Scammon Bay Airport Feasibility Study

August 2025

Alternatives

CFAPT01005 / AIP 3-02-0255-005-2023

Prepared for:

State of Alaska
Department of Transportation & Public Facilities, Central Region
4111 Aviation Ave.
Anchorage, Alaska 99516-6900

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EXECUTIVE SUMMARY

The Central Region of the Alaska Department of Transportation and Public Facilities (DOT&PF) conducted an airport feasibility study for the Scammon Bay Airport (SCM). The feasibility study is Phase I of a multi-phased planning process that was initiated to improve the safety of aviation infrastructure in Scammon Bay and is federally funded through a Federal Aviation Administration (FAA) AIP grant. The planning study is anticipated to include three planning phases: Phase I feasibility study, Phase II, reconnaissance study, and Phase III Airport Layout Plan (ALP)

Scammon Bay is located adjacent to the Kun River, one mile from the Bearing Sea, north of the Askinuk Mountains in the Yukon-Kuskokwim Deta, approximately 150 miles northwest of Bethel, Alaska. The community of Scammon Bay has a population of nearly 600 people. There are two governing bodies: the municipality and the traditional council. The city is classified as a second-class city, within the Kusilvak Census Area.

The Scammon Bay Airport (SCM) is a rural General Aviation (GA) airport with no on-site management. The major issue facing the Scammon Bay Airport is flooding, which is destabilizing the airport surface and embankment, submerging the lighting system and navigational aids, and resulting in airport closures. The closures prevent residents from being able to evacuate during emergencies, access emergency medical services, send or receive mail, or have food and fuel delivered.

The purpose of the Phase I feasibility study was to develop and evaluate preliminary alternatives that could mitigate airport safety and reliability in for the community of Scammon Bay. Phase II is anticipated to be an in-depth reconnaissance study that will build on the findings of the feasibility study. Phase III may include the development of an ALP that will be used for the design of an Airport Capital Improvement Program (ACIP) project for the preferred alternative. The emphasis of the evaluation was to compare maintaining the airport in its current location, shifting the runway and operational surfaces inland, or constructing a new airport further inland away from Kun River.

The Phase I study evaluated five alternatives based on the following criteria:

- Safety and Resiliency
- Land Status
- Environmental Conditions
- Public Access Convenience
- Constructability

- Solid Waste Disposal Sites
- Materials
- Utilities
- Cost
- Public Opinion

The Alternatives include:

- Alternative 1 ("No Action") is used for comparison purposes and does not resolve the erosion and flooding threats.
- Alternative 2 ("Shift & Raise") would shift the runway 340 feet inland along its current alignment as protection from river movement. This alternative includes raising the surface elevation of the edge of the embankment 3-10.5feet to +19.5 feet MHHW NAVD and installing erosion protection.
    a. DOT&PF Aviation Design recommended this elevation raise based on the analysis and recommendations from the 2022 HDR Coastal Report (Appendix C). To prevent overtopping from storm surges, the HDR report recommended +18.5 feet NAVD88 for a 50-year design life and +20.5 feet NAVD88 for a 100-year design life.
- Alternative 3 ("Near") would relocate the Airport onto the transitional area between lowlands and the Askinuk Mountains, near the community of Scammon Bay.
- Alternative 4 ("Castle Hill") would relocate the Airport to the valley between Castle Hill and the Askinuk Mountains.
- Alternative 5 ("Ridgeline") would relocate the Airport to the ridgeline south of Scammon Bay in the Askinuk Mountains.

The Phase I feasibility study included public involvement, an aviation forecast, alternatives evaluation, and incorporated two technical studies that were developed for the Scammon Bay airport; a Coastal Report (HDR, 2022) and a Hydrology and Hydraulics Report (HDR, 2022). The aviation forecast was approved in March 2024. Much of this study focused on exiting data and records for the airport and surrounding area. No field site investigations occurred at potential relocation sites.

Public involvement for the feasibility study included mass public notification emails, flyers, one in-person public meeting with a virtual option, regular website updates, and three requests for public comments. During the public meeting, community members expressed strong support Alternative 2 (Shift & Raise). A tri-party community resolution was passed by the City of Scammon Bay, Native Village of Scammon

Bay, and Askinuk Corporation in support of Alternative 2. The Calista Corporation also submitted a letter of support for Alternative 2.

Findings

Based on the findings in this study, DOT&PF has selected the following alternatives for further analysis: Alternative 1 (No Action), Alternative 2 (Shift & Raise), and Alternative 4 (Castle Hill).

DOT&PF selected Alternative 1 because it is the "No Action" alternative and must be further evaluated to include engineering level estimated costs for repeated rehabilitation projects after catastrophic flooding events. Evaluation of the "No Action" alternative is consistent with the National Environmental Policy Act (NEPA). Alternative 2 (Shift & Raise) was selected for further evaluation because it provides a beneficial mix of operational safety, public access convenience, planning level cost effectiveness, land acquisition probability, and less environmental impact because much of the potentially impacted land has experienced ground disturbance, and it received local support. Alternative 4 (Castle Hill) was selected out of the three relocation alternatives because it is located above the floodplain, within five miles of the Scammon Bay community center, and the planning level estimate indicates it may be less expensive to construct than the "Shift & Raise" alternative. Both Alternatives 2 and 4 require further in-depth analysis of cost, constructability, geotechnical conditions, wind conditions, material resources, and cultural resources prior to final selection.

The other alternatives were considered but deemed not feasible. Alternative 3 (Near) would have relocated the airport further from the river, but it would still have been within the floodplain. Alternative 5 (Ridgeline) had many risks associated with the cost estimate, constructability of an access road, and unlikely land acquisition.

The scope of a Phase II study may include, but not necessarily be limited to: public involvement, wind studies, geotechnical investigation and engineering (including material site investigation), environmental engineering (including cultural resource analysis), civil engineering (including preliminary airport and access road configurations and diagrams), hydrology and hydraulic engineering services (including floodplain and wetlands analysis), economic analysis and cost estimating (including life cycle cost analysis and previous formulated costs), Right-of-Way impacts, an alternatives summary, and analysis of construction phasing for the Alternative 2 (Shift & Raise) and Alternative 4 (Castle Hill). Phase II may also include procuring aerial and/or Light Detection and Ranging (LIDAR) imaging to further guide the selection of a preferred alternative, particularly in evaluating access and alignment options. DOT&PF

anticipates the preferred alternative from the reconnaissance study will advance to a Phase III ALP and design project.

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LIST OF ACRONYMS

%	Percent
AC	Advisory Circular
ACIP	Airport Capital Improvement Program
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADG	Aircraft Design Group
ADNR	Alaska Department of Natural Resources
AHRS	Alaska Heritage Resources Survey
AIP	Airport Improvement Program
ALP	Airport Layout Plan
AWOS	Automated Weather Observing System
BLM	Bureau of Land Management
CASC	Crushed Aggregate Surface Course
CISA	Climate Informed Science Approach
CSPP	Construction Site Phasing Plan
CY	Cubic Yards
DOT&PF	Alaska Department of Transportation and Public Facilities
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GA	General Aviation
HEC	Hydraulic Engineering Circular
HW/D	Headwater Depth to Culvert Diameter Ratio
Kcgc	Calcareous Graywacke and Conglomerate
Klgr	Intermediate Granitic Rocks
LIDAR	Light Detection and Ranging
LP	Localizer Precision
MHHW	Mean Higher High Watermark
MMPA	Marine Mammal Protection Act
NAVAID	Navigational Aids
NAVD	North American Vertical Datum 88
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOTAM	Notice to Airmen
PD&E	Preliminary Design & Engineering
Qs	Unconsolidated Surficial Deposits, Undivided
RNAV	Area Navigation
RNP	Required Navigation Performance
ROFA	Runway Object Free Area
RSLR	Relative Sea Level Rise
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RSLR	Relative Sea Level Rise
SCM	Scammon Bay Airport
SREB	Snow Removal Equipment Building
USACE	U.S. Army Corps of Engineers
USBTS	U.S. Bureau of Transportation Statistics
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The Central Region of the Alaska Department of Transportation and Public Facilities (DOT&PF) conducted an airport feasibility study for the Scammon Bay Airport (SCM) (Figure 1-1, 1-2, 1-3).

Scammon Bay is located adjacent to the Kun River, one mile from the Bearing Sea, north of the Askinuk Mountains in the Yukon-Kuskokwim Deta, approximately 150 miles northwest of Bethel, Alaska, in the Kusilvak Census Area. The community of Scammon Bay has a population of nearly 600 people. The city has a dual government by both the Native Village of Scammon Bay and the City of Scammon Bay, which was incorporated in 1967. There are two governing bodies: the municipality and the traditional council.

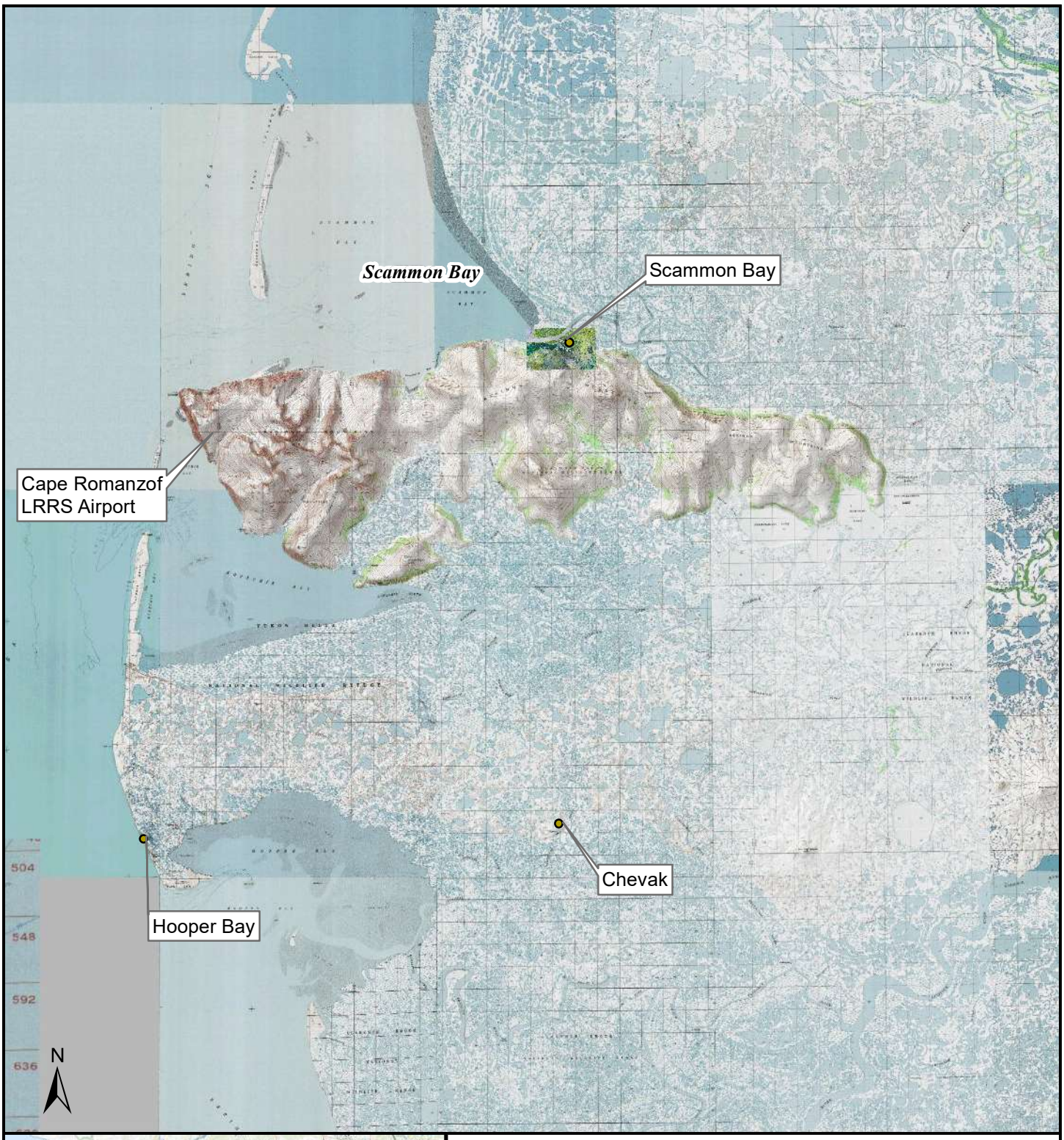
Figure 1-1 Scammon Bay Location

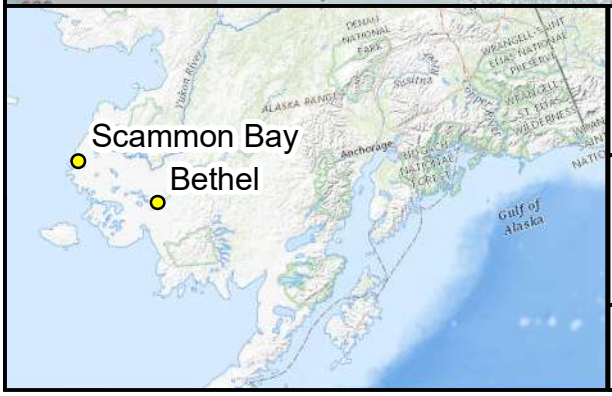
SCM is a public DOT&PF-owned Commercial Service – Non-Primary, Community Off-Road, General Aviation (GA) airport. SCM has a single, gravel, 3,000-foot-long, 75-foot-wide runway, with medium-intensity runway edge lights.

The major issues facing the Scammon Bay Airport are severe flooding and coastal erosion. Disaster level flooding occurs every five to ten years. The flooding is destabilizing the airport surface and embankment, submerging the lighting system and navigational aids, and resulting in airport closures. The closures prevent residents from being able to evacuate during emergencies, access emergency medical services, send or receive mail, or have food and fuel delivered. The airport was declared a Federal Emergency Management Agency (FEMA) disaster area in 2016 and as a state disaster area in 2022.

The Scammon Bay Airport provides the only year-round access to other communities and emergency health care infrastructure. There are no roads connecting Scammon Bay to other communities. During the summer, Scammon Bay is accessible by air and water. Barge service remains an important transportation mode for goods during the summer. During the winter, transportation can occur via air or over snow/ice. Air travel is the only way to reach the hub community of Bethel (150 miles away), where the nearest trauma rated hospital is located, throughout most of the year.

To coordinate the community's planning for building resilient aviation infrastructure, the need exists for an airport planning study to review the feasibility of potential alternative locations of an airport, improvements such as shifting the runway away from the river, and comparison to the current site. This report evaluates potential five alternatives for improving the Airport.





SCAMMON BAY
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August 2024

STATE OF ALASKA
Department of Transportation and Public Facilities
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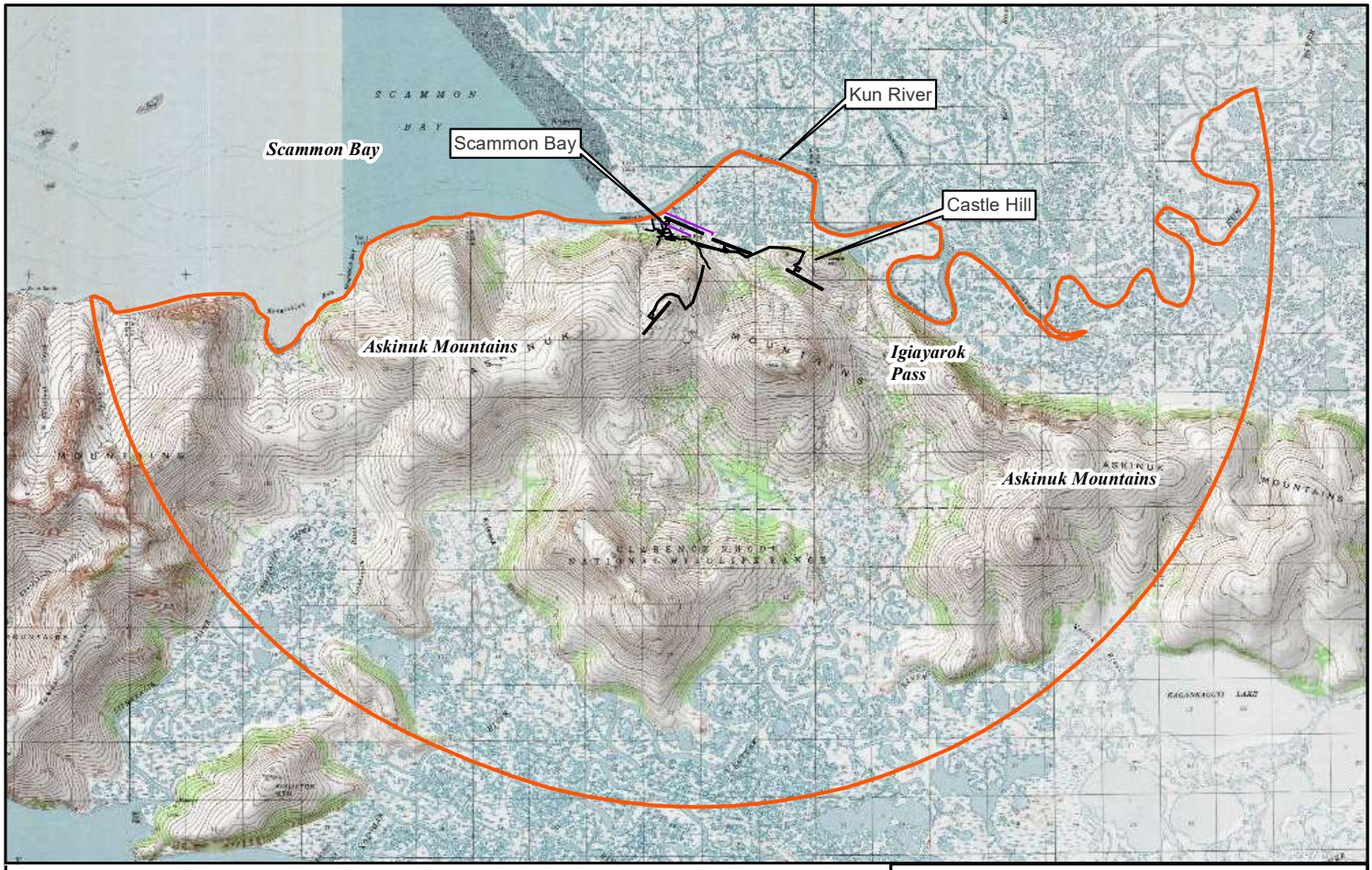
Figure 1-2: Project Location and Vicinity Map



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Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)
Road

SCAMMON BAY
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April 2025

Figure 1-3: Study Area

2 EVALUATION CRITERIA

The evaluation criteria were developed to analyze the suitability of each alternative. These criteria were selected because they reflect challenges that are encountered during airport construction and maintenance of rural Alaskan airports in areas that are impacted by rising sea levels and melting permafrost. They also reflect the challenges faced by rural Alaskan communities that are not connected to the road system and have no other means of year-round transportation.

2.1 Safety and Airport Resiliency

The construction and long-term maintenance of a rural Alaskan airports must be resilient and sustainable for long-term maintenance and meet the community needs for year-round accessibility. This criteria was evaluated based on the following conditions: flooding and erosion, fog and low visibility, wind, geology and potential material sites, and 14 CFR Part 77 surface penetrations.

2.1.1 Flooding and Erosion

The runway has experienced disaster flooding events in addition to flooding after heavy rains and remains as the largest threat to the Airport. The surface elevation of the current runway ranges from 10 to 17.5 feet. HDR published a Coastal Report in 2022 (HDR, 2022 and Appendix C) which recommended that the runway have a surface elevation of 18.5 feet NAVD88 to meet a 50-year storm return period, with a 2 percent (%) Annual Exceedance Probability.

Return Period	Recommended Airport Surface Elevation	Overtopping Discharge (m^3/s per m)
50-Year (2% AEP)	**+18.5 feet NAVD88**	0.02 Avg; 0.05 Max
100-Year (1% AEP)	+20.5 feet NAVD88	0.01 Avg; 0.04 Max

Note: m^3/s per m = cubic meters per second per meter; AEP = Annual Exceedance Probability; NAVD88 = North American Vertical Datum.

Figure 2-1 Recommended Airport Surface Elevations and Associated Overtopping Discharges (HDR Coastal Report, 2022)

HDR also published a Hydrology and Hydraulics Report in 2022 (HDR, 2022 and Appendix D) which recommended that the runway be shifted inland, by 340 feet along its current alignment, to account for river movement over a 50-year period. This report also recommended construction of a variety of erosion protection measures required to protect the airstrip.

2.1.2 Fog and Low Visibility

Fog and low visibility on the runway limit a pilot's ability to operate an aircraft and may result in flight delays or cancellations at the Scammon Bay airport in its current location. Interviews with air carriers and local community members indicated qualitative evidence that the tops of the 1,000-foot Askinuk Mountain ridgelines that surround the community can have lower visibility than the current Airport, located lower and in the river valley.

Similar observations have been reported at Newtok, where the old airport has more fog-free days than the relocated airport.

In an attempt to provide quantitative evidence for the elevation differences, weather data at SCM was obtained from the SCM Automated Weather Observing System (AWOS). The weather station provides visibility measurements at ground level, as well as cloud coverage elevation data. The AWOS does not provide visibility measurements at other elevations beyond ground level, however the cloud coverage elevation data can be used to make inferences about visibility at elevation. A total of 121,295 hours of AWOS data was analyzed for the period of 2010 through 2023. Weather was reported as fog or low visibility (less than 0.5 miles of visibility) at SCM 0.3% of the time. Weather was reported as overcast or broken conditions 6.7% of the time at 500 feet, and 17% of the time at 1,000 feet (Table 2-1). As a reference, the community of Scammon Bay is about 14 feet in elevation, Castle Hill is about 437 feet in elevation, and the ridges of the Askinuk Mountains are about 1,000 feet in elevation.

Table 2-1 Fog and Low Visibility: SCM 2010 - 2023

Weather	Hours	%
Hours rated as with fog or low visibility (<0.5 miles)	371	0.3%
Hours rated as Overcast or Broken at 100 feet	87	0.1%
Hours rated as Overcast or Broken at 500 feet (Top of Castle Hill)	8,134	6.7%
Hours rated as Overcast or Broken at 1,000 feet (Askinuk Mt. ridges)	20,606	17.0%
Other	92,097	75.9%
Total	121,295	100%

Key:
< – less than
% – percent
AWOS – Automated Weather Observing System
SCM – Scammon Bay Airport

Source: Observations between January 1, 2010, to November 1, 2023, at the SCM AWOS (https://www.mesonet.agron.iastate.edu/sites/locate.php?network=AK_ASOS)

It is important to note the possibility for error in interpreting these data. AWOS reports the bottom of the cloud layer but does not report the cloud layer thickness. In coastal Alaska, thin layers of broken or overcast clouds are common. Such layers may obscure visibility at the reported level but only be tens of feet thick. This situation can lead to conditions where an overcast cloud layer exists at a lower level (e.g., 200 feet) while clear visibility is present at 250 feet or higher (e.g., Castle Hill or Askinuk Mountains). Depending on the frequency of such situations, a higher-elevation alternative may be more feasible than the weather data would lead one to believe, as it is not possible to separate these situations from the rest of the dataset.

Despite these data limitations, the AWOS data does provide some level of quantitative support for the qualitative interview responses. There may be more low-visibility conditions at higher elevation airport alternatives than at lower-elevation airport alternatives.

2.1.3 Wind

It is important to evaluate wind conditions when determining the location and orientation for an airport. Wind data from AWOS is available for SCM for the period of 2013 through 2022. Wind data shows that the current runway has All Weather 90.4% wind coverage for a 13-knot crosswind, and Instrument Weather 87.54% coverage for 13-knot crosswinds. Wind analysis revealed that no orientation of a single runway at the current location of SCM can meet the 95% crosswind criterion. The current orientation provides the maximum crosswind coverage that a single runway can obtain at SCM that meets the needs of the current critical aircraft, a Cessna 208 Caravan A-II.

For wind coverages where a single runway cannot meet 95% coverage, the Federal Aviation Administration (FAA) recommends development of a crosswind runway or, when terrain does not allow, increasing the runway dimensions to the next-largest set of aircraft design requirements. At SCM, terrain makes creation of a crosswind runway cost-prohibitive. This report recommends construction of the runway to meet the next-largest aircraft design group requirements for runway width for all alternatives where necessary to meet requirements because the availability of constructable land is limited.

Wind data is highly localized, and it is difficult to predict wind coverage for locations distant from where the data were collected (i.e., the current runway). In the lowlands, the primary winds are from the east, along the current runway alignment. As elevation increases, the primary winds are from the north.

The topography of the Askinuk Mountains and Kun River valley likely directs wind. Local community members report that winds are dramatic and generally follow the drainages coming off the Askinuk Mountains and blow very strongly along the ridgetops.

For mid-elevation alternatives, wind data is available for the Scammon Bay area from a third party. In 2017, a wind turbine analysis was completed at Scammon Bay that included wind direction and strength predictions (V3 Energy LLC, 2017). This data was collected at about 200 feet in elevation, next to the solid waste site. The wind turbine analysis report states that there are higher velocity winds at these elevations, and that the predominant wind direction at higher elevations is different than those found at the current Airport.

