foraging) were identified as an area of concern related to project activities in agency meetings. Construction is planned for winter months where gathering/foraging is minimal and migratory species shall be absent or overwintering outside the project area; as such, limited or no interference with subsistence activities are anticipated. NANA shall adhere to the project-specific stipulations defined in all permits/authorizations and shall coordinate with all tribes and impacted communities on staging and timing of construction. Further

consultation with tribes and local community members to develop informed and specific construction protocols to limit subsistence impacts is anticipated.

1.4 CULTURAL RESOURCES

A desktop study of potential cultural resources in the project area has been developed. This study identified cultural resource sites, historic properties, and previous cultural resource investigations within the proposed construction corridor. It also identified areas where cultural resources may be located based on topography, area land uses, and other indicators. The desktop study informed an August 2025 field investigation that was performed to further inspect and identify tribal and specific cultural resources across the area.

Overall, the proposed project and construction methodologies are unlikely to disturb surface and subsurface cultural resources. The primary concerns for disturbance would be at river crossings and in the limited areas where trenching is proposed.

1.5 WETLANDS

While the FOC corridor is primarily located within wetlands, the potential environmental impact is minimized through the winter-scheduled ground-laid fiber (GLF) methodology with low ground pressure vehicles (LGPVs), which avoids ground disturbance in most areas. Disturbance is limited to activities related to the river crossings (i.e., pole installations), subsea crossings, and trenching near villages as necessary, as detailed in Sections 2–3. The project and route have been designed to avoid and minimize wetland impacts to the highest extent possible. Temporary and permanent impacts are detailed in the USACE Section 404 permit application.

2 WINTER CONSTRUCTION ACTIVITIES

The majority of the project shall be constructed during the winter months, which includes the GLF method across the terrestrial landscape, lakes/ponds, minor stream crossings, and some of the major stream crossings. This section outlines the proposed winter schedule and construction methodology.

2.1 WINTER SCHEDULE

The FOC ground lay is planned to occur during the 2026 and possible 2027 winter construction season. NANA intends to mobilize equipment, barge supplies, and stage materials in summer/fall 2025 and mobilize personnel in late December 2025 to commence the ground lay in January 2026. Exact winter construction start dates shall depend on subsistence consideration, as well as requirements being met for adequate snow cover and ground conditions to support off-road winter travel to minimize environmental impacts (see Section 2.3 for more details). Cable inspections/seating, in-village work, and major water crossings shall occur during the summer of 2026 and 2027 (Section 3.0). The post-construction cable inspection and seating shall be conducted via helicopters.

2.2 PRE-CONSTRUCTION ACTIVITIES

A ground survey of the route by snowmachine occurred in mid-March 2025. This reconnaissance effort helped to refine/optimize the proposed route with the aim to reduce waterbody crossings, minimize environmental and thus subsistence impacts, avoid challenging terrain/barriers, and ensure a robust construction plan. The reconnaissance effort was successful in helping to identify the appropriate construction methodologies for the larger river crossings (Sections 2.3.5.3 and 3.2.2). Cultural/archaeological surveys of the proposed route are complete.

2.3 CONSTRUCTION DETAILS AND METHODS

Construction is scheduled to commence in January 2026 pending receipt of necessary permits and land access agreements. The winter construction schedule shall also be dependent on subsistence considerations, as well as meeting requirements for snow cover/ground conditions sufficient for off-road winter travel.

Impacts would be reduced by conducting winter overland travel only when the required snow coverage is present. Appendix E2 provides the methods for determining the snow depth.

2.3.1 EQUIPMENT

To minimize ground disturbance, the cable shall be placed during winter months utilizing purpose-built equipment designed to perform with minimal impact to the variable tundra landscape of the NAB (Table 1). LGPVs shall be used to deploy the cable and transport personnel, camps, fuel, equipment, and cable tanks along the route. These are the same types of equipment used on the North Slope, for winter overland travel to support oil industry and fiber optic deployment. The equipment (i.e. CAT Dozer, Steiger) have been utilized for decades in a similar low PSI method on the North Slope.

Table 1: Construction equipment proposed to be used for the project.

Equipment	Model	Weight (lbs)	PSI
PistenBully (tracked)	PB600	18,000	2
CAT Dozer (tracked)	D6	50,400	4.2
Steiger Case Tractor (tracked)	535	55,000	5.5
Mulcher (tracked)		25,000	3.3
Mini-Excavators (tracked)		~18,000	4.2
Scissorneck Trailer		35,000	2.9
Flatdeck Trailer		26,000	2.1
Medium Sleigh Trailer		20,000	

2.3.2 FIBER OPTIC CABLE SPECIFICATIONS

The FOC is armored and designed for extreme climate conditions and is durable to wildlife disturbances. A cross-section of the cable is provided in Figure 2, with an example of actual cable size.

Fiber used in the cable was manufactured by Corning (Corning SMF28ULL) in the United States. The cable is manufactured by Prysmian (Prysmian MINISUB LW 48_12 mm) in Germany and has been used on numerous fiber projects around the world, including similar ground lay and subsea projects in Alaska. The outer sheath on that cable is HDPE, which again is used on cables/ducts/conduits and in many other applications around the world, in the US and in Alaska on all sorts of projects.

The cable consists of three main layers:

- Cable core: 24 strands of optical fiber surrounded by a rigid seam-welded copper tube filled with water blocking and hydrogen absorbing compound
- Armoring layer: twelve 1.7mm high tensile strength steel wires
- Outer protection: black high-density polyethylene (HDPE) sheath designed to seal the cable from water ingress
- Cable size and durability-related specifications:
- Thickness: 0.472 in. diameter (smaller than a penny)
- Depth capability: >16,000 ft.
- Cable breaking load: 11,240 lbs of force
- Minimum bending radius: 2.5 ft.

Figure 2: Fiber optic cable specifications.

2.3.3 CONSTRUCTION SEQUENCE

Two to three temporary deployment trains consisting of 12–14 personnel each shall operate simultaneously for the construction activities:

- One crew shall start in Kivalina and work towards Noatak and Noatak River, and then to Noorvik and Kiana.
- Another crew shall start in Kiana and build toward Ambler, Kobuk, Shungnak, and Selawik.
- A third crew shall start in Kotzebue and ground-lay south along the Baldwin Peninsula to Buckland, Deering, and Selawik.

The Hotham Inlet crossing, Kugruk Estuary crossing, all in-village construction activity, and several complex river crossings shall occur in summer 2026/2027, following the main winter build (summer construction detailed in Section 3.0).

Winter installation shall begin with a field survey of the planned FOC route to determine the precise path that the right-of-way (ROW) shall occupy. This shall be followed by minimal vegetation clearing (as needed to facilitate access by cable placement equipment [Figure 3]), snow movement to create a stable prepacked trail and ensure required minimum snow cover, pole placement in preparation for aerial cable crossings of larger rivers, and finally placement of the ground-laid FOC. Each deployment train shall include:

- Tracked cable deployment equipment and a powered spooling system to ensure adequate slack during placement
- Mobile sleigh camp for crew housing
- Clearing equipment (for vegetation removal)
- Support snowmachines for crew transport
- Digging equipment for stream crossings and aerial pole installation

Cable placement shall occur rapidly with the mobile camp traveling daily with the construction team. The cable deployment vehicles shall generally be moving in one direction and shall only pass a location one time. Snowmachines may travel between the camp and cable deployment equipment, but the travel is anticipated to be minimal.

The mobile camp shall be equipped with water-holding tanks that shall be refilled at each village. Grey water shall be maintained in a small tank and emptied into village sewer systems, as necessary. Compositing toilets are anticipated to be used during construction activities. Solid waste shall be accumulated and disposed of in village landfills. More details on hazardous waste usage and disposal are available in the Hazardous Waste Management Plan.

Where vegetation clearing is necessary, a mulcher shall cut vegetation to the level of the snow surface and replace the cut vegetation where it was originally removed, to minimize non-native species proliferation and ground lay impacts. Clearing of vegetation shall be limited to the 30 ft. construction corridor, though the clearing swath shall be only as wide as necessary to support equipment passage (often only 15 ft. [Figure 3]). Vegetation requiring clearing shall primarily consist of woody shrubs with the potential to be taller than the required minimum snow cover, including willows (*Salix* sp.), dwarf birch (*Betula nana*), and green alder (*Alnus viridis*) (Wells et al. 2022). The preferential placement of the FOC is directly on the ground surface, so construction activities shall attempt to avoid areas with a high density of shrubs. Larger diameter (> 9-12 in.) woody materials shall be stockpiled and transported back to the nearest community for sustainable use as firewood.

2.3.4 TERRESTRIAL GROUND-LAY FIBER PLACEMENT

Overland route segments cross extensive wetlands and shall be installed during winter months with adequate snow cover and frozen substrate to minimize ground disturbances.

The FOC shall be spooled out of 20 ft. (length) sleigh-mounted cable tanks (Conex containers) that have approximately 24 miles of cable in each container. Cable shall be laid directly on a prepacked trail via a powered spooler and crew members shall manually guide the cable to the center of the alignment in a 12 ft. wide serpentine pattern to provide enough slack (3–5%) to accommodate the contour of the terrain, allowing it to settle on the vegetation and conform to changing surface features and environmental conditions (Figure 3).

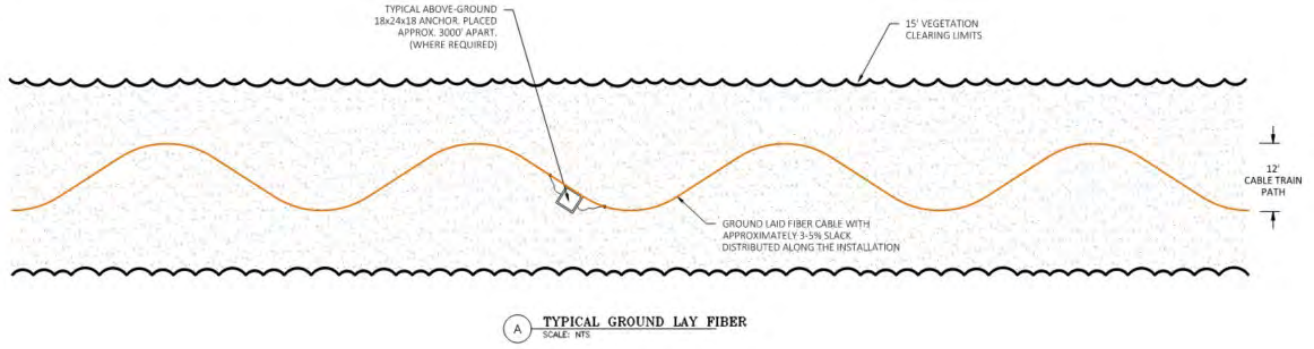

Figure 3: Typical example of ground-lay fiber placement.

Splices at intervals of roughly 24 miles, or closer as necessitated by site conditions, shall be enclosed within weatherproof splice enclosures (28 inches x 14 inches x 14 inches) designed to secure and protect the joint where FOCs are interconnected. Low-profile anchoring devices and cable grips shall be deployed at splice points, elevation transitions, and at regular intervals of no greater than 6,000 ft. to mitigate lateral movement and preserve splice integrity (Figure 4). Additional cable weight, armor, and anchoring measures shall be implemented as required during the cable deployment process to ensure stability and durability.

Along segments of the route where two cables are laid in the same corridor for redundancy (i.e., out and back from a village or the single corridor through Selawik NWR), the dual FOCs shall be placed side by side during the ground-lay operation.

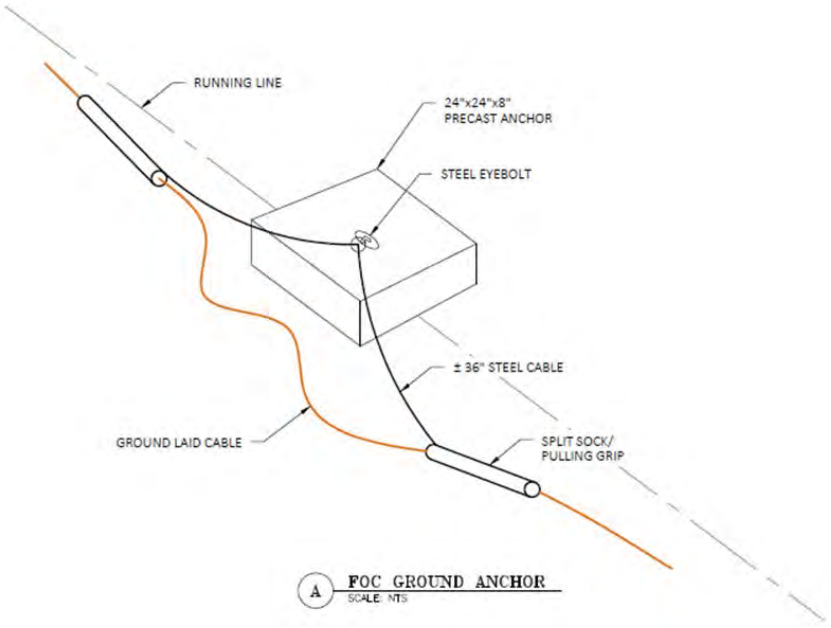

Figure 4: Schematic of the GLF anchor system.

Track mounted GPS systems shall verify placement within approved corridors and monitor linear footage to ensure 3-5% slack is provided (this shall be placed in a serpentine pattern as shown in Figure 3). Winter deployment is expected to last 100-110 days.

2.3.5 WATERBODY CROSSINGS

Waterbody crossings are minimized by routing overland when possible (Section 1.2.3).

2.3.5.1 LAKES AND PONDS

When it is not possible to avoid a lake or pond, the cable shall be laid with adequate slack on the ice surface to facilitate the cable passively dropping to the bottom after the ice thaws. Anchors on either side of the waterbody shall secure the cable at the top of the banks (Figure 4). The low-profile anchors shall be connected to the cable and placed on top of the snow surface. They shall descend to the ground surface with the melting snow and shall remain in place on the bank. The cable shall sink into the waterbody under its own weight after ice thaws and is expected to self-bury within aquatic bed sediments over a short period of time.

2.3.5.2 MINOR STREAMS

For small streams/rivers, the FOC shall be laid in a manner similar to the deployment of lakes and ponds during winter construction. The cable shall be deployed across the ice surface with enough slack for the cable to passively drop to the bottom of the stream once the ice thaws. Heavy, low-profile anchors securing the cables shall be placed on either stream bank. Care shall be taken to position the crossings where the streambanks are most stable (e.g., straight, laminar sections of rivers, well-graded bank material, gentle bank slope angle, etc.) to provide erosion protection and

stability for the cable. Once the snow and ice melt, the anchors and cable shall descend to the stream bed or ground surface (Figure 5).

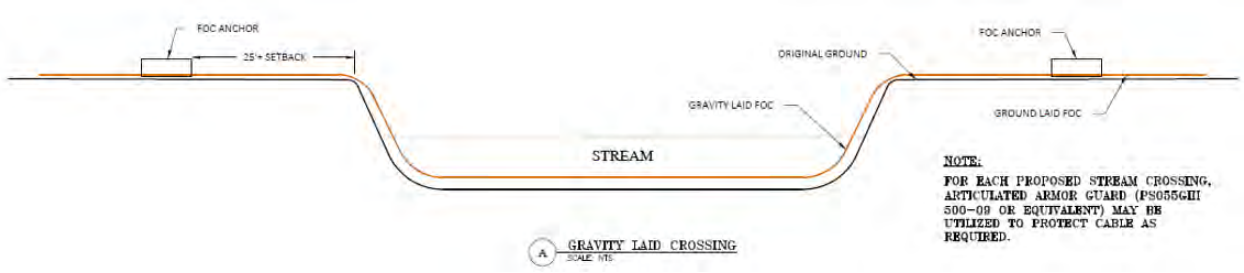

Figure 5. Typical gravity lay fiber cross-section for small stream crossings, as depicted after the snow melts.

When crossing incised streams with steep banks, the cable shall need to be secured in the bank to avoid risks associated with the cable not being flush with the stream bed and bank (Figure 6). These crossings shall involve clearing snow, shallowly excavating into the bank using a mini excavator, placing the fiber in the trench, and backfilling the trench with side cast bank material. During excavation, the organic layer shall be temporarily removed, but excavations shall not reach the permafrost layer. The cable shall transition to gravity laid in the stream bed. The number of such crossings shall be minimized by selecting crossing locations with more favorable geometry during construction that would allow for crossing without temporary bank disturbance, as illustrated in Figure 6. It is estimated that 10 of the ground lay stream crossings shall require bank excavation and the construction crews shall prioritize locating a crossing section that does not involve bank disturbance.

During the cable inspections, which shall occur during the summer following installation, locations where the bank cut method was performed shall be closely monitored for vegetation regrowth and bank stability. If the backfilled material does not appear to be stable and regenerative, then streambank restoration techniques shall be implemented using best practices. ADF&G shall be informed of these locations and shall be consulted prior to restoration efforts.

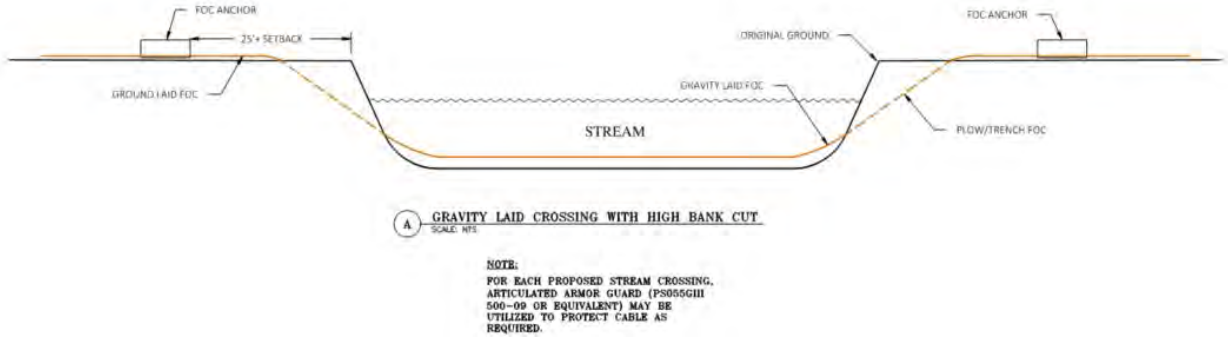

Figure 6: Typical gravity lay fiber cross-section for small stream crossings with steep banks.

The contractor shall install anchoring devices at each stream bank to minimize stress, avoid potential damage, and limit cable movement in flowing water (Figures 4-6). At crossings with

substantial depth and turbulence, the FOC shall be encased in split armor piping or similar between anchor points to increase stabilization and protect the cable and prevent ice buildup. The armored piping shall be continuous from an anchor on one side of stream bank to the anchor point on the opposite bank. It is expected that natural sediment transport shall passively bury the cable over time.

For segments with dual-placed fiber (for system redundancy), the cables may be laid together. This shall minimize physical impacts on the environment.

2.3.5.3 MAJOR RIVERS

At major river crossings, the FOC shall be directionally bored (as described in Section 3.2.2 below), or shall be run aerially over the water to allow safe passage for boats, aircraft, and wildlife.

The aerial cable shall be connected to 35-45 ft. treated wooden poles with the following conceptual design considerations:

- Installing the pole and guy wire anchors, with the method to be determined by ground conditions, into frozen tundra and placing wooden poles vertically
- Filling voids around pole with native fill material
- Splicing and mounting the cable
- Attaching the FOC to a galvanized steel cable and stringing over river crossings
- Increasing visibility of the cable and infrastructure at each aerial crossing:
- Bird diverters to avoid bird strikes (Figure 1)
- Reflective markers on guy wires and poles to protect travelers (e.g., boats, float planes, snowmachines) and wildlife

At aerial crossings, the anchoring design and configuration shall ensure cable sag does not fall below the minimum engineered 20-ft. ice-loaded clearance above bank elevation. All aerial crossings have been designed with a single anchor attached to each pole (Figure 7). Where aerial applications involve dual FOCs sharing the same corridor, the cables shall be installed on the same poles to minimize environmental and visual impacts. Similar aerial installations were used for the Arctic Slope Telephone Association Cooperative (ASTAC) fiber optic project, which can be seen from the photos in Figure 8 approximately 1 year after installation.

The aerial crossings are designed to minimize impacts to the streams and rivers they are crossing. Minimum 25-foot setbacks for pole installation shall ensure that this method does not result in streambank erosion. Periodic inspections throughout the project's duration shall monitor for any structural changes over time and, if any maintenance is needed, it shall occur early on to prevent impacts on the stream or stream banks.

Most waterbody crossings shall be installed during the main winter construction window. However, the most complex river crossings shall be constructed in summer 2026 utilizing horizontal directional drilling (HDD, Section 3.2.2).

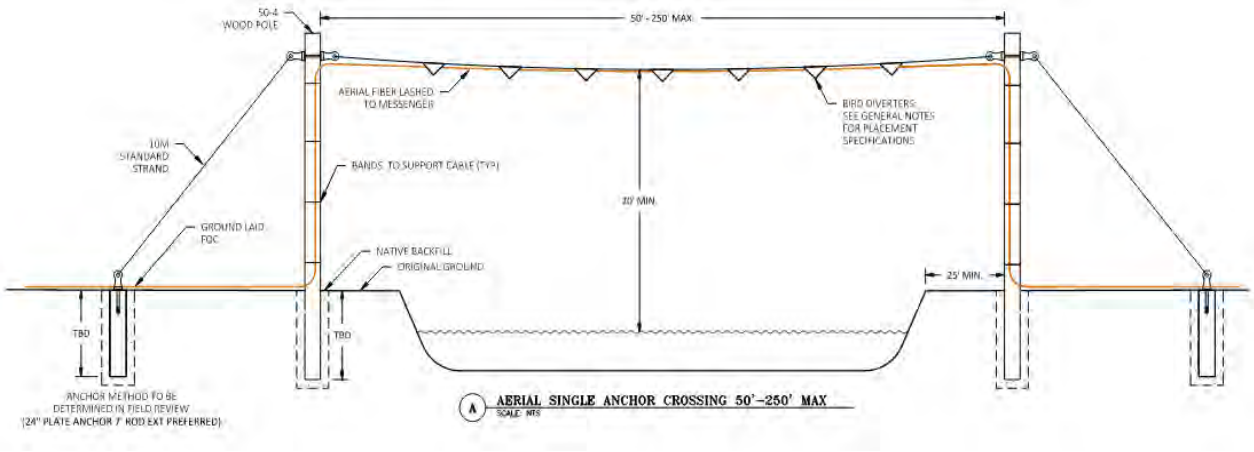

Figure 7: Schematic of an aerial crossing design.

Figure 8. Photos of the ASTAC aerial crossings one year after installation (July 2023).

2.4 CONSTRUCTION SUPPORT DETAILS

Fuel shall be stored in 5,000-gallon fuel sleighs alongside the mobile camps and shall be disbursed to field crews in quantities up to 2,500 gallons. Mobile camps shall move with the crews. Fuel shall be supplied from nearby villages.

The development of several plans/policies shall guide construction activities. These measures may include, but are not limited to, the following:

- Waste Handling Plan
- Wildlife Interaction Plan
- Cultural Resources Orientation and Management Plan
- Weed Control/Invasive Species Management Plan
- Stormwater Pollution Prevention Plan (SWPPP)

- BLM Required Operating Procedures ROPs from the Kobuk Seward Peninsula Resource Management Plan

3 SUMMER CONSTRUCTION ACTIVITIES

Several complex components of the project's construction shall occur during the summer months when snow and ice-free conditions are needed, including the Hotham Inlet subsea crossing, several major river crossings, trenching outside of villages, and securing the FOC to existing utility poles. This section outlines the proposed summer schedule and construction methodology.

3.1 SUMMER SCHEDULE

The summer construction schedule shall commence once sea and river ice melts, allowing barges hauling equipment to travel upriver (approximately May 2026). Construction within the villages shall occur throughout the summer of 2026 and 2027. Subsea construction is scheduled for June-July 2026. Major river crossings with HDD installations shall occur June-August 2026. Winter GLF inspections and cable seating shall take place from July-August 2026/2027. Finally, demobilization and final inspections shall be completed by September 2026 or 2027. This schedule is subject to change, and all legally required stakeholders shall be consulted and apprised of project activities.

3.2 SUMMER CONSTRUCTION DETAILS AND METHODS

Snow and ice-free conditions are needed for some of the more complex construction components of the project. The subsea crossing at Kotzebue Sound, major river crossings, and work occurring in and near villages (including trenching and tying into existing utility poles) shall occur during the summer; their construction methodologies are detailed in this section.

3.2.1 SUBSEA CROSSING (KOTZEBUE SOUND/HOTHAM INLET)

For the subsea crossings, FOC shall be anchored to 48 in. x 78 in. concrete beach manholes (BMH) on either side of the channel, which shall be constructed in stable locations that minimize environmental impacts. The cable shall then be trenched between the BMH and the lowest tide point. Construction shall then be transitioned to operations utilizing an excavator on floats, two tugboats (25 ft. and 92 ft. long) and two accompanying barges (150 ft. x 50 ft. and 205 ft. x 60 ft.). As barge shall place cable in tandem with the excavator on floats to be trenched. Once the water is too deep to allow trenching, the cable shall be gravity laid or fixed-plowed across the sea floor to the opposite side of the inlet, where laying activities shall commence (Figure 9). Best practices shall be implemented throughout the operation to protect the aquatic environment, minimize bank erosion, and avoid creating drainage paths. Construction of the subsea crossing is expected to take 4-12 days.

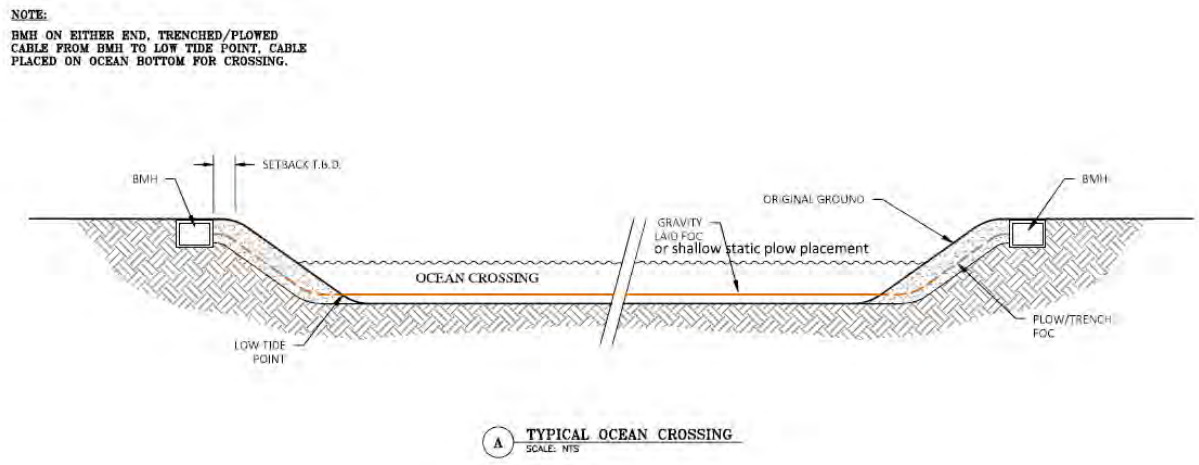

Figure 9: Schematic of the subsea cable crossing.

3.2.2 MAJOR RIVER CROSSINGS

Directional boring equipment as necessary for the major river crossings not on federal lands shall be transported upriver by the tugboats and barges utilized in the subsea crossing. Some of the equipment to be transported includes mini-excavators, utility poles, and the FOC. One of the barges may serve as the field camp facility.