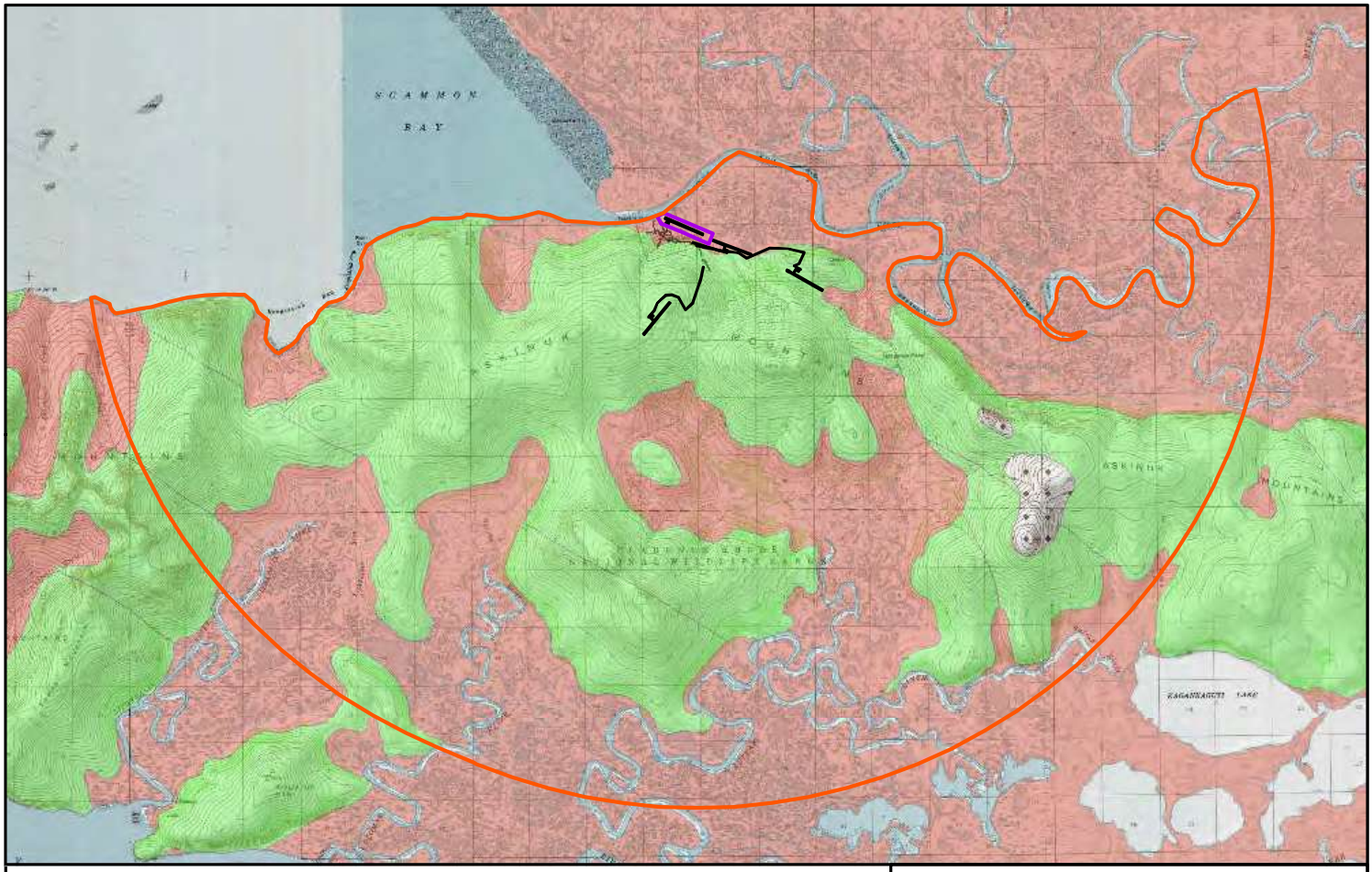
At higher elevations, the pattern of northerly winds creates a fundamental divergence between topography and wind direction for the purposes of airport planning. For medium- and high-elevation runway alternatives, the primary winds are from the north, but the topography rises steeply in that direction. Topography dictates an east/west-oriented runway in most locations, whereas crosswinds dictate a north/south-oriented runway. High-elevation alternatives (e.g., Askinuk Mountains) are located along the tops of ridges, where topography allows for a north/south oriented runway.

2.1.4 Geology and Potential Material Sites

It is important to review the geology and potential material sites at the current airport location and alternatives to determine if a location is feasible. If material sites are located near the community, the materials will not have to be barged in, which will reduce overall project costs. The State of Alaska has mapped the geology of the study area. There are three types of formations in the study area (Figure 2-2, Wilson et al., 2015):

- Kcgc: Calcareous graywacke and conglomerate:
    - Kcgc deposits are located on an isolated location in the eastern part of the study area, likely too far from Scammon Bay to be efficiently developed.
- Klgr: Intermediate granitic rocks:
    - Klgr deposits occur on most of the hills in the study area and have a greater likelihood of being suitable as a material source.
    - Qs: Unconsolidated surficial deposits, undivided:
    - Qs deposits occur on the low river valleys and are unlikely to be suitable for material source development.

The suitability of “Klgr: Intermediate granitic rocks” for production of suitable material, including erosion protection armor stone, is unknown. Field verified geotechnical studies haven’t been conducted. The potential exists that local material sources could be used to develop the required erosion protection material, or their functional equivalents. This deserves additional analysis to refine the costs.



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Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)
Road

AK Geologic Map
Kcgc: Calcareous graywacke and conglomerate
Klgr: Intermediate granitic rocks
Qs: Unconsolidated surficial deposits, undivided

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Figure 2-2: Geotechnical Conditions

2.1.5 14 CFR Part 77 Surface Penetration

14 CFR Part 77 is the federal regulation for the Safe, Efficient Use, and Preservation of the Navigable Airspace. Evaluating potential penetrations for the airspace around each alternative is important to ensure the airport will be compliant with federal requirements. Topographic penetration of protected airspace surrounding the airport (Part 77 surfaces) was calculated for each alternative. This provides a visual representation of the potential hazards to navigation surrounding the airport alternatives.

2.2 Land Status

2.2.1 Land Use/Ownership

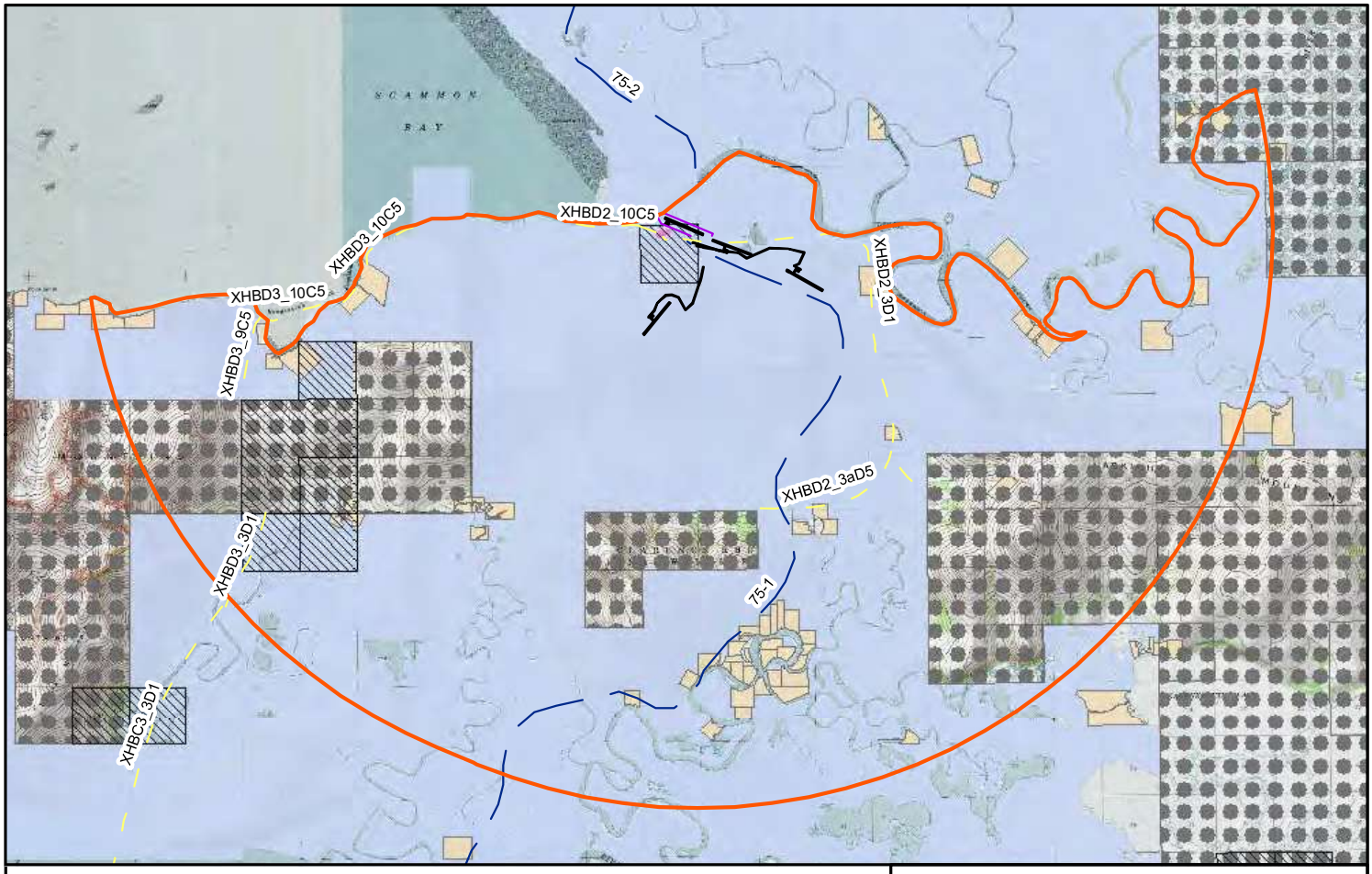
Land status is a very important factor to consider for Scammon Bay. Constructable, vacant land is limited, and the population is growing. Land acquisition may be time intensive if the landowner does not support a capital improvement project or they are unwilling to accept fair market value for their property. Land acquisition issues delay projects and result in litigation or cancellation.

Land analysis in this study is based on publicly available Bureau of Land Management (BLM, 2023) and State of Alaska databases (ADNR, 2023). Further research is warranted to confirm title and boundaries, and no on-the-ground survey has been conducted.

The majority of the study area is owned by Alaska Native organizations (Figure 2-3), including Askinuk Corporation (surface), and Calista Corporation (subsurface). Alaska Native allotments, which are private lands owned by individuals or their heirs, are interspersed throughout the area. The federal National Wildlife Refuge also owns a significant portion of land. National Wildlife Refuge and Alaska Native allotments were removed from consideration in this report, as they are unlikely to be suitable for airport development.

Multiple RS2477 trails and 17(b) easements exist throughout the area. These easements provide overland access between lands of different ownership types. The project can take advantage of these easements to build access roads (if needed), but the project cannot obstruct overland access for other users. For example, public access to a runway is typically restricted. For runways intersecting RS2477 trails or 17(b) easements, the airport can provide functionally equivalent public access by constructing a public trail around the airport.

Inside of the existing community of Scammon Bay, land use is split between Alaska Native organizations, the State of Alaska, and private lands. There are no local or borough zoning areas.



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Notes:
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- Study Area
- Airport Boundary
- Alternatives (2024)
- 17(b) Easement
- RS2477 Trails
- ANCSA Selected
- National Wildlife Refuge
- Native Allotments
- Private Lands
- Conveyed Native Lands

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Figure 2-3: Land Ownership

Alternatives which involve relocation of the airport would require land acquisition from parties willing to sell the land. Those landowners are the Askinuk Corporation (surface) and Calista Corporation (subsurface). Alternatives that these organizations do not support are potentially not feasible, because landowners may contest the acquisition.

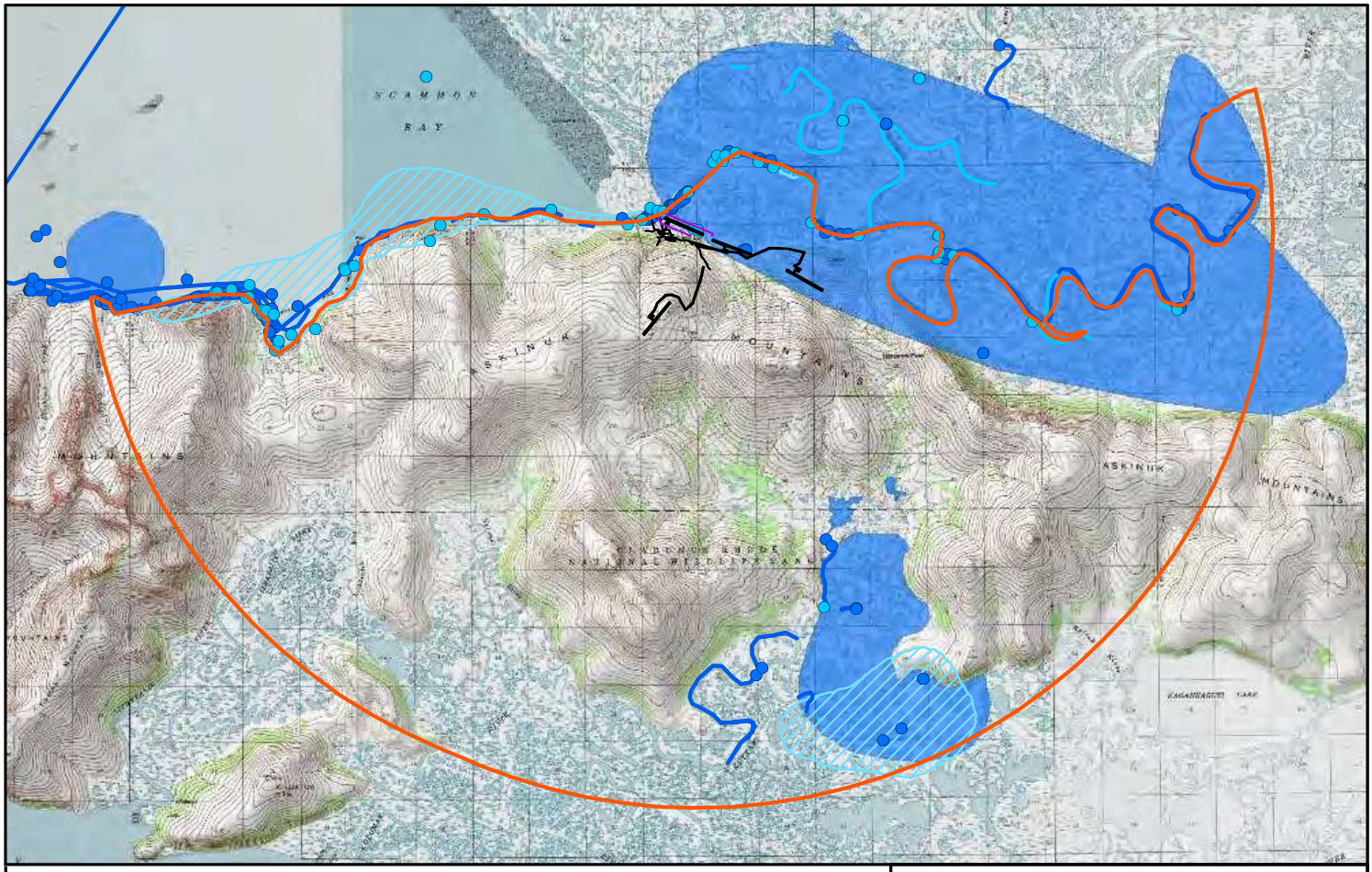
Previous planning efforts with the community have revealed that the community would be interested in acquiring the land for the local dock and dock access road, which are currently on Airport property owned by Alaska DOT&PF. These facilities were relocated and reconstructed by DOT&PF, using non-FAA funding, during previous airport improvement projects. In the past, they were not technically located within the Runway Protection Zone (RPZ). The dimensions of the RPZ have changed over time due to changes in critical aircraft utilizing the airport and revisions to FAA safety recommendations.

Homer Hunter is the City of Scammon Bay Land Planner and is also working for the Askinuk Corporation. He is working on the transfer of lands from the Askinuk Corporation to the City (lands from Castle Hill to west side of community); and expects that process to be completed in 2.5 years (~2028). He has established an advisory board that is working on the process.

2.2.2 Subsistence Use (Fish, Marine Mammals, Ptarmigan, Migratory Birds, Moose, Bear, Berries)

In addition to land ownership, it is important to review the subsistence uses that are currently occurring on the land that could be impacted by an airport improvement project or relocation. Local subsistence use information comes from three main sources and is summarized on Figures 2-4 through 2-6. Alaska Department of Fish and Game (ADF&G) provides subsistence harvest and use data for Scammon Bay in two studies from 2013 and 2017 (Ikuta et al., 2016; Godduhn et al., 2020). Huntington, Nelson, and Quakenbush (2017) also provide information from traditional knowledge interviews held with Scammon Bay residents in January 2017 on marine mammals. (The Donlin Mine Environmental Impact Statement [USACE, 2018] also discusses Scammon Bay subsistence based on Ikuta et al., 2016.)

Fish and marine mammals have subsistence activity in areas around waterways such as Scammon Bay, Kun River, and Kuttak River (Figures 2-4, 2-5, and 2-6). The Kun River is also noted summer habitat for young, bearded seal (Huntington et al., 2017). Airport alternative development is not anticipated to significantly impact fish and marine mammals, although some alternatives may require crossing fish bearing streams or the placement of fill in the Kun River.



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Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

- Study Area
- Airport Boundary
- Alternatives (2024)
- Road
- 2013 Subsistence Study
- 2017 Subsistence Study
- 2013 Subsistence Study
- 2017 Subsistence Study
- 2013 Study (Fish)
- 2017 Study

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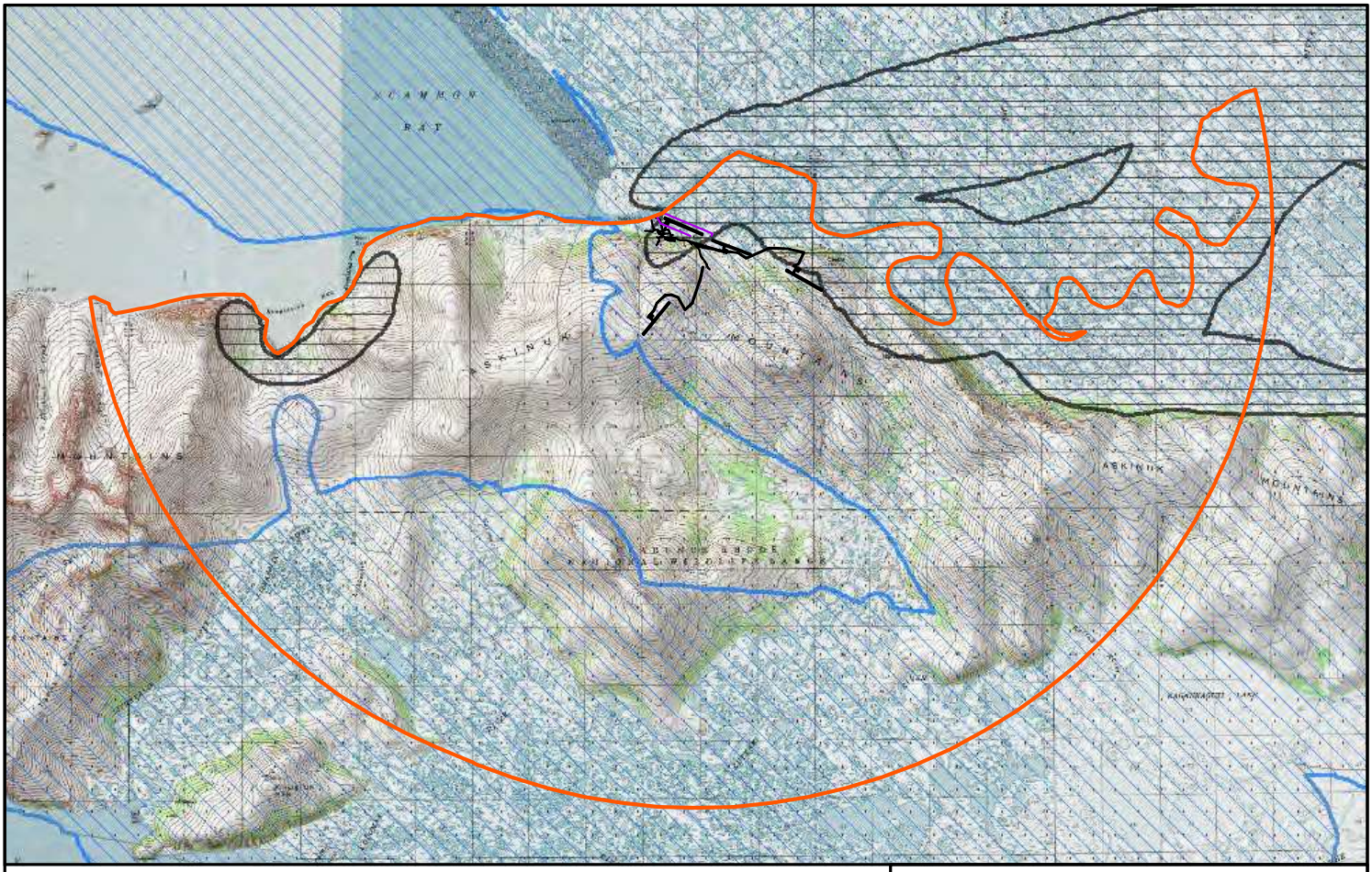
Figure 2-4: Subsistence: Fishing



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Notes:
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Study Area
Airport Boundary
Alternatives (2024)
Road

2013 Subsistence Study
Ptarmigan & Grouse
Ducks & Geese
Moose

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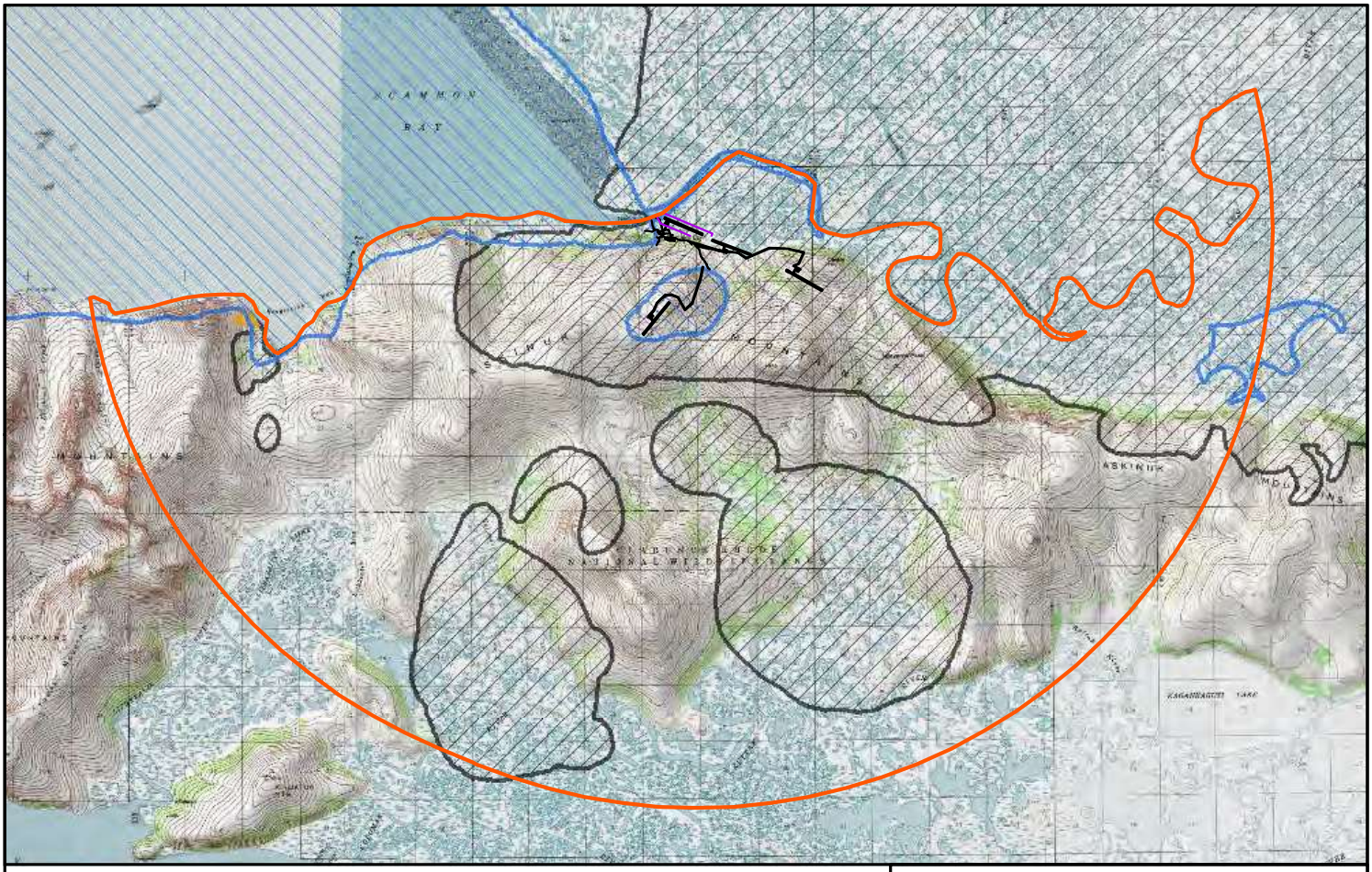
Figure 2-5: Subsistence: Birds, Moose



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Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet
2. High areas are used for spotting seals in the water

- Study Area
- Airport Boundary
- Alternatives (2024)
- Road

2013 Subsistence Study

- Black Bear
- Berries & Greens
- Seals

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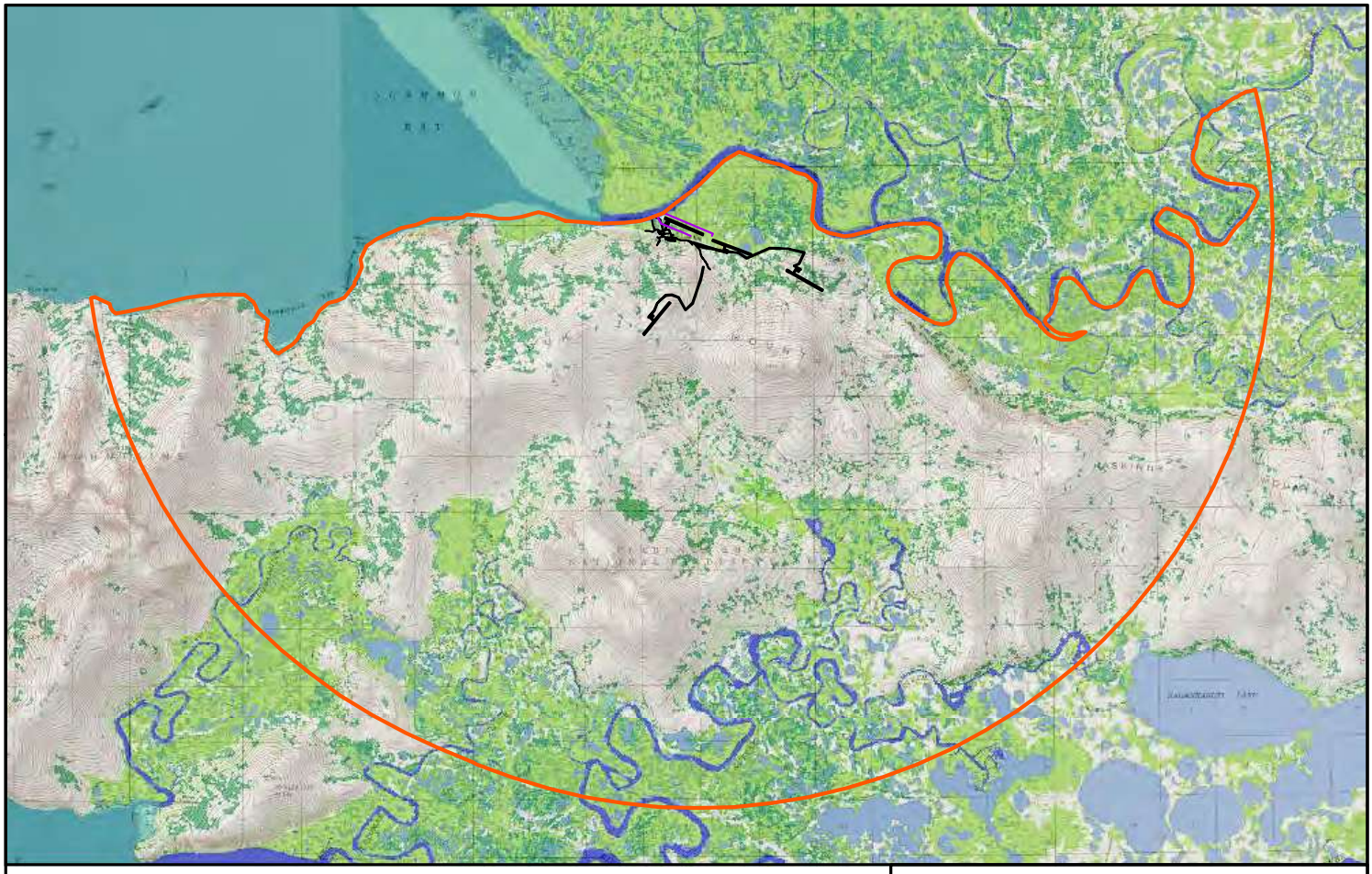
Figure 2-6: Subsistence: Bears, Berries, Seals



N

0 1 2 Miles

1:150,000 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Road
Airport Boundary
Alternatives (2024)

Vegetation Map
Marine
Marine Wetland
Bryophyte
Emergent Wetland
Forested/Shrub Wetland
Pond; Lake
Riverine
Upland

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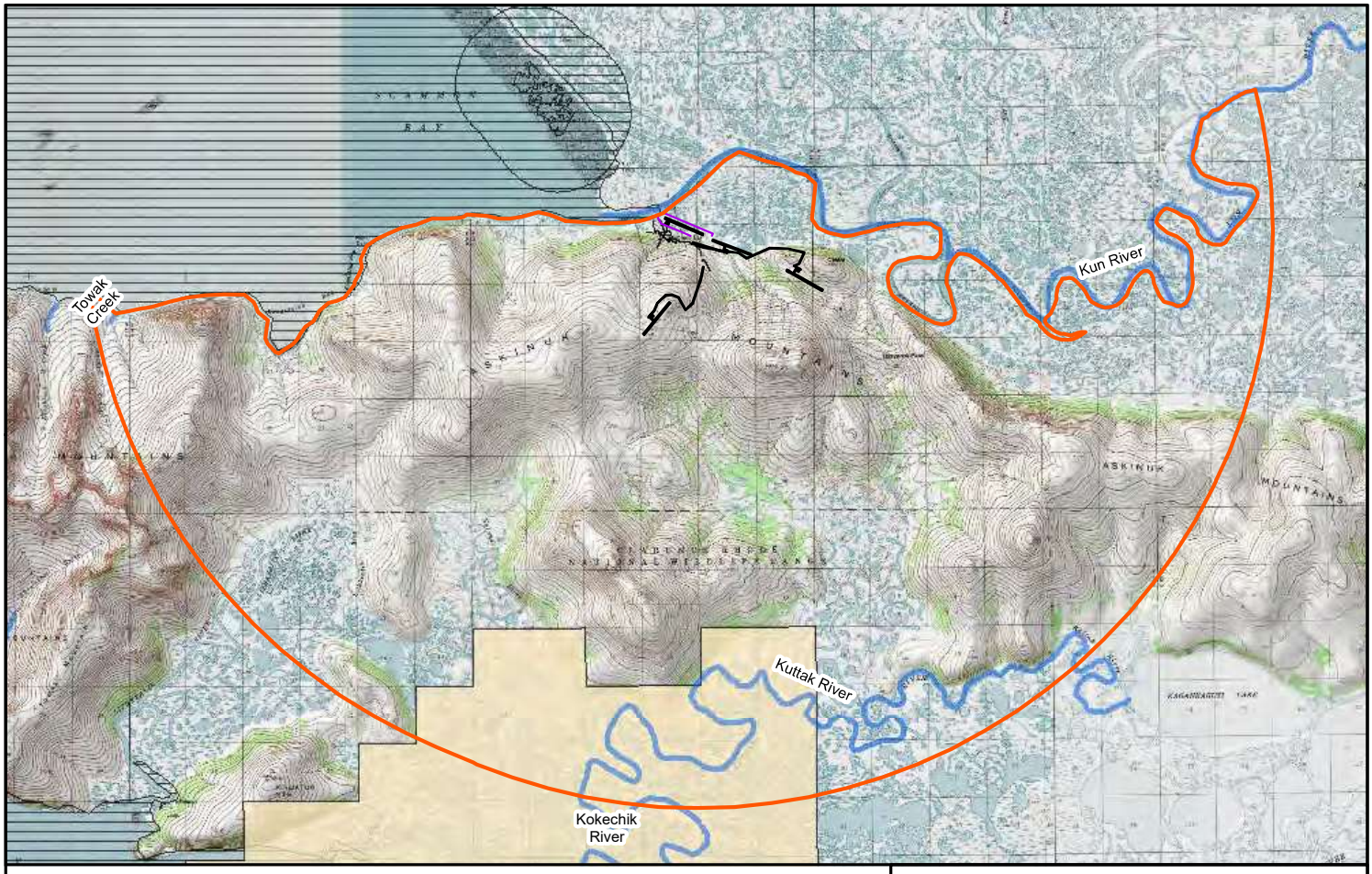
Figure 2-7: Wetlands



N

0 1 2 Miles

1:150,000 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

- Study Area
- Airport Boundary
- Alternatives (2024)
- Road
- Anadromous Waters
- Spectacled & Steller's eider Critical Habitat
- Polar Bear Critical Habitat

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Figure 2-8: Protected Species

For land resources, subsistence users report high use of moose, migratory and resident birds, berries, and vegetation (Figures 2-4, 2-5, 2-6). Bird species include ptarmigan, grouse, ducks, and geese. Land mammals include moose and black bear. Berries and greens are also important subsistence resources.

2.3 Environmental

It is important to evaluate preliminary environmental issues in anticipation of NEPA document that will be prepared for a future capital improvement project. The environmental criteria is analyzed based on the following potential impacts: noise, wetlands, endangered species, marine mammals, fish, birds, cultural resources, contaminated sites, and public access.

2.3.1 Noise

The potential for increased noise or displaced noise was analyzed to determine potential impacts on the community. Aircraft approach and depart from the Airport directly adjacent to the community of Scammon Bay. This subjects the community to aircraft noise. Noise levels are not anticipated to substantially increase above the 65 decibels and recommended limit for the day night average sound level with any of the proposed alternatives.

In many rural Alaskan communities, aircraft noise is not necessarily seen as a negative impact, but rather as a welcome reminder of the connection to larger hub communities and infrastructure. Rural airports are unmanned, so the noise of incoming aircraft acts as an announcement to community members who are awaiting a departure flight or a delivery to the community.

Wildlife such as birds, marine mammals, and fish are also subject to potential impacts from aircraft noise. These impacts are likely greater in habitats that attract these species (near the river for marine mammals and fish, or near migratory bird concentration areas [which may include wetlands and riverine habitats]).

2.3.2 Wetlands

The potential impacts to wetlands and mitigation efforts were evaluated for the alternatives from a planning level. The Scammon Bay Airport is located in the lowlands between the community and the Kun River, which is surrounded by wetlands. Alternatives that are located above the floodplain would not be as likely to require wetland mitigation efforts. Field-verified wetland mapping is not available for the area, but desktop mapping is provided by Flagstad et al. (2018: Figure 2-7). The quality of this mapping when compared to more recent aerial imagery indicates that areas mapped as uplands may be wetlands.

Since this is the most current available information, it was used to calculate acreages from access road and airport footprints; but mapping should be updated.

2.3.3 Endangered Species Act

Endangered species should be considered for all capital improvement projects. The waterways in the Scammon Bay area are listed by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) as potential habitat for species listed under the Endangered Species Act (ESA). These species include the: fin whale, North Pacific right whale, humpback whale, bearded seal, ringed seal, short-tailed albatross, polar bear, wood bison, spectacled eider, and Steller's eider. Of those species, critical habitat is listed in the area of analysis for polar bear, spectacled eider, and Steller's eider (USFWS, 2023).

2.3.4 Marine Mammal Protection Act

The impacts to marine mammals should be considered for all capital improvement projects in Scammon Bay because the residents harvest marine mammals and an airport construction and activity may impact their habitat. Most marine mammals protected under the Marine Mammal Protection Act (MMPA) are also protected under the ESA. The species that are not protected under the ESA but that are protected under the MMPA, and that NMFS indicates have habitat adjacent to the Airport, consist of the spotted seal (NMFS, 2023).

Huntington, Nelson, and Quakenbush (2017) report on traditional knowledge interviews held with Scammon Bay residents in January 2017. Interviewees reported the importance and presence of ringed seals, spotted seals, bearded seals, walrus, and beluga whales in the area. The Kun River was reported as important for young, bearded seal summer habitat. Other species reported by interviewees in the region include ribbon seals, sea lions, killer whales, porpoises, and sea otters.

2.3.5 Fish

Fish were generally analyzed in this study because the Kun River is listed as an Anadromous Water body by the ADF&G for chum salmon, inconnu/sheefish, and whitefishes (Figure 2-4; Giefer and Graziano, 2023). No on-site field studies were performed to verify their presence during this study.

The cross-runway culvert has not recently been sampled to determine if it provides fish habitat. The 1991 Environmental Assessment for the Airport reports that blackfish inhabit the creek flowing under the

runway (DOT&PF, 1991). The ADF&G also considers the culvert habitat for blackfish, ninespine stickleback, and northern pike (See Appendix E Public Involvement comment letter from ADF&G).

2.3.6 Birds

Birds were analyzed for Scammon Bay because they are known to be present near the current airport and in the surrounding area. The FAA's Alaska Supplement warns pilots that the runway hosts birds.

The USFWS does not map the locations of vulnerable bird habitat but does provide some generalized area descriptions. This information lists the immediate area around the Airport as being occupied by Black Turnstones, a Bird of Conservation Concern, which is most likely present in May, June, and July (USFWS, 2023).

The USFWS lists the larger Study Area as also hosting birds identified by the USFWS as vulnerable. Species include the Common Eider, Long-tailed Duck, Red-breasted Merganser, and Red-throated Loon (USFWS, 2023).

The USFWS recommends time periods during which to avoid vegetation clearing to reduce consequent impacts to migratory birds (USFWS, 2024). The time period to avoid is most migratory bird nesting is from May 5 through July 25. In areas with Black Scoter, the time period is from May 20 through August 10, and in areas with Canada Geese, the time period is from April 20 to July 25.

2.3.7 Cultural Resources

Scammon Bay is a predominantly Yup'ik community with a population of nearly 600 people that relies on fishing and subsistence activities. The Yup'ik people have been in the state of Alaska for thousands of years. Historically, Scammon Bay was known in Cup'ik as Maraayaq, and its residents were called Maraayarmiut, which means 'please near the mud flats'. The nearby bay was renamed in 1951 when the Scammon Bay Post Office was established. It was named after Captain Charles Scammon, who served as the marine chief of the Western Union Telegraph Expedition from 1856 to 1867. The city government was incorporated in 1967 as a second class city. The city has a dual government by both the Native Village of Scammon Bay and the City of Scammon Bay.

No cultural resource fieldwork was conducted for this feasibility study. This study was categorically excluded from a National Environmental Policy Act (NEPA) process on January 27, 2022. The DOT&PF Preliminary Design & Engineering Section (PD&E) developed a Cultural Resource Evaluation for FAA

in June 2025 (Appendix H). Further cultural resource evaluation and a Section 106 analysis will also be conducted during that Phase II study. A complete NEPA process will be conducted during the Design Phase of any future airport capital improvement project.

The presence of cultural resources was reviewed through the State of Alaska maintains the Alaska Heritage Resources Survey (AHRS), a database of cultural resource information. Importantly, this is a listing of known sites. Most of the state is un-surveyed, and the available data does not prove an absence of cultural resources. There may be cultural resources that have yet to be identified across Scammon Bay and the surrounding area given the long history of the Yup'ik people in the area.

AHRS data is confidential; therefore, the data are not presented on the maps in this report but are discussed in general terms relating to their influence on future studies.

Cultural resources are reported within the vicinity of the current Airport and the entire Village of Scammon Bay and may be significant based on the size of the area indicated in the AHRS. The "No Action" and "Shift & Raise" alternatives may adversely impact cultural resources. Development of these alternatives would need to incorporate cultural resource considerations, including consultation, recording, protection, and mitigation as part of the National Historic Preservation Act (NHPA) Section 106 process and incorporated into the NEPA process.

There are no listings in the AHRS database for cultural resources located near the three airport relocation alternatives; Alternative 3 (Near), Alternative 4 (Castle Hill) and Alternative 5 (Ridgeline), at the time of this review. Additional archaeological field work, consultation, and literature review would be needed to ensure the proper recording and protection for all potentially adversely impacted cultural resources. Cultural resource surveys, including a 106 process and 4F finding are anticipated to occur during the NEPA process during the Design Phase of the selected alternative.

2.3.8 Contaminated Sites

The presence of contaminated sites in Scammon Bay was evaluated because of the potential impacts on airport improvements or relocation alternatives. The Alaska Department of Environmental Conservation contaminated sites atlas reports two Active and one Cleanup Complete contaminated sites off Airport property (ADEC, 2023). None are located in an area with potential for airport development. While potential contamination plumes are unknown, it is assumed from their topographic position that contamination does not impact the current airport, or proposed alternatives. Any airport operations will

help prevent contamination of water and soil by following current regulations, including on fuel storage and handling.

2.3.9 Public Access Convenience

The ability for the local community to access an airport was analyzed because public access convenience is greatly increased for an airport located near the community. Most residents in Scammon Bay do not own automobiles. All of the buildings in the current community are less than 0.7 miles from SCM, as measured from the airport apron to the farthest residential building. This proximity is important, because most residents arrive at the airport by walking, or in open-air, off-road vehicles. There is no public transportation or shuttle service to the airport. There is no passenger shelter at SCM; during inclement weather, residents listen for the aircraft prior to travelling to the Airport.

Flights also arrive at unexpected times, and residents value the close proximity of the Airport to be able to adapt to flight schedules. The air carrier-reported data for 2022 indicate that Grant Aviation and Ryan Air completed 89% and 70% of their scheduled flights, respectively (USBTS, 2023). Flight radar tracking data indicate that only 19% of scheduled flights to Scammon Bay were completed between October 7 and December 7, 2023 (FlightRadar24.com). This disparity may come from different data collection methods. The U.S. Bureau of Transportation Statistics data (USBTS) is an air carrier self-reported system whereby Flight Radar data is from third party air traffic monitoring. The discrepancy illustrates uncertainty regarding the reliability of air service at SCM. Interviews with local residents revealed that they rely on FlightRadar24.com and have found that it most accurately tracks the flights serving the community.

SCM is also a center for a large quantity of freight and mail. These are unloaded onto the apron, often by local residents, who transport the freight and mail directly to the community. A distant airport is likely to create additional hurdles to mail and freight handling, as fewer residents will be present to offload the aircraft and transport the materials into town because most residents do not own motor vehicles.

2.4 Constructability

Construction and its potential impacts on the residents in Scammon Bay was evaluated in this study because the airport provides the only year-round access to other communities and emergency health care infrastructure and plays a vital role in the daily life of the residents of Scammon Bay. Closure of the Airport due to construction prevents residents from being able to access emergency medical services, and prohibits the delivery of food, medical supplies, and fuel.

Consequently, air service must remain uninterrupted during construction to the extent possible. For alternatives located on, or adjacent to, the current runway, this may include partial runway closures, nightly closures, half-width runway operations, and reduced-length runway operations. The different elevations of partially-raised runways must be considered during project design, as they may prevent safe runway operations (aircraft cannot land immediately adjacent to a large topographic change in the runway).

Construction for all of the build alternatives; Alternative 2 (Shift & Raise), Alternative 3 (Near), Alternative 4 (Castle Hill), and Alternative 5 (Ridgeline), would take place during the summer months, consistent with regular construction season in the Yukon-Kuskokwim Region and rural Alaska generally. The timeline for the construction of any of the build alternatives is highly dependent on land acquisition, the environmental process, and weather conditions. However, construction is unlikely to be completed in one season for any of the build alternatives.

Detailed construction phasing analysis will be performed under the Phase II reconnaissance study for the selected alternatives and is beyond the scope of this Phase I feasibility study. Although Construction Site Phasing Plan's (CSPP's) are not required for planning studies, the project will examine construction phasing in a broader planning level analysis.

Construction practices for any airport improvement project or relocation would be compliant with all federal requirements, including but not limited to, AC 150-5370-2G for Operational Safety on Airports and AC 150/5370-10H for Standard Specifications for Construction of Airports. Additionally, 14 CFR Part 77 for the Safe, Efficient Use, and Preservation of the Navigable Airspace and Notices to Airmen (NOTAMs) would be filed to alert the pilots about the construction.

2.4.1 Airport Operations During Construction

Implementation of runway improvements to the existing airport has the potential to cause impacts to the community of Scammon Bay during construction under Alternative 1 (No Action) and Alternative 2 (Shift & Raise). The community relies on the airport as a reliable means of transportation. There are no all-season non-aviation means of connecting to the medical care available in Bethel. Medevac operations could be supported via helicopter from Bethel, but the distance between Scammon Bay and Bethel makes this a less desirable alternative.

If airport improvements do not incorporate implementation plans to provide for operations with acceptable alternatives to the FAA, the airport will be required to close during the duration of

construction according to FAA AC 150/5370-2G, Operational Safety on Airports During Construction and AC 150-5370-10H Standard Specifications for Construction of Airports. As a result, DOT&PF would plan to conduct airport improvements in a manner that does not close the airport. Potential construction methodology includes half-width runway operations and night fills.

If Alternative 1 (No Action) were pursued, the airport would be subject to regular airport maintenance and rehabilitation, every five to ten years respectively. Additionally, the airport may be closed and undergo major reconstruction projects in the intervening years if heavy flooding destabilizes the airport surfaces.

If Alternative 2 (Shift & Raise) were pursued, much of the existing runway would remain operational. This alternative would in essence extend the runway. After the initial extension is completed, the runway elevation will be raised incrementally. Upon completion, the portion of the runway adjacent to the Kun River (RWY10) would be armored and closed through a NOTAM and declared distances would be implemented.

If a new airport and access road are constructed, the existing airport would remain open and available for public use until the new facilities are completed. After the new airport and access road were put into service, the existing airport would be permanently closed and no longer maintained by DOT&PF.

2.4.2 Estimated Construction Timelines

The construction timeline varies for each Alternative. Construction may take up to four years for Alternative 2 (Shift & Raise). The public voiced support for either land acquisition or a land trade to allow Alternative 2 to use the land depicted on the 2019 ALP. For reference, construction on the Atmautluak and Kasigluk projects took approximately 2 seasons to resurface the runways and safety areas with 9 inches of fill. A project of this scale will likely take 4 seasons to complete. Alternative 2 (Shift & Raise) has the benefit of completed preliminary studies and DOT&PF engineering cost estimates so constructions may begin sooner than the other build alternatives.

The other build alternatives would require additional technical analysis, wind, and engineering efforts before construction could begin, potentially one to two years later than Alternative 2 (Shift & Raise). The relocation alternatives; Alternatives 3 (Near), 4 (Castle Hill), and 5 (Ridgeline), all require road and airport embankment construction, so are likely to take at least one or two more years to construct. However, timeline for construction initiation is more difficult to estimate because the success of the relocation alternatives would be highly dependent on land acquisition. Without landowner and public

support, it may be years before the project is construction, similar to the Kwigillingok Airport Improvement Project, and/or result in project cancellation, similar to the Stony River Airport Relocation project.

2.4.3 Barged Materials Delivery and Stockpiling

The length of time and methodology for barged materials varies by alternative. For Alternative 2 (Shift & Raise), to raise the runway and RSA the recommended 5.5 feet, it will require approximately 160,000 cubic yards of fill material including for the embankment extension for the runway shift. There is little available room for material and equipment staging at the barge landing site but there is some open area near the school. Trucking large quantities of material through the narrow city streets to the school site will likely severely degrade them. A barge landing site can be established at the RW 11 embankment end and a temporary haul road on the RSA around the RW 29 end and across a reestablished road from the airport to the school site. Barged materials will likely be only stockpiled for what can be placed in one season. It may take two to four weeks to deliver the materials each season, depending on whether the materials are obtained locally.

Relocation Alternatives (Alternative 3 [Near], Alternative 4 [Castle Hill], and Alternative 5 [Ridgeline]) do not have completed technical reports available. Detailed estimation of material fill for all sites is beyond the scope of the Phase I Feasibility Study. Additional analysis will be performed for the selected alternatives under the Phase II study. Since the public has not expressed support these alternatives, it is likely that local landowners and community residents may oppose the project and resist DOT&PF survey permission requests and land acquisition. If the community does not support the alternative, construction could be delayed significantly or result in project cancellation.

2.4.4 FAA Standards for the Critical Aircraft

All alternatives evaluated in the Feasibility Study would be designed and constructed to meet FAA standards for the forecasted critical aircraft, which is a Cessna 208 Caravan A-II.

2.4.5 Airport Construction Protection During Flooding Events

Although Design, Airport Layout Plan, and CSPP's are beyond the scope of this Phase I feasibility study, several strategies have been evaluated at a high level. For Alternative 2 (Shift & Raise), a strategy that could be deployed to protect the airport from flooding during construction is to harden the existing embankment with riprap/armor stone under the first phase of construction. This would entail initially

widening the RSA embankment to accommodate the 5.5 foot grade raise and placing the riprap. Alternative 3 (Near) would require the same level of protection as Alternative 2 (Shift & Raise), whereby Alternative 4 (Castle Hill) and Alternative 5 (Ridgeline) would require less protection because both potential airport sites are above the floodplain.

2.4.6 Floodplains

As a federally funded project, DOT&PF is required to design and construct airport improvements consistent with all relevant state, local, and federal requirements for construction within a floodplain. The analysis typically occurs during the NEPA phase of a capital improvement project and includes, but is not limited to, those requirements identified under NEPA and FAA Order 1050.1G for *FAA National Environmental Policy Act Implementing Procedures* and the associated FAA Desk Reference, which lists:

- National Flood Insurance Act, implemented as 44 CFR part 60
- Executive Order 11988, Floodplain Management
- DOT Order 5650.2, Floodplain Management and Protection
- State and local statutes protecting floodplains

Although it was beyond the scope of this feasibility study to conduct floodplain analysis for all of the alternatives, there is preliminary floodplain analysis available for Alternative 1 (No Action) and Alternative 2 (Shift & Raise) because DOT&PF evaluated the Shift & Raise Alternative under the 2022 HDR Coastal Report (Appendix C) and Hydrology & Hydraulics Report (Appendix D) as part of the Scammon Bay Airport Improvement Project. The HDR report based the evaluation, in part, on the Federal Highway Administration (FHWA) 2016 Hydraulic Engineering Circular (HEC) No. 17, 2nd Edition: Highways in the River Environment. The analysis of FHWA HEC-17 can be found in the HDR Hydrology & Hydraulics Report (Appendix D), Pages 10-12.

The HDR studies found that the existing airport configuration, in its current location, would not withstand the 50-year flood due to the runway elevation and inadequate drainage. The HDR study focused on a project that would raise and shift the runway, which is the basis for Alternative 2 (Shift & Raise). The recommendation for a shift and raise approach is further supported under the Floodplain Management section of the Hydrology & Hydraulics Study (Appendix D) on page 17 that states, in part: *"As a federally funded project, this project is subject to the requirements of Executive Order 11988, which stipulates avoidance and mitigation of potential impacts to the 100-year floodplain (FEMA 1977)."*

The Shift & Raise alternative uses HDR's 50-year storm return period, with a 2 percent (%) Annual Exceedance Probability, as described in the Coastal Report (Appendix C). This calculation was selected to match the FAA Grant Assurance and anticipated design life. There is concern about the FAA's participation in funding for design that may not meet these standards.

- HDR's model results for the 100-year (1% Annual Exceedance Probability) storm surge event is 18.4 feet.
- HDR recommended an airport surface elevation of 20.5 feet for the 100-year (1% Annual Exceedance Probability) storm surge event in the Coastal report (Page 13).

DOT&PF Aviation Design recommended an elevation raise to 19.5' to meet and exceed the 50-year floodplain requirement and ensure AIP minimum useful life and grant assurance requirements are met. Alternatives 3 (Near), 4 (Castle Hill), and 5 (Ridgeline) would require additional floodplain analysis. However, DOT&PF is responsible for construction and/or rehabilitation all airports to ensure compliance with FAA standards to be eligible for FAA AIP funding, regardless of which alternative is selected.

2.5 Solid Waste Disposal Sites

Solid waste disposal sites were evaluated in this study to ensure compliance with FAA requirements. The FAA recommends solid waste facilities be located 5,000 feet from a runway. The current Airport is 3,560 feet from a solid waste facility and 550 feet from the sewage lagoon. The current airport location does not meet this recommendation; however, the airport relocation alternatives do.

2.6 Materials

The cost and availability of materials were evaluated as part of this study because material sources and their delivery are one of the primary cost drivers of construction. The relative cost of material is lower if a local material site is developed because the material does not have to be barged to the construction site.

2.6.1 Material Source

The exact location and quality of a local material site is currently unknown, as coordination will need to take place to understand local preferences. The alternative to a local material source is barging in material from outside of Scammon Bay, which has higher relative costs. Planning level cost estimates for local and barged-in material are incorporated into the cost estimate for comparison.