NANA anticipates utilizing Horizontal Directional Drilling (HDD) at major rivers, with an eye toward minimal environmental impacts. The FOC shall be installed approximately 4 ft. beneath the riverbed. This method is ideal for eliminating FOC crossing risks at these major rivers for the short and long-term duration of the project.

This trenchless construction method involves drilling a pilot hole along a pre-determined, curved path starting from an entry point on one riverbank to an exit point on the opposite bank (Figure 10). Drilling fluid, typically a bentonite-water mixture, shall be used to stabilize the borehole, lubricate the drill bit, and transport cuttings to the surface. Following the completion of the borehole, the 2 in. conduit and FOC shall be pulled through the hole and secured. On both sides of the river, 15-20 ft. of conduit shall extend from the borehole openings to serve as a transition to ground-level installation, providing protection for the cable and mitigating potential damage from freeze-thaw cycles. The ends of these pipes shall be sealed and watertight.

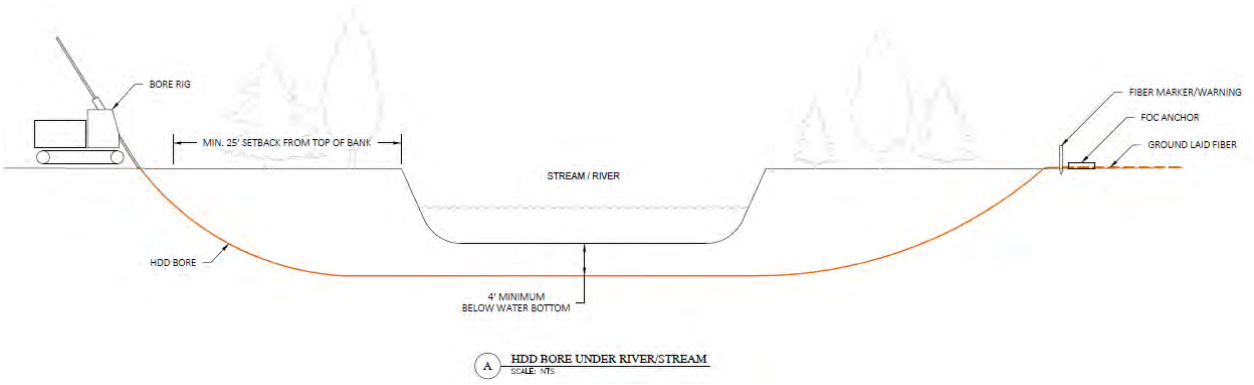

Figure 10. Schematic of an underground river crossing using Horizontal Directional Drilling (HDD).

Drilling operations shall comply with site-specific erosion and sediment control plans and include 24/7 monitoring to ensure the integrity of the drill path and avoid inadvertent returns of drilling fluid to the river. All activities shall operate in consultation with tribal and impacted community stakeholders and adhere to federal, state, and local permitting requirements, with restoration of the affected areas to pre-construction conditions upon project completion.

3.2.3 KUGRUK ESTUARY SUMMER GRAVITY LAY

The Kugruk Estuary east of Deering shall be crossed using gravity-lay methods in the summer months. The winter construction crews shall ground-lay the FOC up to the overbanks of the estuary. Crews shall return by barge in the summer to gravity lay across the estuary and splice the cables. No BMHs or trenching are expected.

3.2.4 AERIAL UTILITY POLE INSTALLATION

The project shall utilize existing utility poles outside of Kivalina and Kotzebue. Pole access agreements are being initiated with the appropriate utilities.

3.2.5 TRENCHING

Where ground-lay sections have the potential to interact with community crossings, the cable shall need to be buried to reduce risk to public safety and to prevent cable damage. The project shall utilize the existing utility poles when exiting villages, then transition to shallow trenched sections. The trenches shall extend for varying lengths outside of each village:

- Ambler: 500 ft.
- Buckland: 150 ft.
- Deering: 60 ft.
- Kotzebue: 200 ft.
- Noatak: 250 ft.
- Noorvik: 1500 ft.
- Shungnak: 500 ft.
- Selawik: 600 ft.
- Kiana, Kivalina, and Kobuk shall not require trenching

Trenches shall be excavated approximately 1 ft. x 2 ft., but may vary with the terrain, and the cable shall be laid directly into the trench. Once permafrost is encountered, excavation won't proceed deeper. Side cast material shall be temporarily placed (i.e., less than 1 week) adjacent to the trench and then backfilled and recontoured to the original pre-existing conditions. This construction segment shall require a temporary, 3-person line crew and a 2-person splicing crew immediately behind them.

3.3 INSPECTIONS OF WINTER GROUND-LAY SEGMENTS

Following winter construction activities, a crew shall return in the summer to ensure the cable is properly seated on the tundra, within waterbody crossings, and to ensure all construction materials and debris have been cleared from the area with minimal environmental and species disruption. These inspections are proposed to occur early in the season prior to significant leaf-out or early in the fall after the leaves had shed to ensure good visibility of the cable. Timing shall be coordinated with relevant agencies to avoid bird nesting activities and seasons and to minimize disturbance to caribou.

Inspections shall be performed by aerial flyovers, while paying particular attention to waterbody crossings and shrubby-vegetated areas to ensure that the anchors and cable are seated securely to the ground and substrate. Where significant anomalies are observed, inspectors shall land the helicopter and perform necessary cable realignment by moving the cable to the ground surface by hand. Helicopter altitudes shall vary according to the visibility of the cable and the sensitivity of environmental resources in the area but shall generally fly about 100-200 ft. above the ground surface.

3.4 OPERATIONS AND MAINTENANCE

The FOC network shall have minimal operations and maintenance requirements following construction. NANA shall conduct aerial annual inspections (1-3 days) at times that accord with subsistence patterns for migratory species to assess cable conditions, focusing on river crossings and areas with high traffic that are prone to physical disturbances. Network outages, however, are not expected to occur as fiber optic networks are robust systems and generally offer greater than 99.9% uptime.

In the event of a cable break or service interruption, emergency repairs shall be carried out by NANA technical staff, village technicians, or qualified contractors with experience in species avoidance and Arctic environments generally. If a break occurs, the system shall automatically switch feed to the redundant route, and the technicians at the Network Operating Center shall use an Optical Time Domain Reflectometer to pinpoint the fault's location.

The type of repair operation would depend on the location and nature of the failure and the time of year when the failure occurs. Depending on the location and season, a technician shall travel by air to the site, or as appropriate, snowmachine or other LGPV in winter. Repairs shall involve splicing the damaged section or replacing it with a new cable segment. Repairs materials, such as spare cable and splicing supplies, shall be pre-staged on NANA property in each village to ensure rapid response.

Failures of the line along the terrestrial portion of the line would be repaired in place. If the failure occurs along the ground-lay portion, the line would be pulled up, likely by hand, from shallow

cover. If some mechanical assistance is needed, it is anticipated that the snowmachine/boat would provide the leverage to help raise the cable. The cable would be respliced or a replacement section inserted to repair the failure, and then the cable would be laid back on the ground. It is very unlikely that the failure would occur along a trenched portion. These sections are trenched during the initial construction, because it makes breaks in the line so unlikely. But if it did break, a new line would be spliced into the existing above ground line and laid on the ground. It is unlikely that the line would be excavated and reburied.

Failures along the stream crossings would be influenced by seasonality. If the failure occurs on the aerial crossings, repairs could be conducted in any season. The cables would be respliced and reattached to the poles. If new poles need to be installed, these could be completed in any season and attached to the existing anchors. It is very unlikely that new anchors would need to be constructed, but if new anchors need to be installed, this would need to occur with a mini-excavator during the summer. If the failure occurs along the ground-lay portion at a stream crossing, the cable would need to be pulled up, respliced, and re-laid (likely by hand). This would occur during the summer. A temporary ground-lay portion could be installed in the winter to provide service. It is very unlikely that the failure would occur along an HDD portion. Cable repair for any HDD shall entail removal of the broken cable from the conduit and replacement; it is unlikely that the conduit would be damaged.

No regular brush clearing is planned along the ROW, except in cases where substantial vegetation growth occurs around aerial crossings. In such instances, clearing shall be conducted using aerial access or snowmachines during winter. All maintenance activities shall adhere to the same environmental protection and subsistence maintenance measures implemented during the initial construction phase.

3.5 CLOSURE AND RECLAMATION

The FOC network is anticipated to have a service life or lifespan of 50 years, with minimal signal degradation over that time. If the network is still viable and relevant after 50 years, then a ROW renewal process shall be considered. The FOC shall descend into the crossed waterbodies and surrounding vegetation once the snow melts. The cable shall be quickly buried by aquatic sediments and overgrown by the vegetation of the area. This may render removal of the cable exceedingly challenging and possibly damaging to waterbodies and the landscape. ASTAC installed a similar GLF on the tundra between Atqasuk and Utqiaġvik in late winter 2022 (ASTAC 2024). After nearly three full years, this cable is now barely visible in many locations, as it becomes incorporated into the underlying vegetation, streambanks, streambeds and lake beds over time.

Access for the cable removal would have to occur during the winter, which would require digging through snow/ice (and into frozen ground) using heavy equipment. This would have the potential to cause damage to the sensitive tundra habitat. For these reasons, NANA proposes the following closure and reclamation measures:

Cable Removal: The FOC shall not be removed.

Aerial Crossings: The wooden poles installed for aerial crossings shall be cut at ground level and removed. Guy wires, bird diverters and other associated infrastructure shall likewise be removed.

Waste Disposal: All removed materials shall be disposed of in the nearest community landfill in accordance with best practices and waste mitigation efforts.

Final Inspection: A comprehensive inspection shall document the condition of the site after reclamation activities are complete.

If upon final inspection and closure activities, if there is any unaddressed project infrastructure reclamation step, this shall be undertaken to address and resolve all remaining environmental impacts to the greatest extent possible.

3.6 "LAST MILE" COMMUNITY CONNECTIONS

While not part of this "middle mile" project, the full project includes the installation of the appropriate FOC into each community, providing service for individual households, businesses, schools, and other entities. These connections shall utilize FOC planned for each community, with cable hung on existing utility poles and appropriate service drops for each served customer. NANA is self-funding this investment for the "last-mile" infrastructure in these communities.

4 AVOIDANCE, MITIGATION, AND MONITORING MEASURES

The project has been carefully designed with avoidance and mitigation strategies to minimize adverse impacts to the environment and the subsistence way of life in the NANA Region, while providing a sustainable, long-term broadband network.

Avoidance

- The chosen route was comprehensively designed to minimize the number of stream crossings to the greatest extent possible.
- With the majority of construction occurring during the winter, the construction impacts on fish and their habitats are greatly reduced. Over 97% of the streams and rivers and 100% of the lakes and ponds along the route shall be crossed with LGPVs in the winter months when adequate snow and ice cover allows for adequate protection of the underlying vegetation.
- Construction methods at large, complex river crossings, such as aerial crossings and HDD, eliminate direct impacts to waterbodies.

Mitigation

- Selecting the HDD method for large river crossings allows for the installation of cables beneath streams and rivers without disturbing the waterbody itself. This technique minimizes sediment disturbance and preserves aquatic habitat.
- Utilizing aerial installation to deploy the cable above large rivers has been chosen to avoid trenching.
- In consultation with community and tribal members, construction shall be scheduled during periods with the lowest possible impact for migratory species, such as caribou and birds, as well as marine life.

Monitoring

- Spring and summer inspections shall verify proper cable placement, assess any potential erosion issues, and confirm that crossings are functioning as designed.
- Annual inspections shall occur throughout the life of the project. If any waterbody issues are identified, ADF&G shall be informed, and corrective measures shall be implemented.

5 CONCLUSION

The project represents a carefully planned, environmentally and culturally sensitive approach to delivering essential broadband infrastructure to the underserved and unserved, predominately indigenous communities of northwest Alaska. The project has been designed to balance technical requirements, environmental protection, and community needs while providing lasting, once-in-a-generation benefits to the region.

6 REFERENCES

Arctic Slope Telephone Association Cooperative (ASTAC). 2024. *Ground Lay Fiber* [PowerPoint presentation]. Alaska Telecom Association (ATA) Winter Conference 2024, Kauai, Hawaii.

Wells, A.F., C.S. Swingley, S.L. Ives, R.W. McNown, and D. Dissing. 2022. Vegetation classification for northwestern Arctic Alaska using an EcoVeg approach: tussock tundra and low and tall willow groups and alliances. Vegetation Classification and Survey, 3: 87-117, doi: 10.3897/VCS.65469.

Appendix D1 – Avoidance, Minimization, and Mitigation

NANA Regional Broadband Network Project

Avoidance Minimization Mitigation

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

Table of Contents

The project has been carefully designed with avoidance and mitigation strategies to minimize adverse impacts to the environment while providing a sustainable, long-term fiber optic broadband network.

1 Avoidance

- The alternatives were designed to minimize the impact to forests, wetlands, and waterbodies to the greatest extent possible. As discussed above, excessive and deep waterbody interaction poses an unacceptable FOC break hazard and thus imperils the purpose and need of the project as a whole.
- Alternatives were considered to reduce or eliminate use of Federal public lands (Appendix L).
- Infrastructure has been chosen to minimize footprint size, including installing single post aerial crossings and minimizing the size of the beach manholes used in subsea construction.
- Construction methods at large and complex river crossings, such as aerial crossings and HDD, eliminate direct impacts to waterbodies.

2 Minimization

For the successful implementation of this project, thoughtful and environmentally responsible construction methods were prioritized to minimize the risk.

- With the majority of construction occurring during the winter, the construction impacts on waterways and fish and their habitats are greatly reduced. Over 97% of the streams and rivers and 100% of the lakes and ponds along the route would be crossed with LGPVs in the winter months when adequate snow and ice cover allows for adequate protection of the underlying vegetation.
- Where possible, vegetation clearing, site preparation, and construction activities would adhere to the recommended periods to avoid vegetation clearing. If vegetation clearing, site preparation, and construction occurs within these periods, consultation would take place with USFWS and/or pre-construction nest surveys would be conducted by qualified personnel and appropriate mitigation developed.
- If an eagle nest is observed within the disturbance buffers (i.e. ½ mile during summer) during construction, consultation with the USFWS would be initiated.
- Determents shall be place on poles used for waterbody crossing to discourage perching raptors and nesting birds.
- All exposed or disturbed waterways and vegetated areas within the construction corridor would be returned to pre-existing contours.
- Disturbed areas would be restored to their natural contours and drainage by filling excavations with natural material.
- Summer construction activities along water bodies would be of short duration.
- During HDD activities, material would not be stockpiled in a wetland or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area. Personnel would avoid setting up drilling equipment in a wetland.

- Hazardous materials, such as chemicals, fuels, and lubricating oils, would not be stored in wetlands. Any equipment maintenance activities would be performed further than 100 ft. away from any wetland areas to avoid spills or contamination.
- Disturbed areas would be restored as progressively and quickly as possible to pre-construction use. If necessary, vegetation cover using native and certified seed mixes and seed dispersal, management, and maintenance processes would be implemented.
- Develop a project website and keep it updated so that the public, community groups, Tribal, local, state, and federal governments, and other interested parties can stay informed of construction activities and pass information on to their constituents.
- BLM Visual Resource Management Plan Required Operation Procedures (ROPs) (VRM-1a to 1f) and Veg-2, which minimize impacts from cross country travel.
- Any den-site disturbances will be reported to the ADF&G office in Kotzebue or the website ADF&G: Report a Wildlife Encounter if and when a disturbance has occurred.
- Community escorts and community reporters will be included to assist in applying indigenous knowledge to minimize impacts to caribou.

2.1 Soil Erosion

Recognizing the potential environmental impacts associated with ground disturbance, the project would employ BMPs designed to preserve soil stability, protect water resources, and maintain ecological balance. Revegetation of disturbed areas would be performed with guidance from ADF&G's "Streambank Revegetation and Protection: A Guide for Alaska" (2005) DNR's "A Revegetation Manual for Alaska" (Wright 2008), and local indigenous knowledge where practicable. The primary revegetation technique would be assisted natural revegetation (Wright 2008).

- Utilize BMPs to mitigate the potential impact to the environment, including (DOT&PF 2021):
    - BMP-10.01 Fiber Rolls for Erosion and Sediment Control
    - BMP-18.00 Rolled Erosion Control for Slopes
    - BMP-20.00 Silt Fence
    - BMP-38.00 Vegetation Buffer
    - BMP-40.00 Cold Weather Stabilization
- Native vegetation would be salvaged and left on-site to the greatest extent possible to prevent erosion of the surrounding area. At least 1-2 feet of root material would be harvested when vegetative mats are temporarily removed. Side cast material would be temporarily placed (i.e., less than 1 week) adjacent to the trench and then backfilled and recontoured to the original pre-existing conditions.

2.2 ADF&G

- Construction would be scheduled during periods outside of sensitive life stages for fish.
- The majority of construction would occur during the winter, avoiding sensitive fish life stages. The limited amount of summer construction at rivers would occur outside of important fish timing windows designated by ADF&G, USFWS, and local indigenous knowledge where practicable. HDD installations are proposed to occur from June-August 2026. The one ground-lay fiber crossing occurring during the summer at Kugruk Estuary is proposed to occur in July 2026 and does not involve any trenching.

2.3 NMFS

Mitigation measures listed in Appendix O (Consultation) are incorporated by reference.

2.3.1 General Mitigation Measures

- The project would inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities (email information to akr.prd.records@noaa.gov).
- If construction activities would occur outside of the specified time window, the project would notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
- Consistent with AS 46.06.080, trash would be disposed of in accordance with state law. The project proponent would ensure that all closed loops (e.g., packing straps, rings, bands, etc.) would be cut prior to disposal. In addition, the project proponent would secure all ropes, nets, and other marine mammal entanglement hazards so they cannot enter marine waters.

2.3.2 Dredging/Screeding/Underwater Excavating Activities

- All vessels involved in dredging, screeding, and underwater excavating operations, including survey vessels, would transit at velocities ≤10 knots.

2.3.3 Intertidal Fill/Bank Stabilization and Maintenance

- Fill material would consist of rock fill that is free of fine sediments to the extent practical or would come from on-site dredged material.
- Fill material would be obtained from local sources or would be free of non-native marine and terrestrial vegetation species.

2.3.4 Project-Dedicated Vessels

Vessel and crew safety measures are required as part of project deployment.

- Vessel operators would:
    a. Abide by all federal and state maritime requirements and BMPs.
    b. Maintain a watch for marine mammals at all times while underway.
    c. Stay at least 91 meters (300 feet) away from listed marine mammals, except that they would remain at least 460 meters (1,500 feet) away from endangered North Pacific right whales.
    d. Travel at less than 5 knots when within 274 meters (900 feet) of a whale.
    e. Reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mile) or less.
- Vessels would not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.
- Project-specific barges would travel at 12 knots or less.

2.3.5 Ice Road/Trail/Pad Mitigation Measures

- The Project would not construct ice roads but would use terrestrial-based snow trails (i.e.,

no snow trails over sea ice) to place ground-laid FOC. (Marine installation would occur during summer.)

2.4 USFWS

Mitigation measures listed in Appendix O (Consultation) are incorporated by reference.

2.4.1 General Mitigation Measures

- Stipulations in the compatibility determination shall be followed.
- If construction activities would occur outside of the time window specified, the project shall notify USFWS of the situation at least 60 days prior to the end of the specified time window.
- Snow and frost depth requirements shall be confirmed with the USFWS Selawik Refuge Manager before initiating winter activities on Refuge lands.
- Conditions and stipulations necessary for ensuring Compatibility with Selawik National Wildlife Refuge Purposes and the mission of the National Wildlife Refuge System shall be followed.
- In-water work shall be conducted at the lowest points of the tidal cycle when feasible.
- Consistent with AS 46.06.080, trash shall be disposed of in accordance with state law. The project would ensure that all closed loops (e.g., packing straps, rings, bands) would be cut prior to disposal.

2.4.2 Dredging/Screeding/Underwater Excavating Activities

- All vessels involved in dredging, screeding, and underwater excavating operations, including survey vessels, would transit at velocities ≤10 knots.

2.4.3 Intertidal Fill/Bank Stabilization and Maintenance

- Fill material would consist of rock fill that is free of fine sediments to the extent practical or would come from on-site dredged material.
- Fill material would be obtained from local sources or would be free of non-native marine and terrestrial vegetation species.

2.4.4 Project-Dedicated Vessels

Vessel and crew safety measures are required as part of project deployment.

- Vessel operators would:
    a. Abide by all federal and state maritime requirements and BMPs.
    b. Maintain a watch for marine mammals at all times while underway.
    c. Stay at least 91 meters (300 feet) away from listed marine mammals.
    d. Travel at less than 5 knots when within 274 meters (900 feet) of a polar bear.
    e. Reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mile) or less.
- Vessels would not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.
- Project-specific barges would travel at 12 knots or less.

2.5 EFH

- Align crossings along the least damaging route. Avoid known fished and sensitive areas such as deep-sea corals, submerged aquatic vegetation, emergent marshes, and anadromous fish bearing streams. Consider using video to assess the proposed cable route.
- Store and contain excavated material on uplands. If storage in wetlands or waters cannot be avoided, use alternate stockpiles to allow continuation of sheet flow. Store stockpiled materials on construction cloth rather than bare marsh surfaces, seagrasses, or reefs.
- Backfill excavated wetlands with either the same or comparable material capable of supporting similar wetland vegetation. Restore original marsh elevations. Stockpile topsoil and organic surface material, such as root mats, separately and return it to the surface of the restored site. Use adequate material so that the proper pre-project elevation is attained following the settling and compaction of the material. After backfilling, implement erosion protection measures where needed.
- During HDD operations under anadromous streams, equipment required to clean up an incidental release should be available and ready to deploy at the site, and the area downstream of the drilling profile should be continuously monitored during drilling for signs of incidental release.
- At HDD sites, a vegetated riparian buffer should be maintained between the drill entry and exit sites and disturbance to existing vegetation should be minimized.
- Use existing rights-of-way whenever possible to lessen overall encroachment and disturbance of wetlands.
- New access roads, if needed, should be constructed to minimize adverse effects to habitat and migratory fish, such as Pacific salmon. The USFWS's Culvert Design Guidelines for Ecological Function was written specifically for Alaska salmonids. This resource provides useful information to minimize the effects of road crossings on aquatic resources.
- Use silt curtains or other barriers to reduce turbidity and sedimentation near the project site whenever possible.
- Limit access for equipment to the immediate project area. Tracked vehicles are preferred over wheeled vehicles. Consider using mats and boards to avoid sensitive areas. Caution equipment operators to avoid sensitive areas and clearly mark sensitive areas to ensure that equipment operators do not traverse them.
- Limit construction equipment to the minimum size necessary to complete the work. Use shallow-draft equipment to minimize effects and to eliminate the necessity for temporary access channels. Use the push-ditch method in which the trench is immediately backfilled to minimize the impact duration when possible.
- Conduct construction during the time of year when it would have the least impact on sensitive habitats and species, in accordance and with the consultation of local indigenous communities. Specific dates would depend on the location. Consultation with NMFS and ADF&G can provide specific work windows.
- For activities on the continental shelf, implement the following measures to the extent practicable to avoid and minimize adverse impacts to managed species:

    - Shunt drill cuttings through a conduit and either discharge the cuttings near the seafloor or transport them ashore.
    - Locate drilling and production structures, including cables, at least 1.6 km (1.0 mile) from the base of a hard bottom habitat.
    - Bury cables at least 0.9 meters (3 feet) beneath the sea floor whenever possible. Particular considerations (i.e., currents, ice scour) may require deeper burial or weighting to maintain adequate cover. Buried cables should be examined periodically for maintenance of adequate cover.
    - Locate alignments along routes that minimize damage to marine and estuarine habitat. Avoid laying cable over high-relief bottom habitat and across live bottom habitats such as corals and sponges.
- Handle and store all fuels and hazardous substances used in the project area in accordance with applicable state and federal regulations. Include both primary and secondary containment areas for all fuel and chemicals.
- Use only licensed, commercial transporters, following U.S. Department of Transportation regulations, for the safe transport of fuels and other products to/from the project area.
- Where able, stockpile and reuse native vegetation and topsoil removed for project construction for site rehabilitation. Seeding and planting would follow this order of preference:
    - Species native to the site
    - Species native to the area
    - Species native to the state
- Trenches must be constructed or backfilled in such a manner to ensure wetlands or other waters of the U.S. are not drained (intentionally or inadvertently).
- Excess material shall be moved to an upland (non-wetland) location.
- Fill material would consist of rock fill that is free of fine sediments to the extent practical or would come from on-site dredged material.
- Fill material would be obtained from local sources or would be free of non-native marine and terrestrial vegetation species.

2.6 Invasive Species

2.6.1 Construction Equipment

To prevent the introduction, or spread, of non-native, invasive plant species or weeds, an invasive species control plan shall be implemented.

- Equipment maintenance staff would bring all pieces of equipment into their heated indoor shop.
- The equipment would receive complete steam cleaning. This provides a means of close inspection for leaks and also removes any direct and foreign debris from the internal and external surfaces that may have accumulated during prior use. This cleaning assures that no material from potential invasive species is transported from site to site and facilitates a comprehensive maintenance inspection. The wash bay uses a containment system for the collection of the wastewater.
- A mechanic would conduct a full mechanical inspection of the equipment, including the checking of hydraulic lines and gaskets for hydrocarbon leaks.

- A mechanic would repair any mechanical deficiencies found during the inspection.
- After all aspects of the inspection are met, the equipment is staged for transportation to the work site.

2.7 Marine and Freshwater Vessels

- Vessels used in marine and freshwater would follow the principles of Clean, Drain, Dry:
    - Clean – Inspect and clean off plants, animals, and mud from clothing, vessels, and equipment including waders, footwear, ropes, anchors, and field gear before leaving water access. Use the local water source initially to help remove heavy deposits. Remove plant fragments and scrub off any visible material with a stiff brush.
    - Drain – all water from watercraft, motor, and bilge before leaving water access. All ballast water would be from a municipal water supply.
    - Dry – equipment, vessels, and gear before moving between waterbodies. Dispose of unwanted materials in the trash; do not dump them in the water or on land.
- Refer to the Alaska Region's Guidelines for Preventing the Spread of Aquatic Invasive Species (fws.gov/media/aquatic-invasive-species-prevention-guidelines-pdf) for more information.
- Biofouling would be managed through BMPs such as applying antifouling hull paint and rigorous cleaning.
- Vertebrate invasive species can be transported in vessels as stowaways. Free-roaming rats and/or mice would be eradicated whenever detected so that they are not inadvertently relocated elsewhere. Live rats/mice should never be released. Trash and food would be stored appropriately to reduce attraction. Other tips for prevention and control are available in ADF&G's State Invasive Rodent Plan (adfg.alaska.gov/static/species/nonnative/invasive/pdfs/invasive_rodent_plan.pdf).

2.7.1 Revegetation and Seeding

If the restoration phase of the project requires revegetation or reseeding where land has been disturbed, these efforts can inadvertently introduce invasive plant species that outcompete native vegetation, degrade habitat quality, and disrupt local ecosystems. NANA is committed to implementing best practices and adhering to ecological restoration guidelines to support biodiversity and long-term ecosystem health without unintentionally spreading invasive species. These best practices include:

- Minimizing soil disturbance and reseeding were appropriate to reduce the likelihood of weed establishment.
- Seed mixes would be locally sourced with native vegetation species.
- Seed stock would be free from weeds and other contaminants.
- Disturbed areas requiring revegetation would be performed with guidance from "A Revegetation Manual for Alaska" (Wright 2008), as well as local indigenous knowledge
- Stipulations per BLM Alaska Instruction Memorandum No. 2022-008 Invasive Plant Prevention and Management would be implemented on BLM-administered lands, including:

- The use of certified weed-free fill material (if unavailable, then an alternative source would be approved by an Authorized Officer).
- The use of Alaska-grown straw (if necessary for revegetation).
- Any other fill or gravel would be weed-free where feasible and available.