Land surface and subsurface ownership in the area is primarily by Alaska Native organizations. The community strongly supports the use of local material. In the past, local residents in Scammon Bay have

been against the use of their current existing material source for large projects, because they do not want their current, nearby, developed material source to be depleted. During public involvement, the community had a similar sentiment and strongly supported the project developing their own local material sources (while avoiding the current community material source). Development of a local material site would decrease the cost and increase the likelihood for the project to proceed.

If a local material source were developed, material source location would be important. Typically, material sources close to the proposed development are less expensive than material sources distant from proposed development. Material sources would most likely be developed in *Klgr: Intermediate granitic rocks*, because *Qs: Unconsolidated surficial deposits* are likely to be low-quality material (Figure 2-2).

HDL and Alaska Energy Authority are currently evaluating locations for establishing new material sources, to serve other projects they are completing in the community. The U.S. Army Corps of Engineers may submit a grant application to assist in the development of new local material sources. Coordinating with these efforts would be valuable in determining the suitability of local materials. Initial conversations indicate that the first testing of material at a local site is silty, but further investigations are ongoing. One possibility may be the use of local material for the bulk of fill, with import of a topcoat of finishing material. Local residents also indicated that the other side of the mountain from the community may have different types of rock.

2.7 Utilities

The availability of utilities was evaluated for the alternatives because the Airport requires power to operate the runway lights and lights along the access road. An Airport also utilizes local telecommunications to provide weather reporting and other information. Both of these utilities are based in Scammon Bay. There is no refueling that occurs at the airport currently, and none is anticipated for the future. An airport in close proximity to Scammon Bay will have minimal utility expense, while a distant airport will need to build utilities from Scammon Bay to the airport.

2.8 Cost

A planning level cost estimate was developed to estimate the cost to build each alternative. The primary driver of cost is the cubic yards of material required to build the infrastructure. The quantity of material required is directly related to the topographic elevation changes that must be leveled to develop a suitable airport, access road, and similar infrastructure. Detailed cost estimates are not typically prepared until the Design and construction phases of a project after likely material sites have been assessed.

2.8.1 Cost Assumptions

The cost for each cubic yard of material is directly related to the development of local material, or barged material (Table 2-2). Excavated materials will be used to build the embankment (as suitable). The cost for excavation, borrow, subbase, and crushed aggregate was developed from research into other project pricing. The price for armor stone and underlayer stone came from estimates at Nome of between $150 – 175/ton, not including barging. The price for barging materials was developed from contractors who have worked in Scammon Bay, and estimated barging of materials to Scammon Bay as $90-100/ton.

Table 2-2 Cost Assumptions

Factor	Cost
Local Material	
Unclassified Excavation	$20/cy
Borrow	$40/cy
Subbase	$75/cy
Crushed Aggregate Surface Course	$70/ton
Primary Armor Stone, Class I	$186/ton
Underlayer Stone, Class I	$164/ton
Barged Material	
Unclassified Excavation	$20/cy
Borrow	$133/cy
Subbase	$175/cy
Crushed Aggregate Surface Course	$140/ton
Primary Armor Stone, Class I	$286/ton
Underlayer Stone, Class I	$264/ton

Access roads are assumed to be 24 feet top width, 4:1 side slopes, and 4 – 6 feet for ditches for a total of an 80 feet wide for a disturbance footprint.

A 25% design contingency was added for each estimate, which includes drainage improvements and muck excavation.

The estimates include 22% Construction Engineering and 7% Indirect Cost Allocation Plan.

Erosion protection is originally detailed in HDR (2022a). HDR provided a range of alternatives, the medium price alternatives ranged between $15 - $33 million. The least expensive option, the marine mattress embankment armor, was discarded due to risk of use in icing conditions. Stantec estimated the cost for embankment armor using primary armor stone and underlaying stone.

The purchase of new land was estimated by DOT&PF to be $1,000 per acre, with the assumption that the existing airport land of (87.5 acres) will be exchanged at a 1:1 ratio for new acreage, if the old airport land is not required for the new alternative.

2.8.2 Maintenance Costs

Maintenance of the airport access road to the community road network is the responsibility of DOT&PF. Acquisition of land for the construction of a new access road may be problematic. There are also many streams and wetlands that may complicate the construction of a long access road away from the community. The cost to maintain long airport access roads in rural Alaska is very difficult to estimate. DOT&PF uses individual local contractors to maintain rural airports. Based on recent contracts, an average cost for 8 airports in the region is $26,822/year. Airports with access roads up to 2 miles are about $40,000/year. DOT&PF prefers not to construct long access roads from the airport to the community due to cost, feasibility, and difficulty maintaining year-long contracting services.

2.8.3 Project Funding

The project would be included in the State Airport Capital Improvement Program and funded when project funding is available. Projects related to public safety and inoperable airports are typically prioritized. It is likely that the design and construction of any project in Scammon Bay would be phased over time. The cost for all of the airport build alternatives (Alternative 2 [Shift & Raise], Alternative 3 [Near], Alternative 4 [Castle Hill] and Alternative 5 [Ridgeline]) are all very expensive. However, as the airport sponsor, DOT&PF is obligated to maintain the airport regardless of the feasibility.

2.9 Public Opinion

Public opinion for each alternative was evaluated because a project is more likely to be successful if it receives support from the local community. A public meeting was held on June 18, 2024, in Scammon Bay, with additional teleconference attendees. The meeting was an interactive town hall, with an active discussion about the community's plans, local preferences, and valuable insights. Local residents have a strong understanding of similar types of construction, and a strong vision for the future. There are multiple development projects taking place in the community. Local individuals contributed their practical knowledge based on their experience working on construction projects similar to the proposed airport improvements at Scammon Bay and throughout the region. Local stakeholder opinions for each alternative are described in Section 3.0; but local stakeholders have an overwhelmingly strong preference for Alternative 2 (Shift & Raise).

The local meeting revealed several important factors to consider when evaluating the alternatives:

- Access roads across the mountain need to incorporate erosion from seasonal runoff. Every spring the current roads need reconstruction or rehabilitation because runoff from the mountain causes substantial erosion.
- Alternatives with longer access roads would be difficult to access in the winter. Additional, industrial, snow removal equipment may be necessary to maintain a longer access road and may also require the construction of an additional Snow Removal Equipment Building (SREB). The access road would be impassable if DOT&PF, or their contractor, are unable to access and maintain it in the winter or after it has been impacted by snow runoff.
- Alternatives further from the community would increase costs for DOT&PF and the community. DOT&PF would face increased contracting costs for road maintenance. The community would need to purchase additional fuel for their off-road transportation or need to purchase vehicles.
- A long access road would also be a major inconvenience to community members.
    - Residents emphasized that the reliability of flights is low. Many rely on hearing the aircraft approach, or receiving a call on the local radio about the aircraft arrival.
    - The local commuter service has very short turnaround times on the ground. The public involvement team was boarding and starting up their aircraft. In that short time, the local commuter airlines landed, offloaded, reloaded, and took off.

During the public meeting, the local residents also touched on these items:

- The local community expressed interest in acquiring some current airport land to build or improve community infrastructure, such as a tank farm, fueling infrastructure, barge landing, or dock if the runway is shifted.
- The current road to the barge landing, barge landing itself, and the fuel header on the barge landing, is located on land owned by DOT&PF. The community would like to build a new road west of the current road and also fill in the areas of land adjacent to either road to provide storage. The City would be willing to lease, own, or develop some other type of agreement to move these projects forward. The City needs to demonstrate some degree of control to obtain funding to help improve these facilities. The City would like to work with DOT&PF on an agreement.
- A new tank farm is anticipated to be constructed at the location indicated on Figure 2-9.
    - The tank farm does not have a fuel pipeline to the barge header. It would be served by trucking from the barge.
- A pipeline is desired from the barge landing to the new fuel tank farm. A preferred path may be through airport property. This path is preferred, because any other path would place the pipeline

upslope of the community. If a leak occurred, it would flow down into the community; providing a health hazard. The City would like to work with DOT&PF on safe project development.

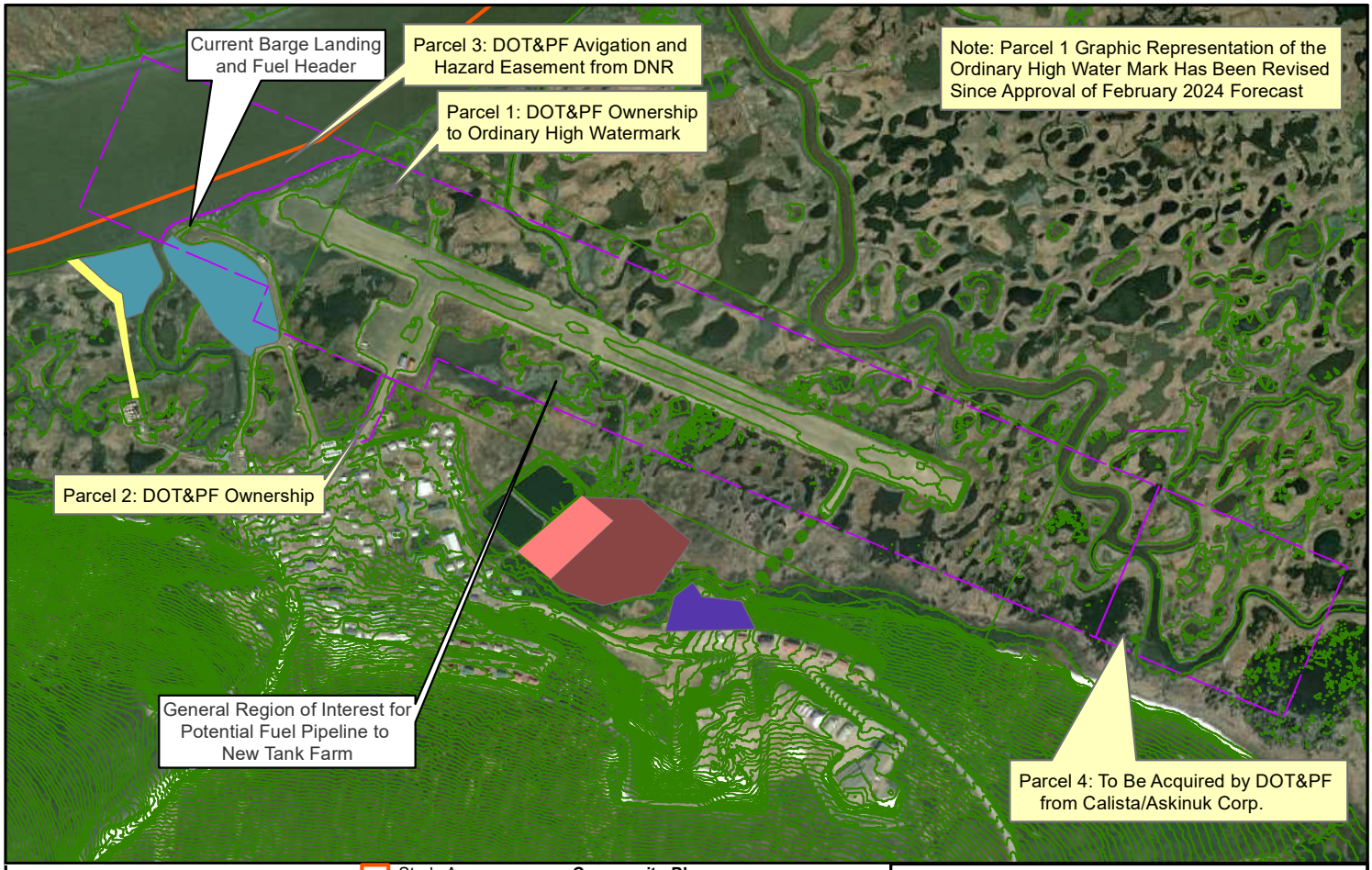
- An expansion of the wastewater treatment plant is expected at the location indicated on Figure 2-9. Phase 1 of the expansion is likely to be built in the near term, with Phase 2 in the longer term.

A request for public comments on the alternatives was redistributed on February 19, 2025, which resulted in additional agency and landowner comments.

- The ADF&G provided a comment that a Fish Habitat Permit would be required for work involving the Kun River, culvert, and other side channels. ADF&G reports that chum salmon, inconnu and whitefish are in the Kun River, and Alaska blackfish, ninespine stickleback, and northern pike are reported in the culvert (and similar side channel) habitats.
- The Calista Corporation is a major landowner in the Scammon Bay area that would be impacted by land acquisition. The corporation provided a letter of support for Alternative 2 (Shift & Raise) on March 26, 2025. Their primary concern was public access to the airport.
- The City of Scammon Bay, Native Village of Scammon Bay, and Askinuk Corporation passed a tri-party resolution on February 24, 2025, stating in part:

> ***"WHEREAS**, the community supports Alternative 2; and,*
>
> ***WHEREAS**, the community specifically does not support Alternatives 1, 3, 4 and 5. These alternatives will have significant impacts on Scammon Bay's ability to use the airport and the safety of aviation service to Scammon Bay; and,*
>
> ***THEREFORE**, the City of Scammon Bay, Native Village of Scammon Bay, and Askinuk Corporation agree on and request that the FAA move forward with the engineering design of Alternative 2 (shift and raise), and its evaluation under NEPA to support construction of an airport improvement project."*

Public Involvement Materials, including comments and the resolution, are located in Appendix E.



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AIRPORT PLANNING STUDY

STATE OF ALASKA
Department of Transportation and Public Facilities
4111 Aviation Ave, Anchorage, Alaska 99516

March 2025

Figure 2-9: Community Projects

3 ALTERNATIVES EVALUATION

Five alternatives were evaluated.

Alternative 1 is the No Action Alternative. Under this alternative, DOT&PF would maintain the airport in its current location, repair, rehabilitate, and reconstruct the airport as needed for regular maintenance and after heavy flooding.

Alternative 2 (Shift & Raise) would shift the runway longitudinally 340 feet inland to provide additional protection from river flooding, raise the Runway Safety Area (RSA) embankment edge elevation to +19.5 feet above Mean Higher High Watermark (MHHW) and North American Vertical Datum 88 (NAVD), and install erosion protection.

Alternative 3 (Near) would move the Airport onto the transitional area between lowlands and the Askinuk Mountains, near the community of Scammon Bay.

Alternative 4 (Castle Hill) would move the Airport into the valley between Castle Hill and the Askinuk Mountains.

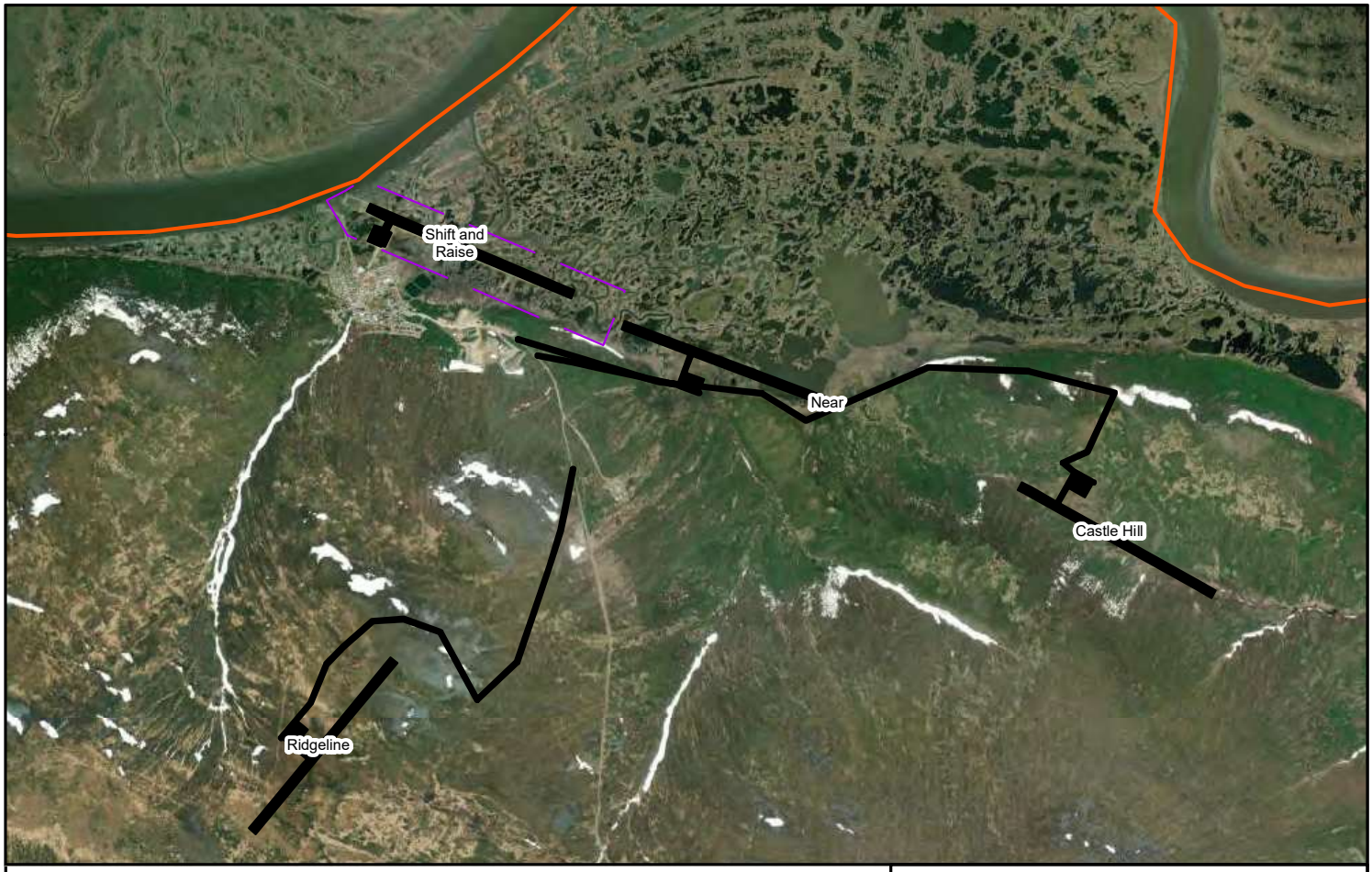
Alternative 5 (Ridgeline) would move the Airport on to the ridgeline above Scammon Bay in the Askinuk Mountains.

3.1 Engineering Analysis, Figures, and Tables

In-depth engineering analysis for all potential alternative sites was beyond the scope of this phase of the planning study. Detailed engineering analysis exists for Alternative 2 (Shift & Raise) because a Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D) were initially completed in December 2022 as part of an airport improvement project in Scammon Bay, which was paused due to cost. Local and privately owned land that were not potentially necessary for that airport improvement project were not studied under the HDR reports.

Figures 3-1 and 3-2 depict the alternatives and preliminary alternative design. Table 3-1 summarizes each alternative and analyzes the evaluation criteria.

Planning level cost estimates are in Appendix A. Maps for each of the alternatives are provided for each screening criteria where the previous maps were at too large of a scale to provide detailed analysis (Figure 3-3 to 3-10).



N

0 0.15 0.3 Miles

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Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)

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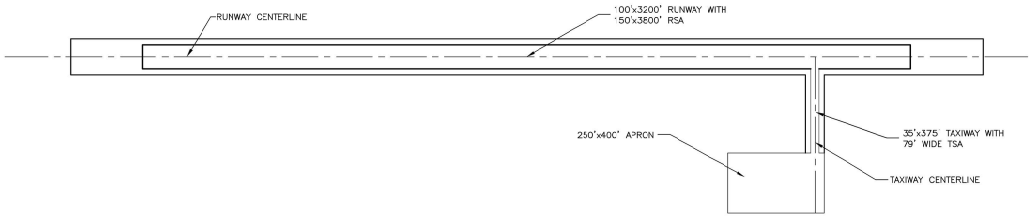
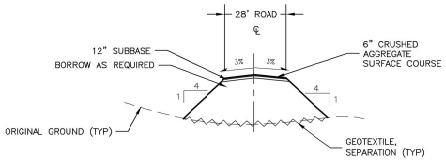
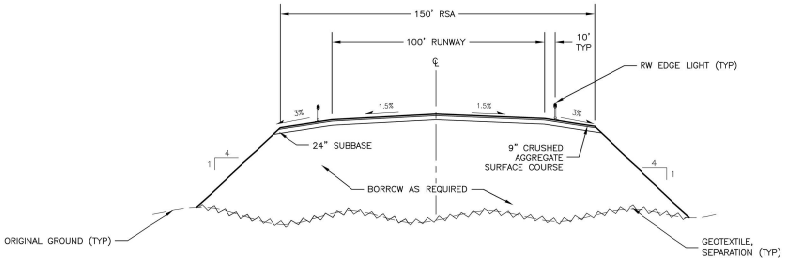
Figure 3-1: Alternatives



1 SCAMMON BAY AIRPORT ALTERNATIVES – AIRPORT PLAN
SCALE: NTS

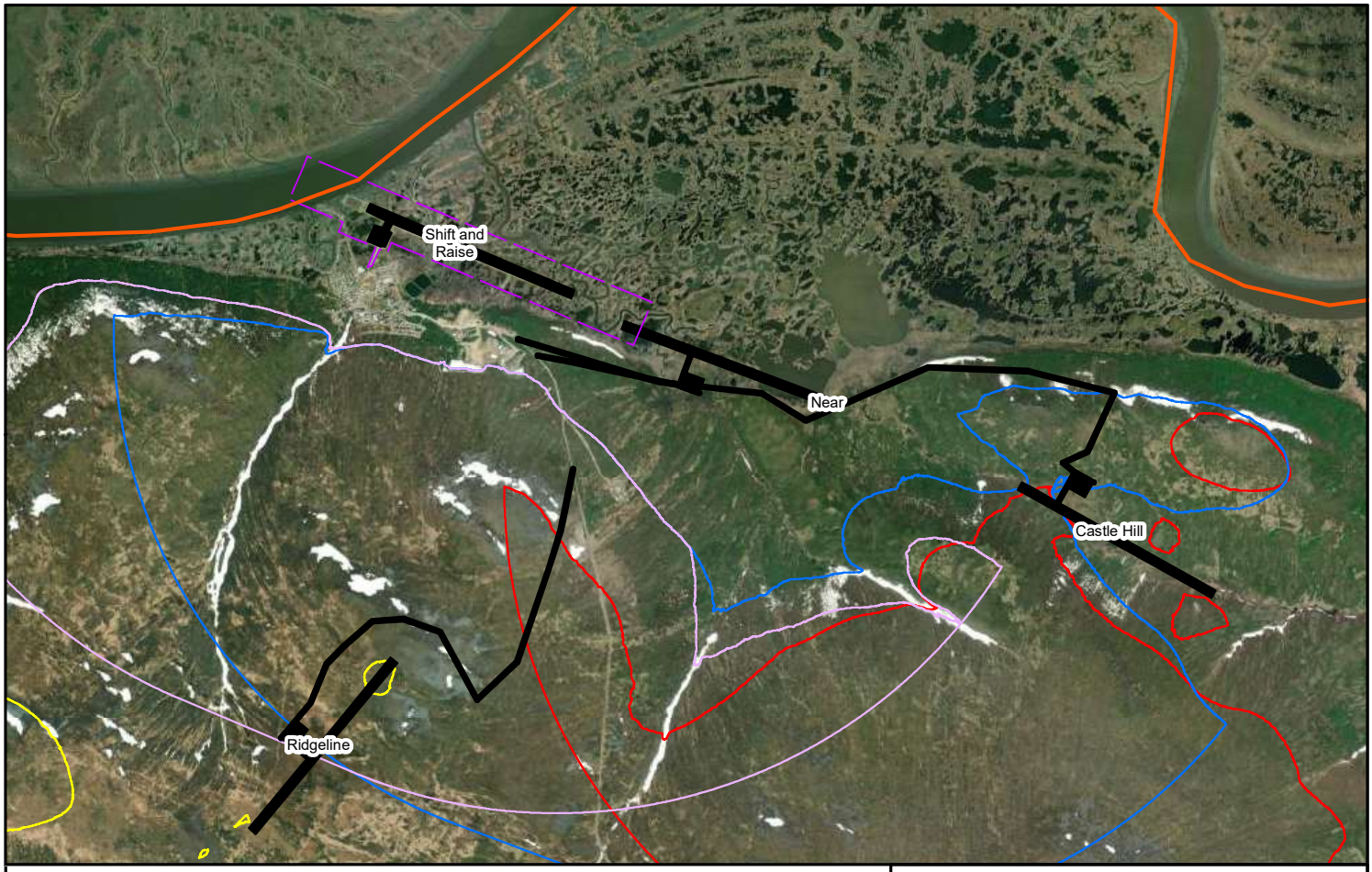


3 ROAD SECTION
SCALE: NTS



2 RUNWAY SECTION
SCALE: NTS

Figure 3-2 Alternative Design



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0 0.15 0.3 Miles

1:27,972 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)

Part 77 Penetrations
Shift & Raise
Near
Castle Hill
Ridge

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April 2025

Figure 3-3: 14 CFR Part 77 Airspace Penetrations

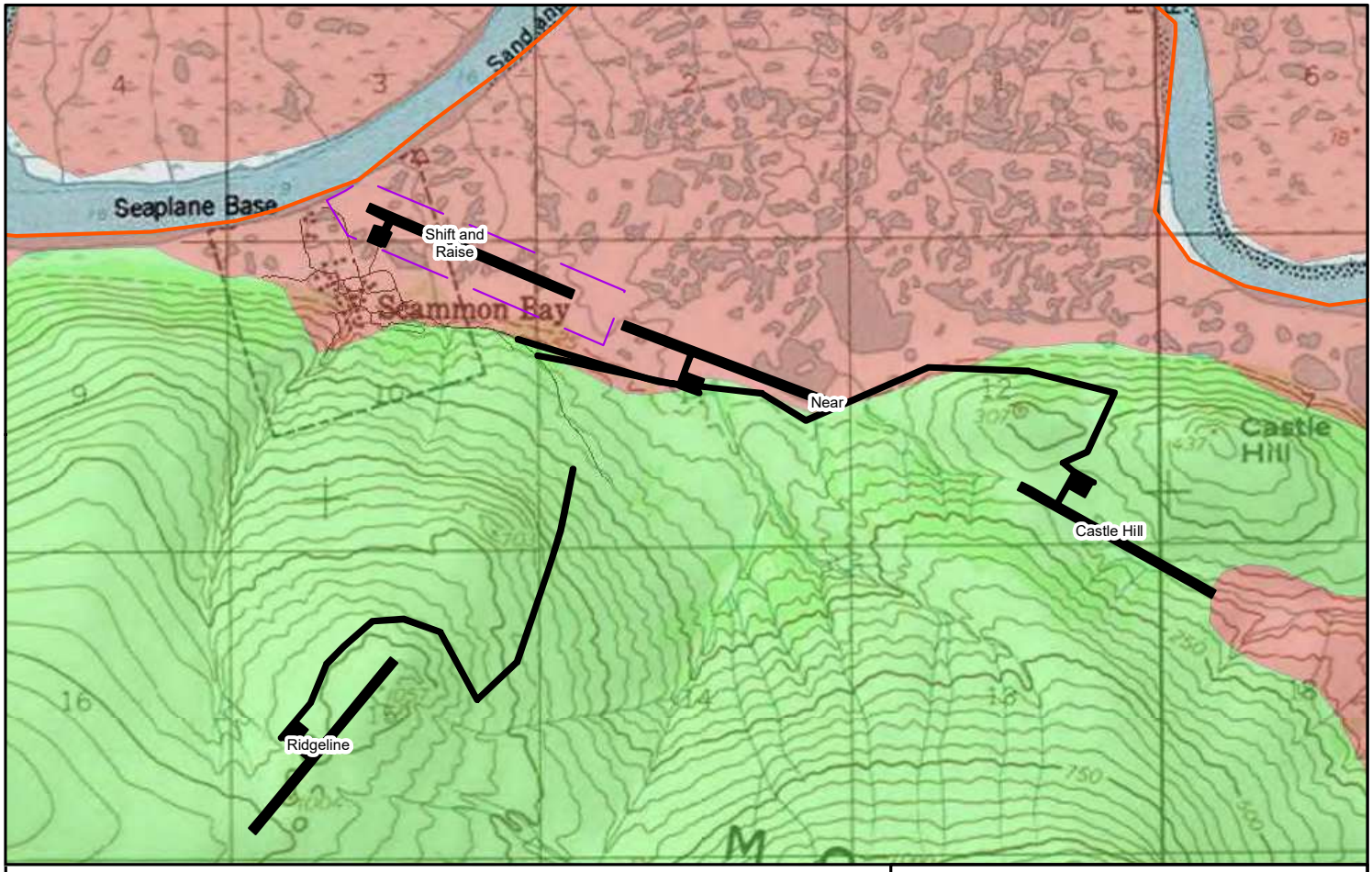

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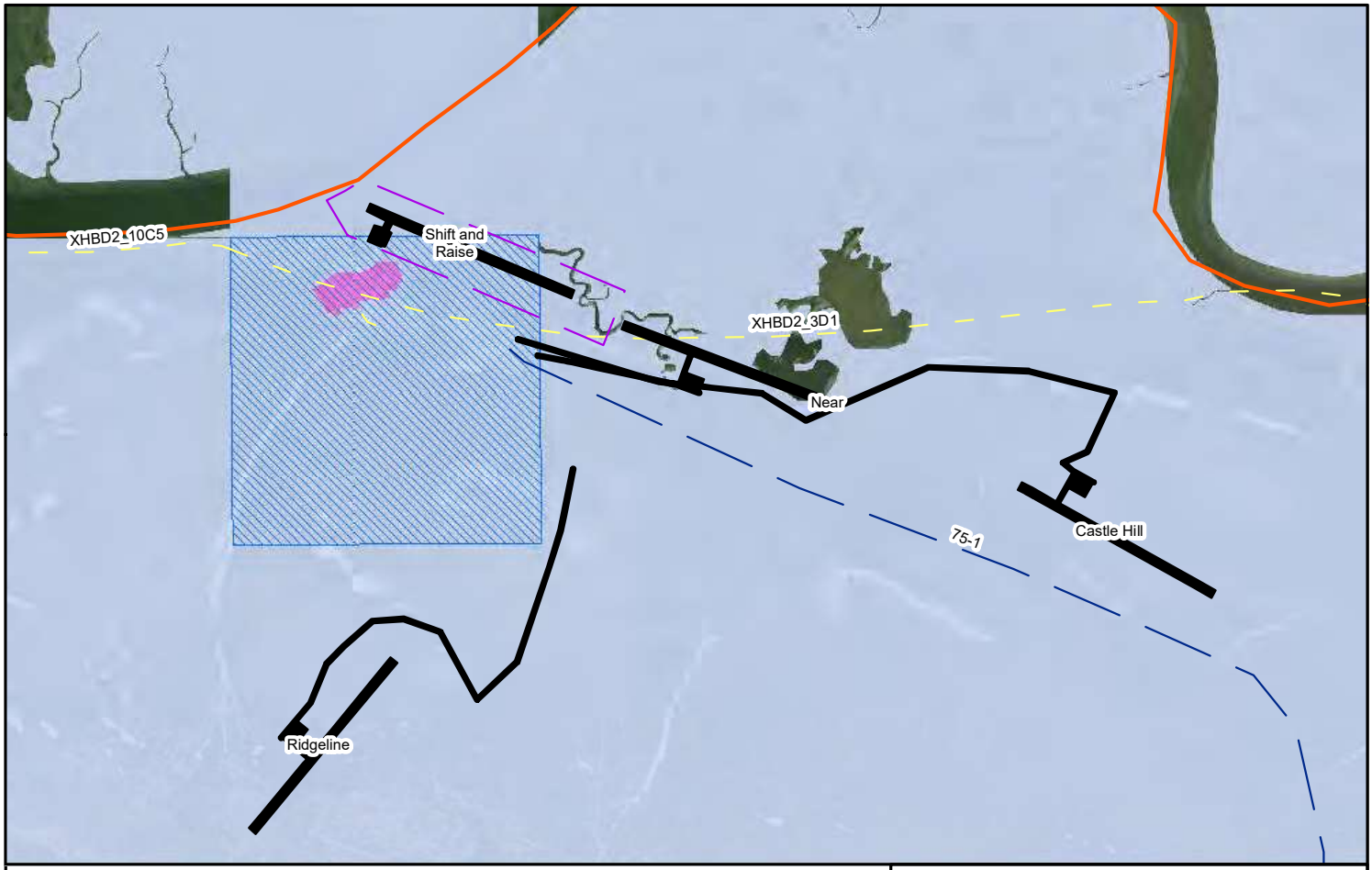
Figure 3-4: Alternatives: Geotechnical Conditions



N

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1:27,972 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)
17(b) Easement
RS2477 Trails
ANCSA Selected
Private Lands
Conveyed Native Lands

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Figure 3-5: Alternatives: Land Ownership

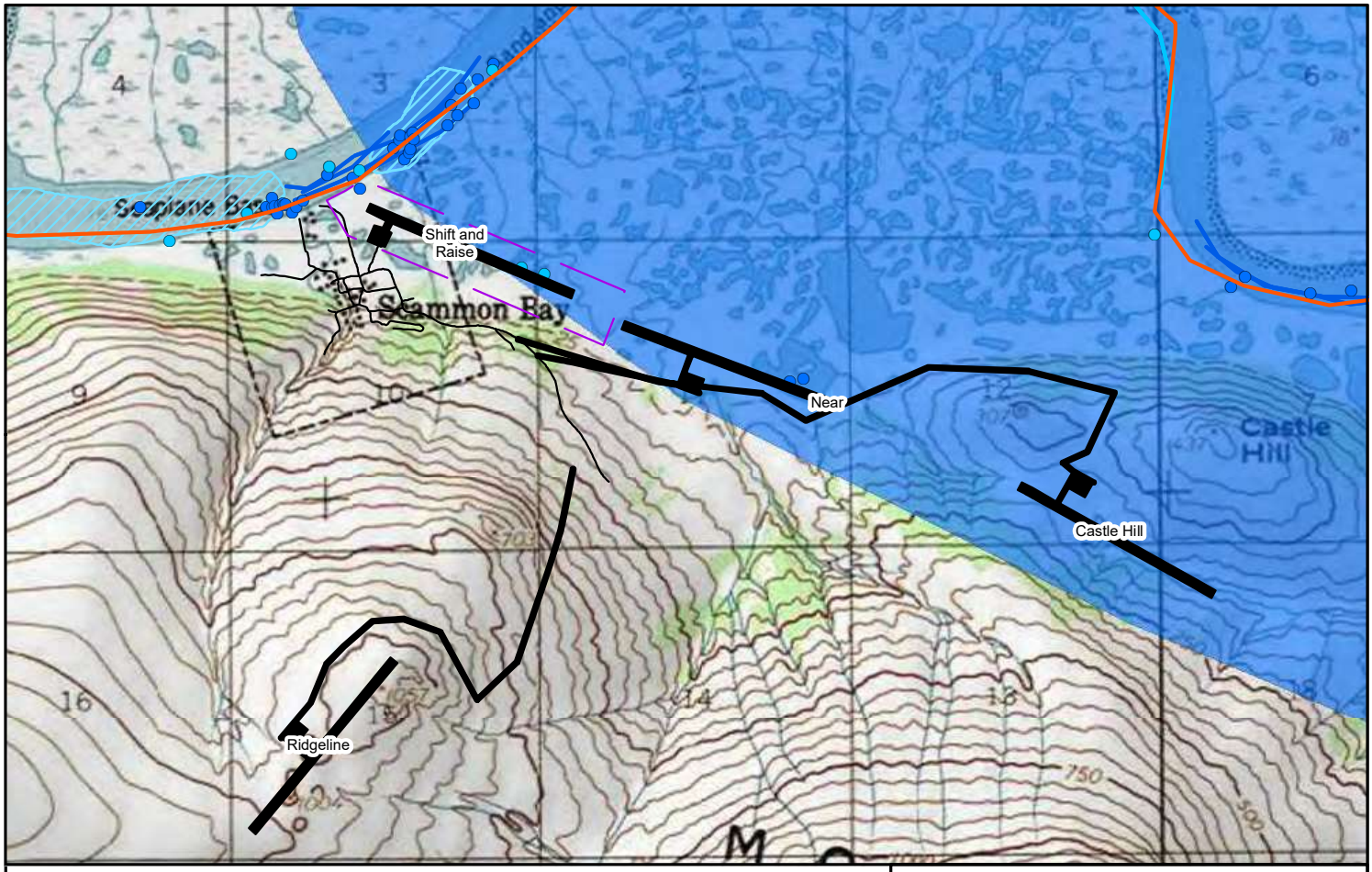

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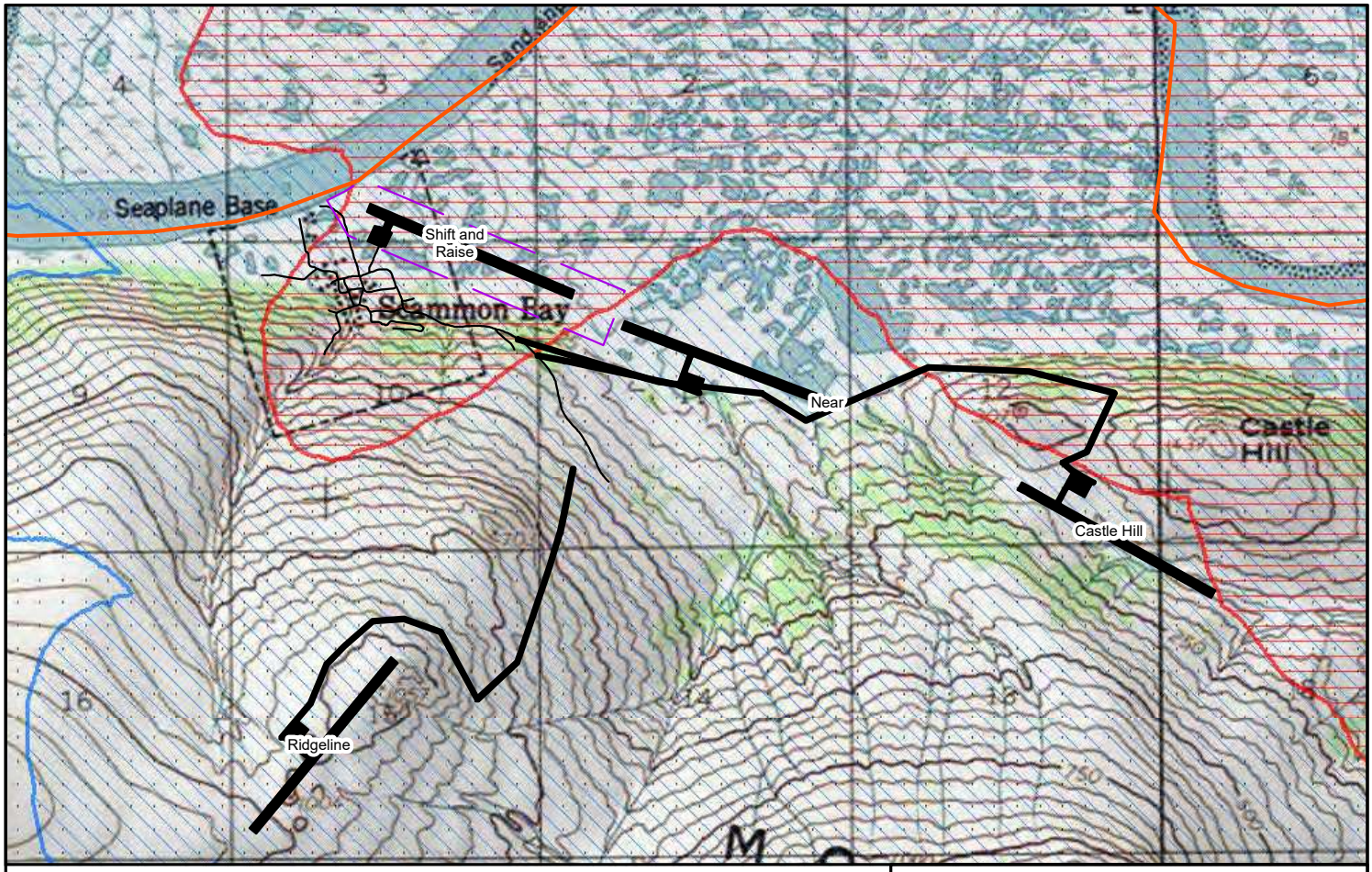
Figure 3-6: Alternatives: Subsistence: Fishing



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1:27,999 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet

Study Area
Airport Boundary
Alternatives (2024)
Road

2013 Subsistence Study
Ptarmigan & Grouse
Ducks & Geese
Moose

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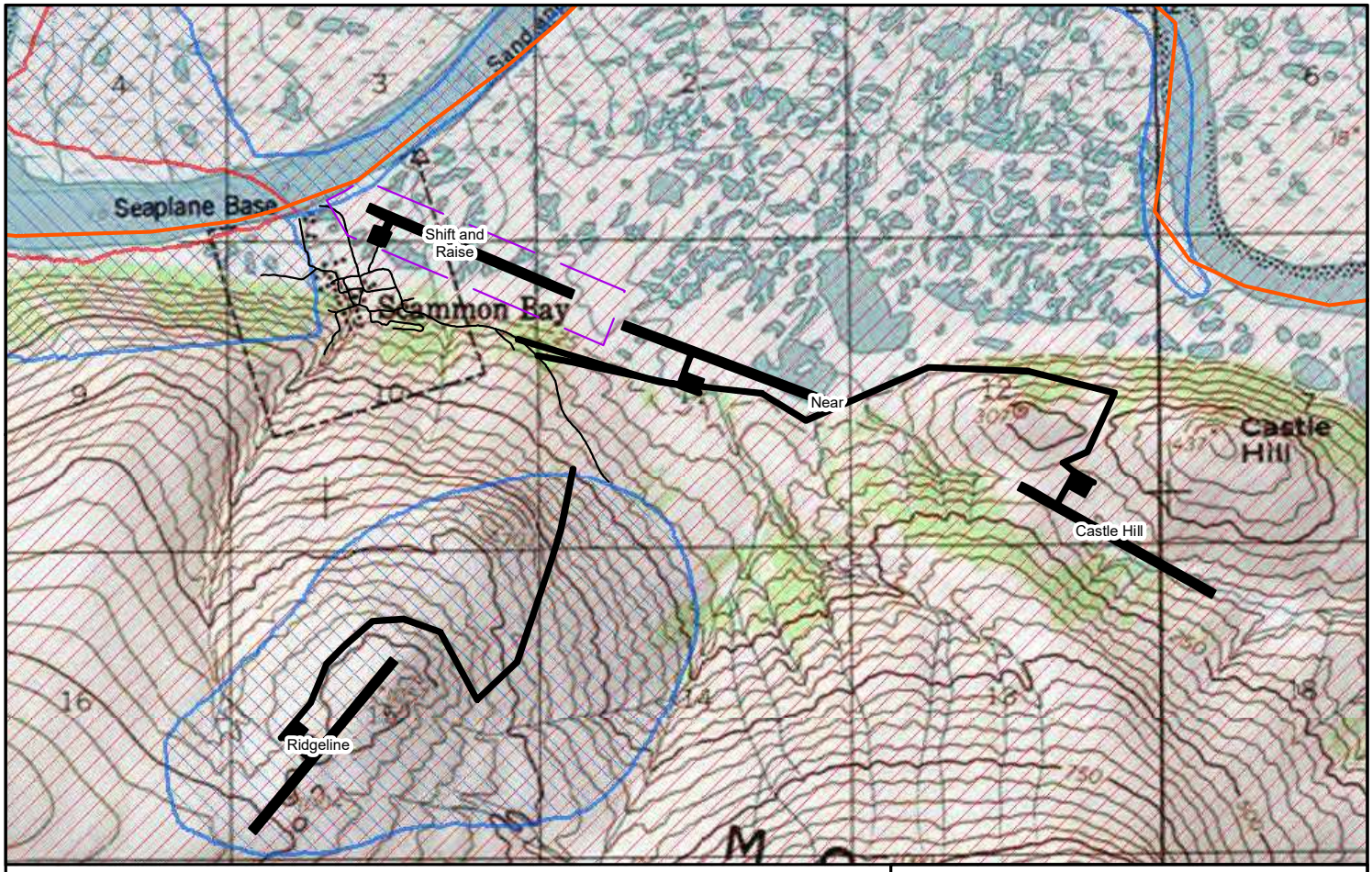
Figure 3-7: Alternatives: Subsistence: Birds, Moose



N

0 0.15 0.3 Miles

1:27,972 (At original document size)

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Alaska 8 FIPS 5008 Feet
2. High areas are used for spotting seals in the water

Study Area
Airport Boundary
Alternatives (2024)
Road

2013 Subsistence Study
Berries & Greens
Seals

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Figure 3-8: Alternatives: Subsistence: Bears, Berries, Seals

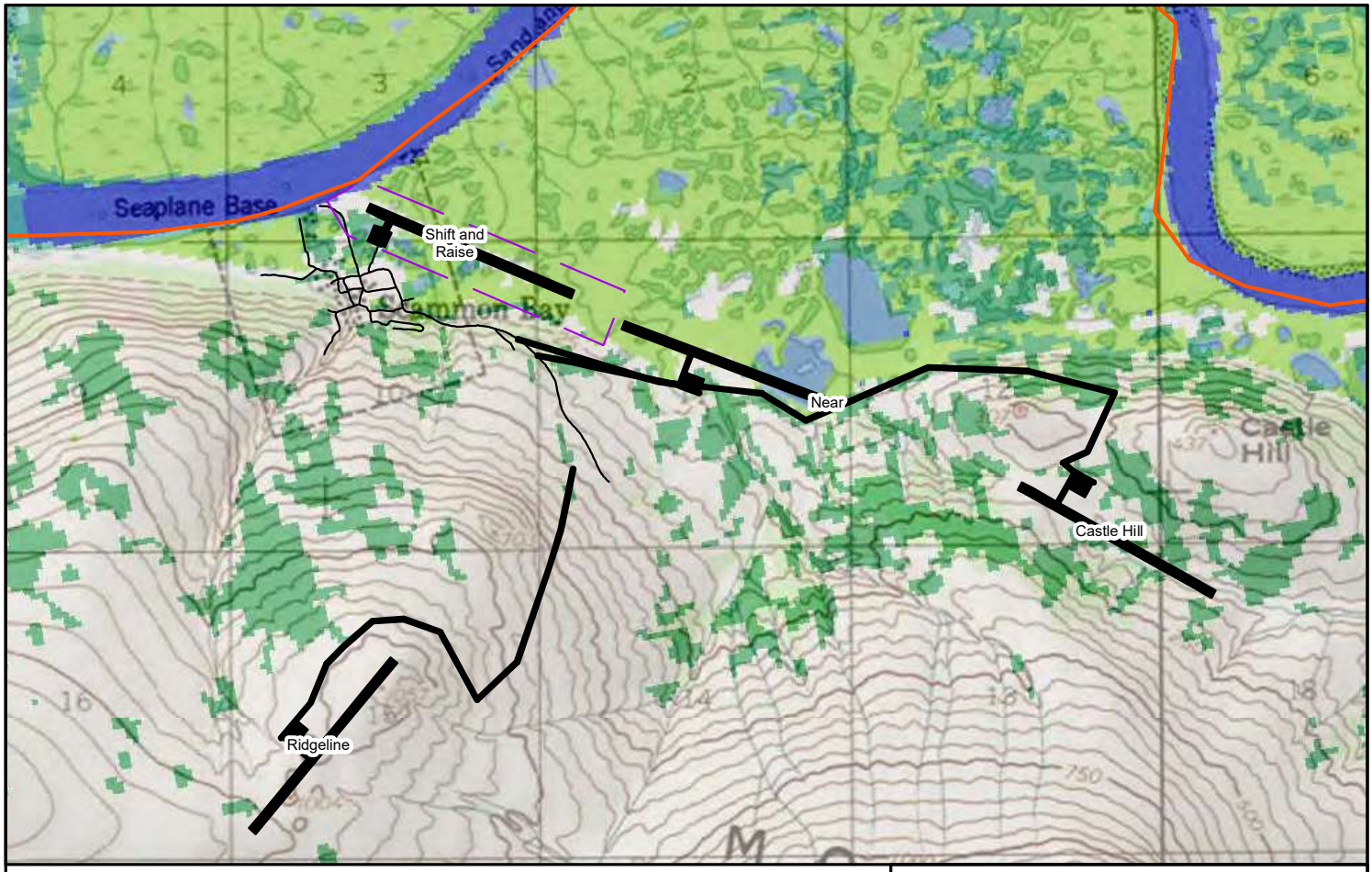

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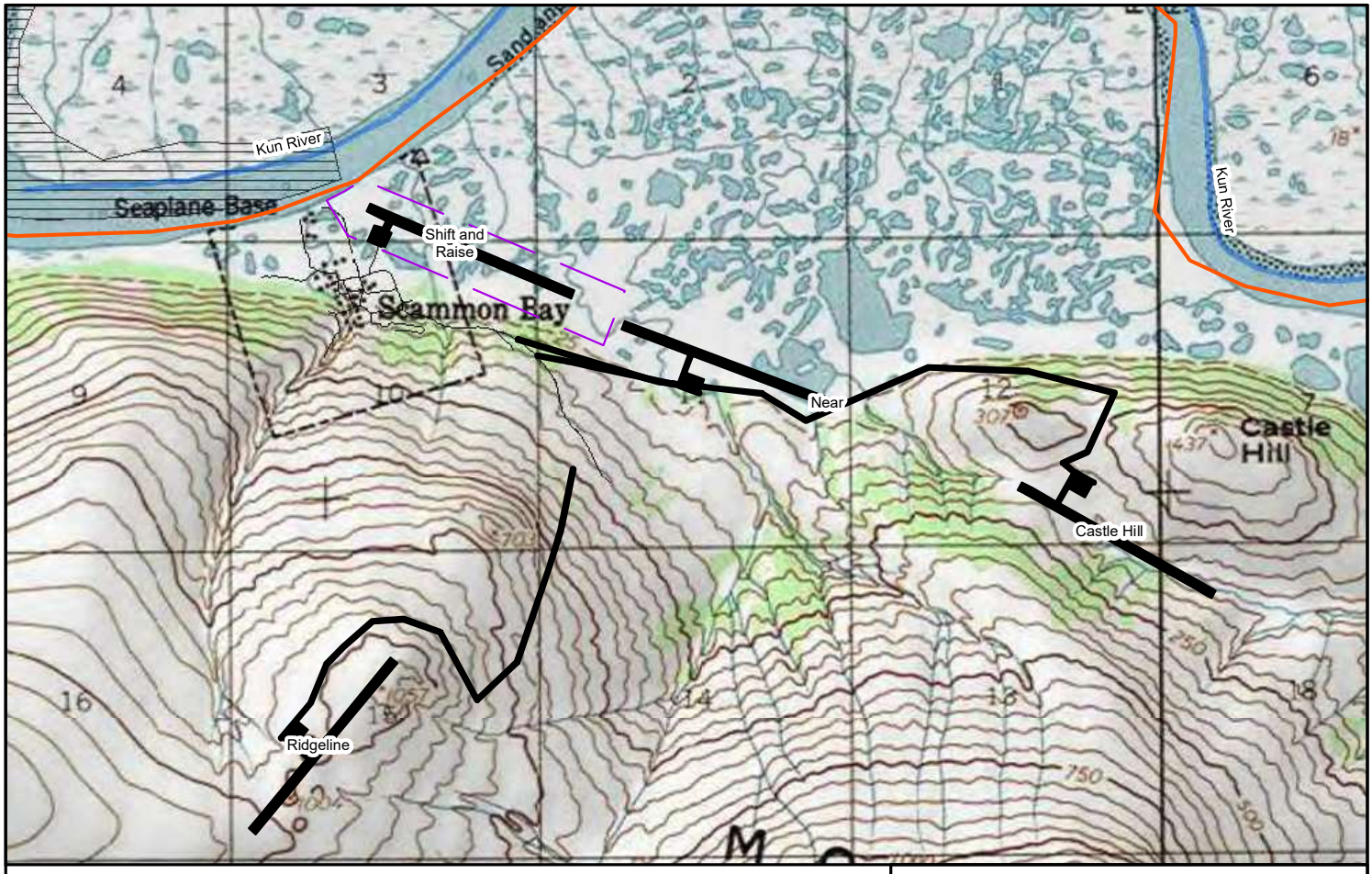
Figure 3-9: Alternatives: Wetlands



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August 2024 | Figure 3-10: Alternatives: Protected Species

Table 3-1 Alternative Evaluation

Evaluation Factor	1: No Action	2: Shift & Raise	3: Near	4: Castle Hill	5: Ridgeline
Safety and Airport Resiliency					
Elevation (Embankment Edge)	+10 - +17.5 feet	+19.5 feet	+19.5 feet	+138 feet	+1,013 feet
Distance from river	0 feet	340 feet	11,000 feet	5,000 feet	4,000 feet
Fog and Low Visibility	0.3%	0.3%	0.3%	~0.3 - 6.7%	17.0%
Wind Coverage	90.4%	90.4%	Unknown	Unknown	Unknown
Wind Strength (Elevation)	N/A	Similar to SCM	Unknown	Unknown	Worst
Airport Geology	Good (Established pad)	Poor (Qs)	Poor (Qs)	Good (klgr)	Good (klgr)
Land Status					
Land Ownership	DOT&PF	DOT&PF & Calista and Askinuk	Calista and Askinuk	Calista and Askinuk	Calista and Askinuk
Likelihood of Acquisition	N/A	Likely, and already on approved Airport Layout Plan	Unlikely	Unlikely	Unlikely
Subsistence Resources	No significant	Low (Fish, Moose, Grouse, Waterfowl, Berries)	Medium (Fish, Moose, Grouse, Waterfowl, Berries)	Medium (Fish, Grouse, Waterfowl, Berries)	Medium (Grouse, Waterfowl, Berries)
Environmental					
Noise (Impacts to Residents)	Medium	Medium	Low	Low	Low
Wetlands (Unverified NWI)	0	2.5 acres	11.4 acres	9.5 acres	0.3 acres
Endangered Species	No significant	No significant	No significant	No significant	No significant
Marine Mammal Protection Act	No significant	No significant	No significant	No significant	No significant
Fish	No significant	Runway culvert	No significant	No significant	No significant
Birds & Other Wildlife Habitat	No significant	16.6 acres	20.9 acres	39.7 acres	33.2 acres
Contaminated Sites	No significant	No significant	No significant	No significant	No significant
Public Access Convenience	Best	Best	Medium	Low	Very Low
Distance to Community Center	0.3 miles	0.3 miles	2.2 miles	4.5 miles	6 miles
Cultural Resources					
AHRS Cultural Resources	Potential impacts to known area	Potential impacts to known area	No known areas	No known areas	No known areas

Constructability					
Constructability	Feasible	Challenge	Challenge	Feasible	Feasible
Distance to Solid Waste	3,560 feet	3,260 feet	3,800 feet	14,000 feet	10,900 feet
Distance to Sewage Lagoon	550 feet	550 feet	7,000 feet	9,500 feet	6,000 feet
Maintenance of Access Road	Easy	Easy	Difficult	Very Difficult	Very Difficult
Floodplain	Within Floodplain	Partially Within Floodplain	Within Floodplain	Above Floodplain	Above Floodplain
Materials					
Unclassified Excavation	0	15,440 cy	40,306 cy	166,594 cy	47,991 cy
Borrow	2,333 cy ** (2016)	161,330 cy	370,691 cy	284,495 cy	224,174 cy
Subbase	3,646 cy ** (2016)	51,215 cy	58,313 cy	72,222 cy	67,426 cy
Crushed Aggregate Surface Course	5,035 ton ** (2016)	38,515 ton	41,369 ton	52,797 ton	47,539 ton
Primary Armor Stone, Class I	0	61,353 ton	61,353 ton	0	0
Underlayer Stone, Class I	0	53,731 ton	53,731 ton	0	0
Material Source Distance (Local)	0	7,300 feet	2,000 feet	600 feet	2,000 feet
Utilities					
Utilities (Cost)	No significant	$237,000	$1,838,500	$3,677,000	$4,911,000
Erosion Protection Materials*	$0	$20,223,492 Local, $31,731,868 Barged	$20,223,492 Local, $31,731,868 Barged	$0	$0
Land Purchase	No significant	$17,000	$5,000	$23,000	$17,000
Cost Summary					
Total Cost (Local Option)	$6,990,353 ** (2016)	$75,656,172.51	$94,588,701.28	$66,714,222.21	$59,398,368.40
Total Cost (Barged Option)	$9,099,607 (2025) (estimated current cost)	$130,444,801.50	$182,828,675.60	$126,997,026.70	$109,266,097.40
Public Opinion	Against	In Favor	Against	Against	Against

*HDR 2022a estimated a variety of erosion protection measures to implement with Alternative 2; ranging in cost from $11 million to $67.7 million. Stantec provided an updated cost estimate.