3 Mitigation

- Low-ground-pressure-vehicles (LGPVs) would be utilized throughout construction. In winter, LGPVs would either be tracked or on skids.
- The vast majority of construction activities would occur during the winter months when snow cover/ground conditions are sufficient for off-road winter travel. DNR guidelines for minimum snow cover, frost layer, and ground temperature requirements would be met. These conditions are expected to include a minimum of 6-9 in of snow cover and a soil temperature of 5°C at a depth of 30 cm for overland travel.

Appendix D2 – BLM Required Operating Procedures

Appendix D2 BLM ROPs

ROP	Applicable?
ROP Soils-1a All topsoil will be saved in a separate area from overburden for future use.	x
ROP Soils-1b All overburden will be stockpiled and saved for respreading over tailings.	x
ROP Soils-1c All overburden piles will be shaped and stabilized to prevent erosion.	x
ROP Soils-1d Final shape of respread tailing and overburden will approximate the shape of the surrounding terrain.	x
ROP Soils-1e Disturbed stream banks will be recontoured, revegetated, or other protective measures will be taken to prevent soil erosion into adjacent waters.	x
ROP Soils 1-f Roads, well pads, and other disturbed areas will be recontoured and revegetated as per an approved reclamation plan or Plan of Operations. Revegetation will occur through seeding of native seed or by providing for soil conditions that allow the site to re-vegetate naturally, whichever provides the most effective means of reestablishing ground cover and minimizing erosion. The final land surface will be scarified to provide seed traps and erosion control.	x
ROP Soils 1-g Surface disturbing proposals involving construction on slopes greater than 25% will include an approved erosion control strategy, topsoil segregation/restoration plan, be properly surveyed and designed by a certified engineer and approved by the BLM prior to construction and maintenance.	x
ROP Soils-2a Roadways will be ditched on uphill side and culverts or low water crossings installed at suitable intervals. Spacing of drainage devices and water bars will be dependent on road gradient and soil erodibility.	N/A
ROP Soils-2b Roads will be designed for minimal disruption of natural drainage patterns.	N/A
ROP Soils-2c Roads will be designed to avoid areas with unstable or fragile soils.	N/A
ROP Soils-2d Water bars will be placed across reclaimed roads. Spacing will be dependent on road gradient and soil erodibility as shown in the following table.	N/A
ROP Veg-1a Vegetation treatments will be designed to achieve desired conditions clearly described in individual burn, project, or activity plans. Desired conditions will be based on the ecological capability of a given site and will be expressed as cover types or seral stages within cover types, based on management objectives.	N/A
ROP Veg-1b Vegetation treatments will be designed to prevent introduction of noxious and invasive weeds. Project, burn, or activity plans will contain a segment on known occurrence of noxious weeds within planned treatment area and strategy for post-burn monitoring or treatment.	N/A
ROP Veg-1c Seeding and planting non-native vegetation may be used in those cases where native species are not available in sufficient quantities; where native species are incapable of maintaining or achieving the objective; or where non-native species are essential to the functional integrity of the site, with specific approval from the AO.	N/A
ROP Veg-1d In order to eliminate, minimize, or limit the spread of noxious and invasive weeds, only certified feed and mulch (hay cubes, hay pellets, straw, etc,) will be permitted on BLM lands.	N/A
ROP Veg-1e Operators must prevent and control noxious and invasive weed infestations. Noxious weeds in Alaska are listed under Alaska Statute 11 AAC 34.020 or other statewide lists that may be developed in the future.	x
ROP Veg-2a Where feasible, existing roads and trails will be utilized.	x

ROP	Applicable?
ROP Veg-2b Bull-dozing of tundra mat and vegetation is prohibited unless there is no feasible alternative (e.g. lode mining), as approved by the AO. If trenching is required, use equipment that minimizes trench width. Clearing of drifted snow is allowed to the extent that the tundra mat is not disturbed.	x
ROP Veg-2c Location of winter trails will be designed to minimize breakage or compaction of vegetation.	x
ROP Veg-2d The location of winter ice roads will be designed and located to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in the subsequent year.	x
ROP Veg-2e Whenever possible, overland moves that are a part of permitted operations will occur when frost and snow cover is sufficient to minimize soil disturbance and compaction. The exact dates will be determined by the AO.	x
ROP Veg-2f When ground operations are required in snow-free months, routes that utilize naturally hardened sites will be selected to avoid the need for trail braiding. The permittee will work with the AO on specifying vehicle types and methods to minimize vegetation and soil disturbance, such as use of air or water craft, utilizing existing roads or trails, or use of low ground pressure vehicles.	x
ROP Veg-2g Permanent oil and gas facilities will be designed and located to minimize the development footprint.	N/A
ROP Veg-2h Off-highway Vehicle use associated with permitted activities will comply with OHV designations in the area. The use of OHVs associated with permitted activities will be allowed under appropriate stipulations as approved by the AO.	x
ROP Veg-2i Permitted livestock grazing will be conducted in a manner that maintains long term productivity of vegetation. Animals will not be picketed in riparian areas. In areas of low grass production, operators will pack in weed-free hay or concentrated feed.	N/A
ROP Veg-2j Require Special Recreation Permit holders, reindeer herders, dog mushers, and other BLM permit holders to use certified weed-free products on BLM lands.	N/A
ROP Water-1a Projects will be designed to protect water quality and comply with Federal and State water quality standards.	x
ROP Water-1b Management practices will include public education and construction of toilet facilities where appropriate.	N/A
ROP Water-2a Activities in wetlands will comply with Federal and State permit requirements for alteration of wetlands.	x
ROP Water-2b Utilize winter access whenever possible and avoid road or trail construction in wetlands.	x
ROP Water-2c In snow-free months, if wetlands cannot be avoided, low ground pressure vehicles will be used wherever possible.	x
ROP Water-3a Streams must be diverted around mining operations using an appropriately sized bypass channel.	N/A
ROP Water-3b All process water and ground water seeping into the operating area must be diverted into the settling pond system for treatment prior to re-entering the natural water system.	N/A
ROP Water-3c Settling ponds will be cleaned out and maintained at appropriate intervals to comply with water quality standards. Fine sediment captured in the settling ponds will be protected from washout and left in a stable condition at the end of each mining season	N/A

ROP	Applicable?
to prevent unnecessary or undue degradation to the environment during periods of non-operation.	
ROP Water-3d Riparian areas between the mined ore deposit and the watercourse will be maintained in order to serve as a buffer strip between mining operations and watercourses: to protect integrity of stream banks, provide water temperature control, and for filtration of sediment from surface run-off. All roads, bunkhouses, offices, equipment storage, and maintenance facilities should be sited in upland areas. Overburden should be placed on the uplands or on the upland side of the mine pit. This is not intended to preclude activities which by nature must occur within riparian areas, such as placer mining.	N/A
ROP Water-3e Streams that have been altered by channeling, diversion, or damming will be restored to a condition that will allow for proper functioning of the riparian zone and stream channels. Active streams will be returned to the natural water course or a new channel will be created at its lowest energy state (valley bottom) that approximates the old natural channel in shape, gradient, and meander frequency using a stable channel design. The new channel will be designed consistent with the capabilities of the reclaimed site.	N/A
ROP Water-3f Riparian vegetation, if removed during operations, will be reestablished.	x
ROP Water-3g The value of prime riparian habitat will be considered for protection and mitigation during development of any mineral resources that may impact riparian resources.	x
ROP Water-4a All permitted operations will be conducted in such a manner as not to block any stream, or drainage system and to comply with State (Alaska Dept. of Environmental Conservation) and Federal (Environmental Protection Agency) water quality standards. This is not intended to preclude activities which by nature must occur within riparian areas, such as hydropower dams or placer mining.	x
ROP Water-4b New road construction within floodplains will be avoided. Where necessary, roads will cross riparian areas perpendicular to the main channel.	N/A
ROP Water-5a Structural and vegetative treatment in riparian and wetland areas will be compatible with the capability of the site, including the system's hydrologic regime, and will contribute to maintenance or restoration of proper functioning condition.	x
ROP Water-5b Refueling of equipment will not be conducted in riparian areas or within 500 feet of the active floodplain of any fish-bearing waterbody or within 100 feet from non-fish bearing waterbodies. The AO may allow storage and operations at areas closer than the stated distance if properly designed to account for local hydrologic conditions. Spill cleanup equipment will be available at all permitted sites.	x
ROP Water-5c Crossing of waterway courses will be made using a low-angle (perpendicular) approach. Snow and ice bridges will be removed, breached, or slotted before spring break-up. Ramps and bridges will be substantially free of soil and debris.	x
ROP Water-5d New structures will be located away from riparian or wetland areas if they conflict with achieving or maintaining riparian or wetland function. Existing structures will be used in a way that does not conflict with riparian or wetland functions or be relocated or modified when incompatible.	x

ROP	Applicable?
ROP Water-5e The design and location of permanent oil and gas facilities within 500 feet of fish-bearing waterbodies or within 100 feet of non fish-bearing waterbodies will only be approved on a case-by-case basis if the lessee can demonstrate that impacts to fish, water quality, and aquatic and riparian habitats are minimal.	N/A
ROP Water-6a Projects requiring withdrawal of water will be designed to maintain sufficient quantities of surface water, and contributing groundwater, to support fish and wildlife and other beneficial uses.	x
ROP SS-1a The planning area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status. BLM may recommend modifications to proposals to further its policy of avoiding BLM-approved activity that will contribute to a need to list such a species. BLM may either require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed, threatened, or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 U.S.C. 1531 et seq., including completion of any required procedure for conference or consultation.	x
ROP SS-1b Within the breeding range of Spectacled eiders, habitat in the project area will be assessed to determine if eiders are likely to use the area for nesting or brood rearing. The following activities will be prohibited within 650 feet (200 meters) of spectacled eider nest sites. 1) Ground level activity (by foot or vehicle) from May 20 through August 1, 2) Construction of permanent facilities, placement of fill, or alteration of habitat, and 3) Introduction of high noise levels within 200 meters of nest sites (from activities at potentially greater distances), May 20 through August 1. These may include but are not limited to: airports, blasting, and compressor stations.	x
ROP SS-1c Within the breeding range of Kittlitz's murrelet, habitat in the project area will be assessed to determine if murrelet's are likely to use the area for nesting. If nests are found, minimize ground-level disturbance and activity within identified areas of suitable habitat during June–August.	x
ROP SS-1d Where practical, use will be redirected, as necessary, to protect Federal and State listed and candidate Threatened and Endangered species habitat, to enhance indigenous animal population, and to otherwise maintain public land health through avoidance of sensitive habitat	x
ROP SS-1e Where populations or individual sensitive status plant species are located, take measures to protect these populations or individuals through site-specific buffers or management prescriptions.	x

ROP	Applicable?
ROP SS-2a In accordance with the guidance below, before the approval of facility construction, aerial surveys of breeding pairs of the following species shall be conducted within any area proposed for development within the breeding range of these species. Spectacled and/or Steller's Eiders (a) Surveys will be conducted by the lessee for at least three years before authorization of construction, if such construction is within the FWS North Slope Eider survey area, and at least one year outside that area. Results of aerial surveys and habitat mapping may require additional ground nest surveys. Spectacled and/or Steller's eider surveys will be conducted following accepted BLM-protocol during the second week of June. b) If spectacled and/or Steller's eiders are determined to be present within the proposed development area, the applicant will consult with the FWS and BLM in the design and placement of roads and facilities in order to minimize impacts to nesting and brood-rearing eiders and their preferred habitats. Such consultation will address timing restrictions and other temporary mitigating measures, construction of permanent facilities, placement of fill, alteration of eider habitat, aircraft operations, and introduction of high noise levels. c) To reduce the possibility of spectacled and/or Steller's eiders from striking aboveground utility lines (power and communication), such lines will either be buried in access roads, or suspended on vertical support members, to the extend practical. Support wires associated with communication towers, radio antennas, and other similar facilities, will be clearly marked along their entire length to improve visibility for low flying birds. Such markings will be jointly developed through consultation with FWS. Yellow-billed Loon a) Aerial surveys will be conducted by before authorization of construction of facilities proposed for development that are within 1 mile of a lake 25 acres or larger in size. These surveys along shorelines of large lakes will be conducted following accepted BLM protocol during nesting in late June and during brood rearing in late August. b) Should yellow-billed loons be present, the design and location of facilities must be such that disturbance is minimized. The default, standard mitigation is a 1-mile buffer around all recorded nest sites and a minimum 1,625-foot buffer around the remainder of the shoreline. Development would be prohibited within buffers.	x
ROP SS-3a An ecological land classification map of the development area will be developed before approval of facility construction. The map will integrate geomorphology, surface form, and vegetation at a scale, level of resolution, and level of positional accuracy adequate for detailed analyses of development alternatives. The map will be prepared in time to plan one season of ground-based wildlife surveys, if deemed necessary by the AO, before approval of exact facility location and facility construction.	x
ROP SS-4a All ore processing (mill sites, tailings piles, containment ponds, etc.) must occur outside of watersheds that drain into these lakes.	N/A
ROP SS-4b All surface water discharge and drainage from mining operations must be re-directed outside of watersheds that drain into these lakes.	N/A
ROP SS-4c All chemicals including fuels will be stored outside of watersheds that drain into these lakes.	N/A

ROP	Applicable?
ROP SS-4d A person, claimant, operator, applicant or other proponent proposing to use or develop the lands, waters or resources within watersheds that drain into these lakes must demonstrate to the satisfaction of the AO that such use or development will not modify the lakes or their watersheds in such a way that it results in adversely: altering the hydrological, chemical, physical or biological integrity of the lakes; or impacting or diminishing the habitat quantity and quality of the aquatic and riparian ecosystems and watershed functions so that fish populations of the lakes are reduced below their natural potential.	x
ROP FW-1a The best available technology will be used to prevent permanent facilities from providing nesting, denning, or shelter sites for ravens, raptors, and foxes in areas where ground nesting populations are sensitive to increased predation.	x
ROP FW-2a No road crossings will be permitted in crucial spawning habitat, unless no feasible alternative exists and it can be demonstrated that no adverse effects will occur. State designated stream crossings will be used whenever possible.	N/A
ROP FW-2b Vehicular travel up and down streambeds, except by boat, is prohibited during the open water season (May-September).	x
ROP FW-2c Rivers and streams will be crossed at shallow riffles from point bar to point bar whenever possible.	x
ROP FW-2d Avoid stream crossings. When a stream must be crossed, the crossing will be as close to possible to a 90-degree angle to the stream. Stream crossings will be made at stable sections in the stream channel.	x
ROP FW-2e Stream and marsh crossings will be designed and constructed to ensure free passage of fish, maintain natural drainage, and minimal adverse effects to natural stream flow. Note: Bridges, rather than culverts, are the preferred method for crossing rivers. When necessary, culverts can be constructed on smaller streams, if they are large enough to avoid restricting fish passage or adversely affecting natural stream flow.	x
ROP FW-2f All water intakes will be screened and designed to prevent fish intake.	x
ROP FW-2g Drilling is prohibited in fish-bearing rivers and streams, as determined by the active floodplain, and fish-bearing lakes, except where the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative.	N/A
ROP FW-3a Within the WAH caribou calving and insect relief areas (Map 3-12), mineral exploration activities will not be authorized from May 20-August 15 unless the AO determines that caribou no longer occupy the specific area of the proposed operations. This seasonal restriction can also be modified based on actual caribou occupancy of area.	N/A
ROP FW-3b Whenever possible, operations that require vegetation removal will avoid the migratory bird-nesting period of May 1 to July 15 (Area specific dates: May 20-July 20 for Seward Pen; June 1-July 31 for Northern region; and May 1-July 15 for interior). If no feasible alternatives exist, assessment will be conducted to determine bird species present, significance of potential impacts, and possible mitigation measures (FWS Advisory: Recommended Time Periods for Avoiding Vegetation Clearing in Alaska to Protect Migratory Birds. September 2005).	x
ROP FW-3c Within defined WAH caribou calving areas, the following uses will not be permitted during peak calving (May 20-June 20): 1) surface disturbing activities; 2) FLPMA leases or permits that exceed 14 days of activity; and 3) mining exploration. Aircraft associated with permitted activities will maintain an altitude of at least 2,000 feet above	N/A

ROP	Applicable?
ground level (AGL) (except for takeoffs and landings), unless doing so would endanger human life or violate safe flying practices. This ROP would not apply to Alternative B.	
ROP FW-3d Within defined WAH insect relief areas, aircraft associated with permitted activities will maintain an altitude of at least 2,000 feet AGL (except for takeoffs and landings) from June 20-August 15, unless doing so would endanger human life or violate safe flying practices.	N/A
ROP FW-3e Exploration and prospecting activities for solid leasable minerals, locatable minerals, and salable minerals will be prohibited between October 31 and April 1 in caribou wintering habitat in the Nulato Hills ACEC unless the operator, applicant, or permittee can demonstrate to the satisfaction of the AO that the activity can be conducted in a manner that will not result in undue disturbance to wintering caribou. This ROP would apply under Alternative D only.	N/A
ROP FW-4a Bridges and culverts will be designed to avoid altering the direction and velocity of stream flow or interfering with migrating, rearing, or spawning activities of fish and wildlife. Bridges and culverts should span the entire non-vegetated stream channel.	N/A
ROP FW-4b Pipelines and roads will be designed to allow the free movement of wildlife and the safe, unimpeded passage of the public while participating in traditional subsistence activities. Listed below are the currently accepted design practices: 1) Above ground pipelines will be elevated a minimum of seven feet as measured from the ground to the bottom of the pipeline at vertical support members; 2) In areas where facilities or terrain may funnel caribou movement, ramps over pipelines, buried pipelines, or pipelines buried under roads may be required by the AO after conferring with Federal, State, and local government regulatory and resource agencies as appropriate, based on agency legal authority and jurisdictional responsibility; and 3) A minimum distance of 500 feet between pipelines and roads will be maintained when feasible.	N/A
ROP FW-6a Power lines will be constructed in accordance with standards outlined in "Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006" (APLIC 2006). The holder will assume the burden and expense of proving that pole designs not shown in the above publication are "raptor safe." Such proof will be provided by a raptor expert approved by the AO. BLM reserves the right to require modifications or additions to all power line structures, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions will be made by the holder without liability or expense to the United States.	x
ROP FW-7a This ROP applies to the Kivalina River, Ungalik River, Shaktoolik River, Inglutalik River, Koyuk River including the East Fork, Tubutulik River, Kuzitrin River, Agiapuk River, Pah River, and Noatak River. This ROP would apply under Alternative D only. Any proposal to use or develop the lands, waters, or resources within 300 feet of the banks of active stream channels must demonstrate to the satisfaction of the AO that such use or development: 1 will not adversely alter the condition and ecological function of aquatic and riparian systems by impacting water quality, stream flow, velocity, ground water hydrology, channel connectivity, channel form, material recruitment, substrate composition, energy (food) flow, and riparian function; 2 will not diminish the quality and diversity of habitats needed to sustain the production of	x

ROP	Applicable?
fish and wildlife populations at their natural potential; or 3 is outside the flood-prone width of these rivers.	
ROP Sub-1a BLM will consider using the following actions to eliminate, minimize, or limit the effects of permitted activities on subsistence use; 1) BLM may recommend modifications to proposed activity to further its policy of effective subsistence management, 2) Permittees will be required to provide information to potentially affected subsistence communities regarding the timing, siting, and scope of the proposed activity, and 3) Permittees will be required to consult with potentially affected subsistence communities to receive input regarding way to minimize impacts to subsistence, and the permittee will be required to provide documentation of their consultation efforts to the BLM.	x
ROP C-1a For permitted activities, cultural resource protection and conservation will be consistent with 1) Sections 106, 110, and 101d of the Historic Preservation Act, 2) procedures under BLM's 1997 Programmatic Agreement for Section 106 compliance, and 3) the BLM's 1998 implementing Protocol in Alaska between BLM and the Alaska State Historic Preservation Officer.	x
ROP C-1b If necessary, mitigation measures will be implemented according to a mitigation plan approved by the AO. Mitigation plans will be reviewed as part of Section 106 consultation for National Register eligible or listed properties. The extent and nature of recommended mitigation will be commensurate with the significance of the cultural resource involved and the anticipated extent of the damage. Reasonable costs for mitigation will be borne by the land use applicant. Mitigation must be cost effective and realistic.	x
ROP C-2a For all actions, the BLM will evaluate the impacts of proposed actions to known resources and avoid damage to already-identified significant paleontological resources by avoidance.	x
ROP C-2b If avoidance is not possible, the applicant will perform scientific examination of the to-be-impacted significant resources followed by appropriate mitigation. This may include the professional collection and analysis of significant specimens by scientists.	x
ROP VRM-1a To the extent practicable, all permanent facilities will be located away from roadsides, rivers, or trails, thereby using distance to reduce the facility's visual impact.	x
ROP VRM-1b Access roads and permanent facilities will be designed to meet the visual resource objective using such methods as minimizing vegetation clearing, and using landforms to screen roads and facilities.	x
ROP VRM-1c Permanent facilities will be designed to be screened behind trees or landforms if feasible so they will blend with the natural surroundings.	x
ROP VRM-1d The modification or disturbance of landforms and vegetative cover will be minimized.	x

ROP	Applicable?
ROP VRM-1e Permanent facilities will be designed so their shapes, sizes, and colors harmonize with the scale and character of the surrounding landscape.	x
ROP VRM-1f In open, exposed landscapes, development will be located in the opposite direction from the primary scenic views, if feasible.	x
ROP FM-1a Permitees and casual users will be held financially responsible for any actions or activity that results in a wildland fire. Costs associated with wildland fires include but are not limited to damage to natural or cultural resources and costs associated with any suppression action taken on the fire.	x
ROP FM-1b The Federal government will not be held responsible for protection of permitees' structures or their personal property. It is the responsibility of permitees and leasees to mitigate and minimize risk to their personal property and structures from wildland fire, if allowed by their permit.	x
ROP FM-1c Gas powered equipment will be equipped with manufacturer approved and functional spark arrestors.	x
ROP FM-1d To avoid the potential impacts to aquatic life the use of fire retardant is prohibited except when necessary to protect: Human life Permanent year-around residences National Historic land marks Structures on or eligible for the National Register of Historic Places Government Facilities, and Other designated sites or structures or if necessary to protect high value resources on adjacent lands under other than BLM administration or ownership Even if one of the above listed resources is being threatened, water will be used instead of fire retardant whenever possible or appropriate. The use of fire suppressant foams is prohibited.	N/A
ROP FM-1e Use of tracked or off-road vehicles in fire suppression or management activities will be conducted in a manner that does not cause erosion, damage to riparian areas, degradation of water quality or fish habitat, or contribution to stream channel sedimentation.	N/A
ROP FM-1f Use of heavy equipment and other motorized vehicles off road requires approval of AO or designee.	x
ROP FM-1g Rehabilitate areas burned by fires as needed, guided by the fire specific rehabilitation plan provided by the Field Office to the suppression agency.	N/A
ROP FM-1h Helicopters used for any activity during snow free conditions, which requires landing in wildland fuels, should have the exhaust/cooling system located high on the fuselage. Helicopters, which have exhaust/cooling systems that are located low on the fuselage and expels the exhaust straight back or downward, should only be landed in areas with no fuel such as areas of bare soil, gravel bars, or other areas of low combustability.	N/A
ROP Forest-1a Timber sales will rely to the extent possible, on natural regeneration through proper site preparation.	N/A
ROP Forest-1b Timber sales will include buffers to prevent disturbance of fish habitat and possible sedimentation into streams. Buffer widths will be dependant on harvest method, season of harvest, equipment used, slope, vegetation, and soil type. Winter operations will be encouraged in order to minimize impacts to riparian areas.	N/A
ROP MM-1a When responding to a request for a material sale or identifying a source for materials on public lands, the highest priority will be given to using existing upland material sources that meet suitability and economic needs. Using material from wetlands, lakes, and active or inactive floodplains will be avoided unless no feasible public upland	N/A

ROP	Applicable?
alternative exists. Sales or permits for in-stream gravel extraction will not be permitted in known fish spawning reaches of the active river or stream channel.	
ROP MM-1b Avoid habitats critical to local fish or wildlife populations (i.e. Fish spawning and over wintering, calving areas, raptor nesting sites).	N/A
ROP MM-1c Avoid key geomorphic features such as the beach barrier dune, river cut banks and associated riparian zones, root zones of spits, tombolos and barrier islands, springs, active channels of small, single channel rivers, and wetlands.	N/A
ROP MM-1d When possible, avoid vegetated habitats. If mining in vegetated areas, all overburden, vegetative slash, and debris will be saved for use during site reclamation to facilitate vegetative recovery. This material will be piled or broadcast so that it will not be washed away.	N/A
ROP MM-1e When scraping gravel in active or inactive floodplains, maintain buffers that will constrain active channels to their original locations and configurations.	N/A
ROP MM-2a The site can provide mineral material meeting the technical and volumetric requirements of the project and still maintain space for any required buffers.	N/A
ROP MM-2b Amount of site preparation and rehabilitation required will be considered to minimize the following: haul distance, vegetation and overburden removal, river training structures bank and other erosion protection devices, length of access route, crossing of active drainage or channels and wet working conditions in the pit.	N/A
ROP MLA-1a Existing access routes will be used where possible. Alternatives to and/or upgrading of existing access will be planned in consultation with the AO.	N/A
ROP MLA-1b All tailings, dumps, mining improvements, deleterious materials and substances, solid waste including scrap steel derelict mining machinery and parts will be disposed of to prevent unnecessary or undue degradation in accordance with applicable Federal and State Laws and in consultation with the AO.	N/A
ROP MLA-1c Hazardous substances used for exploration or mining will be contained and backhauled for disposal at a proper facility for that material. Used petroleum products may be converted onsite or contained and backhauled for proper disposal. The storage of fuels and petroleum products will be in a location approved by the AO in accordance with permit requirements of the State of Alaska Department of Environmental Conservation.	N/A
ROP MLA-1d Sanitation efforts including the disposal of gray water and kitchen wastes will be approved by the AO in accordance with the State of Alaska Department of Environmental Conservation General Mine Permit or plan specifically developed in consultation with that Agency.	N/A
ROP MLA-1e Water quality of both surface and underground waters will be regulated by terms and conditions of The U.S. Environmental Protection Agency's National Pollution Discharge Elimination Permit (NPDES). Note that in the future, implementation of the NPDES program regulating water quality of both surface and ground waters may be regulated by 18 AAC, Chapter 70 (Alaska Water Quality Standards) and 18 AAC, Chapter 83 for surface waters.	N/A
ROP Hazmat-2a All feasible precautions will be taken to avoid attracting wildlife to food and garbage.	x