** "No Action" Materials is from the 2016 FEMA repair project to rehabilitate the airport after the last major flood. The original 2016 FEMA project cost $6,990,353 (Appendix F). The 2025 estimate was adjusted for the current inflation (30.2% - The average annual inflation rate has been 3.8%). Future project estimates would be cumulatively adjusted for increasing inflation each time a similar flood impacts the airport, potentially every 5 – 10 years

3.2 Alternative 1: No Action

The No Action alternative is included as a comparison for the other alternatives. Under this alternative, DOT&PF would continue to maintain the airport in its current location and provide regular maintenance as required for safety and repairs after heavy flooding. This alternative does not meet the purpose and long-term need of addressing the flooding and erosion threats to the airport.

Safety and Airport Resiliency

Alternative 1 (No Action) would not provide long-term safety, resiliency, and reliability for the community due to unplanned emergency maintenance after heavy flooding. The fog and visibility characteristics would remain favorable (only 0.3% of the time less than 0.5 miles).

Wind coverage at the current airport is known at 90.4%, below the recommended 95%, but more certain than other alternatives.

Land Status

The airport is located on DOT&PF owned land. No property acquisition would be needed for this alternative.

Environmental

Environmental and subsistence concerns are the least for this alternative because no new ground would be disturbed. Habitats that may support wildlife (such as fish and birds), and the development of areas that may be used for subsistence use would remain consistent with current conditions. Disruptions may occur during maintenance, rehabilitation, and emergency reconstruction projects. Public access convenience is very high due because to the close proximity of the existing airport to the community.

Cultural Resources

Scammon Bay is a Yup'ik community that has been settled for over one hundred years. Based on a review of the AHRS data for Scammon Bay, cultural resources are reported within the vicinity of the current airport and the entire village of Scammon Bay. These cultural resources could be adversely impacted by any development of the existing Scammon Bay airport. Additional consultation with the local community, literature review, and cultural resource surveys would be needed to verify the location and types of cultural resources there and determine necessary mitigation efforts. A NHPA Section 106

and NEPA process would be required as part of any Design project that would occur on or around the existing airport. Please see the DOT&PF PD&E Cultural Resource Evaluation (Appendix H) for more in-depth review of cultural resources.

Constructability

Although it is possible to continue to maintain, rehabilitate, and reconstruct the airport as needed, it is unlikely to be the most prudent long-term management solution based on the HDR Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D). The airport is located completely within the floodplain and the runway embankment elevation is below the 50-year flood level, and the culverts are insufficient for drainage at the airport.

This alternative would not meet the 50-year floodplain requirement or ensure AIP minimum useful life and grant assurance requirements are met for a rehabilitation project that maintains the current embankment elevation. Additionally, airport rehabilitation projects are subject to AIP grant funding availability, timeline eligibilities, and it may not be possible to obtain funding for disaster relief if the airport is severely flooded. Overtime, repeated submergence of the lighting system and runway embankment will result in failure.

Hydrology / Geology

Based on the HDR Coastal Study (2022) (Appendix C) and the HDR Hydrology & Hydraulics Study (2022) (Appendix D), the airport will continue to be impacted by rising sea levels and major flooding events in the future.

Water Displacement & Mitigation

Water displacement and potential flooding deterioration will continue under the current conditions and be severe after heavy flooding. The HDR Hydrology & Hydraulics Report (2022) stated the 48” culvert is inadequate for the flooding that impacts the airport.

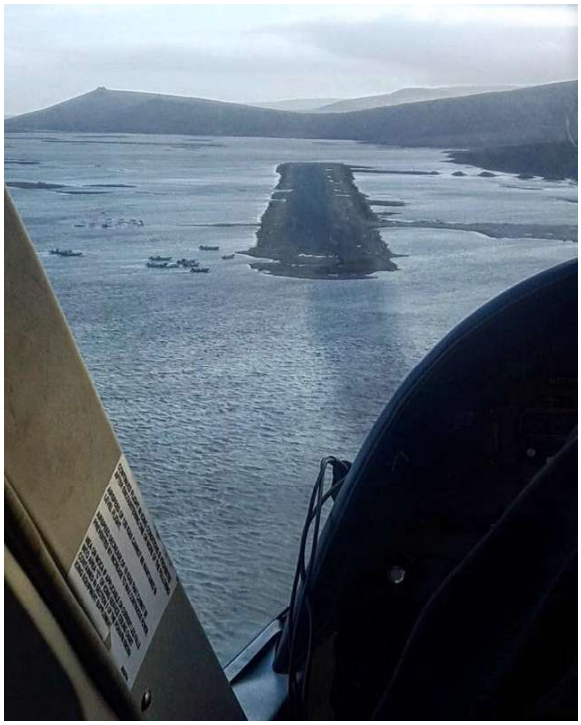


Figure 3-11 2016 Flooding

Figure 3-12 2024 Flooding

Potential Flood Deterioration

Flooding will continue to deteriorate the airport embankment without erosion mitigation based on the findings of the HDR Coastal Report (2022) and Hydrology & Hydraulics Report 2022) due to the low elevation level of the runway.

Figure 3-13 Airport Conditions (2023)

Geotechnical Investigation

Further geotechnical investigation may demonstrate the impact of repeated flooding on the integrity of the airport embankment.

Materials

Material costs were not estimated as part of the "No Action" alternative because the number of major floods that will require major repairs are unpredictable. However, at a minimum, erosion protection should be installed to protect the existing embankment. The estimated material needs during the 2016 FEMA project were: 5,035 of Surface Course, 3,646 for the Subbase, and 2,333 of Borrow to bring the airport back to pre-disaster conditions.

Public Opinion

No public comments were received in support of this alternative.

Cost

The cost for regular maintenance, rehabilitation, and reconstruction after flooding are difficult to assess based on fluctuating material costs and the ongoing impacts of flooding, but they will increase over time. The cost of the FEMA grant to restore the Scammon Bay airport to pre-flood conditions was $6,990,353 after the major flood in 2016. If the average inflation rate remained 3.8%, by 2050, a similar project may cost $23,118,331 (Table 3-2).

Table 3-2 Inflation Adjusted Cost Estimates for 2016 Airport Repairs

Year	Inflation Adjusted Estimates
2025	$9,099,607
2030	$10,965,019
2035	$13,212,840
2040	$15,921,462
2045	$19,185,349
2050	$23,118,331

A surface maintenance grant was awarded in 2009 for $532,000. The next surface maintenance grant was awarded in 2022 for $1,505,811, which included replacement of crushed aggregate surface course (CASC). Intensive airport surface rehabilitation projects in the Yukon-Kuskokwim region consistently cost over $30,000,000. The extent of flood damage and repairs is unpredictable.

Available Engineering Analysis

This alternative was previously evaluated by DOT&PF through HDR, Inc. A Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D) were completed in December 2022, initially as part of a pending construction project. Based on the findings and recommendations of these studies, a No Action alternative is not feasible in the long term. The level of flooding and erosion rate are too significant to not armor and shift the runway or relocate the airport entirely.

3.3 Alternative 2 (Shift & Raise)

Alternative 2 (Shift & Raise) would shift the runway longitudinally 340 feet inland to provide additional protection from river movement, raise the Runway Safety Area (RSA) embankment edge elevation to +19.5 feet, and install embankment armor. This alternative has the most information available because it was initially evaluated by DOT&PF as part of a construction project and two technical reports were developed, which have been incorporated into this feasibility study.

The HDR Coastal Report (Appendix C) focused recommendations based on relative sea-level-rise (RSLR) calculations and storm surge events for a 50-year period and 100-year period. The 50-year period recommended 18.5 feet above MHHW and the 100-year period recommended 21.5 feet above MHHW. DOT&PF engineers selected 19.5 feet based on 1 foot freeboard above the forecasted flood level and to ensure the height would be sufficient upon completion of construction of the project.

Below are diagrams (Figure 3-14, 3-15, 3-16, 3-17) from the Coastal Report that depict the various types of erosion protection methods that will be considered during the Design Phase for this alternative if it is the preferred alternative upon completion of the Phase II reconnaissance study. Please review Appendix C for further details about each erosion mitigation strategy.

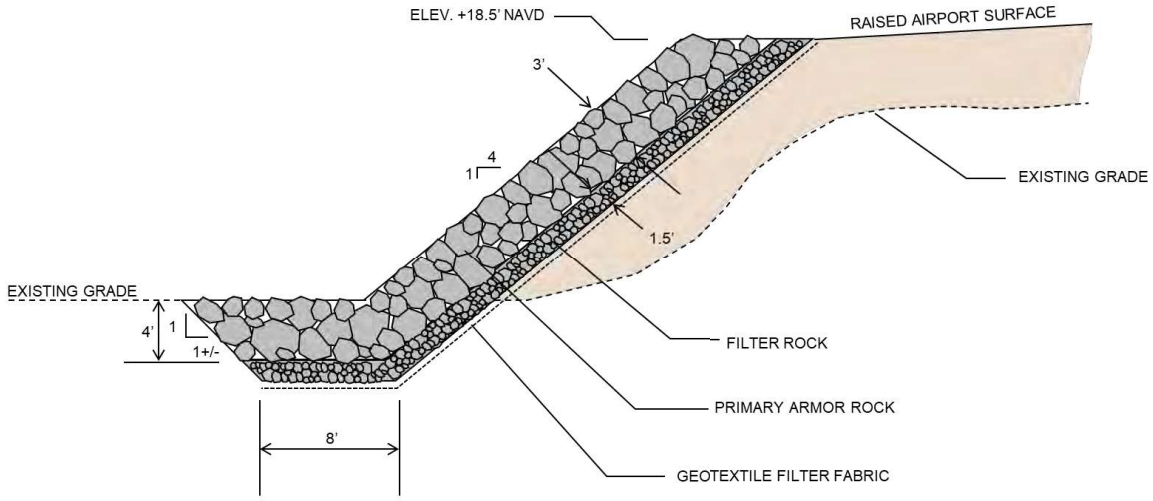


Figure 3-14 Runway Embankment Profile for Erosion Protection Type I (HDR Coastal Report, 2022)

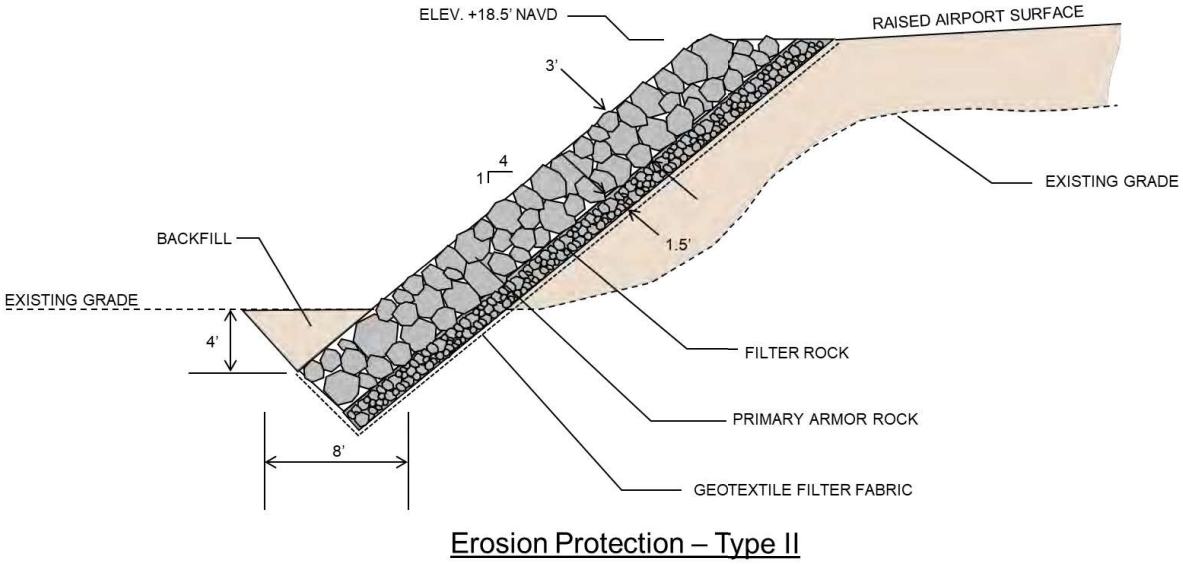


Figure 3-15 Runway Embankment Profile for Erosion Protection Type II (HDR Coastal Report, 2022)

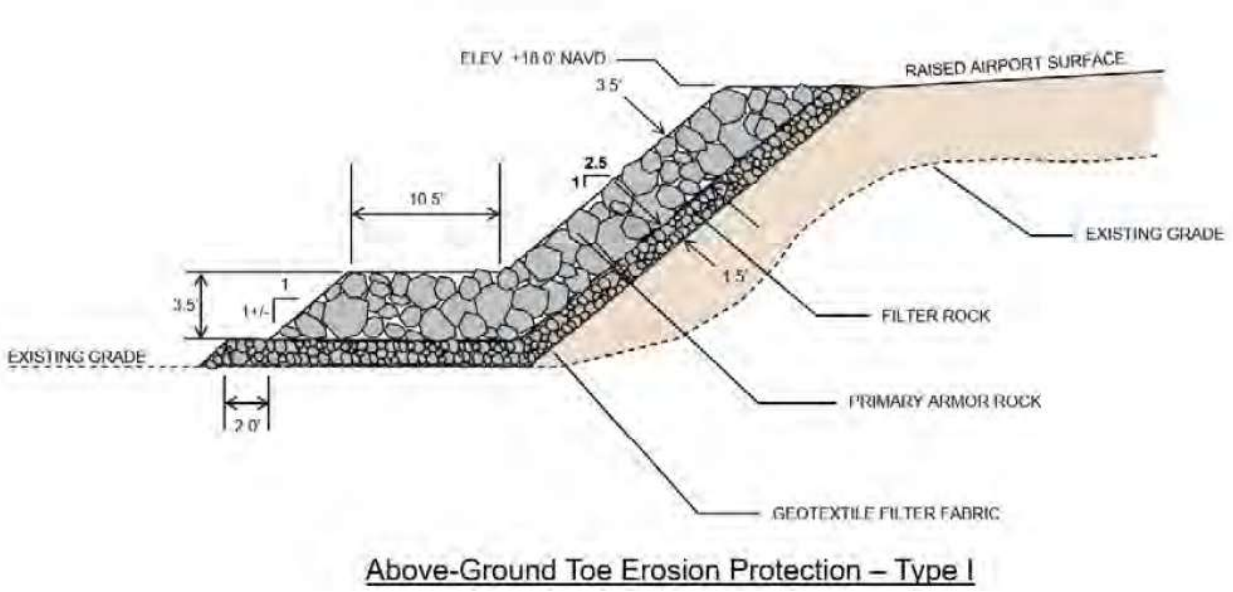


Figure 3-16 Runway Embankment Profile for Above-Ground Toe Erosion Protection – Type 1 (HDR Coastal Report, 2022)

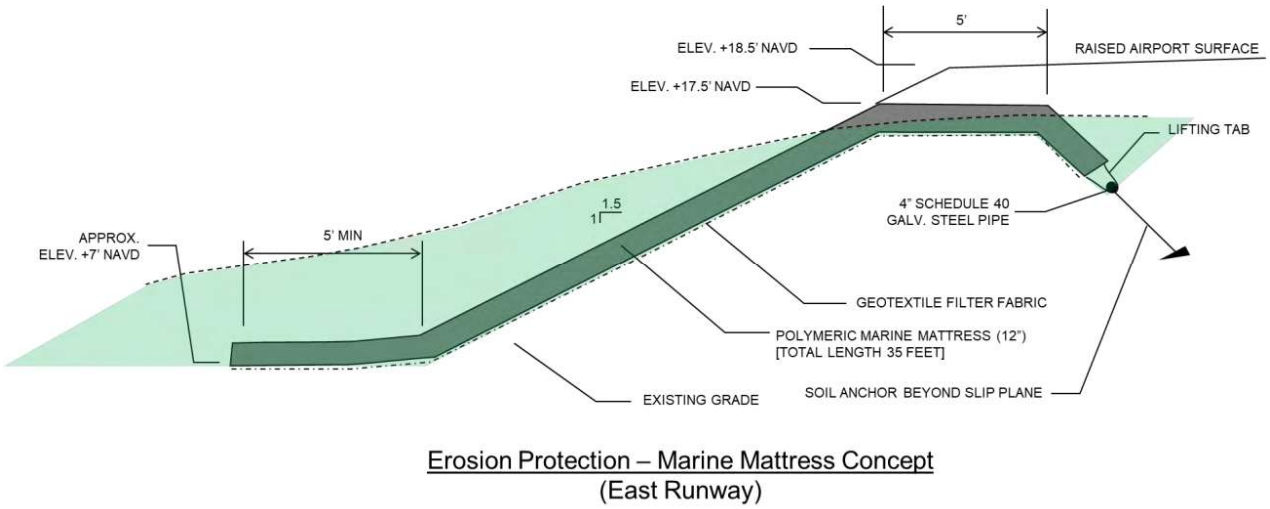


Figure 3-17 Runway Embankment Profile for Marine Mattress Erosion Protection (HDR Coastal Report, 2022)

Alternative 2 (Shift & Raise) would require the culvert to be replaced, with a 72" or 96" diameter culvert, that would be designed to accommodate fish passage. The exact diameter would be determined during the design and engineering phase of the project. However, the HDR Hydrology and Hydraulics Report (Appendix D) proposes a 270 foot long, 96", 8-gage aluminum structural plate culvert at a 0.2 percent slope because it would pass both a 50-year and 100-year design discharge with a headwater depth to culvert diameter (HW/D) ratio less than one.

Fish passage shall be accommodated and structural design would follow the guidelines set forth by the *Memorandum of Agreement* between ADF&G and DOT&PF for the *Design, Permitting, and Construction of Culverts for Fish Passage* (DOT&PF 2025). The Hydrology and Hydraulics study provides additional discussion diagrams and further analysis of a fish passage, which is available in Appendix D.

Safety and Airport Resiliency

Alternative 2 (Shift & Raise) would provide safety and reliability for the community. By shifting the airport 340 feet and raising the edge of the embankment to 19.5 feet above the MHHW and NAVD to protect the airport from forecasted floods and erosion and increase airport resiliency. (An elevation of 19.5 feet, with approximately 6 – 8 feet of material fill, and erosion mitigation at the edge of the embankment was selected to provide 1 foot of freeboard above the forecasted flood level of 18.5 feet above MHHW. The actual runway elevation would be higher, since the center of the runway is designed higher than the embankment edge. To ensure the runway center is sufficiently higher, DOT&PF recommended height is 19.5 feet above MHHW based best on professional judgement. Please see the HDR Coastal Report (Appendix C) and the Hydrology and Hydraulics Report (Appendix D) for complete analysis.

The fog and visibility characteristics would match the current airport and be favorable (only 0.3% of the time less than 0.5 miles).

Wind coverage is known at 90.4%, below the recommended 95%, but more certain than other alternatives.

The area of the alternative that requires new development is considered poor geology because it is comprised of wetlands. This area is limited to the extension of the current infrastructure though, which was also constructed on similar poor geology.

There would be penetrations to Part 77 surfaces including the hills to the south of the runway.

Land Status

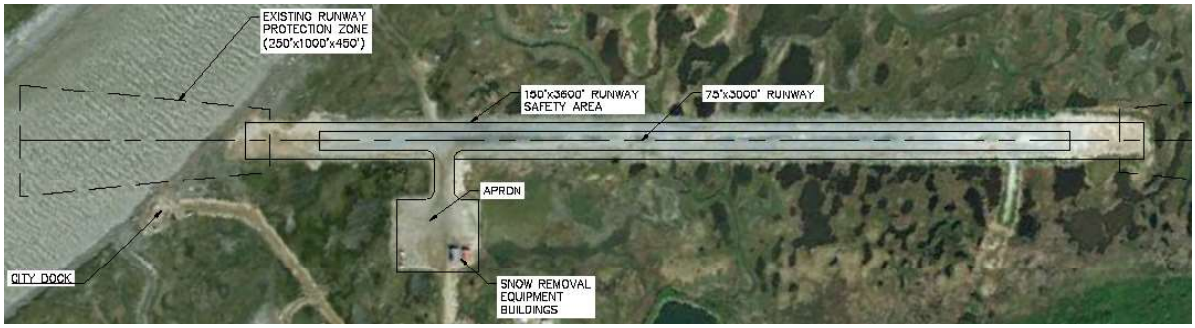
This alternative requires land acquisition for the RPZ. This acquisition would need to be negotiated with local and regional native corporations, at an estimated price of $17,000. The current Airport Layout Plan Property Map (Appendix G) includes planned property acquisition for Parcel 4, that would be required for this alternative. Parcel 4 was initially anticipated for a runway extension, which is no longer supported by the critical aircraft.

Members of the public asked about whether the "Shift & Raise" alternative may allow a portion of the land to be sold. However, it is likely that DOT&PF, FAA, and the community will need to coordinate a land use authorization and avigation easement over the RPZ. The FAA is unlikely to authorize disposal of airport property due to potential shifts in the size of the RPZ. Figure 3-18 depicts the protected land for the existing runway and the "Shift & Raise" alternative. Protecting the land along the approach and departure of the runway is an important safety measure for low flying aircraft, passengers, and the public on the ground. The "Shift & Raise" alternative would expand and shift the protected land to meet current safety standards. Both the "No Action" and the "Shift & Raise" alternatives would discourage the vertical improvement and/or sale of land from the airport to other parties due to these safety concerns. Improvements that don't involve safety concerns can be investigated on an individual basis.

Environmental

Environmental and subsistence concerns are the least, except for the No Action alternative. Public access convenience is very high due to the close proximity to the community and that much of the construction will be on previously disturbed ground. Alternative 2 (Shift & Raise) takes advantage of existing infrastructure, but some new infrastructure is required for the extended runway. This would include filling wetlands, converting habitats that may support wildlife (such as birds), and development of areas that may be used for subsistence use.

Figure 3-18 Protected land adjacent to the Kun River



Existing Runway (above)

Alternative 2: Shift & Raise

Cultural Resources

Scammon Bay is a Yup'ik community that has been settled over one hundred years. Based on a review of the AHRS data for Scammon Bay, cultural resources are reported within the vicinity of the current airport and the entire village of Scammon Bay. These cultural resources could be adversely impacted development under this alternative. Additional consultation with the local community, literature review, and cultural resource surveys would be needed to verify the location and types of cultural resources there and determine necessary mitigation efforts. Please see the DOT&PF PD&E Cultural Resource Evaluation (Appendix H) for more in-depth review of cultural resources. A NHPA Section 106 process and NEPA process would be required as part of any Design project that would occur on or around the existing airport.

Constructability

Constructability is a challenge for the alternative. Construction may take up to four years for Alternative 2 (Shift & Raise). For reference, construction on the Atmautluak and Kasigluk projects took approximately 2 seasons to resurface the runways and safety areas with 9 inches of fill. Due to the need for additional technical studies, NEPA, and design, it is unlikely that construction would begin before 2030.

Air service to the community cannot be shut down for extended periods of time since the Airport is the community's connection to medical facilities and other essential services. The community relies on the airport as a reliable means of transportation. There are no other all-season non-aviation means of connecting to the medical care available in Bethel. Medevac operations could be supported via helicopter from Bethel, but the distance between Scammon Bay and Bethel makes this mode of transport undesirable.

If airport improvements do not incorporate implementation plans to provide for operations with acceptable alternatives to the FAA, the airport will be required to close during the duration of construction according to FAA AC 150/5370-2G, Operational Safety on Airports During Construction.

Replacement of the culvert will require shutting the runway down for a period of time, to excavate, replace the existing culvert, and replace the required fill. This time could be minimized through staging of materials, and preparation to work 24 hours a day during the culvert replacement.

As a result, the project would conduct airport improvements in a manner that does not close the airport for extended periods of time. More detailed design and engineering analysis is required to evaluate feasible construction methods. Some alternatives may include:

- **Temporary Runway Closures:** The contractor could have set periods of time to close the Airport and do sequential lifts of the runway. These can be alternated with periods of the Airport being open, during which the contractor can create the material needed for the next lift.
- **Long, gradual night fills:** Another strategy could include placing fill at night, with the runway reopening during the day to allow flights. The grade transitions would be kept below 3%, and the contactor would feather the grade out longitudinally along the runway so there is no bump in the runway. Project phasing would focus on raising the runway grade incrementally, lift by lift, in the first phase. Once the runway work is completed, then the second phase would concentrate on filling the RSA to grade. This would require the use of a quality source of material, which can support aircraft operations during construction. DOT&PF has had to overcome similar construction challenges for other similar communities, where we have had to keep the runway operational including at Atmautluak, Kasigluk, and Nunapitchuk. The Kasigluk and Atmautluak airport improvement projects were recently completed for Alaska DOT&PF to resurface the runways with crushed aggregate surface course and to correct grades issues on the runways.
- **Halfwidth Operations:** These operations would be difficult given the narrow dimensions of the runway and significant elevation increase. In Alaska, implementation of half-width runway operations for airports undergoing construction projects are considered by the FAA on a case-by-case basis. Half-width runway operations are governed by guidance issued by the FAA (2012) in response to the following questions:
    - Does the airport have another runway with sufficient capability?
        - No for Scammon Bay.
    - Does the Airport have a taxiway of sufficient length and configuration to be used as a temporary runway?
        - No for Scammon Bay.
    - Are there any other viable transportation modes available (year-round road or frequent ferries)?
        - No for Scammon Bay.

  If the answer is no to all three questions, alternative strategies are generally warranted. If the answer is yes to any of the questions, further considerations (below) are required to determine if half-width operations are an acceptable means to maintaining airport operations.
    - Does closing the runway have unacceptable impacts on the community?

        - Yes, this is the primary mode of transportation in and out of the community as well as for the delivery of goods to the city.
    - Can emergency medevac flights be accommodated?
        - Medevac operations could be handled by helicopter but the distance from Bethel can severely limit these operations.
    - Are there published terminal procedures or Required Navigation Performance (RNP) procedures that would be impacted?
        - Scammon Bay has Localizer Precision (LP) Area Navigation (RNAV) procedures for both RW 11 and RW 29.

If Alternative 2 (Shift & Raise) was selected as the preferred Alternative under the Phase II reconnaissance study, the design process for the initial construction project would resume. All design documents and calculations would be compliant with AC 150-5300 13B (2022) for Airport Design, including transverse grade requirements, in the runway, Runways Safety Area (RSA), the Runway Object Free Area (ROFA) to ensure wingtip clearance and aircraft safety consistent with FAA requirements, particularly in the event of aircraft excursions from the runway.

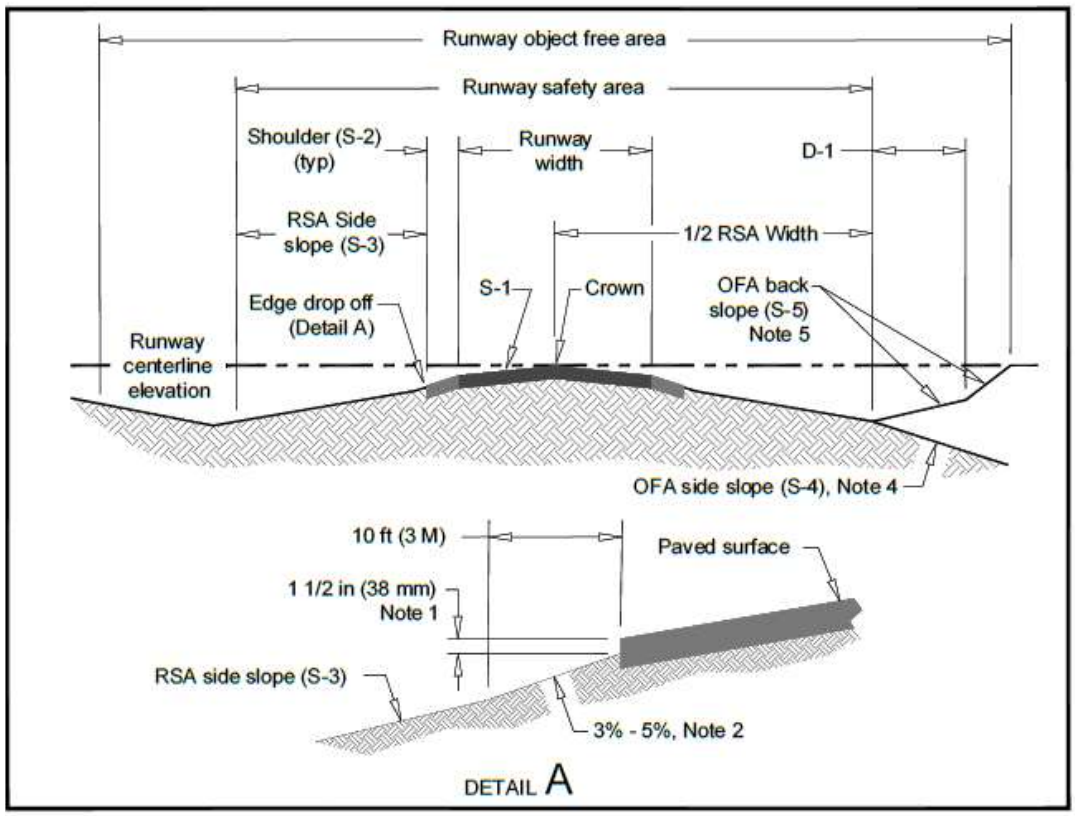


Figure 3-19 AC 150/5300-13B Transverse Grade Limitations

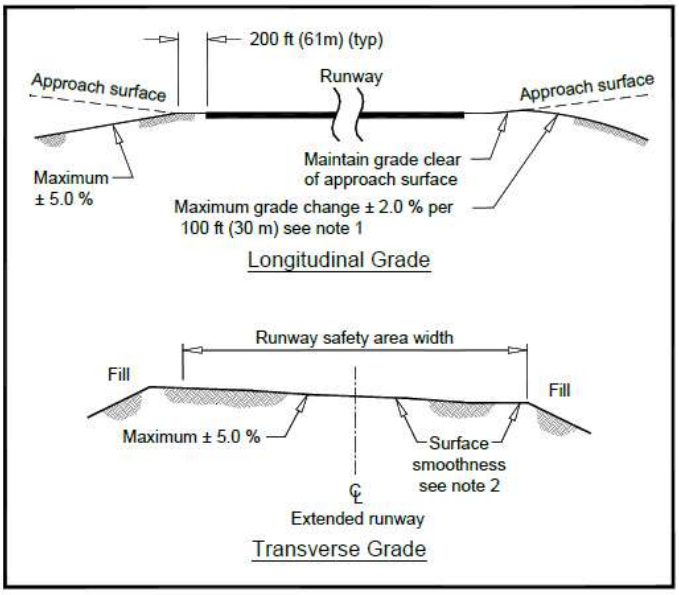


Figure 3-20 AC 150/5300-13B RSA Grade Limitations Beyond 200 feet (61 m) from the Runway End

If the FAA concurs that half-width operations are warranted, the runway embankment will be split into halves. Grade raises would need to be limited to about 6 inches, and 3% differences. The portion of the runway to be in operation in off-work periods will be required to have temporary runway lights. Further analysis of construction phasing for feasibility will occur during the Phase II study, including identifying which navigational aids (NAVAIDs) can remain in service during construction.

At 75 feet wide, Scammon Bay is a relatively narrow runway to accommodate safe half-width operations. This would require pilots to land on a narrow 37.5-foot-wide runway next to a raised embankment during the first phase of work. Additionally, the crosswinds would leave little margin of safety for aircraft operations. A disadvantage to the half-width runway strategy is that flights would be restricted to good visibility and wind conditions.

If required, the runway could be widened, allowing half-width operations and simultaneous construction. Elevation grades would need to be controlled, because steep embankments are not allowed immediately adjacent to active runways. Although design was beyond the scope of this Phase I feasibility study, diagrams of recommended runway improvements consistent with Alternative 2 (Shift & Raise) can be found in the HDR Coastal Report (Appendix C).

Connection to community infrastructure

The taxiway and apron would have to be raised and graded to tie into the community infrastructure. The existing taxiway could likely be widened in 1 night. The apron could be split in half for construction to occur in shifts. The grade of the access road would be raised gradually to meet the airport operational surfaces and meet surrounding community infrastructure. These improvements would occur in phases and there may be short period of time when the access road connection has a dip or hump that would necessitate slower traffic speeds.

Floodplain

Although much of the airport location would remain within the floodplain, this alternative would shift the runway and raise the elevation of the operational surfaces above the floodplain. Based on the analysis of the HDR Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D), this alternative would meet or exceed the 50-year floodplain requirement and ensure AIP minimum useful life and grant assurance requirements are met. Construction may be impacted by flooding.

Hydrology / Geology

Based on the information from the HDR reports, the increased elevation of the airport and drainage improvements should not adversely impact adjacent landowners. The HDR Hydrology and Hydraulics Report (2022) states a project consistent with Alternative 2 would not alter the 100-year floodplain. The increased elevation would be to at least 19.5 North American Vertical Datum (NAVD), not an additional 19.5 feet of materials.

Water Displacement and Mitigation

The elevation of the runway would be raised above the flood zone but is not expected to cause increased water displacement around the new runway any more significantly than current conditions. The final proposed culvert width was 96" diameter in the HDR Hydrology and Hydraulics Report (2022), page 18 for a 100-year design. Although 72" was sufficient, the report determined the cost for the larger culvert was negligible. Water displacement is less clear for Alternative 3 (Near). Water displacement will be less of a concern for Alternative 4 (Castle Hill) and Alternative 5 (Ridgeline).

Potential for Flood Deterioration

The Hydrology & Hydraulics Report (Appendix D) based estimations on a 100-year flood analysis for this alternative. The HDR Coastal Report (2022) (Appendix C) describes the coastal modeling for the project. It assumes a 50-year design life for the modeling of the sea level rise of the runway, which would meet the FAA grant assurance requirements.

The HDR report does provide a table of Storm Surge Probability of Occurring at Least One Time over the Project Life Duration (Table 3-3). The report does not provide a deterioration rate of the armor rock.

Table 3-3 Storm Surge Probability of Occurring at Least One Time over the Project Life Duration

Project Life Duration (years)	50-Year Storm Surge (2% AEP)	100-Year Storm Surge (1% AEP)
25	40%	22%
30	45%	26%
50	64%	40%
75	78%	53%
100	86%	63%

Geotechnical Investigations

Geotechnical investigations are required to design the fill and armoring in the current locations. These are planned for the next phase of the study. These results will allow more accurate characterization of the geotechnical conditions and required engineering design.

The useful life of infrastructure in the Yukon-Kuskokwim Region is difficult to estimate because many communities are located in coastal and riverine areas, wetlands, and permafrost. The soil in those types of topography are typically difficult for construction due to erosion, subsidence, and frost heave.

Climate change and rising water levels are impacting many communities in the Yukon-Kuskokwim Region and coastal Alaska. The recommendations in this study are based on available analysis from the 2022 HDR Coastal Analysis (Appendix C) and Hydrology and Hydraulics reports (Appendix D).

Materials

Required quantities of material are relatively low for the airport improvements, but high for the erosion protection, including riprap materials.

The source of erosion protection materials is unknown. Barging in armor stone is very expensive, and field verified geotechnical studies haven't been conducted yet. The potential exists that local material sources could be used to develop the required erosion protection material, or their functional equivalents. This deserves additional analysis to refine the costs.

A strategy that could be deployed to protect the airport from flooding during construction is to harden the existing embankment with riprap/armor stone under the first phase of construction. This would entail initially widening the RSA embankment to accommodate the raise and placing the riprap.

Under this alternative, materials may not have to be hauled on the community's gravel roads. Trucking of materials in community residential areas can be a concern in small communities. Haul trucks pose a safety and aesthetics impact to the community and increase dust. These impacts differ for barged material and locally developed material depending on the source location. Barged material would require limited trucking in the community since the alternative is very close to the river barge landing. Locally developed material sources east of town would have the potential to increase trucking in the community as they haul material to the airport. These impacts would be reduced if the haul route along the eastern side of the runway is reopened – allowing trucks to avoid trips through town.

Public Opinion

Public support for this alternative was received. A tri-party community resolution was passed by the City of Scammon Bay, Native Village of Scammon Bay, and Askinuk Corporation in support of Alternative 2 on February 24, 2025. The Calista Corporation also submitted a letter of support for Alternative 2 on March 26, 2025.

During the public meeting, the local stakeholders vocalized support for land acquisition for this alternative as well. All residents who spoke at the public preferred this alternative. Stakeholders repeatably stated the other alternatives had inherent weaknesses (detailed in each alternative respectively). This alternative was discussed as having the best airport safety, operations, land status, environmental, maintenance, and convenience to local stakeholders.

Cost

The cost for Alternative 2 (Shift & Raise) is high, because it requires the construction a runway extension and erosion protection (due to its low elevation). The cost for this alternative is estimated to be $75,656,172 for the option using local material, and $130,444,801 for the option using barged material.

Available Engineering Analysis

This alternative was previously evaluated by DOT&PF through HDR, Inc. A Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D) were completed in December 2022, initially as part of a pending construction project. Based on the findings and recommendations studies, this alternative is constructable. However, due to the significant cost, the project was paused for further evaluation, which led to the current study.

Based on the information from the HDR reports, the increased elevation of the airport and drainage improvements should not adversely impact adjacent landowners. The Hydrology & Hydraulics Report (2022) is based estimations on a 100-year flood analysis. It states a project consistent with Alternative 2 (Shift & Raise) would not alter the 100-year floodplain.

The HDR Coastal Report (2022) describes the coastal modeling for a project consistent with Alternative 2 (Shift & Raise). It assumes a 50-year design life for the modeling of the sea level rise of the runway, which would meet the FAA grant assurance requirements.

The recommendations in the HDR reports and associated cost estimates provide in-depth information related to this alternative. The Hydrology Report indicates at least a 72” Diameter Culvert on page 13

based on a 100-year model but recommends a 96" diameter culvert on pages 13 and 18. The Coastal Report provide the following recommendations on pages 31 – 32:

1. To reduce potential for flood inundation, damage from current flow due to breaching, and damage from flooding and wave overtopping, it is recommended to increase the elevation of the Airport Surfaces. For a 2 percent AEP, an elevation of +18.5 feet NAVD88 is recommended in the HDR Coastal Report (Appendix C). However, to ensure the runway height is sufficiently higher than the MHHW for more than 50 years, DOT&PF engineers recommend 19.5 feet above the MHHW based on 1 foot freeboard and best professional practices.

2. Relocating the runway along its current alignment at 340 feet is recommended for a project life duration of 50 years.

3. Erosion protection (armor rock revetment or marine mattress) is recommended around the perimeter of the runway, taxiway, and access road is recommended to mitigate potential erosion and scour due to waves and currents during a flood event.

4. In areas expected to sustain larger wave condition, a section with a toe designed for moderate to severe scour is recommended.

5. Different sections that utilize smaller typical sections should be considered in areas of the airport perimeter that experience smaller wave action.

6. Erosion protection utilizing marine mattresses (or other alternatives to armor rock revetment) should be given consideration, given the infrequent and moderate wave conditions expected to reduce overall construction cost.

3.4 Alternative 3 (Near)

Alternative 3 (Near) would construct a new airport on the transitional area between lowlands and the Askinuk Mountains, near the community of Scammon Bay. A new airport access road, approximately two miles long would need to be constructed. This alternative would require building the Airport embankment edge to +19.5 feet elevation (to provide 1 foot of freeboard above the forecasted flood level of 18.5 feet) and installing the embankment armor. The existing airport would be closed after the construction of the new airport and access road.

Safety and Airport Resiliency

Alternative 3 (Near) provides safety and reliability for the community in a similar manner as Alternative 2 (Shift & Raise), by building the RSA embankment edge up to an elevation of 19.5 feet and installing the embankment armor. This alternative would include an entirely new runway rather than strengthen an existing embankment.

The fog and visibility characteristics and wind characteristics are unknown for this alternative. The V3 Energy (2017) report provides some insights, indicating winds may predominate cross runway but was taken at a higher elevation, and so the local accuracy is unknown. The local topography likely has a large impact on weather.

This alternative does not increase resiliency because it would require new development of an airport and access road in an area of poor geology, similar to the existing airport. The airport access road would be difficult to maintain during inclement weather conditions; heavy rain or snowfall. Flooding may impact the lighting system and embankment.

There would be penetrations to Part 77 surfaces including the hills to the south of the runway and Castle Hill, which would restrict pilot navigation under this alternative.

Additionally, there is a strong correlation between the level of vandalism at a rural airport and its distance from the local community. Airports near the community are less likely to be vandalized. Replacement of lights, cones, and markers over time adds significant costs to overall airport maintenance.

Land Status

This alternative requires acquisition of land for the access road and airport. The current airport may be available for land exchange with the local community after the current airport is closed. This alternative has a relatively short access road off of the existing public access road, minimizing the land acquisition hurdles. However, the project may face delays or cancellation if the landowners and community do not support this alternative.

Environmental

Environmental and subsistence concerns are the least of the relocation alternatives, because less new land would be disturbed for an access road. However, this alternative would require new infrastructure, including filling wetlands, converting habitat that may support wildlife (such as birds), and development of areas that may be used for subsistence use. The level of public access convenience is medium

compared to the other relocation alternatives because the distance is less than three miles from the community.

Cultural Resources

Scammon Bay is a Yup'ik community that has been settled over one hundred years. Based on a review of the AHRS data for Scammon Bay, there are no recorded cultural resources within the vicinity of this Alternative. It is unknown whether there may be adversely impacted cultural resources. Additional consultation with the local community, literature review, and cultural resource surveys would be needed to verify the location and types of cultural resources there and determine necessary mitigation efforts. Please see the DOT&PF PD&E Cultural Resource Evaluation (Appendix H) for more in-depth review of cultural resources. A NHPA Section 106 and NEPA process would be required as part of any Design project that would occur on or around the existing airport.

Constructability

Constructability challenges for this alternative focus on the new access road construction and leveling of the site to allow for the transition between the hill and lowland wetlands and material fill for the operating surface embankment. Due to the need for additional technical studies, NEPA, design, and land acquisition it is unlikely that construction would begin before 2032. Construction would take at least two seasons to complete.

Since this alternative would construct a new airport, further away from the community, construction could occur during the day or night and half-width runway operations would not be necessary because the airport would not be put into service until it was completed and inspected.

Utilities would be challenging because they would need to be expanded into the area. Alaska Village Electric Cooperative provides electricity to the city of Scammon Bay.

A new airport access road would need to be constructed primarily across wetlands. After construction, DOT&PF would be required to maintain the airport access road. DOT&PF and their contractors maintain airport access roads using FAA airport equipment. Under FAA Order 5100.38D, airport access road maintenance is only eligible for AIP funding to the nearest non-aeronautical use access point. This means, if a road connection or driveway is constructed off of the airport access road, that portion of the road will no longer be eligible for maintenance using FAA funds. Communities such as Scammon Bay do not

typically own local heavy maintenance road equipment or regular road clearing services and would be unable to establish a maintenance agreement for the ineligible portions of the road.

Floodplain

This alternative would relocate the airport entirely within the floodplain. Although the embankment and operational surfaces could be designed and constructed to withstand flooding, the costs are significantly higher than the other alternatives. Construction of a new airport in this location is likely to be more impacted by flooding than the other alternatives.

Hydrology / Geology

No hydrological or coastal erosion studies specific to this alternative have been conducted. The location of this alternative is within the floodplain, similar to the existing airport, and would be expected to experience the same impacts of flooding and erosion as the "No Action" and "Shift & Raise" alternatives.

Water Displacement & Mitigation

This alternative is not expected to cause increased water displacement beyond the amount of the "No Action" alternative because of the distance of the airport site from the community within the flood zone.

Potential Flood Deterioration

Due to the location within the flood zone, this alternative is expected to experience the same level of flooding and deterioration as the "No Action" and "Shift & Raise" alternatives. Since the location is further away from the surrounding highlands, it may be worse.

Geological Investigations

No geotechnical evaluation for this alternative has occurred. This alternative would be constructed on similar geology as the existing airport.

Materials

Required quantities of material are relatively high for this alternative, including riprap materials because the airport would be located in the floodplain.

Trucking impacts differ for differ for barged material and locally developed material. Barged material would require extensive trucking through the community. A haul road may need to be developed to avoid trucking through town. Locally developed material sources would reduce the trucking in the community, since construction traffic could be largely located east of town. Material hauled on the local gravel roads would also destabilize the local road embankment and increase dust.

Public Opinion

Public opinion was against this alternative. No public comments were received in support of this alternative.

During the public meeting, the local stakeholders stated that winds would be very bad for this alternative, as suggested by the V3 Energy study. The stakeholders stated winds flow down the mountain and would be directly crosswind to this runway. Drainage also flows down the mountain in the spring toward this location.

Local stakeholders stated that the wetlands and bodies of water would take far more fill than would be expected, because of poor geotechnical conditions in the lowlands.

Local stakeholders were also concerned about the accessibility of the alternative for community members (who have no vehicles for transportation), and maintenance of the access road. There is no public transportation system or shuttle service available for travel to the airport.

Local stakeholders emphasized that land acquisition or potential land transfer required for this alternative is unlikely, given the lack of community support. If the landowners do not support the project, land acquisition could be delayed due to litigation and may ultimately result in the delay or cancellation of the project or re-evaluation of other alternatives.

Cost

The cost for Alternative 3 (Near) is the highest, because it requires the construction of a new airport, erosion protection (due to its low elevation), and an airport access road, primarily on wetlands. The cost is estimated to be $94,588,701 for the option using local material, and $182,828,675 for the option using barged material. Additional costs would include construction and maintenance of the airport access road, which is subject to local contractor agreements and availability.

Available Engineering Analysis

This alternative has not been evaluated through a formal engineering report by DOT&PF. An additional engineering study would be needed to evaluate relocation of the airport to this site.

3.5 Alternative 4 (Castle Hill)

Alternative 4 (Castle Hill) would construct a new airport on the valley between Castle Hill and the Askinuk Mountains. A new access road of approximately 4 miles long would need to be constructed. The existing airport would be closed after the completion of the new airport.

Safety and Airport Resiliency

Alternative 4 (Castle Hill) addresses potential erosion and flooding by constructing a new Airport at a higher elevation that would be more resilient because it would be protected from impacts of future river erosion or flooding.

The fog and visibility characteristics are more uncertain but is assumed to be between 0.3 – 6.7% below 0.5 miles of visibility (based on the data available from the current Scammon Bay Airport weather observations).

Wind coverage is uncertain. The V3 Energy LLC, (2017) wind rose is from a similar elevation (~200 feet) but was positioned in a pass, and the indicators are for different winds at 10m and 50m heights. Complicating matters, the runway would be placed in a valley, surrounded by hills which may change the direction of wind. A weather station and current wind study would need to be installed to confirm local conditions prior to the selection of this alternative to determine the runway alignment.

Geotechnical conditions are expected to be higher quality than the low-laying wetland areas.

A new airport access road, over 4 miles long, would need to be constructed. The airport access road would be difficult to maintain during inclement weather conditions such as heavy rain or snowfall. There isn't an example of an airport access road this long being successfully maintained in other similar communities in Alaska. Inclement weather conditions may impact access to the airport alternative being unusable during the winter.

After construction, DOT&PF would be required to maintain the airport access road. DOT&PF and their contractors maintain airport access roads using FAA airport equipment. Under FAA Order 5100.38D, airport access road maintenance is only eligible for AIP funding to the nearest non-aeronautical use access point. This means, if a road connection or driveway is constructed off of the airport access road,

that portion of the road will no longer be eligible for maintenance using FAA funds. Communities such as Scammon Bay do not typically own local heavy maintenance road equipment or regular road clearing services and would be unable to establish a maintenance agreement for the ineligible portions of the road.

Penetrations to Part 77 surfaces include the hills to the south of the runway and Castle Hill, which restricts the freedom of pilots to navigate to this alternative.

Additionally, there is a strong correlation between the level of vandalism at a rural airport and its distance from the local community. Airports near the community are less likely to be vandalized. Replacement of lights, cones, and markers over time adds significant costs to overall airport maintenance.

Land Status

This alternative requires land acquisition similar to Alternative 3 (Near). Acquisition would need to be negotiated with local and regional native corporations.

Environmental

Potential environmental and subsistence concerns are mixed for this alternative. Wetland impacts are potentially lower than Alternative 3 (Near), due to the favorable topography and elevation. Subsistence and wildlife impacts may be increased due to the larger overall footprint of disturbance. Public access convenience is low for this alternative. It is not close to the community and would require travel by vehicle to the Airport. Residents would be unlikely to see or hear airport activity, making timing of arrivals and departures more difficult. Drainage channels would be constructed as appropriate and it is assumed to be included in the 25% design contingency fee estimate.