ROP	Applicable?
ROP Hazmat-2b Current requirements prohibit the burial of garbage. All putrescible waste will be incinerated, backhauled, or composted in a manner approved by the AO. All unburnable solid waste will be backhauled and disposed of in an approved waste-disposal facility in accordance with U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) regulations and procedures.	x
ROP Hazmat-2c No disposal of domestic wastewater is allowed into bodies of fresh, estuarine, and marine water, including wetlands, unless authorized by the National Pollution Discharge Elimination System (NPDES) or State permit.	x
ROP Hazmat-2d Wastewater must be managed in accordance with Title 18 Alaska Administrative Code, Chapter 72, (18 AAC 72) Wastewater Disposal. Wastewater is defined as Human Waste (sewage), and Gray Water (water which has been used for personal hygiene, washing clothing or equipment, or sanitizing cooking and eating materials). If the standards for Pit Privies found at 18 AAC 72.030 cannot be met, all wastewater must be collected and transported to a state approved disposal facility. Upon closure of the campsite the Pit Privy must be completely back-filled with the surface area covered and re-graded to approximate original appearance.	x
ROP Hazmat-2e Pit privies will be located a minimum of at least 100 feet from the high-water mark of streams, rivers, or lakes. Pit privies will be sprinkled with lime and then backfilled with a minimum of two feet of over-material when the pit has reached capacity or the operation is terminated. All Pit privies must comply with ADEC Standards.	N/A
ROP Hazmat-2f For oil and gas operations, all pumpable solid, liquid, and sludge waste will be disposed by injection in accordance with EPA, ADEC, and the Alaska Oil and Gas Conservation Commission regulations and procedures. The AO may permit alternate disposal if the lessee demonstrates that subsurface disposal is not feasible or prudent and the alternative method will not result in adverse environmental effects.	N/A
ROP Hazmat-2g For oil and gas operations, produced water will be disposed of into injection wells as approved by the Alaska Oil and Gas Conservation Commission (AOGCC) under EPA regulations and the Underground Injection Control (UIC) program. The AO may permit alternate disposal methods if the lessee demonstrates that subsurface disposal is not feasible or prudent and the alternative method will not result in adverse environmental effects.	N/A
ROP Hazmat-3a For oil and gas operations and mining Plans of Operation, a Hazardous Materials Emergency Contingency Plan will be prepared and implemented before transportation, storage, or use of fuel or hazardous substances. The plan will include a set of procedures to ensure prompt response, notification, and cleanup in the event of a hazardous substance spill or threat of a release. The plan will include a list of resources available for response (e.g., heavy-equipment operators, spill-cleanup materials or companies), and names and phone numbers of Federal and State contacts.	N/A
ROP Hazmat-3b The applicant will provide BLM a disclosure of the components in any hydraulic fracturing materials to be used, the volume and depths at which such materials are expected to be used, and the volume capacity of the vessels to be used to store such materials.	N/A
ROP Hazmat-3c For oil and gas operations and mining Plans of Operation, the operator will maintain Material Safety Data Sheet (MSDS) information on all hazardous substances used by the operator.	N/A

ROP	Applicable?
ROP Hazmat-3d Before initiating any oil and gas or related activity or operation, including field research/surveys and/or seismic operations, lessees/permittees will develop a comprehensive spill prevention and response contingency plan per 40 CFR 112 .	N/A
ROP Hazmat-3e For oil and gas operations, mining operations, and other leases and permits, sufficient oil-spill cleanup materials (absorbents, containment devices, etc.) will be stored at all fueling points and vehicle-maintenance areas and will be carried by field crews on all overland moves, seismic work trains, and similar overland moves by heavy equipment.	N/A
ROP Hazmat-3f Fuel and other petroleum products will be stored at a location approved by the AO and within an impermeable lined and diked area capable of containing 110 percent of the stored volume or within approved alternate storage containers.	x
ROP Hazmat-3g Fuel storage will not occur closer than 100 feet from any river, lake, stream, or wetland unless approved by the AO.	x
ROP Hazmat-3h Liner material will be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period.	x
ROP Hazmat-3i Fuel and other petroleum products and hazardous materials will be stored in containers designed to hold that product. All fuel containers, including barrels and propane tanks, shall be marked with the responsible party's name, product type, and year filled and purchased.	x
ROP Hazmat-3j Hazardous materials/toxic substances, as defined by EPA (i.e., used oils/petroleum products, batteries), will be handled and disposed of in accordance with EPA and ADEC guidelines.	x
ROP Hazmat-3k All fuel spills will be cleaned up immediately, taking precedence over all other matters, except the health and safety of personnel. Spills will be cleaned up utilizing absorbent pads or other ADEC approved methods.	x
ROP Hazmat-3l Notice of any reportable spill (as required by 40 CFR 300.125 and 18 AAC 75.300) will be given to the AO as soon as possible, but no later than 24 hours after occurrence and such other Federal and State officials as are required by law to be given such notice including ADEC at (907) 478-9300.	x
ROP Hazmat-3m Surface discharge of reserve-pit fluids and produced water is prohibited unless authorized by applicable NPDES, ADEC, and Borough permits and is approved by the AO.	N/A

United States Department of the Interior

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In Reply Refer To:
1221, 1740 (931) P

Instruction Memorandum No. AK IM 2025-013
Expires: 09/30/2028

To: All BLM Alaska Employees

From: State Director

Subject: Invasive Plant Prevention and Management

Program Area: Applies to all program areas

Purpose: The purpose of this instruction memorandum (IM) is to provide consistent implementation-level direction to prevent the introduction and spread of invasive plant species on BLM managed lands. There is a need for a standard set of stipulations and a priority invasive plant list to ensure 1) invasive species requirements are implemented consistently across the state to protect BLM managed lands; 2) authorized land users are aware of their role in proactive invasive species management; and 3) there is compliance with applicable policy and guidance. This policy applies to external and internal authorized activities and is intended to complement any existing land use plan requirements.

Administrative or Mission Related: This IM is mission related.

Policy/Action: This IM applies to all BLM-authorized activities.[1,2] It provides a standard stipulation template (Attachment 1) to be used on external BLM authorizations and on internal BLM projects as design features. This IM also defines BLM Alaska priority invasive plants for prevention and management efforts (Attachment 2).

Timeframe: This IM is effective immediately.

[1]Per the 3809 Handbook, Section 4.4.2, pre-determined stipulations for mine operations are not allowed, however, these stipulations may be considered through the NEPA analysis and required as conditions of approval, to prevent unnecessary or undue degradation.

[2] Per the 2809 Handbook, Section 10.B.4, BLM may grant Federal Highway Administration/State of Alaska Department of Transportation right-of-way uses (termed highway easement deeds) via a letter of consent for highway or highway materials. While BLM may subject these to conditions of approval (COA)s to protect the adjacent public lands from activities which may cause off right-of-way adverse effects, such as revegetation with non-native species, COAs should not duplicate or conflict with those already required by FHWA/DOT.

Budget Impact: This policy is expected to reduce costs to BLM Alaska in the future. Without proactive management of invasive species, costs to BLM associated with invasive species management would likely increase due to the increased spread of unmanaged invasive plant species. Prevention and early detection have proven to be more successful and cost-effective approaches to managing invasive species than allowing them to establish. Authorized users may incur costs for necessary treatment and control prescriptions.

Background: The John D. Dingell, Jr. Conservation, Management, and Recreation Act of 2019 amended the Fish and Wildlife Coordination Act to provide direction (in 16 USC 666c–1) for each department to develop a strategic plan for protecting water, oceans, coasts, and wildlife from invasive species. This amendment directs the Secretary of the Interior through the BLM to take into consideration the economic and ecological costs of action or inaction during the development of strategic plans. In response, DOI updated Part 524 of the Departmental Manual on Invasive Species Management in 2020 (DOI 524 DM 1), which directs the Bureaus to implement measures to prevent the introduction, establishment, and spread of invasive plant species; detect and rapidly respond to invasive species; and eradicate or control populations of invasive plant species that are established. DOI 524 DM 1 also directs the Bureaus to use best management practices in all activities to reduce risks associated with invasive plant species, which include but are not limited to natural resource management, construction or development, fire management, permitting, and monitoring.

Authority: Fish and Wildlife Conservation Act (1934), as amended through P.L. 116-188; Federal Noxious Weed Act (1974); Federal Lands Policy and Management Act, 43 U.S.C. § 1737 (1976); Executive Order 13112 (1999), as amended by Executive Order 13751 (2016); Plant Protection Act, 7 U.S.C. § 7701 (2000); John D. Dingell, Jr. Conservation, Management, and Recreation Act (2019).

Manual/Handbook Sections Affected: This policy is in conformance with the Integrated Vegetation Management Handbook (H-1740-2), BLM Manual 6100-National Landscape Conservation System Management (2012), and Department Manual on Environmental Quality Programs Series 31: Part 524 - Invasive Species (2020).

Coordination: This IM has been coordinated with Field and District Offices, AK-930 Division of Resources, AK-940 Lands and Realty, Alaska Fire Service, and HQ-220 Division of Forestry, Rangeland, and Vegetation Resources.

Contact: If you have any questions regarding this IM, contact Ann Erickson, BLM Alaska Botany, Forestry, Range Programs Lead, 907-271-1985, aerickson@blm.gov.

Kevin J. Pendergast
BLM Alaska State Director

2 Attachments

1 – Standard Stipulation and Design Feature Template for BLM AK Priority Invasive Plant Prevention and Management (4 pp)

2 – BLM Alaska Priority Invasive Plant List (2 pp)

Attachment 1 - Standard Stipulation and Design Feature Template for BLM AK Priority Invasive Plant Prevention and Management

I. For **All BLM External and Internal Authorized Activities**[1,2], including Saleable Mineral Authorizations, Leasable Mineral Authorizations, Right-of-Way Grants, Timber Authorizations, Special Forest Product Permits, Grazing Authorizations, and Special Recreation Permits. For both surface disturbing[3] and non-surface disturbing activities unless otherwise specified:

A. Responsibilities: The permit/grant/contract holder, hereafter known as the *holder*, is responsible for costs and coordination related to invasive species management to ensure that activities of the holder do not result in the introduction, establishment, or spread of Bureau of Land Management (BLM) Alaska (AK) Priority Invasive Plants (PIP) (Attachment 2) for applicable periods of the permit.

B. Initial Inspection: For surface disturbing activities only, the holder shall conduct a survey of PIP prior to conducting any on site project work to establish a baseline of any pre-activity infestations within the project area. Survey areas shall include all access roads or ancillary features associated with the area of operations, as defined by the plan of operations. Any PIP found during the initial inspection shall be reported to the AO. Authorizations may still be issued at the discretion of the AO with the development of appropriate preventative measures. When the activity is small in scale and scope or non-surface disturbing, the use of best available data (AKEPIC database) may satisfy this initial inspection requirement to establish a baseline of pre-activity infestations, as determined by the AO. Any holder not completing an initial inspection assumes responsibility for all PIP infestations within the project area.

C. Preventative Measures: The holder shall develop project-specific preventative measures based upon standard best management practices for preventing the introduction and spread of invasive species. See list of suggested resources for developing project-specific preventative measures in Section III. Preventative measures shall include but may not be limited to the following:

1. The holder shall ensure that all equipment, vehicles (e.g., trucks, trailers, watercraft, aircraft), and gear is free of visible soil, seeds, and vegetative parts before deploying to the project site and before moving from areas of known PIP infestations.

2. The holder shall not park or stage equipment, supplies, or materials in areas known to be infested with PIP. When feasible, activities shall commence from known un-infested areas and progress toward known infested areas.

3. The holder shall only use feed (e.g., hay), bedding (straw), mulch, erosion control materials, and seed that is certified as weed-free through the Alaska DNR Weed-Free certification programs. Other sources, including stockpiled items from the site, may be approved by the AO on a case-by-case basis. If Alaska certified weed-free products are unavailable, then Alaska-grown material is preferred. Documentation must be provided to the BLM indicating that certified weed-free products are unavailable.

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[1] Per the 3809 Handbook, Section 4.4.2, pre-determined stipulations for mine operations are not allowed, however, these stipulations may be considered through the NEPA analysis and required as conditions of approval, to prevent unnecessary or undue degradation.

[2] Per the 2809 Handbook, Section 10.B.4, BLM may grant Federal Highway Administration/State of Alaska Department of Transportation right-of-way uses (termed highway easement deeds) via a letter of consent for highway or highway materials. While BLM may subject these to conditions of approval (COA)s to protect the adjacent public lands from activities which may cause off right-of-way adverse effects, such as revegetation with non-native species, COAs should not duplicate or conflict with those already required by FHWA/DOT.

4. For operations in waterbodies, when moving equipment or personnel through waterbodies on the way to the project site or before transporting watercraft and aquatic gear (i.e. hip boots, waders, and bait containers) to the authorized use area, the holder shall:

a) Remove any aquatic plants, animals, and mud attached to watercraft and equipment,

b) Drain water from boat, motor, bilge, live wells, and bait containers, and

c) Spray all watercraft and equipment with high pressure water or dry for at least 5 days

5. If the operation involves floatplanes, permittee shall:

a) Inspect and remove aquatic plants from floats, wires or cables, and water rudders, transom, bottom, chine, wheel wells and float step area and

b) Pump water from floats.

c) Before takeoff, do not taxi through heavy plant growth and do raise/lower water rudders to clear off plants.

6. After takeoff, raise/lower water rudder several times to free aquatic plant fragments while over the water being left or over land

D. Monitoring (for surface disturbing activities only): The holder shall survey the project area during the growing season for occurrence of PIP during the life of the permit/grant/contract. If evidence of PIP is documented, treatment and additional monitoring may be determined necessary by the AO. Formal monitoring for non-surface disturbing activities is not required. Casual observations should be reported to the AO.

1. Surveys shall include lands encompassed by all access roads or ancillary features associated with the holder's area of operations, as defined by their plan of operations.

2. **Specific to Saleable Materials (Mineral Materials)**: Prior to any new disposals, the holder will implement an invasive species inspection, monitoring, and treatment program for PIP as follows:

a) Material shall be inspected in the area of origin prior to movement once per growing season by the holder. If material is stockpiled on BLM lands it must also be inspected annually. If gravel/borrow area contains any PIP, then:

(1) Area upon which gravel/borrow material is mined must be treated to prevent seed formation, seed ripening, or dissemination of the seed or propagative parts capable of producing a new plant.

(2) When opening a new gravel pit or expanding an existing gravel pit with PIP present, topsoil and material should be removed and stockpiled. Infested material should not be moved off property or placed in vehicle traffic areas.

[3]**Surface disturbing activities** are actions that alter the land surface in ways that affect natural site conditions and public land values. This includes activities that disturb the mineral soil resource, surface geologic features, or vegetation beyond natural conditions. See applicable BLM manual, handbook, or land use plan for definitions.

E. Treatment: If treatment is necessary to eradicate infestations that result from the activities of the holder (i.e., BLM A.O. has documented establishment or spread of PIP above the baseline established in initial inspection from failure to implement preventative measures) (Section I.B.), permittee-proposed treatment methods must receive concurrence from the AO. If the holder fails to perform the necessary treatment, the BLM may initiate treatment at the expense of the holder. The holder shall reimburse the BLM the cost of the treatment. The BLM will proportionally apply any cost incurred among all authorized users of the site.

F. Reporting: For surface disturbing activities, reports that document: 1) initial inspection and 2) monitoring should be provided annually by December 31 to the AO and include:

1. Inspector's name, title
2. Inspection date
3. List of invasive species identification resource(s) referenced
4. Map showing total area surveyed and any PIP GPS locations.
5. For any PIP infestations detected include:
    a) Species identification for each PIP
    b) Estimation of infestation size (number of plants or acreage)
    c) Photographs showing the general extent of infestation and close-up photographs of individual plants.
    d) Any treatment methods/strategies proposed for BLM approval.

For non-surface disturbing activities, incidental observations of PIP should be reported to AO.

II. Resources for Invasive Species Identification and Project-specific Preventative Measures:

A. Invasive Species Identification

Alaska Exotic Plants Information Clearinghouse (AKEPIC) Database (https://akepic.portal.axds.co/#map) and Elodea Survey Web App (https://arcg.is/TqaWC1)

Flagstad, L.A., H. Cortés-Burns, and C. Greenstein. 2019. Identification of non-native plants in Alaska. Alaska Natural Heritage Program, University of Alaska Anchorage. 219 pp. Available: https://accs.uaa.alaska.edu/invasive-species/publications/

U.S. Department of Agriculture, Forest Service. 2020. Selected Invasive Plants of Alaska. Alaska Region R10-TP-164. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd874598.pdf

B. Preventative Measures

Alaska Department of Transportation and Public Facilities (DOT&PF). 2014. Disposal and Control of Invasive Plant Species. Prepared for Alaska DOT&PF Southeast Region. Prepared by Three Parameters Plus, Inc. Fairbanks, AK. 64 pp. Available: https://dot.alaska.gov/stwddes/desenviron/assets/pdf/resources/se_invasive_final.pdf

Cal-IPC. 2012. Preventing the Spread of Invasive Plants: Best Management Practices For Transportation and Utility Corridors. Cal-IPC Publication 2012-1. California Invasive Plant Council, Berkeley, CA. Available at https://www.cal-ipc.org/resources/library/publications/tuc/

Fleming, J. 2005. Vehicle Cleaning Technology for Controlling the Spread of Noxious Weeds and Invasive Species. USDA Forest Service. Available: https://www.fs.usda.gov/t-d/pubs/pdf/hi_res/05511203hi.pdf

Graziano, G., S Seefeldt, and L. Clayton. 2014. Best Management Practices: Controlling the Spread of Invasive Plants During Road Maintenance. PMC-00342. Available: http://cespubs.uaf.edu/publications/

U.S. Department of Interior, Bureau of Reclamation. 2021. Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species. Available: https://www.usbr.gov/mussels/prevention/docs/EquipmentInspectionandCleaningManual2021.pdf

U.S. Fish and Wildlife Services Region 7.2018. Guidelines for Preventing the Spread of Aquatic Invasive Species. Available: https://www.fws.gov/sites/default/files/documents/Aquatic%20Invasive%20Species%20Prevention%20Guidelines%20508.pdf

Attachment 2 –BLM Alaska Priority Invasive Plant List

BLM Alaska has developed this list of state-wide priority invasive plant species to help direct invasive species management within AK BLM lands (Table 1). BLM may update this list annually by March 15 to include and prioritize other invasive species of concern to BLM. The BLM Alaska Priority Invasive Plant (PIP) List was developed based upon the North American Invasive Species Management Association (NAISMA) and Alaska Department of Natural Resources Certified Weed Free Products Program guidance (http://plants.alaska.gov/invasives/weed-free-gravel.htm) with recommendations from the Alaska Weed-Free Material Committee and the University of Alaska, Alaska Center for Conservation Science. The BLM Alaska PIP List includes 32 plants from the Alaska Weed Free Gravel Certification List of Species (NAISMA list) that are currently known to be present in Alaska and adjacent regions, as identified through analysis of known distribution (AKEPIC, 2025 and 2025a) and consultation with the US Fish and Wildlife Service Regional Invasive Species Program Coordinator, University of Alaska Center for Conservation Science, USDA Forest Health Protection program, USDA Agricultural Research Service, US Geological Survey, National Park Service, and University of Alaska Fairbanks Cooperative Extension Service (Carlson et al. 2008; Nawrocki et al. 2011).

Table 1. BLM Alaska Priority Invasive Plant List

Scientific Name	**Common Name**
Terrestrial Species	
Arctium minus	common burdock
Avena fatua	wild oats
Berteroa incana	hoary alyssum
Carduus nutans	musk thistle
Centaurea maculosa	spotted knapweed
Cirsium arvense	Canada thistle
Conium maculatum	poison hemlock
Convolvulus arvensis	field bindweed
Elymus repens	quackgrass
Euphorbia esula	leafy spurge
Galeopsis sp.	hempnettle
Hesperis matronalis	dame's rocket
Hieracium aurantiacum	orange hawkweed
Hieracium caespitosum	yellow (meadow) hawkweed
Hypericum perforatum	St. Johnswort
Leontodon autumnalis	hawkbit/fall dandelion
Leucanthemum vulgare	oxeye daisy
Linaria dalmatica	dalmatian toadflax
Linaria vulgaris	yellow toadflax
Lythrum salicaria	purple loosestrife
Melilotus albus, M. officinalis	sweetclover, white sweetclover, yellow sweetclover
Phalaris arundinacea	reed canarygrass
Fallopia X *bohemica*	Bohemian knotweed

Fallopia convolvulus, syn. *Polygonum convolvulus*	black bindweed/wild buckwheat
Fallopia japonica var. *japonica*	Japanese knotweed
Fallopia sachalinensis	giant knotweed
Prunus padus, P.virginiana	European bird cherry, choke cherry
Ranunculus acris	tall buttercup
Jacobaea vulgaris	tansy ragwort
Sonchus arvensis	perennial sowthistle
Tanacetum vulgare	common tansy
Verbascum thapsus	common mullein
Vicia cracca	bird vetch
Aquatic Species	
Elodea sp.	waterweed

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Appendix D3 – USFWS Best Management Practices

US Fish and Wildlife Service, Alaska

Technical Assistance for Broadband Projects[1]

In anticipation of substantial expansion of broadband capability in Alaska, the Alaska Region of the US Fish and Wildlife Service (Service) has compiled Best Management Practices (BMPs) for project proponents to consider early in the planning and project development process to avoid and minimize impacts to wildlife populations and habitats.

Although these BMPs are designed to be broadly applicable across projects, each individual project will likely have unique environmental and wildlife considerations, and we encourage project proponents to reach out directly to either the Northern Alaska Fish and Wildlife Field Office or Southern Alaska Fish and Wildlife Field Office, depending on the location of the project.

To determine if your proposed project is on land managed by the Service (i.e., National Wildlife Refuges) or has Service trust resources (e.g., Threatened and Endangered species, eagles, migratory birds, marine mammals, wetlands, etc.) in the vicinity of or within the project footprint, see the Service's Information Planning and Consultation (IPaC) tool (ipac.ecosphere.fws.gov/). To use IPaC, click on 'Get Started', and select the project area by manually drawing project boundaries or uploading a shapefile.

In addition to universal BMPs that will be broadly applicable across all activity types, activity specific BMPs are organized based on the type of broadband deployment method being used (i.e., terrestrial, riverine, and marine cable lay as well as broadband towers). Additional sections on species-specific BMPs and regulatory BMPs are provided and should be considered when additional species or resources are identified within or adjacent to the project area in IPaC. Contact the relevant Field Office (listed on the IPaC Resource List printout) with any questions and for additional guidance on avoiding and minimizing impacts to resources.

Overview:

[1] https://www.fws.gov/service/technical-assistance-broadband-projects

Universal Best Management Practices

Migratory birds

- The Service has developed a timing guidelines table for migratory birds in Alaska to help avoid the take of nesting birds based on location, habitat, and bird species. Visit fws.gov/alaska-bird-nesting-season to view the table online and download a PDF version.
- Prevent increase in lighting of native habitats during the bird breeding season.
- To the maximum extent practicable, limit construction activities to the time between dawn and dusk to avoid the illumination of adjacent habitat areas.
- If construction activity time restrictions are not possible, use down shielding or directional lighting to avoid light trespass into bird habitat (i.e., use a 'Cobra' style light rather than an omnidirectional light system to direct light down to the roadbed). To the maximum extent practicable, while allowing for public safety, low intensity energy saving lighting (e.g., low pressure sodium lamps) should be used.
- Minimize use of high-intensity lighting, steady-burning, or bright lights such as sodium vapor, quartz, halogen, fluorescent, or other bright spotlights.
- Minimize illumination of lighting on associated construction or operation structures by using motion sensors or heat sensors. Use switches to keep lights off when not required.
- Avoid installing lights offshore or within 0.5 miles of the coast.
- Cap pipes and cover and seal all small dark spaces where birds may enter and become trapped.
- Install anti-perching devices on facilities and equipment where birds may commonly nest or perch.
- Cover or enclose all potential nesting surfaces on the structure with mesh netting, chicken wire fencing, or other suitable exclusion material prior to the nesting season to prevent birds from establishing new nests. The netting, fencing, or other material should have no opening or mesh size greater than 19 millimeters and should be maintained until the structure is removed.

Oil spills

- To fulfill Federal and State reporting requirements, all spills of oil, petroleum, or other hazardous substances, of any size, should be reported to the National

Response Center (1-800-424-8802) and the Alaska Department of Environmental Conservation Spill Reporting Hotline (1-800-478-9300).

Method-specific Best Management Practices

Terrestrial broadband

- Reduce the project footprint to the maximum extent practicable, and locate proposed projects and their associated activities in already disturbed areas or lower functioning or lower quality habitat.
- Collocate infrastructure whenever possible in permanently disturbed areas such as rights-of-way (e.g., place utilities in existing road corridors, use existing pipeline or transportation corridors for new infrastructure construction, place new antenna on existing towers or place new structures near existing structures whenever possible).
- Avoid placement of infrastructure and fill materials in wetlands whenever possible. Effects to wetlands are usually proportional to the size of the impact. Therefore, if avoidance is not possible, minimization should be employed by choosing broadband options with smaller footprints (i.e., single tower vs. miles of overhead cable poles with cleared right-of-way) that do not obstruct hydrologic flow across the landscape.
- If impacts to wetlands are unavoidable, make them temporary impacts by restoring the site to pre-existing conditions (e.g., hydrology, grade, vegetation). Permanent impacts (e.g., placement of fill, alteration of hydrology) should be offset with the purchase of compensatory mitigation within the same or a nearby watershed. This will reduce subsidence, scarring, and habitat alteration.
- Avoid sensitive soils such as highly erosive soils, thaw-stable, and thaw-unstable permafrost.
- Avoid ground-disturbing activities during the bird nesting season when possible.
- Preserve stream and riparian buffers to protect water quality, maintain stream channel and bank stability, maintain fish and wildlife habitat, and provide flood water protection. See https://www.fws.gov/Riparian-Management-Interior-Alaska for more information on riparian buffers.
- Trenching should be avoided in terrestrial areas of thaw-sensitive soils (i.e., continuous and discontinuous permafrost). The activity of trenching, even during freezing temperatures where a stable, frozen platform is available for digging and backfill, creates linear density differences within the trench, allowing groundwater

to collect and pass more easily than the surrounding non-disturbed soils. The higher permeability of backfilled trenches usually causes a French-drain effect, aggregating surface flows and groundwater, which then melts surrounding permafrost and causes water flow, further exacerbating the permafrost degradation. Subsequent water quality and habitat degradation causes numerous negative effects. Alternatives for trenching include direct cable lay, overhead cable with poles, or use of non-cable broadband such as 4G and 5G networks via network towers.

Invasive species

- Equipment must arrive and leave the project clean without visible soil clumps, plant, or animal material. Use a pressure washer, paying special attention to wheel wells, areas behind the bumper, trailers, and other areas that are likely to catch vegetation or seeds. Equipment washing should occur at the same location during project operations; this site should then be surveyed regularly and treated as necessary. Do not clean equipment in or near waterways as it may promote the spread of invasive plant species downstream. Conduct project operations in uninfested areas first to ensure that invasive species do not contaminate equipment and get moved to new areas.
- Prevent invasive plant contamination of project materials when stockpiling materials. Ensure the area is free of invasive species, and cover gravel and construction materials to prevent accidental introduction of plant parts such as seeds, roots, and propagules (i.e., reproductive vegetative parts). Remove any plant parts from materials before deploying them into the field.
- Use certified weed free gravel (plants.alaska.gov/invasives/weed-free-gravel.htm)
- Use certified weed free hay in straw wattles (plants.alaska.gov/invasives/weed-free-forage.htm)
- Soil disturbance includes contouring, grubbing, logging, moving, removing, excavating, and cutting. Soil disturbance destabilizes and exposes soil, which can impact water and air movement, biological activity, root growth, and seedling emergence. Disturbed soil provides an opportunity for invasive plants to establish and spread, to compete with native species, and to colonize new areas. Disturbed soil should be stabilized and covered as soon as possible to prevent the germination and growth of invasive plants. If a worksite is infested with invasive plants, schedule treatment of these plants prior to ground disturbance to minimize spread of invasive plants into other uninfested areas. Project materials such as fill, aggregate, and

erosion control materials can also carry invasive plant seeds, which further increase the risk for infestation after soil disturbance. Refer to the weed free hay and gravel above.

- When possible, wear clothing, boots, and gear that do not retain soil and plant material. Clean clothing, boots, and gear before entering and leaving worksite. Remove soil, mud, seeds, and any plant material from clothing, boots, and gear with appropriate equipment. This may include wire brushes, small screwdrivers, boot brushes, extra rinse water, and bags for plant material. Inform coworkers about possible seeds or other propagules carried on their clothing, footwear, and gear.
- Vertebrate invasive species can be transported in cargo planes and ships where they stowaway in grain, straw, and hay. Eradicate free-roaming rats and mice whenever they are detected on or in equipment to ensure they are not inadvertently relocated elsewhere. Eliminate rat attractants including shelter, edible refuse, and food. Keep trash and foodstuffs in metal or other rodent-proof containers.
- Never release live rats or mice into the wild, and never throw captured rats overboard; they are excellent swimmers and may reach land. Other tips for rat prevention and control are available in the Alaska Department of Fish and Game's State Invasive Rodent Plan (adfg.alaska.gov/static/species/nonnative/invasive/pdfs/invasive_rodent_plan.pdf).

Direct cable lay on tundra

- Depending on the type of tundra, some sections of the cable may never subside when directly laid on the ground. Ensure above ground cable sections remain in a line and do not curl up to avoid entanglement by wildlife (e.g., birds, caribou, etc.).
- When necessary, cable slack on the ground to prevent impacts of temperature expansion, contraction, and cable settling may be necessary. However, the cable slack should be laid on the ground in a waving line instead of twisted in circles to prevent entanglement of birds, caribou, and other wildlife.
- The extra effort to place the cable on the ground, regardless of the thickness or height of shrubs, will prevent potential entanglement of birds.
- Be aware that wildlife (e.g., grizzly bears, polar bears, foxes, rodents, etc.) may attempt to chew on cables. This could also occur for cables that are trenched shallowly.

Overhead between poles

- To reduce bird collisions, place transmission lines associated with the development underground to the extent possible unless burial of the lines is prohibitively expensive (i.e., where shallow bedrock exists) or where greater impacts to biological resources would result.
- Overhead lines may be acceptable if they are sited away from areas used by high numbers of birds crossing between roosting and feeding areas or between lakes, rivers, and nesting areas.
- Use bird flight diverters (i.e., flappers) or related deterrent devices that are durable and visible to reduce collision risk. Studies suggest that most bird collisions occur with the shield wire – the smallest diameter and highest wire on a transmission line. The observed reduction in collision rates can range from about 10 percent to as much as 80 percent (Barrientos et al. 2011[1]) and appears to vary with location, habitat, wire, pole configurations, and other factors. The type and spacing of diverters will also affect the degree to which collision risk is reduced.
- Above water crossings of the cables may still impact birds, regardless of the bird diverters. This primarily may happen with thick fog during fall migration or during breeding when birds are flying in circles, etc. to impress a potential mate. Placing the cable under water, and perhaps under the bottom of streams or rivers, likely will be the best solution to avoid avian impacts.
- On the North Slope of Alaska, where ravens depend on manmade structures for perching and nesting, install deterrent features on poles to reduce their availability as artificial perching and nesting platforms.

[1] Barrientos, R., J.C. Alonso, C. Ponce, and C. Palacín. 2011. Meta-analysis of the effectiveness of marked wire in reducing avian collisions with power lines. *Conservation Biology* 25:893-903.

Riverine broadband

- Adhere to permit construction timing windows to avoid sensitive fish life stages such as spawning, incubation, and migration.
- Preserve stream and riparian buffers to protect water quality, maintain stream channel and bank stability, maintain fish and wildlife habitat, and provide flood water protection. See fws.gov/node/378411 for more information on riparian buffers.

- Use screened intake for water withdrawals. The Alaska Department of Fish and Game Habitat Division Technical Report No. 97-8 (adfg.alaska.gov/static/license/uselicense/pdfs/97_08.pdf) contains additional information on screening criteria for various species and life stages of fish as well as methods for design and fabrication of cylindrical water intakes. Appropriate screening prevents suction entrapment and entrainment injury to small and juvenile fish present in the area of the withdrawal.
- For riverine fiber-optic and traditional cable overhead wire crossing, horizontal directional drilling (HDD) is highly recommended as a crossing method. This is especially true for Navigable Waters regulated under Section 10 of the Rivers and Harbors Act and rivers that are navigable in fact. HDD should be used over the 100-year floodplain extent to maintain lateral movement of the river without obstructions from protective broadband infrastructure. This ensures protection of wildlife from the infrastructure obstructions and entanglements, decreases regulatory oversight from potential obstructions to navigation, and increases infrastructure lifespan by avoidance of damage from flooding.
- The use of plastic fiber erosion control fabrics is not acceptable to mitigate streambank erosion or maintain erosion control on steep slopes in or near flowing waterbodies. Instead, use bioengineering techniques and materials that will not pose hazards to wildlife if escapement occurs. For examples, see the Alaska Department of Fish and Game Streambank Revegetation and Protection: A Guide for Alaska (adfg.alaska.gov/index.cfm?adfg=streambankprotection.main).

Spill mitigation

- Maintain a minimum 200-foot setback from waterways when storing hazardous or toxic material.
- Ensure that secondary containment is provided for the storage of fuel or hazardous substances and sized as appropriate to container type and according to governing regulatory requirements in 18 AAC 75 and 40 CFR 112.
- Containers with an aggregate storage capacity of greater than 55 gallons that contain fuel or hazardous substances should not be stored within 100 feet of a waterbody or within 1,500 feet of a current surface drinking water source.
- During equipment storage or maintenance, ensure that the site is protected from leaking or dripping fuel and hazardous substances by the placement of drip pans or other surface liners designed to catch and hold fluids under the equipment or by

creating an area for storage or maintenance by using an impermeable liner or other suitable containment mechanism.

- During fuel or hazardous substance transfer, ensure that a secondary containment or a surface liner is placed under all container or vehicle fuel tank inlet and outlet points, hose connections, and hose ends. Appropriate spill response equipment, sufficient to respond to a spill of up to five gallons, should be on hand during any transfer or handling of fuel or hazardous substances.

Sedimentation and pollutants

- Isolate wetlands and waterbodies from project-generated sediment and pollutants (i.e., soil sediments, fuels, grease, and oil) with project specific measures to avoid and minimize water quality degradation to protect respiratory gill function of fish. Measures may include maintaining riparian zone setbacks and bank stabilization or restoration practices. During the construction phase, properly installed silt fencing, silt curtains, etc. should be used interim to proper bank stabilization with vegetation. Long-term use of silt fencing must be avoided due to level of maintenance necessary to maintain and the likelihood of plastics escapement to the environment.

Invasive species

- Aquatic Best Management Practices follow the principles of Clean, Drain, Dry:
    - Clean – Inspect and clean off plants, animals, and mud from clothing, vehicles (i.e., float planes and boats), and equipment including waders, footwear, ropes, anchors, and field gear before leaving water access. Use the local water source initially to help remove heavy deposits. Remove plant fragments, and scrub off any visible material with a stiff brush.
    - Drain – all water from watercraft, motor, bilge, bladder tanks, live well, and portable bait containers before leaving water access.
    - Dry – equipment, vehicles, and gear before moving between waterbodies. Dispose of unwanted materials in the trash; do not dump them in the water or on land.
- Refer to the Alaska Region's Guidelines for Preventing the Spread of Aquatic Invasive Species (fws.gov/media/aquatic-invasive-species-prevention-guidelines-pdf) for more information.

Marine broadband

- Select cable routing to avoid listed eider and short-tailed albatross concentration areas to reduce potential behavioral and disturbance effects.
- Depending on the project area, Protected Species Observers may be necessary to avoid potential take of Endangered Species Act-listed species and marine mammals protected by the Marine Mammal Protection Act.
- Keep cable lines tight to decrease entanglement risk.
- Take all precautions necessary to minimize the risk of spilling fuels or other materials in the marine environment.
- Avoid project activities, particularly those that disturb subsurface vegetation, in areas of eelgrass and kelp growth. Eelgrass and kelp provide rearing and refugia habitat for a wide variety of small and juvenile marine fish and invertebrate species that provide food for listed eiders. Northern sea otters are also associated with kelp forests, which they use to escape from marine predators.
- Minimize the use of external lighting at night, and angle lights downward toward the surface of the water to reduce potential for collisions with vessels and gear. The use of bright lights at night, especially during inclement weather, increases risk of collision and mortality events. Bright lights on vessels at night can serve as an attractant or can cause temporary visual impairment, which increases the risk of birds colliding with vessel gear or rigging that is difficult to see at night. Weather patterns can further reduce visibility and the lower cloud ceiling enhances light where birds tend to fly at lower altitudes. Further information on vessel strikes in the marine environment is available at fws.gov/service/technical-assistance-prevent-bird-vessel-strike-alaska-marine-environment
- Vessels should not discharge materials (i.e., trash or other debris) into the ocean that may attract seabirds, including short-tailed albatross.
- Vessels will not allow tow lines to remain in the water, thereby reducing the potential for entanglement.

Invasive species

- Alaska relies on the US Coast Guard to enforce national standards for ballast water and biofouling.
- Commercial ships use ballast water, typically loading ballast when offloading cargo and discharging ballast when onloading cargo. However, when loading ballast, small organisms are often also brought onboard with the water. If unmanaged, water can

then be transferred to areas and discharged with viable organisms in the effluent. Organisms that are then deposited can cause harm to native flora and fauna in the new area they inhabit.

    - Empty/Refill Exchange: pump the ballast tank or tanks and refill the tank with mid-ocean waters at least 200 nautical miles from any coast.
    - Flow through exchange: pump in mid-ocean water, at least 200 nautical miles from any coast, at the bottom of the tank and continuously overflow the tank from the top until three full volumes of the ballast water tank capacity have been changed.
    - Onboard Treatment: Use a properly functioning treatment system approved by the US Coast Guard that is designed to kill all living organisms in the ballast water.
    - Freshwater: Use ballast water from a municipal water supply from the US or Canada.
    - Sealed tanks: Use ballast water in sealed tanks incapable of discharging ballast water.

- Biofouling accumulation on a submerged vessel can begin within minutes. The process begins with bacteria and algae recruiting onto the vessel, progressing into a slime layer (biofilm) within days. Then further advancing into a macrofouling community in weeks. Macrofouling happens especially in the niche areas (i.e., propeller shafts, rudder, sea chest intake, bow thruster gratings, etc.), which act as protective spaces for biofouling organisms. Applying the proper antifouling hull paint and maintaining the coating to the manufacturer's specifications may substantially reduce vessel operating costs and minimize environmental impacts. Following best management practices for managing biofouling "early and often" at the slime layer level will cut biofouling management and fuel costs, thereby reducing vessel carbon emissions in addition to reducing biosecurity risks ports.
- Vertebrate invasive species can be transported in cargo planes and ships where they stowaway in grain, straw, and hay. Eradicate free-roaming rats and mice whenever they are detected on or in equipment to ensure they are not inadvertently relocated elsewhere. Eliminate rat attractants including shelter, edible refuse, and food. Keep trash and foodstuffs in metal or other rodent-proof containers.
- Never release live rats or mice into the wild, and never throw captured rats overboard; they are excellent swimmers and may reach land. Other tips for rat

prevention and control are available in the Alaska Department of Fish and Game's State Invasive Rodent Plan (adfg.alaska.gov/static/species/nonnative/invasive/pdfs/invasive_rodent_plan.pdf).

Broadband towers

- Guy wires and tower lighting should be avoided when possible. Use self-supporting towers when applicable. If guy wires are necessary, bird flight diverters or high visibility marking devices should be used. When guy wires are necessary, each wire should be marked for its full-length using markers colored to contrast with the wire and surrounding environment during daylight hours. The Service can provide information as needed on types that have proven durable as not all markers have withstood use in Alaska. Markers should be checked and maintained periodically to ensure continued functionality for the life of the project.
- Use visual contrasting colors on towers to improve visibility.
- Use motion detectors and down-shield lights to reduce collisions and light loss when lighting facilities.
- Towers and associated facilities should be designed, sited, and constructed to avoid or minimize habitat loss within and adjacent to the tower "footprint" (including guy wire circumference). Several shorter, un-guyed towers may be preferable to a single, tall, guyed and lit tower.
- If a tower is in the path of a potential bird migration corridor, the Service recommends mortality monitoring. Representatives from the Service or other experienced biological monitors (i.e., from other agencies, biological consulting companies, etc.) should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place above ground net catchments below the towers; and to perform studies using radar, infrared, thermal imagery, and acoustical monitoring, as necessary.
- Use monopole structures when possible, rather than lattice structures to discourage perching and nesting by ravens, raptors, and other birds of prey unless a monopole structure would require additional guywires on an otherwise un-guyed tower. Nesting by ravens and raptors can result in increased rates of predation. In these cases, the applicant should work with the Service to incorporate anti-perching and anti-nesting devices into project design.
- Powerlines should be buried in roadbeds or placed in electrical trays strung on Voltage Sensing Modules when possible.

- Locate towers to avoid placement of fill in or disturbance to wetlands, which are prime breeding and forage areas for migratory birds and other trust species.
- Towers should not be sited on ridgelines or other known bird concentration areas (e.g., State or Federal refuges, staging areas, rookeries, and Important Bird Areas) or in known migratory bird movement routes, daily movement flyways, areas of breeding concentration, or in habitat of Threatened or endangered species.
- Avoid installing towers offshore or within 0.5 miles of the coast.
- It is recommended that new towers should not be more than 199 feet above ground level. This height increases the mean free airspace between the top of the tower and the height at which birds generally migrate, reducing collision risk.
- Lights are a primary source of bird aggregation around towers, thus minimizing all light is recommended. Eliminating tower lighting is the preferred option if allowed by FAA regulations and lighting standards (Patterson 2012[1]). See (faa.gov/documentlibrary/media/advisory_circular/ac_70_7460-1l_.pdf) for more detailed information about FAA guidelines. To meet FAA requirements for visibility lighting of towers the Service recommends (in order of least to most likely to affect birds): red strobe, dual red and white strobe, strobe-like, or flashing and not steady state lights. Pilot warning lights should fire synchronously.
- Security lighting for on-ground facilities, equipment, and infrastructure should be motion or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination while still allowing safe nighttime access to the site.
- On the North Slope of Alaska, where ravens depend on manmade structures for perching and nesting, design towers to reduce their suitability as artificial perching and nesting platforms.

[1] Patterson, J.W. 2012. Evaluation of new obstruction lighting techniques to reduce avian fatalities. Technical Note: DOT/FAA/TC-TN12/9.

Species-specific Best Management Practices

Additional best management practices are provided for species protected under the Endangered Species Act and/or Marine Mammal Protection Act.

Northern sea otter

- For all vessel-based activities within the sea otter range, take precaution to avoid harassment or harm of sea otters. Vessel strikes are a cause of injury and death for

sea otters and the probability of death or serious injury to a marine mammal increases as vessel speed increases. Use established navigation channels or commonly recognized vessel traffic corridors and avoid alongshore travel in shallow water (less than 20 m) whenever practicable. Follow the Service's sea otter vessel guidelines for Alaska (fws.gov/sea-otters-boater-guidance).

- Vessels should avoid approaching within 100 meters (328 feet) of areas with kelp at the surface when operationally possible. If vessels must approach kelp canopy areas more closely, apply extra vigilance to look for sea otters (e.g., assign an additional spotter), and maintain an appropriate distance from sea otter individuals or groups.
- Sea otters may be disturbed or harmed by loud in-water noise, and the Service considers sea otter to be harassed when exposed to in-water sound levels exceeding 160 dB re 1 µPa SPL_{RMS}. If activities involve in-water noise production in sea otter habitat above this level, contact the Service's Marine Mammals Management office (FW7_AK_Marine_Mammals@fws.gov; 800-362-5148).
- Coordinate with Tribal organizations to ensure activities do not disrupt sea otter subsistence harvest. The Service's Marine Mammals Management office may be able to assist with coordination.
- Depending on the project area, Protected Species Observers may be necessary to avoid potential take of sea otters.
- Areas have been designated as critical habitat for northern sea otters. These areas represent locations that are of particular importance to the species. The Service asks that project proponents are cognizant of the importance of these locations to sea otters and limit actions within these areas when possible.

Pacific walrus

- Walruses are sensitive to disturbance from noise, sights, and smells associated with human activities. Take caution to avoid disturbing walruses that are in the water or are hauled out on ice or land. Follow the Service's guidelines for avoiding disturbance, including from marine vessels and aircraft: fws.gov/walrus-approach-viewing-guidelines
- When planning work in the Bering or Chukchi Seas, consult the Pacific Walrus Coastal Haulout Database 1852-2016 (alaska.usgs.gov/products/data.php?dataid=74) for information regarding location and use patterns of known terrestrial walrus haulouts in Alaska. Note there are five

regularly used walrus haulouts in Bristol Bay, located at Round Island and Hagemeister Islands and Capes Peirce, Newenham, and Seniavin. During the months of May through December, walruses may be encountered in the water and resting on land in these areas. In the Chukchi Sea, there are especially large, sensitive haulouts at Point Lay and Cape Lisburne. The sea ice edge is also a sensitive congregation and migration area. When walruses are present, haulouts should be avoided by the stand-off distances from the Service's marine vessel guidelines, reiterated here:

    - Vessels less than 50 feet in length should remain at least 0.5 nautical miles away from a walrus haulout.
    - Vessels 50 feet or more but less than 100 feet in length should remain at least 1 nautical mile away from a walrus haulout.
    - Vessels 100 feet or more in length should remain at least 3 nautical miles away from a walrus haulout.
    - All vessels should refrain from anchoring or conducting tendering operations within 3 nautical miles of a walrus haulout.

- If aircraft are being used, it is very important to follow the aircraft measures included in the guidelines linked above.
- For more information on a specific haulout, reach out to the contact noted in the Pacific Walrus Coastal Haulout Database or the Service's Marine Mammals Management office (FW7_AK_Marine_Mammals@fws.gov; 800-362-5148). If activities must occur within 3 nautical miles of a haulout, near the sea ice edge, or are within the Bering Strait, reach out to the Service.
- Walruses may be disturbed or harmed by loud in-water noise, and the Service considers walruses to be harassed when exposed to in-water sound levels exceeding 160 dB re 1 µPa SPL_{RMS}. If activities involve in-water noise production in walrus habitat above this level, contact the Service.
- Coordinate with Tribal organizations to ensure activities do not disrupt walrus subsistence harvest. The Service's Marine Mammals Management office may be able to assist with coordination. Specifically, activities near communities in the Bering Strait and near Saint Lawrence Island between April and June would likely overlap with subsistence walrus hunting activities.
- Depending on the project area, Protected Species Observers may be necessary to avoid potential take of walruses.

Polar bear

- Polar bears use sea ice, marine waters, and terrestrial areas in northern and northwestern Alaska for resting, feeding, denning, and seasonal movements. They are most likely to be encountered within 25 miles of the coastline, especially along barrier islands during July–October. Polar bears may also be encountered farther inland, especially females during the denning period (November–April). Be aware that polar bears also occur within human settlements such as villages, camps, and work areas. If any work in polar bear habitat may occur, see the Service's Best Management Practices to Minimize Impacts to Polar Bears document (https://www.fws.gov/media/polar-bear-bmps), which also includes polar bear encounter guidelines and reporting procedures. Following as many relevant measures as possible through the development and implementation of a polar bear avoidance and encounter plan will help protect both human and bear safety.
- Denning is a critical, sensitive period in polar bear life history. Human disturbance of maternal dens at any stage, including after emergence, could result in the taking (harassment or harm) of polar bears. This may include the possibility of lethally taking cubs. Projects with operations between November and April and within 25 miles of the Bering, Chukchi, or Beaufort coasts (outside of communities) may impact denning, and planners should contact the Service's Marine Mammals Management office (FW7_AK_Marine_Mammals@fws.gov; 800-362-5148) as early as possible to discuss activities.
- For any project with operations on sea ice or within five miles of the Alaska Arctic coast from the Canadian border to Point Hope, within one mile of the western coast from Point Hope to Nome, or along the coast of St. Lawrence Island, contact the Service Marine Mammals Management office to discuss activities.

Short-tailed albatross

- Short-tailed albatross spend most of their lives in marine environments and are known to forage primarily on continental shelf breaks in Alaskan waters but may also be found near shore when upwelling creates prey-rich concentrations. They can be attracted to vessel debris, such as bait used in the hook-and-line commercial fishery in Alaska, and therefore can be vulnerable to entrapment, entanglement, or bycatch. Specifics for preventing bird-vessel strike can be found at: fws.gov/service/technical-assistance-prevent-bird-vessel-strike-alaska-marine-environment. Also refer to the 'Marine Broadband' section above for more guidance.

Spectacled eider / Steller's eider

- Listed eiders are at risk of colliding with moving or stationary marine vessels around Alaska. Impaired visibility and vessel lighting may increase the likelihood of bird strikes. Generally, the Service recommends keeping deck lighting to a minimum and shielding lights to direct illumination inboard and downward to the extent possible while still maintaining compliance with navigation rules. Concern for eider-vessel collision risk is particularly high between August and November, during which time Steller's and spectacled eiders frequently fly in large groups between nesting, molting, and wintering areas. This timing coincides with decreasing hours of daylight and a high potential for inclement weather, both of which may impair eider visibility to human observers and increase the likelihood that birds may become disoriented by ship lighting, in turn, reducing their ability to avoid colliding with structures. More specifics for preventing bird-vessel strike can be found at: fws.gov/service/technical-assistance-prevent-bird-vessel-strike-alaska-marine-environment. Also refer to the 'Marine Broadband' section above for more guidance.
- Steller's eiders and spectacled eiders are migratory birds. Refer to the 'Migratory Bird' section for more BMPs.
- Listed eiders are at risk of injury or death due to collision with communication towers and wires. Refer to the 'Broadband Towers' section above for appropriate mitigation measures to reduce eider collisions.
- Areas have been designated as critical habitat for both spectacled and Steller's eiders (review if your project occurs within critical habitat at ipac.ecosphere.fws.gov/). These areas represent locations that are of particular importance to each species or locations at which birds are particularly vulnerable to disturbance. We ask that project proponents are cognizant of the importance of these locations to each species and limit actions within these areas. For projects with marine components, we ask that vessels limit their transit and actions within these areas and be extra cautious about vessel lighting. Furthermore, we ask that mariners do not disturb congregations of eiders within these areas as they may be flightless and unable to move away from vessels.
- Depending on the project area, Protected Species Observers may be necessary to avoid potential take of listed eiders.

Regulatory Best Management Practices

Bald and Golden Eagle Protection Act

- For any project that may result in take or disturbance of eagles or their nests, the USFWS recommends a survey by a qualified raptor biologist prior to conducting

activities to document locations of nests and help inform avoidance and minimization measures and the need for a permit. Surveys should be conducted within the project footprint and extending 0.5 miles beyond the project footprint, including cliffs of tributary streams, to determine if and where eagles may be nesting.

- The Alaska Bald Eagle Nest Atlas (eagle.abrinc.com/) is a useful first step to identify potential bald eagle nest locations in and around project areas. However, the Atlas should not be used as a replacement for recommended, location-specific surveys to verify the presence of nests identified in the Atlas and document additional nests.
- The Service's National Bald Eagle Management Guidelines (fws.gov/media/national-bald-eagle-management-guidelines) provide activity-specific buffers to help avoid disturbance to nesting bald eagles.
- The Service in Alaska has provided additional information and guidance on bald eagle nesting windows and sensitivity to disturbance (fws.gov/Alaska-eagle-nesting).
- In general, golden eagles are more sensitive than bald eagles, and, in Alaska, the Service recommends a 0.5-mile buffer for most, but not all activities. For more information on historical golden eagle nests in the project area or for additional questions or guidance on eagles, please contact the local Field Office.
- The Service's National Eagle Management webpage (fws.gov/program/eagle-management) provides an overview of the types of eagle take permits.
- If needed, permit applications are submitted through the Service's ePermits portal (fwsepermits.servicenowservices.com/fws/). Please note that permits can take up to 90 days to process once a completed application is submitted.

Clean Water Act

- Wetlands and waters of the US are regulated by the US Army Corps of Engineers under the Clean Water Act and the US Environmental Protection Agency.
- These habitats are often considered important habitat for aquatic life, migration and movement, migratory bird staging, forage and reproduction, and resident wildlife populations. Therefore, the Service regulates activities within the same footprint under different statutory authorities. However, consultation with the Service is often necessary pursuant to project permitting under the Clean Water Act due to the nexus of high-value habitat provided by wetlands and waters.

Endangered Species Act

- The purpose of the Endangered Species Act (ESA) is to provide a means to conserve the ecosystems upon which Endangered and Threatened species depend and provide a program for the conservation of such species. The ESA directs all federal agencies to participate in conserving these species. Specifically, section 7(a)(1) of the ESA charges federal agencies to aid in the conservation of listed species, and section 7(a)(2) requires the agencies to ensure their activities are not likely to jeopardize the continued existence of federally listed species or destroy or adversely modify designated critical habitat.
- Additionally, the ESA prohibits, with certain exceptions, the take of listed species. Take means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."
- IPaC (ipac.ecosphere.fws.gov/) will generate a letter including a list of Threatened and Endangered species, designated critical habitat, and other sensitive resources in your project area. If consultation or further assistance is needed, contact the appropriate Service Field Office named in the letter.

Executive Orders

- Executive Order (EO) 13751, Safeguarding the Nation from the Impacts of Invasive Species (federalregister.gov/documents/2016/12/08/2016-29519/safeguarding-the-nation-from-the-impacts-of-invasive-species) was issued December 5, 2016, and Amends EO 13112. This EO aims to prevent the introduction of invasive species and provide for their control, and to minimize the economic, plant, animal, ecological, and human health impacts that invasive species cause.

Fish and Wildlife Coordination Act

- Under the Fish and Wildlife Conservation Act, the Service is directed and authorized to evaluate Federal actions that affect any stream or other body of water and provide recommendations to minimize impacts on fish and wildlife resources.
- Proponents with projects involving rivers or other water bodies should reach out to the Service during project planning to coordinate on minimizing impacts.

Marine Mammal Protection Act

- The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the take of all marine mammal species in US waters. Take is defined as "to harass, hunt,

capture, or kill, or attempt to harass, hunt, capture, or kill". Harassment includes behavioral disturbance.

- In Alaska, the Service implements the MMPA for walruses, sea otters, and polar bears. The National Marine Fisheries Service has jurisdiction over pinnipeds and cetaceans.
- When certain requirements are met, the Service may authorize incidental take of small numbers of Pacific walruses, polar bears, or northern sea otters through an incidental take authorization under Section 101(a)(5) of the MMPA (see fws.gov/ITA-general-info and fws.gov/ITA-applicant-instructions). Note that issuance of an incidental take authorization can take over a year, and early coordination with the Service's Marine Mammals Management (MMM) Regulatory Program is very important. Contact the MMM Regulatory program with any questions on incidental take authorizations (R7mmmregulatory@fws.gov).