Cultural Resources

Scammon Bay is a Yup'ik community that has been settled over one hundred years. Based on a review of the AHRS data for Scammon Bay, there are no recorded cultural resources within the vicinity of this Alternative. It is unknown whether there may be adversely impacted cultural resources. Elevated areas have an increased likelihood for hosting cultural resources, so this alternative may have undiscovered cultural resources. Additional consultation with the local community, literature review, and cultural resource surveys would be needed to verify the location and types of cultural resources there and determine necessary mitigation efforts. Please see the DOT&PF PD&E Cultural Resource Evaluation (Appendix H) for more in-depth review of cultural resources. A NHPA Section 106 and NEPA process would be required as part of any Design project that would occur on or around the existing airport.

Constructability

Constructability challenges for this alternative focus on the longer distance from the community, requiring improvements in access roads and new infrastructure. Due to the need for additional technical studies, NEPA, and design, it is unlikely that construction would begin before 2032. Construction would take at least two seasons to complete.

Since this alternative would construct a new airport, further away from the community, construction could occur during the day or night and half-width runway operations would not be necessary because the airport would not be put into service until it was completed and inspected.

Utilities would be challenging because they would need to be expanded into the area. Alaska Village Electric Cooperative provides electricity to the city of Scammon Bay.

A new access road would need to be constructed and maintained that may be over 4 miles in length and could impact local creeks and streams. Small bridges and culverts may be needed. The road would also be subject to spring thaw runoff and potentially wash out in some areas and difficult to maintain in the winter.

Floodplain

This alternative would relocate the airport above the floodplain. Construction of a new airport in this location is less likely to be impacted by flooding than Alternatives 1, 2, and 3. Additional floodplain analysis would be required to fully analyze potential flooding impacts on design and construction.

Hydrology / Geology

No hydrological or coastal erosion studies specific to this alternative have been conducted. The location of this alternative is above the floodplain so impacts from erosion and flooding are expected to be less than Alternatives 1 (No Action), Alternative 2 (Shift & Raise), and Alternative 3 (Near).

Water Displacement & Mitigation

This alternative is not expected to cause increased water displacement because it is located above the flood zone over four miles from the community.

Potential Flood Deterioration

This alternative is not expected to experience flood deterioration because it would be located above the flood zone.

Geological Investigations

No geotechnical evaluation for this alternative has occurred. This alternative would be constructed above the flood zone so the soil and geology may be more stable. Further analysis is needed to determine the geological composition of the site.

Materials

This alternative avoids the need for erosion protection materials; but still requires significant materials to build the access road and new airport.

Similar to other alternatives, there is a difference in the potential impacts from barged material and local material. Local material sources are likely available to be developed near the alternative, which reduces the cost and impact to the community.

Barged material and equipment would need to travel through the community, which is a potential safety hazard and negative community impact. Material hauled on the local gravel roads would also destabilize the local road embankment and increase dust. A haul road may need to be constructed around the community.

Public Opinion

Public opinion was against this alternative. No comments were received in support of this alternative.

At the public meeting, the local stakeholders stated that winds would be bad for this alternative, and that the winds are funneled by the topography to the north side, resulting in a lot of turbulence, wind shear, and cross winds at this location. The only alternative with worse winds would be the Ridgeline Alternative.

Local stakeholders were also concerned about the accessibility of the alternative for community members (who have no vehicles for transportation), and maintenance of the access road. There is no public transportation system or shuttle service available for travel to the airport.

Local stakeholders emphasized that the land acquisition or land transfer required for this alternative is unlikely, given the lack of community support. If the landowners do not support the project, land

acquisition could be delayed due to litigation and may ultimately result in the delay or cancellation of the project or re-evaluation of other alternatives.

Cost

The cost for Alternative 4 is high because of the long new access road and the construction of a new airport. Prior to selecting this particular location on Castle Hill, other locations were evaluated around Castle Hill, and all of them have high degrees of topography change. The best location was selected and is situated in a flat pass between Castle Hill and the Askinuk Mountains. The cost is estimated to be $66,714,222 for the option using local material, and $126,997,026 for the option using barged material. Additional costs would include construction and maintenance of the airport access road, which is subject to local contractor agreements and availability.

Available Engineering Analysis

This alternative has not been evaluated through a formal engineering report by DOT&PF. An additional engineering study would be needed to evaluate relocation of the airport to this site.

3.6 Alternative 5 (Ridgeline)

Alternative 5 (Ridgeline) would construct a new Airport on the ridgeline south of Scammon Bay in the Askinuk Mountains. A 6-mile airport access road would also need to be constructed. The existing airport would be closed after the completion of the new airport.

Safety and Airport Resiliency

Alternative 5 (Ridgeline) addresses lowland riverine erosion and flooding by moving the Airport to the top of the Askinuk Mountains. Although the airport would be at a higher elevation and more resilient to erosion and flooding, the overall weather conditions may make this airport less reliable than the other alternatives.

The impact of weather on airport operations is the most uncertain for this alternative. The V3 Energy LLC wind studies indicate winds come from the north (rather than the east) and are at a higher velocity than the existing airport. This requires rotation of the runway. A current wind study will be required to determine the best runway alignment. Runway alignment to provide wind coverage is particularly important for this alternative, because the winds run opposite to the topography, so that even small alignment shifts requiring large additional costs in materials to compensate for the steep hillside.

Fog and visibility also appear to be worse for this alternative, with up to 17% of the time being below 0.5 miles, as estimated from the current Scammon Bay airport weather data.

Geology for this alternative is expected to be favorable.

A new airport access road, over 4 miles long, would need to be constructed. The airport access road would be difficult to maintain during inclement weather conditions such as heavy rain or snowfall. There isn't an example of an airport access road this long being successfully maintained in other similar communities in Alaska. Inclement weather conditions may impact access to the airport alternative being unusable during the winter.

After construction, DOT&PF would be required to maintain the airport access road. DOT&PF and their contractors maintain airport access roads using FAA airport equipment. Under FAA Order 5100.38D, airport access road maintenance is only eligible for AIP funding to the nearest non-aeronautical use access point. This means, if a road connection or driveway is constructed off of the airport access road, that portion of the road will no longer be eligible for maintenance using FAA funds. Communities such as Scammon Bay do not typically own local heavy maintenance road equipment or regular road clearing services and would be unable to establish a maintenance agreement for the ineligible portions of the road.

Penetrations to Part 77 surfaces include the peaks to the southwest of the runway.

Additionally, there is a strong correlation between the level of vandalism at a rural airport and its distance from the local community. Airports near the community are less likely to be vandalized. Replacement of lights, cones, and markers over time adds significant costs to overall airport maintenance.

Land Status

This alternative requires land acquisition, including improvements of the access road, and construction of an extension of the access road, including acquisition of title for these improvements. These would need to be negotiated with local and regional native corporations.

The access road will also need to be to be regularly maintained, which has proven to be a large burden for other communities with small populations.

Environmental

Potential environmental and subsistence concerns are mixed for this alternative. Preliminary indications of wetlands impacts are less than Alternative 3 (Near) and 4 (Castle Hill) but the mapping is of low quality in this area. Subsistence and wildlife impacts may be increased due to the use of the ridgelines for subsistence activities. Public access convenience is very low for this alternative. It is not close to the community and would require travel up to the ridgelines. Access in winter would be particularly difficult and require road maintenance that may not be feasible with current local maintenance. This could result in an airport that is not useable for the local community.

Cultural Resources

Scammon Bay is a Yup'ik community that has been settled over one hundred years. Based on a review of the AHRS data for Scammon Bay, there are no recorded cultural resources within the vicinity of this Alternative. It is unknown whether there may be adversely impacted cultural resources. Elevated areas have an increased likelihood for hosting cultural resources, so this alternative may have undiscovered cultural resources. This is supported by the subsistence mapping, which reports using ridgelines for spotting seals. This activity can lead to high levels of cultural resources since the same locations have often been used to spot marine mammals for generations. Additional consultation with the local community, literature review, and cultural resource surveys are needed to verify the location and types of cultural resources there and determine necessary mitigation efforts. Please see the DOT&PF PD&E Cultural Resource Evaluation (Appendix H) for more in-depth review of cultural resources. A NHPA Section 106 and NEPA process would be required as part of any Design project that would occur on or around the existing airport.

Constructability

Constructability challenges are focused on the long distance from the community. Access roads, utilities, and new infrastructure will be required. Due to the need for additional technical studies, NEPA, and design, it is unlikely that construction would begin before 2032. Construction would take at least two seasons to complete.

Since this alternative would construct a new airport, further away from the community, construction could occur during the day or night and half-width runway operations would not be necessary because the airport would not be put into service until it was completed and inspected.

Utilities would be challenging because they would need to be expanded into the area. Alaska Village Electric Cooperative provides electricity to the city of Scammon Bay.

A new access road would need to be constructed and maintained that may be over 6 miles in length and could impact local creeks and streams. Small bridges and culverts may be needed. The road would also be subject to spring thaw runoff and potentially wash out in some areas and difficult to maintain in the winter.

Floodplain

This alternative would relocate the airport above the floodplain. Construction of a new airport in this location is less likely to be impacted by flooding than Alternatives 1, 2, and 3. Additional floodplain analysis would be required to fully analyze potential flooding impacts on design and construction.

Hydrology / Geology

No hydrological or coastal erosion studies specific to this alternative have been conducted. The location of this alternative is above the floodplain so impacts from erosion and flooding are expected to be less than Alternatives 1 (No Action), Alternative 2 (Shift & Raise), and Alternative 3 (Near).

Water Displacement & Mitigation

This alternative is not expected to cause increased water displacement because it is located above the flood zone over six miles from the community.

Potential Flood Deterioration

This alternative is not expected to experience flood deterioration because it would be located above the flood zone. However, it may be impacted by to spring runoff from the surrounding mountains.

Geological Investigations

No geotechnical evaluation for this alternative has occurred. This alternative would be constructed above the flood zone so the soil and geology may be more stable. Further analysis is needed to determine the geological composition of the site.

Materials

This alternative avoids the need for erosion protection materials; but requires a lot of material to build the access road and new airport.

Similar to other alternatives, there is a difference in the potential impacts from barged material and local material. Local material sources are likely available to be developed near the alternative, which reduces the cost and impacts to the community.

Barged material and equipment would need to travel through the community, which is a potential safety hazard and negative community impact. Material hauled on the local gravel roads would also destabilize the local road embankment and increase dust. A new haul road may need to be constructed around the community.

Public Opinion

Public opinion was strongly against this alternative.

The local stakeholders stated that winds would be bad for this alternative. The winds have lots of turbulence and high speeds in this area.

At the public meeting, a local resident spoke of his experience maintaining the telecommunication tower near this alternative. He stated that he maintains this telecommunication tower, and many other towers in communities throughout the region, and the Scammon Bay tower experiences the most wind damage because the winds are so bad. He stated that the warm sea air and cold land air mix, creating bad winds and bad visibility.

Local stakeholders stated the visibility is the worst on the ridgelines. They stated that while the valley bottoms are often clear, the ridgelines are often filled with fog and clouds.

Local stakeholders were also concerned about the accessibility of the alternative for community members (who have no vehicles for transportation), and maintenance of the access road. There is no public transportation system or shuttle service available for travel to the airport.

Local stakeholders emphasized that the transfer of lands required for this alternative is unlikely, given the lack of community support. If the landowners do not support the project, land acquisition could be delayed due to litigation and may ultimately result in the delay or cancellation of the project or re-evaluation of other alternatives.

Cost

The cost for Alternative 5 (Ridgeline) must balance the uncertainty about wind direction and the excavation and fill required to reshape the topography into a flat runway. The current orientation takes advantage of the natural ridge to minimize cost. The Alternative also requires an extension of the access road. The cost is estimated to be $59,398,368 for the option using local material, and $109,266,097 for the option using barged material. Additional costs would include construction and maintenance of the airport access road, which is subject to local contractor agreements and availability.

Available Engineering Analysis

This alternative has not been evaluated through a formal engineering report by DOT&PF. An additional engineering study would be needed to evaluate relocation of the airport to this site.

3.7 Alternatives Considered and Deemed Not Feasible

Three alternatives were considered at a high level, but rejected from further analysis:

- North of the Kun River: An airport could be constructed on the north side of the Kun River. This alternative was rejected because the extensive lowlands in this area would subject the airport to the same floodwaters threatening the current location. The airport location would require the construction and maintenance of an access road and bridge across the Kun River, which would likely be more expensive than the evaluated relocation alternatives; Alternative 3 (Near), Alternative 4 (Castle Hill) and Alternative 5 (Ridgeline).

- Lowlands South of the Kun River: An airport could be constructed south of the Kun River, in the large wetland complex northeast of the existing community of Scammon Bay. This alternative was rejected because the lowlands would subject the airport to the same floodwaters threatening the current location. In addition, moving the airport from the Kun River does not remove the need to provide costly erosion protection. The erosion modeling (HDR, 2022a) indicated that erosion takes places during flooding at all locations of the airport, not just along the Kun River. This location would also require the construction and maintenance of a new access road.

- Raise: The current airport could be raised and armored, without shifting it away from the Kun River. This alternative would subject the airport embankment to the continued erosion threat and repeated erosion mitigation rehabilitation after heavy flooding events. The primary benefit is that this alternative would not require new land acquisition, airport relocation, or a new access road.

4 ALTERNATIVES SUMMARY

Five alternatives were reviewed that considered maintaining the airport in its current location, shifting the runway and operational surfaces inland, or constructing a new airport further inland. Two of those alternatives, Alternative 1 (No Action) and Alternative 2 (Raise & Shift), were previously evaluated by DOT&PF as part of an airport improvement project that was paused due to funding and viability concerns. Two technical studies were produced by HDR in 2022 that were incorporated into this study: Coastal Report (Appendix C) and Hydrology and Hydraulics Report (Appendix D). It was beyond the scope of this feasibility study to develop engineering designs and diagrams for the relocation alternatives.

Alternative 1 (No Action) does not address the flooding and erosion threats to the airport. This alternative does not offer operational safety because the airport may be periodically closed due to flooding and repairs. This alternative offers public access convenience and there would be no environmental impact beyond periodic improvements to the existing embankment. This alternative also does not meet FAA standards for wind and widening the runway should be considered.

Based on the information provided in the 2022 HDR Coastal Report and Hydrology and Hydraulics Report, (Appendix C and Appendix D), a “No Action” alternative is not feasible as a long-term solution for the Scammon Bay airport.

Alternative 2 (Shift & Raise) raises and shifts the runway embankment allowing for greater armoring of the runway and shifting the remainder of the runway away from the river.

This alternative offers operational safety, public access convenience, and much of the environmental impact is within the existing footprint of the airport. There are known cultural resources in the AHRS located in the vicinity of this alternative that require further consultation and analysis for adverse effects and mitigation are needed. This alternative requires land acquisition near the current airport that the community provided verbal support for at the public meeting and a community resolution, so there would be a low risk for delays in design and construction related to land acquisition opposition.

Preliminary engineering concepts and diagrams of the runway profile for this alternative can be found in the 2022 HDR Coastal Report and Hydrology and Hydraulics Report, (Appendix C and Appendix D). Based on the information in those reports, this alternative is feasible.

Alternative 3 (Near) requires both erosion protection and construction on poor topography and wetlands, which negatively impacts wind and Part 77 surfaces. This alternative also does not offer the same level of

operational safety and public access convenience as Alternative 2 (Shift & Raise). There are no known cultural resources in the AHRS located in the vicinity of this alternative. Further consultation and analysis for adverse impacts and mitigation are needed. This alternative would require land acquisition and construction of a new 2 mile access road, which the landowner and community are opposed to. The acquisition process may delay much needed airport improvements for the community. Maintenance of the access road would be difficult for the community and DOT&PF. The development of engineering diagrams for this alternative were beyond the scope of this Phase I feasibility study. This alternative is not considered feasible.

Alternative 4 (Castle Hill) avoids the cost of erosion protection in Alternative 3 (Near), but it does not offer the same level of operational safety, public access convenience, as Alternative 2 (Shift & Raise), and will cause significant environmental and wetlands disturbance. There are no known cultural resources in the AHRS located in the vicinity of this alternative. However, the location is at a higher elevation and there is a likelihood of cultural resources. Further consultation and analysis for adverse impacts and mitigation are needed. Based on existing wind data, it is unclear what the ultimate runway and crosswind configuration would be for the Castle Hill alternative. This alternative would require land acquisition and construction of a new 4 mile access road, which the landowner and community are opposed to. The acquisition process may delay much needed airport improvements for the community, if not result in cancellation. Maintenance of the access road would be difficult for the community and DOT&PF. The development of engineering diagrams for this alternative were beyond the scope of this Phase I feasibility study. This alternative may be considered feasible if additional studies demonstrate the further support this alternative and public support is provided.

Alternative 5 (Ridgeline) has the lowest cost estimate because it does not require the additional flooding and erosion protection of lowland alternatives. Due to lack of data for wind and visibility, this may be the least feasible option, or most uncertain. It is unclear what the ultimate runway and crosswind configuration would be for the Ridgeline alternative. Installation of a weather station and further analysis would be needed to determine the feasibility of this alternative. If the alignment is significantly different, the cost of excavation and fill will increase and potentially eliminate the overall cost savings.

Alternative 5 (Ridgeline) would not allow for public access convenience and would cause significant environmental impact. There are no known cultural resources in the AHRS located in the vicinity of this alternative. However, the location is at a higher elevation and there is a likelihood of cultural resources. Further consultation and analysis for adverse impacts and mitigation are needed. This alternative would require land acquisition and construction of a new 6 mile access road, which the landowner and

community are opposed to. The acquisition process may delay much needed airport improvements for the community. Maintenance of the access road would be difficult for the community and DOT&PF. The development of engineering diagrams for this alternative were beyond the scope of this Phase I feasibility study. This alternative is unlikely to be feasible due the distance from the community and significant environmental impact.

4.1 Preferred Alternative

DOT&PF recommends Alternative 2 (Shift & Raise) as the preferred alternative based on this Phase I feasibility study because it provides the best combination of operational safety, public access convenience, and limited environmental impacts than the other alternatives, other than the "No Action" alternative. The "Shift & Raise" alternative has preliminary coastal and hydrology analysis and design recommendations completed.

This alternative is also the only one with a practicable land acquisition based on verbal support during the public meeting. The community passed a tri-party resolution in support of this alternative. The Calista Corporation also submitted a letter of support for this alternative. This support may allow for project design and construction to begin without undue delay. This alternative's cost can be better estimated with the results from future geotechnical studies for local material sources.

DOT&PF believes the importance of community and landowner support cannot be underestimated. DOT&PF needs cooperation and permission from the potentially impacted landowners to gain access to their private land for cultural resource information, wind studies, and geotechnical studies. There have been many examples of rural construction projects that were delayed or ultimately cancelled due to landowner resistance and lack of public support. Landowner resistance may also result in litigation and condemnation, leading to community resentment. Some examples of land acquisition issues delaying or cancelling a project include the Stony River Airport Relocation, Bethel Tundra Ridge Road, Kwigillingok Runway Shift Project, and the Port Graham/Nanwalek Airport Improvement Project.

Alternative 2 (Shift & Raise) has been formally evaluated by DOT&PF and was in the Design phase, but was paused due to funding concerns, and led to this Phase 1 feasibility study. The Design and Environmental process could be completed within three to five years. Additional Right of Way analysis would also be required for the community housing and community utility (fueling, wastewater treatment) due to increased edge of airport. Additional public involvement will also be required, including cultural resource consultation and review, consistent with the NHPA Section 106 and NEPA process. A life cycle cost analysis would need to be developed under a Phase II study or during the Design Phase.

The relocation alternatives would require additional multi-year technical studies prior to beginning the Design and Environmental phases, followed by contentious land acquisition, which could delay much needed airport improvements for Scammon Bay indefinitely.

4.2 Alternatives Selected for Analysis under the Phase II Reconnaissance Study

The primary goal of this federally funded Phase I feasibility study was to evaluate the feasibility of maintaining the airport in its current location, shifting the runway and operational surfaces inland, or constructing a new airport further inland. Based on this analysis, DOT&PF selected the "Shift & Raise" alternative as the preferred alternative. However, additional in-depth analysis is needed to make a final determination due to the high cost and potential environmental risks associated with each alternative evaluated under this study. Federally funded studies are required to evaluate a reasonable range of alternatives when assessing the potential environmental impacts and costs of proposed projects.

Three potentially feasible alternatives were selected for in-depth analysis under a Phase II reconnaissance study: Alternative 1 (No Action), Alternative 2 (Shift & Raise), and Alternative 4 (Castle Hill).

Alternative 1 (No Action) was selected because FAA advised that under a NEPA process, a "No Action" alternative must be analyzed and compared to "Action" alternatives. Based on DOT&PF's findings of this feasibility study, this alternative does not meet the safety and airport resiliency needs for the community though because flooding will not be mitigated and repeated construction projects will be necessary based on this study. A life cycle cost analysis, construction phasing, and cultural resource information will be necessary to further evaluate the feasibility of this alternative for further comparison with the "Shift & Raise" and "Castle Hill" alternatives.

Alternative 2 (Shift & Raise) was selected because it provides the best combination of operational safety, public access convenience, and less environmental impacts than the other alternatives, except the "No Action" alternative based on this study. This alternative is also the only one with a practicable land acquisition because landowners have submitted a resolution and letter of support. It was also verbally supported at the public meeting. Since coastal and hydrology studies have already been completed for this alternative, the project could reinitiate the Design Phase without delay. If the improvements were constructed consistently with coastal report and hydrology and hydraulics studies, the airport embankment would be resilient to flooding and erosion and meet federal grant assurance requirements. This alternative's cost can be better estimated with the results from future geotechnical studies for local material sources. A life cycle cost analysis, construction phasing analysis, and cultural resource

evaluation are also required for this alternative for further comparison with the "No Action" and "Castle Hill" alternative.

Alternative 4 (Castle Hill) was selected as the relocation alternative to be considered for additional analysis because it is at a higher elevation than the current airport and would be resilient to flooding and erosion. Alternative 4 is estimated to cost less than Alternative 2 (Shift & Raise) to construct because erosion mitigation would not be needed. This alternative still requires additional geotechnical analysis, material source investigation (including location, quality, material transport, and material stockpiling), wind study, and airport access road constructability and maintenance evaluation. A life cycle cost analysis, construction phasing analysis, and cultural resource information are also required for this alternative compared for further comparison with the "No Action" and "Shift and Raise" alternatives. The Right of Way for this potential airport site must also be evaluated for a 4-mile access road route. The potential cost of electricity and sources for lighting along the access road must also be estimated in a Phase II study and are likely to be higher than Alternatives 1 and 2, due to the distance from the community. Maintenance of a new airport road would be difficult during inclement weather conditions and be subject to costs for a local contractor, which may vary due to limited availability of qualified contractors in Scammon Bay. Traveling at least 4 miles to the airport would be difficult for Scammon Bay residents since many of them do not own motor vehicles. They will be traveling to and from the airport via the ATV, snow machine, and on foot. Landowners and the local community do not support this alternative based on the public comments and the resolution, which may lead to resistance for DOT&PF to study and acquire land to construct this alternative.

However, DOT&PF is required to evaluate a reasonable number of alternatives, including the "No Action" alternative to ensure compliance with NEPA. Alternative 4 (Castle Hill) appears to be the most feasible of the relocation alternatives.

4.3 Alternatives Not Selected for Additional Analysis

Alternative 3 (Near) was not selected to advance for additional analysis because it is the most expensive, and perhaps the least feasible due to requiring erosion protection and construction on poor topography including wetlands and likely unstable geology. Although a new access road for this alternative is shorter than the other relocation alternatives, it would be on wetlands, unlike Alternative 4 (Castle Hill) and Alternative 5 (Ridgeline), which would primarily be constructed on uplands. The potential cost of electricity and sources for lighting along the access road are likely to be higher than Alternatives 1 and 2. Maintenance of a new airport road would be difficult during inclement weather conditions and be subject

to costs for a local contractor, which may vary due to limited availability of qualified contractors in Scammon Bay. Traveling at least 2 miles to the airport would be difficult for Scammon Bay residents since many of them do not own motor vehicles. They will be traveling to and from the airport via the ATV, snow machine, and on foot. Landowners and the local community do not support Alternative 3 based on the public comments and the resolution, which may lead to resistance for DOT&PF to study and acquire land to construct this alternative.

Alternative 5 (Ridgeline) was not selected to advance for additional analysis. This alternative is estimated to be the least expensive for airport embankment construction and erosion protection but also has the most uncertainty in the cost estimate because the exact route and constructability of the 6-mile access road is unknown. The potential cost of electricity and sources for lighting along the access road is likely to be the highest of the alternatives due to sheer distance from the community. Maintenance of a new airport road would be difficult during inclement weather conditions and be subject to costs for a local contractor, which may vary due to limited availability of qualified contractors in Scammon Bay. Traveling at least 6 miles to the airport would be difficult for Scammon Bay residents since many of them do not own motor vehicles. They will be traveling to and from the airport via the ATV, snow machine, and on foot. This alternative is also expected to have the highest risk to aviation safety because the cross winds and weather on top of the ridgeline is expected to be very poor. Landowners and the local community do not support this Alternative 4 based on the public comments and the resolution, which may lead to resistance for DOT&PF to study and acquire land to construct this alternative.

5 RECOMMENDATIONS

DOT&PF will pursue FAA funding for a Phase II reconnaissance study to conduct in-depth analysis for Alternatives 1 (No Action), 2 (Raise & Shift), and 4 (Castle Hill). DOT&PF will evaluate the three alternatives in anticipation of future environmental analysis for an airport improvement or relocation project, consistent with NEPA. This study and subsequent phases are federally funded and required to comply with NEPA, which requires the evaluation of a reasonable range of alternatives when assessing potential impacts of a proposed project, meaning they must consider multiple options beyond the preferred alternative, including a "no action" alternative, to ensure a thorough analysis of potential environmental effects.

Under the Phase II study, the three alternatives will undergo a more in-depth evaluation that may include geotechnical conditions, wind conditions, material sources, coastal storm/flooding/erosion, and environmental impacts, including cultural resources, and other issues that may be required to ensure compliance with FAA standards. A life cycle cost analysis will be developed for each alternative to determine economic feasibility and ability to meet federal grant assurances. Constructability analysis may include phasing, closures, material transportation, material stockpiling, NAVAIDs, floodplain impacts, and culvert and drainage analysis to better determine each alternative location's suitability for airport construction. Procuring aerial and/or LIDAR imaging may be beneficial for the selection of a preferred alternative, particularly for the analysis of potential access roads. Further Right of Way analysis and impacts to community transportation, housing and potential impacts on neighboring landowners will be evaluated. Further utility analysis such as electricity availability, fueling, and wastewater treatment for airport improvements will also be conducted. Most importantly, there will be increased public involvement and stakeholder engagement to allow for more community guidance for the final selection of an alternative.

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