Migratory Bird Treaty Act

- Intentional take of migratory birds may be permitted in limited situations (fws.gov/program/migratory-bird-permit).
- Incidental take (i.e., unintentional take from an otherwise lawful activity) of migratory birds cannot be permitted. The best way to avoid incidental take and comply with the Migratory Bird Treaty Act is to avoid vegetation clearing, ground disturbance, and other site construction activities during the nesting season. Visit fws.gov/alaska-bird-nesting-season to view nesting season dates for migratory birds based on location, habitat, and bird species.

Rivers and Harbors Act

- For rivers listed as Navigable Waters of the US, overhead structures or structures or cables laid in-stream on the riverbed are often considered potential impediments to navigation and to aquatic life migration and movement. Therefore, the Service may engage in consultation under this statute.

Appendix E1 – Management Plan

NANA Regional Broadband Network Project

Monitoring and Management Plan

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

Table of Contents

1 Introduction

This Monitoring and Management Plan (MMP) has been prepared for the NANA Regional Broadband Network Project, which proposes to connect the communities in the Northwest Arctic Borough to an approximately 660 mile fiber optic cable (FOC) route. The FOC construction would include ground-laid directly FOC (as depicted in Figure 1), aerial installations on existing utility poles, river crossings using direct lay, aerial, or horizontal directional drilling (HDD), and a submarine installation across Hotham Inlet within Kotzebue Sound.

Figure 2 provides an example of a similar installation on the North Slope, one year after placement (in July 2023). This illustrates the minimum level of disturbance that is proposed by the project.

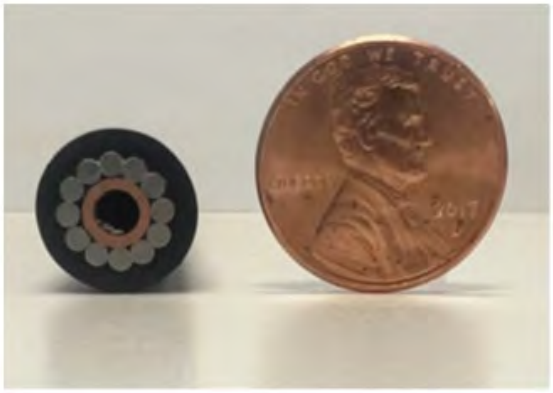

Figure 1: Fiber optic cable.

Figure 2. Photos of the ASTAC Ground Laid Fiber on the North Slope, one year after placement (July 2023).

NANA is committed to restoring ground disturbances to their pre-construction conditions, performing ongoing monitoring, and ensuring that fish and wildlife are not harmed from this project.

The MMP includes a(n):

- Erosion and Sediment Control Plan,

- Vegetation Management Plan,
- Invasive Species Management Plan,
- Post-Monitoring Plan, and
- Wildlife Monitoring, Interaction, and Avoidance Plan.

2 Erosion and Sediment Control Plan

The majority of the project does not involve soil disturbance, as FOC is being laid over the ground. Soil disturbance is anticipated during trenching outside of villages and some streambank excavation (where overhanging banks make it necessary for stable cable placement). The installation of fiber optic cable through trenching, particularly near waterbody approaches, presents a heightened risk of soil disturbance, erosion, and sedimentation that can impact both terrestrial and aquatic environments.

NANA is committed to preventing soil loss, protecting water quality, and maintaining ecological integrity of the project area during and after construction. The project has been designed to disturb less than 1 acre of soil, to avoid erosion and sediment threats to the greatest extent possible.

This plan identifies best management practices (BMPs) and control measures to ensure compliance with regulatory requirements and short and long-term protection of the natural environment.

2.1 Avoidance and Mitigation

The project has been carefully designed with avoidance and mitigation strategies to minimize adverse impacts to the environment while providing a sustainable, long-term broadband network. Stream crossings present a significant construction challenge, which necessitates careful route planning and the adoption of construction methods that minimize impact to the aquatic environment. The following avoidance strategies have been implemented into project planning:

2.1.1 Avoidance

- The chosen route was comprehensively designed to minimize the number of stream crossings to the greatest extent possible.
- With the majority of construction occurring during the winter, the construction impacts on fish and their habitats are greatly reduced. Over 97% of the streams and rivers and 100% of the lakes and ponds along the route shall be crossed with LGPVs in the winter months when adequate snow and ice cover allows for adequate protection of the underlying vegetation.
- Construction methods at large river crossings, such as aerial crossings and horizontal directional drilling (HDD), eliminate direct impacts to waterbodies.

As this project covers an expansive area of the Northwest Arctic Borough, complete avoidance of waterbodies is not possible or practicable. The following mitigation measures have been developed to reduce environmental damage from project construction activities and infrastructure:

2.1.2 Mitigation

For the successful implementation of this fiber optic cable project, thoughtful and environmentally responsible construction methods shall be prioritized to minimize the risk of erosion and sedimentation. Recognizing the potential environmental impacts associated with ground disturbance, the project shall employ BMPs designed to preserve soil stability, protect water resources, and maintain ecological balance. Revegetation of disturbed areas shall be performed with guidance from ADF&G's "Streambank Revegetation and Protection: A Guide for Alaska" (2005) and Alaska Department of Natural Resource's "A Revegetation Manual for Alaska" (Wright 2008). The primary revegetation technique shall be assisted natural revegetation (Wright 2008).

Additional measures include:

- Utilize BMPs to mitigate the potential impact to the environment, including (DOT&PF 2021):
    - BMP-10.01 Fiber Rolls for Erosion and Sediment Control
    - BMP-18.00 Rolled Erosion Control for Slopes
    - BMP-20.00 Silt Fence
    - BMP-38.00 Vegetation Buffer
    - BMP-40.00 Cold Weather Stabilization
- HDD
    - Selecting the HDD method for large river crossings allows for the installation of cables beneath streams and rivers without disturbing the waterbody itself.
    - This technique minimizes sediment disturbance and preserves aquatic habitat. HDD involves first installing silt fencing, rolled erosion control, and/or fiber rolls as appropriate to prevent sediment migration from the drilling site.
    - Then the process shall be started by drilling a pilot hole along a pre-determined, curved path starting from an entry point on one riverbank to an exit point on the opposite bank. The pilot hole shall then be incrementally enlarged using reaming tools to accommodate the installation of the pipeline or utility conduit. Drilling fluid, typically a bentonite-water mixture, shall be used to stabilize the borehole, lubricate the drill bit, and transport cuttings to the surface. Following the completion of the borehole, the 2 in. conduit and FOC shall be pulled through the hole and secured. On both sides of the river, 15-20 ft. of conduit shall extend from the borehole openings to serve as a transition to ground-level installation, providing protection for the cable and mitigating potential damage from freeze-thaw cycles. The ends of these pipes shall be sealed and watertight.
    - All slurry and wastewater that is generated during the drilling process that cannot be discharged under permits shall be containerized, transported off site, and disposed of at a permitted waste facility.
- Aerial Installation
    - Aerial installation shall be used to deploy the cable above several large rivers, to avoid trenching. This method is described in the Plan of Development.
- Trenching
    - Trenches shall be excavated approximately 2 ft. x 2 ft., but may vary with the terrain, and the cable shall be laid directly into the trench. Native vegetation shall be salvaged and left on-site to the greatest extent possible to prevent erosion of the surrounding area. At least 1-2 feet of root material shall be harvested when vegetative mats are temporarily removed. Side cast material shall be temporarily placed (i.e., less than 1 week) adjacent to the trench and then backfilled and recontoured to the original pre-existing conditions.
- The majority of construction shall occur during the winter, avoiding sensitive fish life stages. The limited amount of summer construction at rivers shall occur outside of important fish timing windows designated by Alaska Department of Fish & Game (ADF&G) and U.S. Fish and Wildlife Service (USFWS). HDD installations are proposed to occur from June-August

2026. The one ground-lay fiber crossing occurring during the summer at Kugruk Estuary is proposed to occur in July 2026 and does not involve any trenching.

- During summer construction, personnel shall avoid walking on riparian habitat to the greatest extent possible.
- All exposed or disturbed waterways and vegetated areas within the construction corridor shall be returned to pre-existing contours.
- Tundra sod and vegetative mats shall be replaced in disturbed areas.
- Disturbed areas shall be restored to their natural contours and drainage by filling excavations.
    - Summer seeding and revegetation activities may include:
        - Stabilizing slopes with a combination of seed and mulch. See the Invasive Species Management Plan for further information on seed mixes (Section 4).
        - Ensuring that disturbed areas are reestablished according to methods outlined in the Post-Monitoring Plan (Section 5).

2.2 Monitoring

Post-construction monitoring activities are a critical component of successful revegetation efforts following construction, ensuring that disturbed areas recover effectively and sustainably over time. Long-term success depends on verifying that vegetation is establishing as intended, invasive species are controlled, and soil stability is maintained. Monitoring allows for the early identification of issues such as poor germination, erosion, or inadequate species diversity, enabling timely corrective actions.

No permanent or post-construction BMPs shall be installed as part of the project.

Details on monitoring activities can be found in the Post-Monitoring Plan in Section 5.

3 Vegetation Management Plan

This project involves laying fiber optic cable across over 600 miles of Arctic tundra and wetlands. In order to protect this sensitive and important landscape, the majority of construction shall occur during the winter months, significantly alleviating vegetation disturbance by taking advantage of frozen ground conditions and dormant plant life. When soils are frozen, the risk of soil compaction, rutting, and erosion is greatly reduced, helping to preserve root systems and minimize long-term damage to existing vegetation. Additionally, since most native plants are dormant in winter, the likelihood of disrupting growth cycles or causing irreversible harm is lower compared to construction during the growing season. By strategically scheduling work during this period, NANA can reduce the project's environmental footprint and support more effective post-construction restoration.

3.1 Avoidance and Mitigation

Avoidance and mitigation considerations have been central to the planning of this project to reduce potential damage to sensitive vegetation, including Arctic tundra and wetland ecosystems. These environments are particularly vulnerable to disturbance due to their slow recovery rates and ecological importance. Construction techniques have been designed to limit ground disturbance. The following avoidance and mitigation considerations have been adopted during project planning:

3.1.1 Avoidance

- The optimal route has been designed to avoid boreal forests, wetlands, and waterbodies to the greatest extent possible.

3.1.2 Mitigation

- The vast majority of construction activities shall occur during the winter months when snow cover/ground conditions are sufficient for off-road winter travel. Alaska Department of Natural Resources (ADNR) guidelines for minimum snow cover, frost layer, and ground temperature requirements shall be met. These conditions are expected to include a minimum of 6-9 in. of snow cover and a soil temperature of 5°C at a depth of 30 cm. for overland travel.
- Low-ground pressure-vehicles (LGPVs) shall be utilized throughout construction. In winter, LGPVs shall either be tracked or on skids.
- Infrastructure has been chosen to minimize footprint size, including installing single post aerial crossings and minimizing the size of the beach manholes used in subsea construction

3.2 Construction Methods

The project's construction methods have been designed to be low-impact and supportive of natural vegetation regrowth. Revegetation and/or seeding is not currently anticipated, because the existing vegetation mat is expected to be salvaged and used to provide vegetation regrowth. Any necessary revegetation or seeding of disturbed areas shall be performed with guidance from ADF&G's "Streambank Revegetation and Protection: A Guide for Alaska" (2005) and Alaska Department of Natural Resource's "A Revegetation Manual for Alaska" (Wright 2008). NANA recognizes the

importance of minimizing impacts to the area's vegetation and shall implement the following construction techniques:

- Fiber optic cable shall be laid on the ground in a serpentine (wavy) pattern to provide slack which shall prevent impacts of temperature expansion and contraction and to promote cable settling. The serpentine pattern shall also help to prevent entanglement of birds, caribou, and other wildlife.
- During winter ground-lay, vegetation that is incompatible with laying operations and protruding above the snow surface shall be cut back using a mulcher to the level of the snow surface.
    - Vegetation requiring clearing shall primarily consist of woody shrubs with the potential to be taller than the required minimum snow cover, including willows (*Salix* sp.), dwarf birch (*Betula nana*), and alder (*Alnus* species).
    - Plant roots shall remain intact.
    - Cutting shall be as limited as possible and restricted to the 30 ft. construction corridor.
    - Mulch and cuttings shall be placed in the general vicinity of where the vegetation was removed.
- During HDD activities, material shall not be stockpiled in a wetland or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area. Personnel shall avoid setting up drilling equipment in a wetland.
- Hazardous materials, such as chemicals, fuels, and lubricating oils, shall not be stored in wetlands. Any equipment maintenance activities shall be performed further than 100 ft. away from any wetland areas to avoid spills or contamination.
- Disturbed areas shall be restored as progressively and quickly as possible to pre-construction use. If necessary, vegetation cover using native and certified seed mixes and seed dispersal, management, and maintenance processes shall be implemented.

3.3 Monitoring

Post-construction monitoring shall be a critical component of determining this project's success. Monitoring shall allow for the early identification of any issues with vegetation regrowth. The approach shall not only support regulatory compliance but also help achieve long-term ecological restoration goals and land-use functionality. Detailed monitoring details can be viewed in the Post-Monitoring Plan (Section 5).

4 Invasive Species Management Plan

There are several ways in which invasive species and weeds have the potential to be introduced to the project area during construction and maintenance activities. Primarily these methods are from introduction by construction equipment or marine vessels and through the use of seeds and vegetation during restoration activities.

NANA is committed to ensuring that no invasive species or weeds are introduced to the project area and shall follow guidelines outlined in the Bureau of Land Management plans. For example, the Kobuk-Seward Peninsula Approved Resource Management Plan (BLM 2008) management goal K-2(3) is to: *Use integrated pest management practices to control or eradicate noxious and invasive species*. NANA shall follow this by implementing the following measures:

4.1 Construction Equipment

To prevent the introduction, or spread, of non-native, invasive plant species or weeds in the Northwest Arctic Borough, Cruz Construction, Inc. has implemented the following plan. This is a procedure used by Cruz for all projects, regardless of the location.

This procedure is designed to ensure that all equipment is properly maintained, inspected for leaks and serviceability, cleaned of all organic material, and prepared appropriately for remote service.

- Cruz' equipment maintenance staff shall bring all pieces of equipment into their heated indoor shop in Deadhorse.
- The equipment shall receive complete steam cleaning. This provides a means of close inspection for leaks and also removes any direct and foreign debris from the internal and external surfaces that may have accumulated during prior use. This cleaning assures that no material from potential invasive species is transported from site to site and facilitates a comprehensive maintenance inspection. The Cruz wash bay uses a containment system for the collection of the wastewater, and the wastewater is sent to North Slope Borough Service Area 10 for treatment and disposal.
- A Cruz mechanic shall conduct a full mechanical inspection of the equipment, including the checking of hydraulic lines and gaskets for hydrocarbon leaks.
- A Cruz mechanic shall repair any mechanical deficiencies found during the inspection.
- After all aspects of the inspection are met, the equipment is staged for transportation to the work site.

4.2 Marine and Freshwater Vessels

Barges and tugboats shall be utilized in the construction phase of the project for the subsea cable lay across Hotham Inlet and to transport directional drilling equipment and personnel up project area rivers. The introduction of invasive species through vessels poses a significant threat to coastal and marine ecosystems. These species are often transported unintentionally via ballast water discharge, hull fouling, and other vessel-related pathways, where they can outcompete native organisms, disrupt ecological balance, and cause economic harm to fisheries and coastal infrastructure. The U.S. Coast Guard enforces national standards for ballast water and biofouling in

Alaska. NANA is committed to minimizing the spread of invasive species from vessels and the project shall adhere to the following BMPs:

- Vessels used in marine and freshwater shall follow the principles of Clean, Drain, Dry:
    - Clean – Inspect and clean off plants, animals, and mud from clothing, vessels, and equipment including waders, footwear, ropes, anchors, and field gear before leaving water access. Use the local water source initially to help remove heavy deposits. Remove plant fragments and scrub off any visible material with a stiff brush.
    - Drain – all water from watercraft, motor, and bilge before leaving water access. All ballast water shall be from a municipal water supply.
    - Dry – equipment, vessels, and gear before moving between waterbodies. Dispose of unwanted materials in the trash; do not dump them in the water or on land.
- Refer to the Alaska Region's Guidelines for Preventing the Spread of Aquatic Invasive Species (fws.gov/media/aquatic-invasive-species-prevention-guidelines-pdf) for more information.
- Biofouling shall be managed through BMPs such as applying antifouling hull paint and rigorous cleaning.
- Vertebrate invasive species can be transported in vessels as stowaways. Free-roaming rats and/or mice shall be eradicated whenever detected so that they are not inadvertently relocated elsewhere. Live rats/mice should never be released. Trash and food shall be stored appropriately to reduce attraction. Other tips for prevention and control are available in ADF&G's State Invasive Rodent Plan (adfg.alaska.gov/static/species/nonnative/invasive/pdfs/invasive_rodent_plan.pdf).

4.3 Revegetation and Seeding

If the restoration phase of the project requires revegetation or reseeding where land has been disturbed, these efforts can inadvertently introduce invasive plant species that outcompete native vegetation, degrade habitat quality, and disrupt local ecosystems. NANA is committed to implementing best practices and adhering to ecological restoration guidelines to support biodiversity and long-term ecosystem health without unintentionally spreading invasive species. These best practices include:

- Minimizing soil disturbance and reseeding were appropriate to reduce the likelihood of weed establishment.
- Seed mixes shall be locally sourced with native vegetation species.
- Seed stock shall be free from weeds and other contaminants.
- Disturbed areas requiring revegetation shall be performed with guidance from "A Revegetation Manual for Alaska" (Wright 2008).
- Stipulations per BLM Alaska Instruction Memorandum No. 2025-013 Invasive Plant Prevention and Management shall be implemented on BLM-administered lands, including:
    - The use of certified weed-free fill material (if unavailable, then an alternative source shall be approved by an Authorized Officer).
    - The use of Alaska-grown straw (if necessary for revegetation).

- Any other fill or gravel shall be weed-free where feasible and available.

5 Post-Monitoring Plan

Following construction of the FOC installation, a post-monitoring plan shall be instituted to ensure proper cable alignment, site stability, and successful ecological recovery. Focal areas of the post-monitoring plan include waterbody crossings and locations where ground disturbing activities occurred. These plans focus on assessing soil settlement, erosion control, and the re-establishment of native vegetation to confirm that disturbed areas are returning to their pre-construction condition. Monitoring also helps identify any areas where revegetation efforts may be failing or where further intervention is needed to prevent long-term environmental degradation. Through effective adaptive management techniques, post-monitoring ensures regulatory compliance, supports environmental stewardship, and protects the integrity of both the fiber optic infrastructure and the surrounding landscape.

5.1 Schedule

The majority of the project construction shall occur in the winter months between January and April 2026. Winter construction includes deploying over 600 miles of FOC through the ground-lay method, crossing 730 streams and 59 lakes through the ground-lay method, and 18 aerial crossings at large rivers (e.g., Kugaruk River, Wulik River, and Singauruk Creek).

Inspections of the winter ground-lay, waterbody crossings, and cable seating shall occur between July – August 2026.

The summer construction activities include subsea construction at Hotham Inlet (June-July 2026), HDD crossings at 16 large rivers (June-August 2026), and a ground-lay crossing at Kugruk Estuary (July 2026).

Inspections of the summer construction portion shall occur in summer 2027 (after the first growing season following construction).

5.2 Inspection of Winter Ground-Lay Segments

Following winter construction activities, a crew shall return in the summer to ensure the cable is properly seated on the tundra, within waterbody crossings, and to ensure all construction materials and debris have been cleared from the area. Inspections shall be performed by helicopter flyovers, while paying particular attention to waterbody crossings and shrubby-vegetated areas to ensure that the anchors and cable are seated securely to the ground and substrate. Where significant anomalies are observed, the helicopter shall land so cable realignment can be performed by the inspectors.

5.2.1 Terrestrial Ground-Lay Inspections

- Along the entire route, the cable shall be evaluated for proper seating on the ground.
- Where cable is suspended within woody shrubs (because snow melt happens to place cable on top of shrubs that were not identifiable in the winter), the helicopter shall land (outside of wetlands and sensitive riparian areas) so that cable adjustments to place it on the ground can occur by hand.
- Inspections shall ensure that the cable remains in a line and does not curl up (to avoid wildlife entanglements).

- The winter travel route across wetlands and sensitive habitat shall be closely evaluated for any damage or relic trails.

5.3 Waterbody Ground-Lay Inspections

- Helicopter flyovers shall particularly focus on waterbody crossings to verify that the cable has ascended the streambed and is not risking wildlife entanglement or streambank integrity.
- A helicopter shall land wherever streambank trenching occurred for a robust visual inspection to ensure recovery of the revegetated streambank and to assess that the potentially impacted watercourse is functioning properly.
- Post-construction waterbody surveys shall consider the impacted area within 50 feet of the ordinary high-water mark, including visual inspections of:
    - scour,
    - head cuts,
    - knickpoints,
    - erosional rills or gullies,
    - bank slumping, and
    - sediment deposition.

5.4 Aerial Crossing Inspections

- The foundation for wooden pole placement shall be approximately 2 ft x 2 x ft area. Inspections shall evaluate vegetative regrowth of the disturbed area and assess the potential for additional monitoring after the first year.
- The area around the guy wire anchor shall be inspected to ensure proper vegetative cover.
- The pole shall also be evaluated to assess its overall condition and to verify the strength of the foundation. Any signs of instability, such as loose or wet soil, shall be documented and reinforced, if necessary.

5.5 Inspection of Summer Construction Segments

Inspections of the summer construction areas shall occur after the following summer after the first growing season. Helicopter-assisted inspections shall focus on the areas of ground disturbance.

5.5.1 Horizontal Directional Drilling Inspections

- Evaluate the areas around the HDD boreholes for construction impact to native vegetation.
- Check the streambanks for integrity and any damage due to construction activities.

5.5.2 Hotham Inlet Subsea Crossing

- Evaluate the area surrounding the beach man holes for vegetation regrowth.
- Check trenched areas above and below mean lower low water for stability and vegetative regrowth.
- Ensure that the cable remains buried in trenched segments.

5.5.3 Kugruk Estuary Crossing

- Evaluate the banks for stability.
- Ensure the cable is buried within the bed sediments.

5.6 Monitoring Protocol

Monitoring surveys to assess vegetation conditions and progress toward performance standards shall be conducted once following the first growing season or until performance standards are achieved, or sooner if agency botanists concur that no further monitoring or corrective actions are necessary. A Monitoring Form capturing the same information on the Pre-Construction and Post-Construction forms shall be completed.

Reference sites that were unimpacted by construction disturbance shall be chosen to compare the restoration sites and help to evaluate the restoration outcomes. The following metrics shall be used to define success of restoration activities.

Resource	Initial Performance Standard	Final Performance Standard
Vegetation	Minimum of 25-50 percent vegetation cover during initial inspection.	If minimum cover is not met during the initial inspection, then the site shall be revisited annually until there is at least 75 percent vegetation cover relative to pre-construction conditions.
Invasive Plants	No increase in percentage cover of plants listed as highly or moderately invasive compared to pre-construction conditions. See Carlson et al. 2008	Invasive plant cover in restored areas shall be less than or equal to invasive plant cover of neighboring undisturbed areas. Percent increase is relative to baseline conditions established in reference plots.
Wetlands/Sensitive Communities	Minimum of 25-50 percent vegetation cover during initial inspection.	Provide 1:1 replacement for wetlands and sensitive natural communities relative to baseline conditions.
Hydrologic Channels	Impacted waterbody inspections shall be performed to check the following: The channel is functioning properly. Restored channel bed/bank does not have any visible scour, head cuts, knickpoints, erosional rills or gullies, bank slumping or sediment deposition.	There is proper channel function, streambank integrity remains intact, the cable remains buried.

5.6.1 Adaptive Management Strategy

A crucial component of the Post-Monitoring Plan lies within the adaptive management strategy, in which a flexible, iterative approach shall address environmental and infrastructure performance challenges that may arise post-construction. This strategy begins with a clearly defined monitoring protocol, such as ensuring successful revegetation, maintaining soil stability, and protecting water

quality, and uses ongoing monitoring data to assess whether those objectives are being met. If issues are detected, such as unexpected erosion, poor vegetation recovery, or trench subsidence, the strategy allows for timely modifications to mitigation measures, such as re-seeding, enhancing erosion control, or revising maintenance schedules. By incorporating feedback loops, stakeholder input, and scientific data, adaptive management enables continuous improvement and ensures that both environmental and project goals are achieved efficiently and sustainably over time.

Throughout the life of the project, the development and implementation of additional protection measures or corrective actions may be required. If fires, droughts, floods, extreme heat, or other stochastic events/unanticipated circumstances impact revegetation and restoration efforts, the impacted site shall revegetate in parallel with the damage sustained by the surrounding vegetation community.

Adaptive management shall use monitoring data on a site-specific basis to assess whether revegetation/restoration activities are on track to meet performance criteria. If revegetated areas do not meet performance standards, NANA shall attempt to expediently ascertain and address the source of the problem. Sites not meeting the performance standards, and corrective actions taken shall be documented in the Monitoring Report. Additional seeding, removal of invasive plant species, and additional application of weed-control measures may be implemented as corrective actions. Implementation of supplemental actions shall be based on the general revegetation recruitment trend, site-specific conditions, and climatic factors. Consideration of supplemental actions shall be based on the causal factors contributing to mortality, slow growth, or poor recruitment, as best can be determined.

The Monitoring Report shall include failures to meet the year's performance standard benchmarks summarized in the Monitoring Protocol, likely causal factors of the shortfalls, and prescribed corrective actions. If needed, consultation shall occur with the area landowners and appropriate agencies to help facilitate a complete site recovery.

5.6.2 Monitoring Reports

Monitoring reports shall be prepared and submitted to the required agencies as dictated by permit requirements. The reports shall provide determinations of revegetation and restoration suitability for each impact area, summarize revegetation and restoration for each applicable impact area, provide data on performance standards and success criteria, and detail any corrective actions necessary to close out sites. Information and data in each Monitoring Report shall include pre-construction, post-construction, and monitoring forms for each impact area, initial data, maintenance activities, additional surveying and monitoring data, and status of revegetated/restored sites.

Once the final success criteria have been achieved for a given impact area, monitoring shall not be further conducted in that area and data collection at that area shall not be included in subsequent monitoring reports after revegetation/restoration is listed as complete and the site is closed out.

6 Wildlife Monitoring, Interaction, and Avoidance Plan

The construction and maintenance phases of this project have the potential to overlap human activities with wildlife habitat, including the habitat of some threatened and endangered species. This plan outlines the mitigation efforts by the project to avoid, monitor, and report interactions with mammal and bird species.

6.1 Bears

Portions of the construction activities and field operations shall occur within polar bear and brown bear habitat; and crews have the potential to encounter a bear during construction activities and associated field work. Therefore, NANA has developed this plan to:

- Prevent or minimize the potential for human-bear interactions
- Prevent bears from associating humans and facilities with food
- Protect field personnel and bears
- Understand controls to prevent interaction
- Implement observation and reporting procedures

6.1.1 Polar Bear and Brown Bear Interaction Plan

NANA has prepared and shall implement a polar bear and brown bear interaction plan to minimize conflicts between humans and bears, including measures to:

- Minimize the attraction of bears to operational use areas.
- Organize the layout of construction and operational use areas to minimize human/bear interactions.
- Warn personnel of bears near or in the construction areas and the proper procedures to take.
- If authorized, deter bears from interactions with project workers to maintain a safe work environment.
- Provide contingencies in the event bears do not leave the site or cannot be deterred by authorized personnel.
- Discuss proper storage and disposal of materials that may be toxic to bears.
- Provide a systematic record of bears within and adjacent to the construction area.

Although NANA developed this plan for bear interactions, it also helps to prevent worker interactions with other wildlife. NANA field personnel shall comply with all applicable local, state, and federal codes, statutes, and regulations including the Marine Mammal Protection Act of 1972 (MMPA) (16 United States Code [USC] 1361-1407) and the Endangered Species Act of 1973 (ESA) (16 USC 1531-1544).

6.1.2 Bears and Impacts of Human Activity

Human activity may attract wildlife. The biggest attractants for wildlife are associated with food, waste-handling practices, food-associated byproducts, dumpsters and other waste disposal facilities. Bears, in particular, can learn to associate humans and facilities with food. Bears

throughout Alaska have passed this human-food association through generations – sows teaching cubs.

Proper food and waste management practices are critical for preventing conditioning of all wildlife, and particularly bears, to associate human activity with food. When female bears and their cubs emerge from dens (April/May), they start looking for food. Extra care is necessary to properly store and dispose of food waste to prevent bear attraction and their entry into work areas at these times. Bears shall generally avoid human activities if they are not attracted by food and waste.

6.1.3 General Policies and Mitigation

All field personnel shall be trained to adhere to several general procedures that deter wildlife species from entering work areas and potentially interacting with personnel. These procedures are necessary for the safety of both personnel and wildlife. The construction supervisor or field crew chief shall maintain a file of wildlife observation forms that shall be submitted to the appropriate agency (NSB, Alaska Department of Fish & Game [ADF&G], or United States Fish and Wildlife Service [USFWS]), if required.

6.1.3.1 Food Handling and Food Waste Management

Proper food handling and food waste management is imperative. NANA shall implement the following measures in order to minimize interaction with bears:

- Personnel shall not feed wildlife. Any personnel observed doing so shall be subject to disciplinary action.
- When possible, personnel shall not eat outside of buildings or vehicles.
- Personnel shall discard food waste only in designated receptacles.
- Personnel shall remove food waste from the field and shall not place it in dumpsters or receptacles that are not secure from wildlife access.
- Personnel shall contact the construction supervisor or field crew chief if any improperly managed food waste is observed or for answers to questions on refuse management.

6.1.3.2 Handling Non-Food Materials and Non-Food Waste

Non-food materials (e.g., plastic, rubber, motor oil, and chemicals such as antifreeze) can be attractive to some wildlife species. If these materials are not handled properly, they can increase the likelihood of wildlife encounters. Proper waste handling procedures shall include the following:

- Personnel shall store potentially harmful materials in secure containers (e.g., 55-gallon steel drums) or inside secure equipment.
- Storage containers shall be inspected periodically to ensure they are secure, in good condition, and no spills have occurred.
- All waste shall be disposed of properly.
- Personnel shall contact the construction supervisor or the field crew chief if any improperly managed non-food materials or waste is observed or for answers to questions on waste management.

6.1.3.3 Infrastructure Design and Maintenance

Infrastructure can potentially provide nesting structure for wildlife.

6.1.3.4 Stressed or Injured Bears

If field personnel observe a bear or other wildlife that is stressed or injured, they shall maintain a safe distance from the animal, shall not approach it, and shall not attempt to provide assistance in any form. Injured bears can be aggressive. All field personnel must immediately notify the construction supervisor or the field crew chief with observation details, such as the species, location of the animal, and type of injury or problem.

The construction supervisor or field crew chief shall contact the appropriate agency immediately, either the ADF&G (Kotzebue Office, (907) 442-3420) or the USFWS (Northern Alaska Field Office, (907) 456-0203), and work with that agency to take necessary action. The presence of a potentially dangerous predatory species may require agency supervision before any action can be taken.

6.1.4 Brown Bears

Brown bears (*Ursus arctos*), commonly referred to as grizzly bears occur throughout Alaska, are present in small populations in and around the project area. Therefore, a possibility exists that project activities at certain times of the year may encounter a brown bear.

Typically, brown bears are active in the summer and occupy dens during late fall (October or November), throughout winter, and into early spring (April). All occupy winter dens; pregnant females enter dens earlier and emerge later with their cubs. Males and non-pregnant females hibernate for a shorter duration. Den destruction or abandonment can cause mortality since a bear that has been displaced from its den may not be able to dig a new den in frozen ground. Additionally, the next spring's cubs could also be lost if a replacement den is not found quickly.

6.1.4.1 Early Detection and Avoidance

To minimize the potential for human-bear interactions, field personnel shall follow early detection and avoidance procedures. Activities related to the field operations that may attract brown bears include field staff handling of food and waste. Even when garbage and other non-natural foods are not available, brown bears are curious about their surroundings and shall investigate camps, vehicles, and buildings. Darkness, vegetation cover, blind corners, noise, wind, precipitation, fog, and other conditions may make it difficult to see or hear a bear. All project personnel should remain alert for the presence of bears while in the field and at camp facilities. Personnel shall take the following precautions during construction activities and field operations:

- Manage all potential bear attractants, particularly food, waste, and chemicals, in accordance with waste management and chemical storage policies.
- Be especially alert when weather prevents good visibility. Make a lot of noise before walking into an area with poor visibility.
- Use the buddy system when working outdoors and, if necessary, designate a "Bear Watch" to regularly inspect surroundings and scan for bears.
- Coordinate with others, if present, working in the area to assure each other's actions are compatible with providing protection from and avoidance of bears.
- Maintain visual or radio contact with other team members when working outdoors to receive any brown bear sighting alerts.
- Report all brown bear sightings to the construction supervisor, crew chief or the project manager.

- Delay field operations if bears, or other wildlife, are encountered along the project route during construction activities.

6.1.4.2 Interaction and Response

If field personnel observe a bear in the project area, they shall follow the precautions:

- Depending on the distance between the bear and activities, personnel may need to retreat to vehicles, equipment emergency shelter, or temporary buildings for safety.
- Personnel must never approach or crowd a bear. Each bear is unique in its comfort level with humans, the more distance between personnel and the bear, the better for conflict avoidance.
- If a bear is encountered at a close distance, personnel are to remain calm. Attacks are rare. Most bears are interested only in protecting food, cubs, or their "personal space". Once the threat is removed, they shall move on. Personnel are reminded of the following:
    - **Identify Yourself:** Let the bear know you are human. Talk to the bear in a normal voice. Wave your arms. Help the bear recognize you. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening. You may try to back away slowly diagonally, but if the bear follows, stop and hold your ground.
    - **Don't Run:** You cannot outrun a bear. They have been clocked at speeds up to 35 miles per hour (mph), and like dogs, they shall chase fleeing animals.
    - **If the Bear Moves Toward You:** Stand your ground and talk calmly. Monitor the bear's movement. If you move away, you may indicate to the bear that you are prey, and it may follow you.
    - **If a Bear Charges:** Stand your ground. Bears often make bluff charges, sometimes to within 10 feet of their adversary without making contact. Continue waving your arms and talking to the bear. If the bear gets too close, raise your voice and be more aggressive. Make noise but never imitate bear sounds or make a high-pitched squeal. Use bear deterrent spray if within range.
    - **If Attacked:** If a deliberately approaching bear makes contact, it may be a predatory attack. Fight back vigorously. Permitted brown bear hazing may be conducted at any time when the bear is perceived to be too close for personal safety. Vehicles shall not be used to herd bears away from work locations.

6.1.4.3 Monitoring and Reporting

Construction and field personnel shall likely be the primary source of brown bear sighting information. If a worker observes a bear or fresh bear sign (e.g., tracks or scat) in or near the project area, they must first ensure their own safety by returning to a secure location, if necessary. Then they shall report the sighting to the construction supervisor or the crew chief. Personnel should never remain in an exposed position in order to view or photograph a bear.

When a bear sighting is reported, workers in the area shall be contacted immediately and directed to move to a secure location. Secure areas may include the project equipment, vehicles, or buildings (although few buildings exist within the project area). If only a vehicle is available, personnel should drive at least 50 yards from the bear and observe the bear with the vehicle engine running.

While the bear is in the vicinity, a state of alert shall be imposed. The alert shall consist of voice communication that provides specific information on the location of the bear, instructions on where to move to for safety, and other evacuation instructions. Only when the construction supervisor or the field crew chief determines the bear is no longer present in the work area shall the alert be lifted.

The field crew chief shall verify the brown bear sighting and complete a Brown Bear Reporting Form. Wildlife encounters can be reported at https://www.adfg.alaska.gov/index.cfm?adfg=reportwildlifeencounter.main.

6.1.5 Polar Bears

Polar bears (*Ursus maritimus*) are considered Arctic marine mammals and are protected from hunting or harassment under the MMPA. They are also designated as a threatened species under the ESA. Polar bears are excellent swimmers and can run up to 25 mph. Because of their size, speed, and curious nature, any encounter with a polar bear is potentially dangerous. During the summer months, polar bears normally hunt seals for food far out on the pack ice. As winter approaches, newly formed ice bridges may bring them closer to land. Only pregnant females use dens during the winter months, and they emerge with their cubs in March. Polar bears are coastal animals, and in their natural setting they eat only meat, mostly seals. However, in areas with human activity, they may be attracted to plastic, rubber, motor oil, and chemicals such as antifreeze. Bears may visit work sites because of curiosity or food odor, but their visits shall be transitory if they are not rewarded with food. The likelihood of a polar bear encounter in the project area is low. Field operations are scheduled during winter months, but not along the coast. Polar bears have been documented far inland, but this is a rare occurrence.

6.1.5.1 Early Detection and Avoidance

Polar bear early detection and avoidance procedures are similar to those for brown bears. Polar bears are attracted to food and waste. They are also curious creatures that may investigate camp sites, vehicles, and buildings simply because of their curiosity. The polar bear's white fur makes it exceptionally difficult to see when there is snow cover. Darkness, blind corners, noise, wind, precipitation, and fog shall also add to the difficulty of seeing or hearing a polar bear. All field personnel must be alert to the possibility that a polar bear may enter the project area, and all personnel shall follow the general early detection and avoidance precautions presented for brown bears in Section 1.4.1.

6.1.5.2 Interaction and Response

Polar bear hazing shall be done or approved by the field crew chief only after consultation with the USFWS or in the event of a life threating situation and the USFWS cannot be reached. Vehicles shall not be used to herd bears away from work locations.

6.1.5.3 Monitoring and Reporting

Reporting a polar bear sighting shall differ slightly from the required reporting for brown bear. When a polar bear is sighted, the construction supervisor or field crew chief shall verify the sighting and must complete a Polar Bear Sighting Report. A copy of the completed report shall be retained at the NANA Anchorage office, and a copy shall be sent to the USFWS Northern Field Office. As a courtesy, NANA shall send a copy to ADF&G in Kotzebue. The field crew shall report any polar bear observations to the USFWS (907-456-0203) within 24 hours.

6.1.6 Training and Meetings

All personnel working on the project construction or on the associated field programs shall receive environmental orientation before beginning work. This orientation shall cover the information included in this plan and shall reinforce the importance of proper waste handling and food management to minimize human-wildlife interactions. Additionally, contractors shall disseminate information specific to human- wildlife interactions in the form of environmental alerts and updates, safety bulletins, and safety meeting briefings during construction activities and field operations. The project manager shall be responsible for maintaining completed copies of specific human-wildlife interaction forms on site and routing forms as necessary to ADF&G or USFWS. Blank copies of all applicable forms are provided as appendices.

6.1.7 Risk Locations and Situations

The following are lists of locations, situations and activities where bear encounter risks may be higher and where attention to mitigating risks is essential. Possible bear encounter locations include:

- Near water courses
- Access roads
- Camp facilities
- Food consumption areas
- “Blind” areas at camps that are obscured by facilities, equipment, or other obstacles

At-risk bear encounter situations and activities include:

- Survey work
- Solid waste handling and disposal
- Inexperienced crews
- Dark/unlighted and visually obscured areas

6.2 Birds

There is the potential for interactions with birds to occur throughout the construction and field operations of the project, including with seabirds and raptors. Additionally, two species of birds, Spectacled eider (*Somateria fischeri*) and Steller’s eider (*Polysticta stelleri*), are listed species under USFWS jurisdiction and protected by the Endangered Species Act (ESA). Bald and Golden Eagles are protected under USFWS jurisdiction under the Bald and Golden Eagle Protection Act. Migratory birds are protected under the Migratory Bird Treaty Act.

NANA has developed this plan to prevent or minimize bird interactions with project construction and infrastructure. The following mitigation and minimization procedures shall be implemented:

- In order to reduce the possibility of bird collisions, aerial installation of fiber optic lines in this project has been minimized.
- Where aerial installation does occur, bird flight diverter deterrent devices shall be installed that are durable and visible to reduce collision risk.

- The majority of the project construction shall occur during the winter season, greatly reducing the risk of disturbing birds from surface construction.
- If an active nest is encountered at any time, including before or after the local recommended avoidance times, it shall be left undisturbed.
- To the maximum extent practicable, construction activities shall be limited to the time between dawn and dusk to avoid the illumination of adjacent habitat areas.
- If necessary to light at night, lights shall be angled downward to reduce potential for collisions with vessels, equipment, and gear.
- For the subsea installation, cable routing avoids listed eider concentration areas to reduce potential behavioral and disturbance effects.
- Post-construction helicopter surveys and concurrent fiber optic line refinement shall occur outside of the bird nesting window (which is between May 1 -July 31, according to USFWS).

Additional considerations specific to the listed threatened and endangered species in the area include:

- If construction activities occur outside of the time window specified by USFWS, the applicant shall notify USFWS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
- Consistent with AS 46.06.080, trash shall be disposed of in accordance with state law. All closed loops (e.g., packing straps, rings, bands) shall be cut prior to disposal.
- All vessels involved in dredging, screeding, and underwater excavating operations, including survey vessels, shall transit at velocities ≤10 knots.
- Fill material shall consist of rock fill that is free of fine sediments to the extent practical or shall come from on-site dredged material.
- Fill material shall be obtained from local sources or shall be free of non-native marine and terrestrial vegetation species.
- Vessel operators shall:
    - Maintain a watch for marine mammals at all times while underway.
    - Stay at least 91 meters (300 feet) away from listed marine mammals.
    - Travel at less than 5 knots when within 274 meters (900 feet) of a polar bear.
    - Reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mile) or less.
    - Vessels shall not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.
- Project-specific barges shall travel at 12 knots or less.
- Vessels used in construction shall not discharge materials (i.e., trash or other debris) into the ocean that may attract seabirds.

6.3 Caribou and Big Game

Interaction with large mammals, such as caribou, moose, and muskox, can potentially occur during the project's construction and maintenance phases. The following avoidance and minimization procedures shall be implemented:

- On-the-ground construction or maintenance activities shall be ceased if large wildlife is observed in the area. Particularly, activities shall not interfere with traditional migration or normal grazing patterns.
- Extra precautions shall be taken to avoid activities that interfere with the fall caribou migration (August-December), winter grazing, and spring migration (April-May).
    - During the fall migration, which coincides with breeding season and possible hunting pressure from humans and predators, caribou may be more reactive to stimulus. Avoidance of disrupting caribou movement during this time shall include an emphasis on allowing the undisturbed passage of the first caribou ("lead caribou") moving through an area, as these individuals set preferred pathways for subsequent caribou movements through the area.
- If moose or muskox are observed moving through the construction area, activities must cease until the animals are more than 300-ft. from project equipment and infrastructure.
- While helicopters must prioritize safety and compliance with Federal Aviation regulations, pilots shall also attempt to minimize disturbing caribou and other wildlife by:
    - Maintaining an adequate distance (based on altitude and lateral distance) from known animal locations;
    - Limiting the number of trips or flights per day during fall when caribou are present, as practical;
    - Avoiding landing in proximity to caribou during migration; or
    - Temporarily suspending transport operations.

6.4 Foxes and Rabies

- Rabies is present in Arctic foxes and red foxes of the region. Since foxes are opportunistic foragers, feeding foxes is strictly prohibited as it increases the risk that people shall be bitten and exposed to rabies.
- Unusual fox behavior includes any of the following:
    - Demonstrating no fear of humans
    - Staggering, tremors, or uncoordinated movements
    - Nipping or biting at themselves or random objects
    - Acting seemingly unaware or blind
    - Acting lethargic or reluctant to move
- If a fox is behaving sick/abnormal but has not bitten anyone, inform the Construction Manager and contact ADF&G.
- Under the Alaska Public Health Regulations, reports of foxes that have bitten or potentially exposed a person to rabies must be made immediately to the Department of Health and Social Services (DHSS) Section of Epidemiology (907) 269-8000, 1-800-418- 0054 in Anchorage, AK.
    - On the direction from the DHSS, carcasses of canids (foxes, wolves, coyotes) that have bitten a person may be shipped to the Alaska State Virology Lab with the forms found under Appendix C at http://dhss.alaska.gov/dph/Epi/id/Pages/rabies/default.aspx or to ADF&G.

- Canids that have bitten someone should not be shot in the head since a negative confirmation shall be impossible. When canids that are found dead or were killed after exhibiting signs of illness or strange behavior but no human exposure to saliva/brain tissues, contact Dr. Kimberlee Beckmen at ADF&G (907-328-8354; email: dfg.dwc.vet@alaska.gov). Carcass submission forms for found dead wildlife are found at: www.adfg.alaska.gov/index.cfm?adfg=disease.main. Please do not freeze carcasses; keep them chilled until directed on shipping or disposal.

6.5 Wildlife is Accidentally Killed or Injured

- The construction manager shall initiate an incident report if caribou, muskox, moose, bear, wolf, sheep, birds, or fish are accidentally killed by construction activities.
- The following agencies shall immediately be notified:
  - ADF&G in Kotzebue at 907-442-3420 for accidental wildlife deaths.
  - ADF&G Habitat in Fairbanks at 907-459-7282
  - The Alaska Wildlife Trooper – Kotzebue Office at 907-442-3241 for accidental moose, caribou, muskox, Dall sheep, brown and black bear, and wolf deaths. Troopers may be notified of other animal deaths at the discretion of the Construction Manager.
  - USFWS in Fairbanks at 907-456-0203 shall be notified of accidental deaths of a caribou, migratory bird, or threatened or endangered species.
  - Notification is not required for small mammal species, such as ground squirrels or rabbits.
- If an animal is killed, but the carcass may be salvageable, the construction manager shall contact the NANA staff to determine if nearby villages want the carcass.
- To avoid the transmission of diseases, disposable gloves must be used when handling carcasses.

7 References

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Appendix E2 – Snow Sampling Methodology

State of Alaska
Department of Natural Resources
Division of Mining, Land & Water **Northern Regional Office**

SNOW SAMPLING REQUIREMENTS
ICE ROAD CONSTRUCTION AND WINTER OFF-ROAD TRAVEL

The DNR may approve conditional off-road travel prior to opening the tundra to winter off-road travel. Conditional approval is dependent upon the data provided by the permittee. The necessary data may include soil temperature and snow depths. This document describes the minimum criteria for snow depth data collection.

MINIMUM ACCEPTABLE STANDARDS FOR INDUSTRY SNOW DATA COLLECTION

For data to be considered for ice road construction and winter off-road travel, certain standards must be met.

General Guidelines

- It is recommended that transects be 100 meters long.
- Locate transects at least 25 meters from infrastructure.
- Record 20 measurements per transect.
- Snow depths should be recorded to the nearest 0.5 centimeter or 0.25 inch.
- Provide photos of the transect.
- Provide GPS coordinates for the transect.

Transect Frequency

The frequency of transects is dependent upon the length of the route. To determine the number of snow transects that should be sampled, please contact the DNR. Below is a guideline for transect frequency.

Route Length	Transect Spacing
≤ 5 miles	0.75 mile
> 5 miles, ≤ 10 miles	1 mile
> 10 miles	1.5 mile

Equipment Needed

- A metric or standard ruler or probe (tape measures are not acceptable for collecting snow depths).
- GPS
- Notebook and pencil (or other means of data recording)
- Camera

Directions for Data Collection

1. Locate and measure out a 100 meter transect at least 25 meters away from infrastructure. Record the transect location information for the start of the transect (i.e. GPS point coordinates).
2. Photo document the transect to capture the general snow conditions in the area.
3. Collect at least 20 depth measurements. If using a metric ruler, record depths to the nearest 0.5 centimeter. If using a standard ruler, depths should be recorded to the nearest 0.25 inch.

Directions for Data Reporting

1. Report all measurements for each transect.
2. Record the date that the data was collected.
3. Clearly label each transect with a descriptive name so that the data can be easily cross-referenced with its location information and photos.

Appendix E3 – Hazardous Waste Plan

NANA Regional Broadband Network Project

Hazardous Waste Plan

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

Table of Contents

1 Hazardous Waste Plan

All waste and hazardous substances handling will follow applicable federal, state, and local regulations, with detailed tracking and records throughout the process.

1.1 Waste Types, Waste Sources, and Disposal Methods

All waste generated from the project will be securely contained and disposed of properly. Much of the waste will be backhauled to the Kotzebue landfill, however some waste will be transported to nearby local community landfills. When appropriate, material that can be reused or recycled will be separated and appropriately delivered to locations for community beneficial reuse or backhauled for recycling.

The following types of waste may be generated during construction:

- • Solid Wastes: Excess cable, connectors, plastic spools, packaging materials, and general construction waste will be transported back to Kotzebue or backhauled to a larger landfill for proper disposal. Materials that can be reused or recycled, such as fiber optic spools, will be separated and backhauled to an appropriate facility.
- Wood Wastes: Excess wood from packaging materials, pallets, and wooden support poles will either be backhauled to Kotzebue or provided to local communities for beneficial reuse.
- Food and Domestic Wastes: Excess food and domestic waste materials generated by construction crews will be contained and transported to local community landfills for proper disposal.

1.2 Hazardous Substances

Hazardous substances necessary during construction will be stored within traveling equipment securely away from sources of heat, sparks, and flames and within secondary containment structures. The storage area will be cool, dark, and well-ventilated. Hazardous substances traveling with the construction crews will include:

- Diesel Fuel: Stored in double-walled 5,000-gallon fuel sleighs with appropriate dispensing systems and spill prevention measures.
- Gasoline Fuel: Approximately 110-gallons of unleaded gasoline will be stored in polyethylene drums, with secondary containment, for use in generators and other equipment as needed. Appropriate dispensing systems and spill prevention measures will be used when transferring gasoline.
- Hydraulic Oil: Stored in properly labeled and secured stainless steel or polyethylene drums within traveling equipment or mobile camps, with secondary containment provided. Approximately 200 gallons of oil will be consumed per month of construction.
- Antifreeze, lubricant, windshield washer fluid, and brake cleaner: Small quantities (approximately 5 gallons each) of these preventative maintenance fluids will be stored in properly labeled and secured containers with secondary containment.

- Lead acid batteries: Two 12-V lead acid batteries will be on-site to start and power various equipment. Care will be taken when handling batteries, and they will be securely stored away from other fluids.
- Drill fluid (i.e., drill mud): For the HDD activities, a bentonite-water mixture will be used to stabilize the borehole, lubricate the drill bit, and transport cuttings to the surface. This fluid will be mixed as needed for daily drilling activities using the bentonite powder and clean water. Bentonite will be stored in dry sacks. HDD activities will be performed in the summer as noted previously.

The following types of hazardous waste may be generated during construction:

- Used Oil and Lubricants: These liquids will be collected in sealed containers and transported to Kotzebue for proper hazardous waste disposal. Approximately 25 gallons of used oil and lubricants will be generated during each month of project construction.
- Used oil and lubricants will be stored in a structurally sound and leak-proof 55-gallon drum that is made from polyethylene.
- Fuel Residues and Spills: In the event of a spill, contaminated soils or absorbent materials will be stored in separate containers and stored securely until their proper disposal.

1.3 Spill Plan and Spill Prevention

Effective spill prevention and response measures will be implemented during project construction. Implementation measures include:

- Proper handling and storage, such as secure and appropriate containers for each substance and safe transportation, limited storage, and strategic placement of hazardous materials to minimize spill risks.
- All hazardous materials will be stored within a secondary containment structure.
- Hazardous substance transfers will always take place within a containment berm and/or while utilizing a drip pan. Absorbent materials will be readily available during transfer.
- All containers will be clearly labeled.
- Daily inspection of all storage areas, containers, and equipment will occur to look for signs of leaks, corrosion, or other issues. Preventative maintenance on tanks, valves, or pumps will be performed regularly.
- Daily record keeping of inspection activities, and maintenance of accurate records when materials are stored or disposed of.
- Spill kits will be readily available at all work sites and in all vehicles containing absorbent materials, contaminated chemical waste bags, gloves, and brooms.
- Personal Protective Equipment, including gloves and safety glasses, will be readily available.
- Key personnel will be trained in spill response management and all personnel will be trained in spill response procedures.
- Any spills will be immediately reported to appropriate agencies.

The development of several plans/policies are anticipated to guide construction activities. These will be provided through the NEPA analysis stage of the project and may include the following:

- Waste Handling Plan
- Wildlife Interaction Plan
- Cultural Resources Orientation and Management Plan
- Weed Control/Invasive Species Management Plan
- Stormwater Pollution Prevention Plan (SWPPP)Purpose: This plan outlines procedures to prevent, monitor, and respond to inadvertent drilling fluid releases (frac-outs) during HDD activities.

Appendix E4 – Fracout Plan

NANA Regional Broadband Network Project

Frac Out Plan

NANA Regional Corporation, Inc. (EAXX-006-60-3D-1754935958)

NANA Region Middle Mile Fiber Optic Project

Northwest Arctic Borough, Alaska

Table of Contents

1 Frac Out Plan

Purpose: This plan outlines procedures to prevent, monitor, and respond to inadvertent drilling fluid releases (frac-outs) during HDD activities.

Drilling Method & Materials

- Method: Horizontal Directional Drilling (HDD) beneath rivers for the NANA Broadband Project
- Drilling Fluid: Bentonite-based, non-toxic, biodegradable mud designed to stabilize the borehole and transport cuttings.
- Additives: Only environmentally safe polymers or loss-circulation materials (LCM) approved for use in aquatic environments. Only utilized if required, not anticipated.
- Minimize mud pressure to accommodate 2” product, pressure monitored continuously to reduce blowout potential.

Risk Assessment

Potential for frac-out exists when drilling fluid migrates through natural fractures or porous soils to the surface or waterbody. Sensitive receptors include:

- Riverbed and riverbank habitats
- Fish spawning areas
- Drinking water intakes (if present)
- Wetlands and adjacent vegetation

Prevention & Monitoring Measures

Drilling Best Practices:

- Maintain circulation of mud flow and monitor volume.
- Use pilot hole for product placement, no back reaming or multiple increased diameter back pulls.

Monitoring:

- Continuous pressure and return flow monitoring.
- Visual inspections of riverbanks and upland ground surface by trained spotters.

Response Procedures

If a frac-out is suspected:

- Stop drilling immediately.
- Notify:
    - HDD superintendent
    - Environmental Support
    - NANA Broadband
    - Regulatory agencies (ADEC, DNR, USACE) as required by permit.

- Assess release location and extent.
    - Use turbidity monitoring, surface observation, and spill detection.
    - Containment & Recovery:
        - Excavate pits or use pumps for upland releases.
        - Hand removal of mud where practical to minimize habitat disturbance.
    - Written report within 24 hours including incident summary and corrective actions.

8. Training & Equipment

- Personnel Training: All HDD crew trained in frac-out recognition and emergency response.
- On-Site Equipment:
    - Absorbent pads
    - portable pumps for each bank
    - Spill kits and shovels
    - Communication equipment (radios, phones)

9. Post-Incident Review

Following any frac-out event, the project team will:

- Conduct a root-cause analysis.
- Revise drilling parameters or mud programs as needed.
- Submit a corrective action report to agencies.

Appendix E5 – Spill Response

Cruz CONSTRUCTION, INC. ALASKA
3852 N. Clark-Wolverine Road • Palmer, Alaska 99645 Tel: (907) 746-3144 Fax: (907) 746-5557
www.cruzconstruct.com

Spill Prevention, Control and Countermeasure Plan

APPENDIX A
SPILL HISTORY

APPENDIX A
SPILL HISTORY

1. **Date:** _____

Product Spilled: _____

Volume: _____

Location: _____

Cause: _____

Corrective Action Taken: _____

Plans for Preventing Recurrence: _____

_____

2. **Date:** _____

Product Spilled: _____

Volume: _____

Location: _____

Cause: _____

Corrective Action Taken: _____

Plans for Preventing Recurrence: _____

_____

3. **Date:** _____

Product Spilled: _____

Volume: _____

Location: _____

Cause: _____

Corrective Action Taken: _____

Plans for Preventing Recurrence: _____

_____

APPENDIX B
FUEL STORAGE AND DISTRIBUTION SYSTEM INSPECTION CHECKLIST

Name of Facility: Cruz Construction Fuel Storage
Inspector:_____. Date:_____.

Item	Frequency	Yes	No	Comments
Aboveground Storage Tanks (AST's)	Daily			
Is any rust or pitting visible?	Daily			
Are there any visible leaks or seepage?	Daily			
Are cam-locks capped and access locked?	Daily			
Are fuel storage drums in good condition?	Daily			
Measure and record fuel volume:_____gallons	Each Delivery			
Penetrations				
Is the fill connection cam-lock capped and access locked?	Daily			
Is the valve between the cam-lock and the manifold in the OFF position? Is access locked?	Daily			
Are the tank vents secure and free of obstructions?	Daily			
Is the drain valve(s) secured and locked in the closed position?	Daily			
Are other penetrations and valves capped/plugged or locked in the closed position?	Daily			
Containment Structure				
Are any abrasions, minor nicks, or tears visible?	Daily			
Are any punctures or cracks visible?	Daily			
Are there any visible leaks?	Daily			
Are there any visible stains?	Daily			
Is debris or precipitation (liquid or frozen) present in the containment structure?	Daily			
Is there any damage to the containment structure that will prevent the containment of fuel released from an AST or drum?	Daily			
Is the containment liner properly anchored, stable, and able to withstand high winds?	Daily			
Are there any stains on the ground or surrounding area?	Daily			
Note: Accumulated precipitation shall be removed daily and shall be examined for odor and sheen before removal from the containment structure to avoid accidentally discharging fuel.	Daily			
Supply Lines:				
Are any abrasions, nicks, or wear points visible?	Daily			
Are any cracks visible?	Daily			
Are there any visible leaks?	Daily			
Are there any visible stains beneath lines?	Daily			
Are sufficient drip pads present to support fueling operations, including pads at hose connections?	Daily			
Are connections between the tank and supply lines tight?	Daily			

Item	Frequency	Yes	No	Comments
Valves and connections				
Are all cam-lock fittings and drain valves locked (wired shut) in the closed position?	Daily			
Are there any visible leaks?	Daily			
Are there any visible stains?	Daily			
Transfer Pump and Dispenser				
Are there any visible leaks from the pump containment?	Daily			
Are the fuel line connections to the pump secure?	Daily			
Are there any visible stains beneath the pump containment?	Daily			
Is the connection to the fuel dispenser secure?	Daily			
Is the fuel dispenser placed inside containment when not in use?	Daily			
Is debris or precipitation (liquid or frozen) present in the transfer pump containment structure?	Daily			
Note: Accumulated precipitation shall be removed daily and shall be examined for odor and sheen before removal from the containment structure to avoid accidentally discharging fuel.	Daily			
Transfer Area				
Are there visible from fueling operations?	Daily			
Are there visible in the vicinity of the fuel storage tank that may indicate a leak?	Daily			
Security				
Is a fire extinguisher charged and accessible?	Daily			
Is the spill response equipment accessible?	Daily			
Is site lighting functional?	Daily			

Note: If a task is not applicable, record NA in the comment column. Sketches, photographs, or additional comments should be attached to the checklist.
Daily inspections shall be made while the facility is in active operation and while someone is onsite during periods of inactivity while fuel is being stored.

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Spill Prevention, Control and Countermeasure Plan

APPENDIX C
SPCC PROGRAM REQUIREMENTS

APPENDIX C
SPCC PROGRAM REQUIREMENTS

The following actions are required for the facility to maintain compliance with Title 40, Code of Federal Regulations, Part 112 (40 CFR 112). Current practice covers the requirements but they must be continued to maintain compliance.

Requirements	Action	Date
The project logbook and all records pertaining to the spill prevention, control and countermeasure (SPCC) plan and the fuel storage and supply systems shall be maintained by Cruz Construction, Inc. for a minimum of 3 years. Copies of all records shall be maintained at the project site, shall be available to site personnel, and shall be on file at Cruz Construction, Inc.'s Palmer office.		
Appropriate spill response materials and equipment to prevent discharged oil from reaching a navigable watercourse shall be maintained at the station. A summary of spill response materials and equipment is presented in Appendix F.		
Locks shall be placed to restrain access to valves, filling caps, and refueling nozzle (when not in use) to provide reasonable security for the fuel system.		
The facility fuel storage and distribution system shall be inspected daily. An inspection checklist is presented in Appendix B.		
The containment shall be inspected daily for wear and accumulation of precipitation. Accumulated precipitation shall be examined before it is removed to avoid discharging fuel from the containment structure.		
Cruz Construction, Inc's trained personnel will operate the system. These personnel shall be properly instructed in the operation and maintenance of the fuel storage and distribution system.		
Cruz Construction, Inc's personnel shall be familiar with applicable regulatory guidance and spill reporting requirements (see section V of the SPCC plan).		
Adequate lighting of the facility, portable or fixed, shall be provided for visual inspection or spill discovery during hours of darkness.		
All fuel spills at the facility shall be properly recorded on the Spill Report form (Appendix H) and report to Cruz Construction, Inc's Operations Manager.		
Cruz Construction, Inc. personnel shall be present to monitor all fuel transfers.		
All miscellaneous 55-gallon fuel and lubricant drums shall be stored within containment at the site.		
Cruz Construction, Inc. personnel shall prepare the station for removal/storage status by draining all fuel distribution lines, locking all tank valves in the closed position, and inspecting the system using the checklist in Appendix B.		

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Spill Prevention, Control and Countermeasure Plan

APPENDIX D
SPCC PROGRAM RECOMMENDATIONS

APPENDIX D
SPCC PROGRAM RECOMMENDATIONS

The following improvements or actions have been recommended for the facility following the implementation of this SPCC plan (record improvement measures and date of action):

Recommendation	Action	Date

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Spill Prevention, Control and Countermeasure Plan

APPENDIX E
RELOCATION SUMMARY SHEET

APPENDIX E.1
RELOCATION SUMMARY SHEET

General Location: Kotzebue, Alaska
Latitude: 66.895 Longitude: -162.58

Facility Owner/Operator:
Cruz Construction, Inc.
7000 E. Palmer-Wasilla Highway.
Palmer, Alaska 99645

Onsite Project Manager: Ben Bitler

Site Conditions, Surface Drainage and Specific Environmentally Sensitive Areas:

_____

_____

_____

Confirmed By:

Date System Moved to Above Location: _____ _____

Start Date of System Operations: _____ _____

End Date of System Operations: _____ _____

Date System Emptied/Moved to New Location: _____ _____

Site conditions following the removal of the facility from the above location: _____

_____

_____

_____

_____

_____ _____
Onsite Project Manager Date

_____
Printed Name

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Spill Prevention, Control and Countermeasure Plan

APPENDIX F
SPILL RESPONSE MATERIALS AND EQUIPMENT

APPENDIX F
SPILL RESPONSE MATERIALS AND EQUIPMENT

Cruz Construction, Inc. has prepared emergency response kits to be staged around the facility during all fuel transferring activities.

The following spill response materials will be a part of each spill kit:

- Oily waste impermeable bags
- Fire extinguishers, first aid kits, shovels, etc.
- Spill containment booms
- Absorbent pads
- Gloves
- Sealable barrel

Heavy equipment available

- 1 CAT 962K Loader w/ Bucket & Forks
- 1 CASE IH Steiger

Additional equipment and/or materials such as diaphragm pumps, sump pumps, hoses, collapsible containers, drums, non-sparking tools, and sorbent materials may be required following the initial response. Cruz Construction, Inc. will mobilize this equipment/material from Palmer, Anchorage or Kotzebue

Supplies taken from the spill kit for use shall be replaced as soon as possible to maintain a full inventory.

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Spill Prevention, Control and Countermeasure Plan

APPENDIX G
CONTACT LIST

APPENDIX G
CONTACT LIST FOR KOTZEBUE FUEL STORAGE

Cruz Construction, Inc.
Greg Miller,VP Operations: (907) 690-0989; Mobile (907) 761-6606
Ben Bitler, Project Manager: Mobile (907) 982-0804
Jeff Miller, President: (907) 761-6623; Mobile (907) 841-8099
Stephen Nowers, HSE Manager: (907) 761-6610; Mobile (907) 232-5313

U.S. Environmental Protection Agency
National Response Center: (800) 424-8802

Alaska Department of Environmental Conservation
Central Region: (907) 451-2121; Fax (907) 451-2362

- **TO WATER:** *Any* release of oil to water *must be reported* as soon as the person has knowledge of the discharge.
- **TO LAND:** Any release of oil in *excess of 55 gallons* must be reported as soon as the person has knowledge of the discharge. Any release of oil in *excess of 10 gallons but less than 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge. A person in charge of a facility or operation shall maintain, and provide to the Department on a monthly basis, a written record of any discharges any discharge of oil *from 1 to 10 gallons*.
- **TO IMPERMEABLE SECONDARY CONTAINMENT AREAS:** Any release of oil *in excess of 55 gallons* must be reported within 48 hours after the person has knowledge of the discharge.

Police Departments
Alaska State Troopers, Anchorage: (907) 269-5511

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3852 N. Clark-Wolverine Road • Palmer, Alaska 99645 Tel: (907) 746-3144 Fax: (907) 746-5557
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Spill Prevention, Control and Countermeasure Plan

APPENDIX H
SPILL REPORT FORM

APPENDIX H
SPILL REPORT FORM

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
OIL & HAZARDOUS SUBSTANCES SPILL NOTIFICATION FORM

ADEC USE ONLY

ADEC SPILL #:	ADEC FILE #:	ADEC LC:

PERSON REPORTING:	PHONE NUMBER:	REPORTED HOW? (ADEC USE ONLY) ❑ Phone ❑ Fax ❑ Troopers
DATE/TIME OF SPILL:	DATE/TIME DISCOVERED:	DATE/TIME REPORTED:

INCIDENT LOCATION/ADDRESS:	DATUM: ❑ NAD27 ❑ NAD83 ❑ WGS84 ❑ Other _____	PRODUCT SPILLED:
	LAT.	
	LONG.	

QUANTITY SPILLED: ❑ gallons ❑ pounds	QUANTITY CONTAINED: ❑ gallons ❑ pounds	QUANTITY RECOVERED: ❑ gallons ❑ pounds	QUANTITY DISPOSED: ❑ gallons ❑ pounds

	POTENTIAL RESPONSIBLE PARTY:	OTHER PRP, IF ANY:	VESSEL NAME:
Name/Business:			
Mailing Address:			VESSEL NUMBER:
Contact Name:			> 400 GROSS TON VESSEL: ❑ Yes ❑ No
Contact Number:			

SOURCE OF SPILL:	CAUSE CLASSIFICATION:
CAUSE OF SPILL: ❑ Under Investigation	❑ Accident ❑ Human Factors ❑ Structural/Mechanical ❑ Other

CLEANUP ACTIONS:

DISPOSAL METHODS AND LOCATION:

AFFECTED AREA SIZE:	SURFACE TYPE: *(gravel, asphalt, name of river etc.)*	RESOURCES AFFECTED/THREATENED: *(Water sources, wildlife, wells, etc.)*

COMMENTS:

ADEC USE ONLY

SPILL NAME:	NAME OF DEC STAFF RESPONDING:	C-PLAN MGR NOTIFIED? ❑ Yes ❑ No

DEC RESPONSE: ❑ Phone follow-up ❑ Field visit ❑ Took Report	CASELOAD CODE: ❑ First and Final ❑ Open/No LC ❑ LC Assigned	CLEANUP CLOSURE ACTION: ❑ NFA ❑ Monitoring ❑ Transferred to CS or STP

COMMENTS:

Status of Case: ❑ Open ❑ Closed **DATE CASE CLOSED:**

REPORT PREPARED BY:	DATE:

STI SP001 AST Record

OWNER INFORMATION	FACILITY INFORMATION	INSTALLER INFORMATION
Name	Name	Name
Number and Street	Number and Street	Number and Street
City, State, Zip Code	City, State, Zip Code	City, State, Zip Code

.

TANK ID _____

SPECIFICATION:

Design: ☐ UL _____ ☐ SWRI _____ ☐ Horizontal ☐ Vertical ☐ Rectangular
☐ API _____ ☐ Other _____
☐ Unknown

Manufacturer: Contents: Construction Date: Last Repair/Reconstruction Date:

Dimensions: Capacity: Last Change of Service Date:

Construction: ☐ Bare Steel ☐ Cathodically Protected (Check one: A. ☐ Galvanic or B. ☐ Impressed Current) Date Installed: _____
☐ Coated Steel ☐ Concrete ☐ Plastic/Fiberglass ☐ Other
☐ Double-Bottom ☐ Double-Wall ☐ Lined Date Installed: _____

Containment: ☐ Earthen Dike ☐ Steel Dike ☐ Concrete ☐ Synthetic Liner ☐ Other _____

CRDM: ☐ Date Installed: _____ Type: _____

Release Prevention Barrier: ☐ Date Installed: _____ Type: _____

TANK ID _____

SPECIFICATION:

Design: ☐ UL _____ ☐ SWRI _____ ☐ Horizontal ☐ Vertical ☐ Rectangular

☐ API _____ ☐ Other _____

☐ Unknown

Manufacturer: Contents: Construction Date: Last Repair/Reconstruction Date:

Dimensions: Capacity: Last Change of Service Date:

Construction: ☐ Bare Steel ☐ Cathodically Protected (Check one: A. ☐ Galvanic or B. ☐ Impressed Current) Date Installed: _____

☐ Coated Steel ☐ Concrete ☐ Plastic/Fiberglass ☐ Other

☐ Double-Bottom ☐ Double-Wall ☐ Lined Date Installed: _____

Containment: ☐ Earthen Dike ☐ Steel Dike ☐ Concrete ☐ Synthetic Liner ☐ Other _____

CRDM: ☐ Date Installed: Type:

Release Prevention Barrier: ☐ Date Installed: _____ Type: _____

TANK ID _____

SPECIFICATION:

Design: ☐ UL _____ ☐ SWRI _____ ☐ Horizontal ☐ Vertical ☐ Rectangular

☐ API _____

☐ Unknown ☐ Other _____

Manufacturer: Contents: Construction Date: Last Repair/Reconstruction Date:

Dimensions: Capacity: Last Change of Service Date:

Construction: ☐ Bare Steel ☐ Cathodically Protected (Check one: A. ☐ Galvanic or B. ☐ Impressed Current) Date Installed: _____

☐ Coated Steel ☐ Concrete ☐ Plastic/Fiberglass ☐ Other

☐ Double-Bottom ☐ Double-Wall ☐ Lined Date Installed: _____

Containment: ☐ Earthen Dike ☐ Steel Dike ☐ Concrete ☐ Synthetic Liner ☐ Other _____

CRDM: ☐ Date Installed: Type:

Release Prevention Barrier: ☐ Date Installed: _____ Type: _____

TANK ID _____

SPECIFICATION:

Design: ☐ UL _____ ☐ SWRI _____ ☐ Horizontal ☐ Vertical ☐ Rectangular

☐ API _____

☐ Unknown ☐ Other _____

Manufacturer: Contents: Construction Date: Last Repair/Reconstruction Date:

Dimensions: Capacity: Last Change of Service Date:

Construction: ☐ Bare Steel ☐ Cathodically Protected (Check one: A. ☐ Galvanic or B. ☐ Impressed Current) Date Installed: _____

☐ Coated Steel ☐ Concrete ☐ Plastic/Fiberglass ☐ Other

☐ Double-Bottom ☐ Double-Wall ☐ Lined Date Installed: _____

Containment: ☐ Earthen Dike ☐ Steel Dike ☐ Concrete ☐ Synthetic Liner ☐ Other _____

CRDM: ☐ Date Installed: Type:

Release Prevention Barrier: ☐ Date Installed: _____ Type: _____

TANK ID _____

SPECIFICATION:

Design: ☐ UL _____ ☐ SWRI _____ ☐ Horizontal ☐ Vertical ☐ Rectangular

☐ API _____

☐ Unknown ☐ Other _____

Manufacturer: Contents: Construction Date: Last Repair/Reconstruction Date:

Dimensions: Capacity: Last Change of Service Date:

Construction: ☐ Bare Steel ☐ Cathodically Protected (Check one: A. ☐ Galvanic or B. ☐ Impressed Current) Date Installed: _____

☐ Coated Steel ☐ Concrete ☐ Plastic/Fiberglass ☐ Other

☐ Double-Bottom ☐ Double-Wall ☐ Lined Date Installed: _____

Containment: ☐ Earthen Dike ☐ Steel Dike ☐ Concrete ☐ Synthetic Liner ☐ Other _____

CRDM: ☐ Date Installed: Type:

Release Prevention Barrier: ☐ Date Installed: _____ Type: _____

STI SP001 Monthly Inspection Checklist

General Inspection Information:

Inspection Date: _____ Retain Until Date: _____ (36 months from inspection date)

Prior Inspection Date: _____ Inspector Name: _____

Tanks Inspected (ID #'s): _____

Inspection Guidance:

- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Upon discovery of water in the primary tank, secondary containment area, interstice, or spill container, remove promptly or take other corrective action. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- (*) designates an item in a non-conformance status. This indicates that action is required to address a problem.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- **In the event of severe weather (snow, ice, wind storms) or maintenance (such as painting) that could affect the operation of critical components (normal and emergency vents, valves), an inspection of these components is required as soon as the equipment is safely accessible after the event.**

Item	Task	Status	Comments
1.0 Tank Containment			
1.1 Containment structure	Check for water, debris, cracks or fire hazard	☐Yes* ☐No ☐N/A	
1.2 Primary tank	Check for water	☐Yes* ☐No	
1.3 Containment drain valves	Operable and in a closed position	☐Yes ☐No* ☐N/A	
1.4 Pathways and entry	Clear and gates/doors operable	☐Yes ☐No* ☐N/A	
2.0 Leak Detection			
2.1 Tank	Visible signs of leakage	☐Yes* ☐No	
2.2 Secondary Containment	Visible signs of leakage from tank into secondary containment	☐Yes* ☐No	
2.3 Surrounding soil	Visible signs of leakage	☐Yes* ☐No ☐N/A	
2.4 Interstice	Visible signs of leakage	☐Yes* ☐No ☐N/A	

Item	Task	Status	Comments
3.0 Tank Equipment			
3.1 Valves	a. Check for leaks.	□Yes* □No □N/A	
	b. Tank drain valves must be kept locked.	□Yes* □No □N/A	
3.2 Spill containment boxes on fill pipe	a. Inspect for debris, residue, and water in the box and remove.	□Yes* □No □N/A	
	b. Drain valves must be operable and closed.	□Yes* □No □N/A	
3.3 Liquid level equipment	a. Both visual and mechanical devices must be inspected for physical damage.	□Yes □No* □N/A	
	b. Check that the device is easily readable	□Yes □No* □N/A	
3.4 Overfill equipment	a. If equipped with a "test" button, activate the audible horn or light to confirm operation. This could be battery powered. Replace the battery if needed	□Yes □No* □N/A	
	b. If overfill valve is equipped with a mechanical test mechanism, actuate the mechanism to confirm operation.	□Yes □No* □N/A	
3.5 Piping connections	Check for leaks, corrosion and damage	□Yes* □No	
4.0 Tank Attachments and Appurtenances			
4.1 Ladder and platform structure	Secure with no sign of severe corrosion or damage?	□Yes □No* □N/A	
5.0 Other Conditions			
5.1 Are there other conditions that should be addressed for continued safe operation or that may affect the site spill prevention plan?		□Yes* □No	

Additional Comments:

STI SP001 Annual Inspection Checklist

General Inspection Information:

Inspection Date: _____ Retain Until Date: _____ (36 months from inspection date)

Prior Inspection Date: _____ Inspector Name: _____

Tanks Inspected (ID #'s): _____

Inspection Guidance:

- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Remove promptly upon discovery standing water or liquid in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility must regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- (*) designates an item in a non-conformance status. This indicates that action is required to address a problem.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- Complete this checklist on an annual basis supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

Item	Task	Status	Comments
1.0 Tank Containment			
1.1 Containment structure	Check for: • Holes or cracks in containment wall or floor • Washout • Liner degradation • Corrosion • Leakage • Paint failure • Tank settling	☐Yes* ☐No ☐N/A	
2.0 Tank Foundation and Supports			
2.1 Foundation	Settlement or foundation washout?	☐Yes* ☐No	
2.2 Concrete pad or ring wall	Cracking or spalling?	☐Yes* ☐No ☐N/A	

Item	Task	Status	Comments
2.3 Supports	Check for corrosion, paint failure, etc.	□Yes* □No □N/A	
2.4 Water drainage	Water drains away from tank?	□Yes □No* □N/A	
2.5 Tank grounding	Strap secured and in good condition?	□Yes □No* □N/A	
3.0 Cathodic Protection			
3.1 Gavlvanic cathodic protection system	Confirm system is functional, includes the wire connections for galvanic systems	□Yes □No* □N/A	
3.2 Impressed current system	a. Inspect the operational components (power switch, meters, and alarms).	□Yes □No* □N/A	
	b. Record hour meter, ammeter and voltmeter readings.	□Yes □No* □N/A	
4.0 Tank Shell, Heads, Roof			
4.1 Coating	Check for coating failure	□Yes* □No	
4.2 Steel condition	Check for: • Dents • Buckling • Bulging • Corrosion • Cracking	□Yes* □No	
4.3 Roof slope	Check for low points and standing water	□Yes* □No □N/A	
5.0 Tank Equipment			
5.1 Vents	Verify that components are moving freely and vent passageways are not obstructed for: • Emergency vent covers • Pressure/vacuum vent poppets • Other moving vent components	□Yes* □No	

Item	Task	Status	Comments
5.2 Valves	Check the condition of all valves for leaks, corrosion and damage.	□Yes* □No	
5.2.1 Anti-siphon, check and gate valves	Cycle the valve open and closed and check for proper operation.	□Yes □No* □N/A	
5.2.2 Pressure regulator valve	Check for proper operation. (Note that there may be small, 1/4 inch drain plugs in the bottom of the valve that are not visible by looking from above only)	□Yes □No* □N/A	
5.2.3 Expansion relief valve	Check that the valve is in the proper orientation. (Note that fuel must be discharged back to the tank via a separate pipe or tubing.)	□Yes □No* □N/A	
5.2.4 Solenoid valves	Cycle power to valve to check operation. (Electrical solenoids can be verified by listening to the plunger opening and closing. If no audible confirmation, the valve should be inspected for the presence and operation of the plunger.)	□Yes □No* □N/A	
5.2.5 Fire and shear valves	a. Manually cycle the valve to ensure components are moving freely and that the valve handle or lever has clearance to allow valve to close completely.	□Yes □No* □N/A	
	b. Valves must not be wired in open position.	□Yes □No* □N/A	

Item	Task	Status	Comments
	c. Make sure fusible element is in place and correctly positioned.	□Yes □No* □N/A	
	d. Be sure test ports are sealed with plug after testing is complete and no temporary test fixture or component remains connected to valve.	□Yes □No* □N/A	
5.3 Interstitial leak detection equipment	Check condition of equipment, including: • The window is clean and clear in sight leak gauges. • The wire connections of electronic gauges for tightness and corrosion • Activate the test button, if applicable.	□Yes □No* □N/A	
5.4 Spill containment boxes on fill pipe	a. If corrosion, damage, or wear has compromised the ability of the unit to perform spill containment functions, replace the unit.	□Yes* □No □N/A	
	b. Inspect the connections to the AST for tightness, as well as the bolts, nuts, washers for condition and replace if necessary.	□Yes* □No □N/A	
	c. Drain valves must be operable and closed	□Yes* □No □N/A	
5.5 Strainer	a. Check that the strainer is clean and in good condition.	□Yes □No* □N/A	

Item	Task	Status	Comments
5.5 Strainer	b. Access strainer basket and check cap and gasket seal as well as bolts.	□Yes □No* □N/A	
5.6 Filter	a. Check that the filter is in good condition and is within the manufacturer's expected service life. Replace, if necessary.	□Yes □No* □N/A	
	b. Check for leaks and decreased fuel flow	□Yes □No* □N/A	
5.7 Flame arrestors	Follow manufacturer's instructions. Check for corrosion and blockage of air passages.	□Yes* □ No □N/A	
5.8 Leak detector for submersible pump systems	Test according to manufacturer's instructions and authority having jurisdiction (AHJ). Verify leak detectors are suited and properly installed for aboveground use.	□Yes □No* □N/A	
5.9 Liquid level equipment	a. Has equipment been tested to ensure proper operation?	□Yes □No* □N/A	
	b. Does equipment operate as required?	□Yes □No* □N/A	
	c. Follow manufacturer's instructions	□Yes □No* □N/A	
5.10 Overfill equipment	a. Follow manufacturer's instructions and regulatory requirements for inspection and functionality verification.	□Yes □No* □N/A	
	b. Confirm device is suited for above ground use by the manufacturer	□Yes □No* □N/A	

Item	Task	Status	Comments
6.0 Insulated Tanks			
6.1 Insulation	Check condition of insulation for: • Missing sections • Areas of moisture • Mold • Damage	☐Yes* ☐ No ☐N/A	
6.2 Insulation cover or jacket	Check for damage that will allow water intrusion	☐Yes* No ☐N/A	
7.0 Miscellaneous			
7.1 Electrical wiring and boxes	Are they in good condition?	☐Yes ☐No* ☐N/A	
7.2 Labels and tags	Ensure that all labels and tags are intact and readable.	☐Yes ☐No* ☐N/A	

Additional Comments:

STI SP001 Portable Container Monthly Inspection Checklist

General Inspection Information:

Inspection Date: _____ Retain Until Date: _____ (36 months from inspection date)

Prior Inspection Date: _____ Inspector Name: _____

Containers Inspected (ID #'s): _____

Inspection Guidance:

- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- (*) designates an item in a non-conformance status. This indicates that action is required to address a problem.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.

Item	Area: _____	Area: _____	Area: _____	Area: _____
1.0 AST Containment/Storage Area				
1.1 ASTs within designated storage area?	☐Yes ☐No*	☐Yes ☐No*	☐Yes ☐No*	☐Yes ☐No*
1.2 Debris, spills, or other fire hazards in containment or storage area?	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No
1.3 Water in outdoor secondary containment?	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No
1.4 Drain valves operable and in a closed position?	☐Yes ☐No*	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No
1.5 Egress pathways clear and gates/doors operable?	☐Yes ☐No*	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No

Item	Area: _____	Area: _____	Area: _____	Area: _____
2.0 Leak Detection				
2.1 Visible signs of leakage around the container or storage area?	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No
3.0 Container				
3.0 Noticeable container distortions, buckling, denting or bulging?	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No	☐Yes* ☐No

Comments: